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Second Report of the Royal
Commissioners on
Technical Instruction

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6816

SECOND REPORT
OF THE
ROYAL COMMISSIONERS
ON
TECHNICAL INSTRUCTION.

Vol. IV.

EVIDENCE, &c. RELATING TO IRELAND.

Presented to both Houses of Parliament by Command of Her Majesty.



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DIGEST
OF
MINUTES of EVIDENCE in Vol. IV.

Evidence taken at Dublin.

DAWSON, MR. CHARLES, M.P. Pages 1 to 5.

Means of acquiring accurate knowledge by operatives are exceptionally deficient in Ireland. Recommends compulsory primary education, including elementary technical instruction by certificated teachers. The voluntary system with State assistance is inapplicable to Ireland; the State should initiate. Drawing has been taught in some schools, but without practical effect on trades. New industries requiring little machinery or capital might be introduced for young people, e.g., wood carving. Messrs. Supple introduced glove making at makers' homes in Dublin, but gave it up, as the gloves when returned were generally soiled. Gloves are made abroad at artisans' homes, their families having learnt careful and cleanly working at school. Recommends that actual home industries (not only drawing, &c.) should be taught by the State as part of the school curriculum, but not so as to conflict with existing trades, 4563-6. There would be no difficulty in obtaining teachers for carpentry, tailoring, &c. but there would be for new trades, e.g., wood carving. Thinks there would be difficulty in finding men who could teach the principles of wood and iron work, as the present system of apprenticeship in large houses does not produce them. Whatever the Commission think necessary for England might well be applied to Ireland, subject to such increased monetary assistance as the exceptional circumstances of the latter might require. Refers to the secretary of the Bakers' society, who will give information as to the needs of that trade, 4567-71.

MULLIGAN, MR. JOHN, and WEBB, MR. ALFRED. Pages 6 to 17.

(*Mr. Mulligan.*) Both are members of Dublin Town Council, and joint authors of a report from that body, setting forth the absence and need of technical education in primary schools, 4572-6. Boys and girls look down upon manual labour. The wages earned during training are not sufficient to attract them, while the time occupied places manufacturers at a disadvantage in competition. Technical education should be given in primary schools. Believes parents would willingly keep their children at school longer for it. As secretary of an orphanage committee has had difficulty in obtaining employment for boys in factories, some technical knowledge being required. Lately has taught them drawing, reducing plans, &c., and many get good situations, 4577-84. In schools of 150 or 200, boys should be taught drawing, cutting patterns, distinguishing colours, &c., girls sewing, dressmaking, &c., 4585. Girls are taught sewing in Dublin schools, and some of the larger schools elsewhere, but not in country schools, 4586-8. It would be desirable, if practicable, to teach use of tools in primary schools, 4589-91. Doubts if in towns of less than 7,000 inhabitants skilled workmen could be found to teach. Drawing could be taught, 4592-7. (*Mr. James Winstanley.*) At Ennis, a town of 3,000 or 4,000 inhabitants, stone for a new bank had to be brought 60 miles, as there

MULLIGAN, Mr. John, and WEBB, Mr. Alfred—*cont.*

was no one there to dress it; labourers came about the same distance. Such instruction would be very desirable if practicable, 4587-801. (*Mr. Mulligan.*) The absence of manufactories, &c. in small towns makes it difficult to teach apprentices, and more profitable to employ, when required, workmen from large towns. If boys were taught trades it would enable them to get employment, not in their native towns, but elsewhere. Labourers come to Dublin from all parts of Ireland; cannot speak as to their relative capacity, 4602-6. In convent and some other schools girls are taught, but insufficiently, as nursery governesses. Suggests prizes for cookery, &c., 4607. Occasionally ladies give lectures for adults on cookery, but they are not practical. Suggests that girls be trained to teach cookery in schools, 4608-10. Evening schools, and especially science classes, are very desirable. A course of instruction by lecture and practice was started at the College of Science with success, but interest flagged and practical instruction was discontinued, 4611-3. There is a literary class and drawing classes in Marlboro' Street, the latter not of wide application, 4614. (*Mr. Webb.*) Agrees generally with Mr. Mulligan. Is anxious to improve the teaching in remote schools, 4615. Drawing should be taught in nearly all schools, and the general teaching should be more thorough. More attention should be given to attendance. Approves of Kindergarten system. Sees no difficulty in making education compulsory if the system were arranged in accordance with the wishes of the people, especially as to religious instruction, 4616-26. (*Mr. Mulligan.*) Precedent to compulsion education must be denominational. The population of a district may not be large enough to support two efficient schools, Protestant and Catholic. In these cases schools for the minority should be established by extra Government assistance, or, if the minority is very small, special safeguards—inspection, &c.—should be provided. No change in the general outlines of the present system is needed. Liberty should be given to the Christian Brothers' schools as to religious emblems, prayers, &c. The schools of Religious Orders should be made part of the national system. Nuns' schools are inspected, if part of the national system, and are under restrictions as to religious emblems, 4627-41. (*Mr. Webb.*) Schools receiving Government grants are required to obscure religious emblems during the time of secular instruction. This should not be. Compulsion would be much aided if schools of Religious Orders were recognized, and allowed freedom as to their religious methods, the grant being given on results of secular instruction. Free instruction should be provided for very poor children, 4642-7. (*Mr. Mulligan.*) Total abolition of fees, though not essential, is desirable. At present poor children must be excused, 4648-52. Instruction in manual work might advantageously be given in higher elementary schools, to which children should be sent as a reward for efficiency after two or three years instruction in primary schools. Payment by results of examination leads to neglect of the more useful, but less profitable, subjects, and to cram; recommends constant inspection, &c. Suggests that the model schools, which have generally failed because they were purely secular, be converted into denominational elementary technical schools, teaching science, drawing, use of tools, &c. adapted to local needs, 4653-61. Government should support the schools, and the districts from which the children come should provide their board and lodging, which they would do voluntarily by scholarships, &c. Only promising children should be admitted, who should enter at 12 or 13, 4662-3. These schools would at first be sufficient. It is not desirable that the intermediate schools should become such, 4669-70. If grant were given for it, the Religious Orders would, either by themselves or assistants, give rudimentary trade instruction in their schools, 4671-2. The inspection he suggests would cost perhaps twice as much as the present system, but increased efficiency would repay it. If payment by results be retained increased inspection would still be advantageous, 4673-4. (*Mr. Webb.*) Concurs, 4675. (*Mr. Mulligan.*) The science and art classes are not so numerous as they should be in Dublin, partly owing to apathy of the people, partly to want of arrangement by the professors, 4676-7.

MULLIGAN, Mr. John, and WEBB, Mr. Alfred—*cont.*

Extensive manufactories in Belfast lead more persons to attend science and art schools there than in Dublin. The advantages of the Science College should be advertised, 4678-85. 15 years ago the number of persons attending science classes was large, then it fell off, and probably there is now a revival. (*Mr. Webb.*) The large attendance at Belfast science classes is partly due to manufactories there, but largely to accordance of the people with the Government. In Dublin, although the Science College professors have done their best, young men think that by attending they would do something Protestant and not national. These institutions should be made more national, 4686-7. Suggests that science instruction be under some representative Irish board. (*Mr. Mulligan.*) If the secondary system were carried out foremen, &c. would go on to the higher college. Suggests that applied science be added to the curriculum of the 3 Queen's Colleges. There should be more schools for teaching butter making. Does not suggest that it be taught in primary schools. There is no education in net making and fish uring. (*Mr. Webb and Mr. Mulligan.*) Do not blame the professors at Cork in any way, 4688-90. (*Mr. Mulligan.*) Girls should be taught designing. They should be allowed to attend the College of Science and to take degrees in science. Cookery is not taught there, except by occasional lectures. Knows of no intermediate girls' technical school in Ireland that would serve as a model, 4692-4.

WINSTANLEY, MR. JAMES. Pages 18 to 20.

Is a wholesale boot and shoe manufacturer, 4695. Boys of 12 to 14 should be taught in elementary schools the names and use of the tools and something of the materials of their future trades. Trades associations might usefully provide such instruction, but have never attempted to do so. It would be difficult, owing to the large number of trades. Teaching the use of tools generally, and training the hand, would answer the purpose, 4696-709. Boys from Dublin schools a little above the national schools have a distaste for trades, and prefer clerkships, &c. Their education is too purely literary. Workshop instruction should be given in both denominational and national schools, 4710-4. Boys and girls should, in some way, be taught the elements of several trades; carpentry is often most useful, 4715-6. Apprentices in his trade should attend evening technical classes, 4717. Evening drawing instruction would be useful to them. They might learn drawing under the Science and Art Department, but do not from apathy, 4718-22. Science classes might become popular if schoolmasters and employers encouraged lads to attend them, 4723-4. Dublin artisans were prejudiced against the instruction and work in industrial schools, but the feeling is dying out, 4725-6. Girls should be taught in much the same manner, especially needlework. This is now taught in convent schools, 4727-8. If science classes were established in parts where workpeople live they would be better attended. At present there is a feeling that they are intended for a higher class, 4729-30.

DAWSON, MR. CHARLES, M.P., re-examined. Page 20.

Recommends that, in any reorganization of the national school system, functions similar to those of English school boards be conferred on municipal corporations. Is aware that science classes may be started without Government initiative, 4731-4.

SHACKLETON, MR. ABRAHAM, and SEXTON, MR. ROBERT. Pages 21 to 23.

(*Mr. Shackleton.*) Both are guardians of S. Dublin Union, and have experience of the schools attached to the workhouse, 4735. Technical instruction should be given in these schools. Only a small amount is

SHACKLETON, Mr. Abraham, and SEXTON, Mr. Robert—*cont.*

given now, owing to over-crowding from increase of pauperism relatively to population. New schools are about to be built. Gives numbers, &c. of boys at various trades. Some of the boys follow in after life certain trades there taught to them, and do well (*gives instances*), but in other trades the instruction is not sufficiently systematic or technical to be of much use. The permanent inmates (about 50) look upon the work as a task, and take no interest in it, and the remainder (about 70) frequently leave the school for a time and then return, 4736-44. The difficulties in the way of improved instruction are (1) want of space, (2) the necessity of employing paupers as teachers, (*Mr. Sexton*) who are unpaid, and therefore indifferent, 4745. In the new premises a carpenter's shop may be provided, but training as weavers or tailors could only be given by transferring the boys to some outside school, 4746. Does not know of elementary schools to which they could be sent if the workhouse schools were closed. (*Mr. Shackleton*.) Thinks there are such schools, but prefers to teach them in workhouse schools. If there were a large Christian Brothers' school in the neighbourhood, giving technical instruction they might be sent there. (*Mr. Sexton*.) It would be very advantageous, as removing them from workhouse influences. They now get domesticated at the workhouse, and many come back after leaving it. (*Mr. Shackleton*.) It is desirable that technical instruction (of which boarded-out children would get the advantage) should be introduced into elementary schools generally, and that workhouse children should be sent to such schools, 4747-52.

McKENNA, Rev. J. Pages 23 to 27.

The neighbourhood of his parish (Belleek) is replete with mineral wealth—best limestone and lead and iron ore—still the people lack employment. Attempts have been made to work the lead and iron, but have failed, though not from want of mineral lode. A company is about to begin work again, 4753-7. There is also felspar (the existence of which probably led to the establishment of the potteries), peat, and coal, 4758-9. Technical instruction is needed as a means towards establishing manufactures, 4760. Factories have been rather discouraged in Ireland. Has heard that a factory, completed 20 years since, was bought up and kept idle that it might not compete with England, and that a similar course was attempted with the Belleek pottery. The peasantry think that the English are jealous of Irish manufactures, 4761-8. The Belleek potteries are the chief industry of Ireland, artistically and commercially, 4769-70. Establishment of factories, &c. would do much for Ireland. At Belleek there is a large, peaceable, industrious, and intelligent population suffering from want of employment, with abundant opportunities for factories round them. Many have gone to America, 4771-3. Has under his management 6 national schools. Only literary instruction is given in them. Strongly recommends the teaching of different trades suitable to the district, 4774-82. Belleek has sufficient skilled workmen to provide instruction for the district. In more remote districts local workmen could not teach, but if sufficient wages were given teachers would come, 4783-8. Work-people for the potteries are trained by apprenticeship. Drawing is not taught in the schools. Its introduction is desirable. The Board supplies materials. Introduced it, but from lack of pupils was obliged to discontinue it. The Board would pay for teaching drawing, but teachers rarely care or are able to undertake it. Recommends that they be paid to teach it to both boys and girls. Has science in connection with the Science and Art Department, but no art teaching, 4787-98. In his last parish, science teaching in national schools was introduced, but abandoned in his own school, as it occupied too much of the teachers' time and attention. There is no science class at Belleek school, 4797-800. The agricultural classes are of no practical use, 4801. Would like to see children taught trades, e.g., pottery painting, or the making of book markers such as are made in Dublin by girls taught in convents, 4802-4.

BLOOMFIELD, MR. FITZMAURICE. Pages 27 to 28.

Payment by results leads, in national schools, to neglect of useful but unpaid-for subjects, and to the cramming of a few clever boys. More recognition should be paid to the general condition of the schools, and certain useful subjects paid for on results, 4805-6. Suggests instruction in agriculture, wicker work, &c. Sewing, &c. for girls is entirely neglected, the inspector being a male, and a bad judge of the work. There are no ladies in the parish to assist. Belleek pottery has improved the condition of the people physically, morally, and intellectually, 4807-10.

CONNOLLY, MR. THOMAS. Pages 28 to 33.

Is emigration agent for Government of Canada, 4811. Is a stonemason, and self-taught, 4812-5. Irish artisans have more natural genius than those of any other country, but lack aids to learning. The Science and Art Department does not reach the people, 4816-8. Drawing is as essential to workmen as reading or writing. It should be taught to all children in primary schools, first freehand, then (to those having aptitude) linear, and those who wish it might go on to art schools, 4819-22. Use of tools should not be taught. Such teaching would prejudicially affect the boys' future skill, and would not correct the desire to become clerks, &c., 4823-5. Children should be taught literary subjects and drawing in schools, and afterwards learn their trades in workshops and the principles underlying them in science and art classes. These classes do not reach the people at a sufficiently early age. Children should begin to attend them at 12. Does not know how far the rules of the Department meet the need of such early instruction, but it exists throughout the United Kingdom, 4826-30. In Ireland the facilities offered by the Department are not taken advantage of, because the people, not having been taught drawing in primary schools, know nothing of art or its uses. Suggests the establishment of reading rooms, 4840-4. There are in Dublin a mechanics' institute (which does not answer the purpose) and a few clubs, &c., but no free library, 4845-50. In the United States and Toronto, free libraries are established and supported by municipalities; would like to see the same thing in Ireland, but everything done there is for the benefit of people able to take care of themselves, and does not begin low enough. More public spirit is wanted. Agriculture cannot sustain the population; manufactures are needed, and their establishment would be greatly aided by reading rooms. A museum is needed, showing the products of the country and a collection of labour-saving machinery. There are many industries that might be made profitable (e.g., marble quarrying), and plenty of capital in the country, but public spirit is wanting, 4851-66. Cheap railways are required. The absence of the aristocracy has been a great drawback. The prospects of Ireland are now better, 4867-8. Technical education in the United States and Canada is less satisfactory than in the United Kingdom. Trades might be advantageously taught in reformatories, &c., but in the main can only be properly learnt in workshops, 4869-70.

O'CALLAGHAN, MR. PETER VINCENT. Pages 34 to 39.

Introduced the manufacture of straw envelopes for bottles, &c. 50,000l. worth were formerly imported annually from France. Has introduced simple apparatus for their manufacture; the French make them by hand only, 4871-5. Produces about 5,000l. worth annually at 20s. to 25s. per thousand, 4876-9. They are not made in England or Scotland. Cannot manufacture more largely, or for export, for want of capital. People will not make them at home for fear of fire, and he had not capital to take a large store. Capitalists have no confidence in the manufacture; it has not been put before them as a limited company, &c., 4880-6. In France they are made for export in convict establishments, &c. The French have bought straw in Ireland. Rye straw is the best; there is not much grown in Ireland, but plenty of barley straw adapted for the purpose and otherwise useless, 4887-92. Has invented machines for the manufacture, but as

O'CALLAGHAN, Mr. Peter Vincent—*cont.*

it must be largely worked to pay the expenses of a company, thought it best to spread it over the country and have it taught in schools before attempting to get up one. Gives an instance of its introduction, 4893-5. A skilful hand can make 8 dozen per hour, worth 3*d.* to 4*d.* per dozen, Materials cost about 7*s.* per thousand. Workers can earn 2*d.* per hour, 4896-900. At Blackrock, co. Dublin, the makers are paid 1*d.* per dozen and earn from 8*d.* to 1*s.* a day. At Skerries, where the selling price minus cost of straw is divided among them, they earn about 7*s.* per week, 4901-9. Where the manufacture has failed it has been from waste and the mixing of badly made articles with good. Undertakes the sale himself, and now refuses to sell unless all are good. At some places the Irish are now making them perfectly, and better than the French, 4910-7. The trade and demand is increasing. Has not introduced them into England from insufficient production, 4918-20. The rates of carriage (*mentioned*) are very favourable, but has to compete with foreign convict labour, 4921-2. The work should be taught in schools. The Board rules do not allow it either in the day or the evening, otherwise persons would be willing to teach it in suitable districts. Has been paid 1*l.* per day and travelling expenses for teaching it (which can be done in 2 days), and in some cases travelling expenses only, 4923-7. Will put in unsolicited testimonials as to quality of envelopes. Gives names of certain firms in Ireland using them, 4928-9. Small rewards for the best work, especially in schools, would stimulate the industry, 4930. Suggests that local authorities should, from rates, pay for teaching of suitable local industries, *e.g.*, marble quarrying, preparation of peat for litter, &c. Peat from Kildare, &c. is used successfully in Dublin stables. Sketches its preparation. As to cost of carriage, many vessels leave Dublin in ballast, 4931-41. For making straw envelopes prefers home work; the factory system, however, leads to better and cheaper production. Describes a mixed system. One set of the 3 machines used costs 18*s.*, 4942-7.

BOJRKE, MR. RICHARD. Pages 39 to 45.

Is Local Government Board inspector, and landowner in Limerick and Tipperary, 4948-9. Industrial education might usefully be given in national and workhouse schools by private effort, with Government inspection, and perhaps payment by results. Government recognition would give local committees, &c. *locus standi*, and so remove difficulties. Sanction of National Board and patron should be required. The sympathies of patrons (mostly clergymen) should be enlisted, and, as a rule, if the committees were representative religiously and socially, their sanction would be given. Would grant the use of his own schools, 4950-61. The subjects taught should be chosen locally from a published catalogue. Suggests certain trades. Agriculture would be the chief thing, to teach which small farms must be attached to schools, 4962-4. Farms, varying in size, are attached to almost all workhouses, sometimes let for meadowing, but seldom for agriculture, 4965-8. The workhouse farms in 10 of the 14 unions in Limerick district are used for agricultural instruction, 4969-70. Two acres would be sufficient for national schools. There would be difficulty in obtaining teachers for some trades, but not for agriculture, 4971-3. The agricultural instruction at Glanevin has been profitable. Gives instances, 4974-80. Thinks there would be no difficulty in introducing the French system of teaching use of tools after school hours. If it were conducted by local committees a central committee in Dublin should give instruction to special teachers, whom it should pay and send out as required, 4981-7. Volunteers could in many places be found to teach domestic industries. Gives instances. They would be aided by the use of a public room. There might be difficulty in obtaining this in some districts, in his own none, as he has a large vacant house, but he would be much aided by inspection, payment by results, and some public recognition, 4988-93. Many of the national school buildings are fit for the purpose. They are improving throughout Ireland, 4994. Work-

BOURKE, Mr. Richard—*cont.*

house children are not sent to national schools, as the workhouse schools have more competent masters, but children boarded-out (a large and increasing proportion) are, 4995-7. Believes the Religious Teaching Orders would qualify themselves to teach manual labour, 4998. No lace-making is done in workhouse schools, but generally only domestic work, to avoid interference with outside labour, 5000. Country national schools, even in remote districts, show great improvement. Inspection under the National Board is very careful and general, and payment by results has stimulated masters, 5001-9. In remote districts there would be difficulty in obtaining teachers of domestic industries, 5009a-10. Mathematical and freehand drawing are not taught to any extent in national schools, 5011-2. If domestic industries were taught, the teachers must know something of design, and should communicate it to the children, 5013. Time might, with advantage to the literary work, be devoted to drawing in the ordinary national school hours. Voluntary teachers might be found, or, failing local assistance, the central society (not yet organized) might send down teachers, absentees proprietors subscribing to the expense. The association for obtaining employment for women would be a suitable organisation for taking up industrial teaching, 5014-8.

PERRY, Mr. JAMES. Pages 45 to 52.

His education and early career, 5019-23. Good primary education is most important. The salaries of teachers (about 50l. a year altogether) are not sufficiently high to retain good men. They should be appointed by competitive examination at higher salaries. The school houses should be simple, but of good workmanship. Where local workmen were not able to build them well, would bring tradesmen from a distance, 5024-34. Does not advocate technical instruction or use of tools as part of ordinary primary school course. Considers it very desirable to teach it after school hours to those desiring it, but doubts whether teachers could be found, 5035-8. This refers to rural schools. In large towns there should be technical schools supported and managed by Government. Being expensive they could not be numerous, and should only be established where evident need for them existed. They should have special reference to existing trades. The localities of particular trades are generally chosen for physical reasons, e.g., the linen industry became located in Ulster because of the soft water there, 5039-47. Government should determine the position of the schools with reference to existing industries. Names suitable centres, 5048-50. By technical schools means schools (not necessarily day schools) where apprentices could learn the science underlying their trades. They would be simply an advance on science and art schools, in which payment is by results and the teachers lack technical education, 5051-4. Would teach in them everything suited to the locality, e.g., would teach the science of weaving, not the practice, machine construction, &c., 5055-7. Would teach the chemistry of bleaching in a practical manner. Elementary chemistry should precede such special instruction, and theoretical mechanics should precede machine construction, &c., 5058-65. With certain exceptions, farming is not intelligently carried out in Ireland, the land being devoted to grazing only. Traces origin, &c. of present land system, 5066-9. Suggests establishment of model farms, 5070-3. In towns apprentices should be bound by indentures to attend the proposed technical schools, and masters to give them time for the purpose. Apprenticeship should be revived. Contemplates action by trades unions, but believes there would be some jealousy of technically educated men at present, 5074-6. Technical art education would be of great value to painters, 5077-8. Plumbers, both journeymen and masters, should know something of sanitary science and more than they usually do of hydraulics. Technical education should be provided by the State, and every man should have the same chance. Would, as far as possible, limit the instruction to principles, except in localities having special industries, 5079-83. The Royal University will not give a science degree to a man who has not graduated

PERRY, Mr. James—*cont.*

in arts, including Latin and Greek. There is also an age limit. Both of these restrictions should be removed, 5084-8. There is not much industry, fishing or otherwise, in county Galway. Recommends evening technical instruction, and the establishment in Galway of a higher technical school with practical teachers, 5089-90.

DAVITT, MR. MICHAEL. Pages 52 to 64.

Has acquired knowledge of Irish educational system, &c. by residence, inquiries, &c., 5091-2. Better primary education is required. The books used in primary schools are antiquated and unpractical, and the teaching backward. The supply of books should be thrown open to competition, and teachers' salaries (*mentioned*) raised. Control of schools by patrons is mischievous; they should be under elective school boards. Inspectors should be shifted more frequently. Employment of untrained monitors is another evil; all teachers should be trained for the work, 5093-9. This need not exclude the Religious Orders, who could be trained in their own colleges. Would insist upon proof of actual training as well as examination before granting certificates of capacity as teachers. The instruction given by the Christian Brothers is far superior to that in national schools. Believes they would qualify themselves for certificates, if they were paid by the State, and if the examination were in secular subjects only. If trades were taught in primary schools there would be fewer criminals, 5100-7. Recommends compulsory attendance at school. Provision would have to be made that the poorer tenant farmers, who require their sons' assistance at certain times, should not suffer; and Government should afford assistance in food and clothing for children in the poorest districts. Boards of guardians (reflecting the poverty of the country) have only to a very small extent supplemented teachers' salaries. This shows the need of further Government assistance, 5108-13. Agricultural progress is much retarded by general ignorance among the peasantry, while the absence of technical education places emigrants at a disadvantage. Recommends the teaching of general history in primary schools, and the encouragement of mechanics' institutes, which have been of immense value to English workmen. Dublin Mechanics' Institute is languishing from lack of external support; in other cities, &c. they are not generally attended by artizans, 5114-20. More attractive buildings and provision of libraries would increase the attendance. Knowledge of the conditions upon which building grants are made by the Science and Art Department should be disseminated. Increased Government aid to education would lessen crime. Suggests free science and technological lectures. In Irish-speaking districts these lectures and the instruction in elementary schools should be given in Irish. School teachers are insufficiently acquainted with that language. The model farms, which have failed as such, should be converted into agricultural colleges, 5121-32. Recommends apprenticeship schools, as at La Villette, 5133-4. Such schools should be encouraged by Lancashire manufacturers; competition now is a question of quality and design, *e.g.*, Belfast linen, from its antiquated designs, cannot compete with continental. For boys having no previous technical knowledge, factory training, with evening theoretical instruction in mechanics' institutes and by free lectures, would be better, but all boys should have general technical instruction in primary schools, 5135-6. Technical instruction, including use of tools, should be given as part of the regular curriculum in Irish primary schools, and the general education more directed to industrial pursuits, 5137-42. Teachers of technical subjects could be obtained if sufficient salaries were offered. Results fees have stimulated teaching in intermediate schools, but lead to cramming, 5143-5. American technical instruction is very rudimentary, but great industrial progress has been made there, 5146-8. The backward state of Western Ireland is due to poverty. The people are as intelligent as those of the East, and under similar circumstances in America become as good mechanics, but all Irishmen are at a disadvantage there as compared with the better educated Americans, 5149-57.

DAVITT, Mr. Michael—*cont.*

Each boy should be taught at school the elementary principles of his future trade, the instruction being first general, then specific. The books used in national schools are calculated to produce a dreamy rather than a practical state of mind. Good literary instruction is valuable as a preparation for scientific study. Instruction for children should be simple, but fables, &c. in national school books are useless, and even harmful, 5158-65. By assistance of Ladies Land League, enabled Miss Yeates to establish a cottage industry (needlework, &c.) at Carraroe with some success. Not speaking Irish she had some difficulty. The Bishop of Clonfert proposes to establish a similar industry at Loughrea, 5166-7. Suggests other home industries that might be introduced. A central association is needed to help the movement, 5168-70. The work done under Miss Yeates is sold in England, where it has to compete with factory work; it pays the girls, however, to do it, as they would otherwise be doing nothing, 5171-2. The teaching of plain sewing in national schools would assist such a movement; girls should be taught occupations in primary schools, 5173. Recommends more attractive buildings for, and provision of libraries at mechanics' institutes, 5174. The wealthy classes are antagonistic to the working classes, and the tradesmen poor, hence voluntary aid cannot be much depended on, but something might be got from many parties for the extension of mechanics' institutes if the Treasury would assist. There is a national objection to S. Kensington control of Irish educational matters, 5175-81. The character of Irish female education is determined by the wishes of parents, who desire accomplishments rather than practical usefulness. Recommends the teaching of domestic and lighter technical occupations, sanitation, and hygiene, 5181a.

O'REILLY, PROFESSOR JOSEPH PATRICK, C.E., M.R.I.A. Pages 65 to 66.

Has been secretary of Royal College of Science for 8 and professor of mining and mineralogy for 16 years, 5182-6. Numbers, nationality, &c. of day students there, 5187-99. Many of the Irish students have received imperfect preparatory education, 5200-1. In the evening classes, strictly scientific instruction is given to from 60 to 100 students (some artisans) in chemistry, physics, &c. Cannot say whether they have laboratory instruction, 5202-3. All associate students take the same subjects in the first year, then differentiate. There is no entrance examination. Preliminary instruction is given in mathematics to those requiring it. Previous knowledge of other subjects is not insisted on. Believes the manufactures class is unique, 5209-15.

HARTLEY, PROFESSOR W. N., F.C.S., F.R.S.E. Pages 67 to 68.

Course of instruction, number of students, &c. in manufacturing class at Royal College of Science, 5216-20. All associate and some other students pass an examination in theoretical chemistry, only his class in technical chemistry, 5231. A reduction of the course to 2 years would increase the numbers attending, at the expense of efficiency, 5232-3. No other institution gives similar instruction. The small number of students (3 or 4) is due to the fact that the training given in schools does not attract attention to science. Engineering instruction is given in Queen's Colleges, but the number receiving it at Trinity College is very small. Cannot say as to Belfast, 5234-7.

BARRETT, PROFESSOR W. F., F.R.S.E. Pages 68 to 76.

The number of day students at the Royal College of Science is small, but of evening students (130) satisfactory, considering the recent great excitement. (*Prof. O'Reilly.*) There is a strong prejudice against trade in

BARRETT, Professor W. F., F.R.S.E.—*cont.*

Ireland, from which, and from the competition of Trinity and Queen's Colleges, Dublin Science College has suffered. (*Prof. Barrett.*) Anything connected with trade is considered degrading, hence the large number of barristers, clerks, &c. (*Prof. O'Reilly.*) The College is an extension of a museum of Irish industry. It is in advance of other institutions in chemical apparatus, &c., and is therefore, although copied, regarded with jealousy and decried, 5228-30. (*Prof. Barrett.*) The evening classes do not work with S. Kensington. . . Sketches their history, subjects, attendance, &c. They have had beneficial effect on the subsequent careers of students. Laboratory instruction in connection with them is desirable, but with the present staff and apparatus impracticable, 5231-3. The classes are purely voluntary, undertaken by about half the professors. No subvention is received for them, and under the Science and Art Department rules the professors are unable to receive payment on results, 5238-45. (*Prof. Hartley.*) Science teaching is not sufficiently carried out in Dublin. The professors of the College are not allowed to receive payment on results, but have established an evening class (*Prof. Barrett.*) in their individual capacity. Some former evening-class students now teach Department science classes, 5246-9. Science teaching in Dublin has somewhat fallen back lately. Gives comparative statistics for England, Scotland, and Ireland. Physics is the most popular subject in Ireland, then agriculture, 5250-2. Geometrical drawing is not taught in the evening classes. (*Prof. O'Reilly.*) There is an easily remediable defect of light, 5253-5. (*Prof. Hartley.*) There is a demand for science teachers, some of whom attend the College (*gives instances*), but they prefer to go to London. There is no vacation course at Dublin for teachers, 5256-7. (*Prof. Barrett.*) Such a course would be advantageous, and would popularise the institution, 5258-60. Political prejudice may to a slight extent affect the attendance at the College, (*Prof. Hartley*) not at the evening classes. (*Prof. O'Reilly.*) Being under Government does prejudice the College. (*Prof. Barrett.*) The points against it are (1) insufficient primary education, (2) poverty of the country, (3) it is insufficiently known. Irish science and art classes earn higher payments on results per head than English or Scotch, 5261-3. (*Prof. O'Reilly.*) The evening class fees are only 6s. or 7s. per course. They are no obstacle to attendance, but the reverse. (*Prof. Barrett.*) When fees were lower attendance was larger. They are fixed by and divided among the professors. (*Prof. Hartley.*) The lower the fees the smaller the attendance, 5264-6. The evening classes, except those assisted by the Drapers' Company, are worked at a loss voluntarily by the staff. An increased grant from that Company has been applied for to enable increased instruction in mathematics and practical instruction in chemistry and physics to be given, 5267-9. (*Prof. O'Reilly.*) A few students in metallurgy and chemistry attend the City Guilds technological examinations, 5270-1. (*Prof. Hartley.*) The payments on results that could be obtained would be insufficient to maintain evening classes in applied chemistry, &c., 5273-4. There is a course of applied chemistry at the College, and a diploma is given in manufactures. There are courses in manufactures at 3 other institutions only (*named*), 5275-6. (*Prof. Barrett.*) Day students of physics receive some, but not sufficient, practical instruction, evening students of physics and chemistry none. It is desirable that they should receive some, 5277-80. (*Prof. Hartley.*) The evening classes might be improved by the introduction of mathematics and practical instruction. As many attend as need the instruction and can give time to it. (*Prof. Barrett.*) The attendance might be greatly improved and the country benefited if the classes were made widely known and opened at a small fee, and if scholarships at the day classes could be gained at them, 5281-2. (*Prof. Hartley.*) Science teaching is insufficiently encouraged by the Intermediate Board. The marking for science in its examinations is below that for classics and literature. (*Prof. O'Reilly.*) The intermediate examinations encourage cramming, 5283-91.

SCOTT, Mr. THOMAS B. Pages 77 to 85.

Is a cabinet-maker in Dublin, and a considerable employer of labour, 5292-3. Cabinet-making in Dublin is at a very low ebb owing to the importation of inferior but cheap furniture. A demand is now growing up for a better class of goods, 5294-6. All kinds of goods might, given trained workmen, be advantageously made in Dublin. There are few apprentices, and they, from the small variety of work done in the shops, learn but little. Large houses could make good articles cheaper than buy them, but few will risk the necessary capital, and trained workmen are difficult to get, 5297-8. Proposes to start a shop for boys in which they shall learn the trade. Employs machinery. This does not remove the need for good cabinet-makers, 5299-301. The boys would be employed in the shop during the day, and attend a drawing school under a practical cabinet-maker in the evening. Fairly educated men with a knowledge of drawing are the best workmen. Many workmen are uneducated, their parents not having, in many cases, compelled them to attend school while children, 5302-5. Compulsory attendance would, if practicable, be advantageous, 5306-8. Drawing, beginning with instrumental, should be an important element of school education; even a little knowledge of it gives a workman an advantage over others, 5309-13. Learnt drawing in London and also at schools of Royal Dublin Society connected with S. Kensington. There are other such schools, all within reach of workmen's houses, but the hours are not suitable for apprentices. Gives his apprentices facilities, but they will not attend, 5314-20. Boys should be taught drawing in elementary schools, 5321. In drawing schools special attention should be given to drawing adapted to the trades of students. Believes this is done in the Royal Dublin Society's school, 5322-5. Modelling in clay is taught there, 5326. After elementary drawing, cabinet-makers should be taught styles, 5327-9. If apprentices, &c. used the opportunities of learning drawing, &c. which are available they would be better off, but technical schools, attached to elementary schools, in which the boys should, after school hours, be taught use of tools and the elements of their future trades, would be advantageous and would shorten apprenticeship. Believes boys would enjoy the work, 5330-6. Ordinary schoolmasters could not give the instruction, but even in small towns artisans could be got to teach the trades required, 5337-47. Country lads so trained would readily find employment in Dublin, 5348-51. Can never get sufficient men. There are men, no doubt, but not suited to the trade, 5352. Has employed English and Scotch workmen. Irishmen are as good workmen, have as good natural taste, and are as easily trained, 5353-6. Would be glad to see something in Dublin like Finsbury College, 5357-8. Instruction in cabinet-designing should be given by teachers acquainted with the trade, and having knowledge of drawing. Persons acquainted with the trade could be found who could materially assist drawing teachers, 5359-68. Drawing classes in Dublin are not well attended by cabinet workmen and apprentices. None of his 40 or 50 men attend art classes. Does not see how prizes for cabinet-making would stimulate such attendance, nor how the classes could be made more serviceable to artisans, 5369-75. Drinking habits and improper dwellings are a great drawback. Believes temperance principles are spreading, 5376-8. The apprenticeship system has been practically broken down in England and Ireland. This has been a great evil in many trades. Many lads enter the cabinet trade without apprenticeship, and are kept making one article, and never learn anything. In some shops apprentices are bound for five or six years. Thinks it desirable, and not difficult, to revive apprenticeship, 5379-85. All materials and machinery for cabinet-making have to be imported, which puts Ireland at a disadvantage in competition with England, 5386-9. There is a fair demand for furniture, chiefly of cheaper classes, 5390-2. Wages are about equal to those in large English and Scotch towns, but Irish cabinet-makers work longer hours,—59 hours for 32s. 6d. to 35s. a week, 5393-4. Trades unions control the trade to some extent, 5395. There is plenty of teaching power of a mechanical kind. Mechanics' institutions are a great benefit, 5396-7.

xviii ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

PIM, MR. JONATHAN, and PIM, MR. THOMAS, JUNIOR. Pages 85 to 88.

(*Mr. T. Pim.*) Agricultural produce might be increased and improved by technical education of farmers. The teaching of agriculture to schoolmasters at Glasnevin is a good movement. If they and the priests had such knowledge they might greatly assist the people, 5398-403. (*Mr. J. Pim.*) Technical instruction of his workpeople is hardly possible, from their deficient primary education. (*Mr. T. Pim.*) Some write and read badly, others not at all, and all are ignorant of accounts, 5404-7. (*Mr. J. Pim.*) If compulsory education be introduced, schools should be managed by the people. (*Mr. T. Pim.*) The country is ripe for compulsion if the people's religious views are met. Government should judge by results, 5408-10. (*Mr. J. Pim.*) In thickly peopled districts a large increase of schools would be required; such districts had better for the present be left out, 5411-3. The schools should be denominational (they are practically so now). There should be denominational training colleges for teachers, 5414-7. Would only establish school boards where the accommodation provided is insufficient. (*Mr. T. Pim.*) People will not willingly be taxed for education not in accordance with their views. The Nationalist party wish to introduce manufactures, but their views are crude. Some manufactures are increasing, e.g., woollens, which are largely exported. At the very successful Blarney woollen mills the foremen are nearly all English or Scotch. There was great jealousy of their employment, which is now dying out, 5418-25. The large supply of water and its quality are of importance, but steam power is used in most mills. Many small trades might be extended in Ireland; thus, the manufacture of brushes and wheels is successfully carried on 5426-7. Technical instruction in dyeing would be useful to manufacturers of poplin; the master dyers are imported from England or Scotland. The poplin trade has nearly died out from change of fashion, &c., 5428-32. Many small trades might be developed, but the people are indisposed to steady labour and are unsettled by politics, 5433-4.

KENNEDY, MR. TRISTRAM. Pages 88 to 93.

As agent of an estate in co. Monaghan built nine schools where lace-making was taught, and on leaving the estate continued his connection with the schools. Hands in statement of payments made, results, &c. The head mistress was paid 50*l.* a year, the other mistresses 2*l.*, and 4*l.* from the estate. A lady in the neighbourhood had held a lace-making class for a few years, so teachers were readily obtained. The central school at Carrickmacross is now a mixed school. Cannot say whether lace-making is now carried on in the schools. It is in the neighbourhood, and has considerably increased. Taught plain work first, 5435-48. Applied for the schools in 1847, and they were opened in 1849 as national primary schools, in which, after fair literary knowledge was gained, certain industrial instruction was given. The central school was for girls. The teacher's salary was 50*l.*, 5449-56. The lace-making attracted scholars. Prefers this system to compulsion, 5457-8. Plain needlework was taken in to prepare the children for lace-making. No other industry was taught, 5459-62. The lace-makers, when proficient, worked at home; no factory was established, 5463-5. An art school was established at which all children learning lace-making were taught drawing, 5466-70. Certain prize designs produced were worked (by combining parts of other designs) by children trained there, 5471-6. Does not know whether industrial instruction in the schools was continued after 1855. It was most useful, and was not objected to by parents or the Board. Cannot account for the system not having spread, if it has not. The girls earned but little at first. Gives statistics. The Board cordially co-operated with him. The national system is adapted for training girls, to whom his attention was chiefly directed, 5477-83.

ROCHFORD, MR. THOMAS. Pages 94 to 102.

Is a farmer, charitably interested in the establishment of local industries at Nenagh. Hands in circulars and report of committee on work done

RACEFORD, Mr. Thomas—*cont.*

5486-9. Give statistics. The straw envelope makers can earn 11 to 13 pence per day of eight hours, 5490-5. There is a good field round Nenagh for establishment of a woollen industry. A liberal grant is required towards the foundation of an industrial school and dépôt for home-made goods, under management of some religious body. Lack of employment is the cause of Irish poverty. This leads to insecurity, and drives away the capital necessary to give employment. English capitalists crush out any newly founded Irish industry by selling at a loss. Powerful local machinery, with liberal State aid, can alone cope with the evil. Small industries should be introduced by State aid. Government should issue a report, giving details of all suitable trades. Local committees should then be formed, who should select the industries suited to their districts, and establish technical schools for teaching them and dépôts for selling the produce. Government should make liberal grants and superintend the management. The committees would develop agriculture, woollen trade, &c., 5496. Private enterprise will not suffice to force industries; the State should do it, 5497. Technical schools should be founded by local committees with Government aid. In Nenagh there is great poverty, and in the district a number of small farmers greatly needing help. Gives size of farms, &c., 5498-506. There is much water power. The committee has 120*l.*, and proposes to establish a technical school teaching suitable trades (*mentioned*) and a dépôt for sale of work, under management of some religious body; hopes for Government aid, 5507-8. The envelope making is in abeyance. It takes a week to teach a child the work. Mentions other trades suitable to be taught in a technical school, *e.g.*, basket-making, for which osiers could be grown in the district. Advocates liberal State aid. In the West such industries are depreciated by insufficient railway communication, not in his district, 5509-15. No considerable attempts have been made to introduce basket-making. Agricultural education in primary schools is much needed. The small farmers generally till badly and have no stock, 5516-7. Was educated in Northumberland. Tried the experiment of feeding stock on cultivated crops with marked success. Suggests that, to educate farmers to see the advantages of this system, local societies be formed in connection with the Royal Agricultural Society, who should collect money and offer prizes. They should also, to enable farmers to avail themselves of the borrowing powers given by the Land Act of 1881, assist them in carrying out improvements. This would lead to increased tillage, and therefore increased employment, 5518. Approves of Lord Spencer's system of granting prizes to small farmers for best cultivated farms. Small prize farms would have more effect, as examples, than large, 5519-23. Agricultural instruction in primary schools is necessary. Plots should be attached to schools. Qualified teachers would be required. The teaching of agriculture at Glasevin to primary teachers is a good movement, 5524-9. Some agricultural instruction is given in primary schools, but not sufficient; the national school books are defective in this respect, 5530-1. Children between 12 and 15 should and would willingly receive such instruction, 5532-4. Glasevin is the only agricultural school. The present would be a good time to take the suggested measures. Farmers begin to show anxiety for knowledge. Has, under the auspices of the local society, offered prizes, 5535-8.

MATHERS, Mr. CHARLES. Pages 103 to 105.

Is secretary to Bakers' Association. Desires that the men should be educated in chemistry. Many of the operatives share this desire, 5539-43. Being employed at night they could only receive instruction in the day-time, 5544-6. There are 600 members of the association, all of whom work at night. Many would avail themselves of opportunities of day chemical instruction; no other trade, except printers, work at night, 5547-50. Did not know of the Guilds Institute bread-making examination, 5551-3. Practical bakers could not, from want of chemical knowledge, give the instruction needed. A chemist would be the proper person, 5554-7.

XX ROYAL COMMISSION ON TECHNICAL INSTRUCTION:

MATHERS, Mr. Charles—*cont.*

There are bakers sufficiently intelligent to qualify as teachers. Could not himself afford the time. Would like the Commissioners to try to obtain instruction for such from some practical chemist, but thinks it better that instruction should be given by professional chemists than by workmen teachers, 5558-63. Has not attempted to obtain cheap instruction from any of the professors of chemistry. Given a teacher nothing more would be necessary, 5594-6. Attended with benefit lectures at the Royal Dublin Society, 5567-70. Suggests circulation of pamphlets, &c. to make the science classes generally known. Never saw Science and Art Department programmes, &c. circulated in bakeries, 5571-3. During his apprenticeship as a baker attended lectures, was given by his employer a ticket for the library, then attended the art school, 5574-5. Dublin Mechanics' Institute would be more attractive if better conducted. It is governed by an elected committee of subscribers, 5576-9. Science instruction is given there, which might be improved, 5580-2. Bakers could not attend evening lectures there as they work at night, 5583. The teacher should come to the association, which has adequate accommodation but no laboratory, 5584-7. Apprentices are bound for five years. The association does not teach, 5588-90. Dublin bread is very superior, 5591-2. Some bakers are deficient in elementary education. Calls attention to the impurities in flour, 5593-4. There was, but is not now, a masters' association, 5597.

KAVANAGH, PROFESSOR C. U. Pages 105 to 115.

Was an inspector of schools till 1858, and since professor at the Catholic University, 5598-9. Irish primary school houses built by State aid (vested schools) are in fair, some of those built by the people (non-vested) in deplorable condition. Quotes statistics. Only about one-third of the teachers are trained, and those only for from 3 to 10 months, nearly all, especially of the Roman Catholics, for the shorter period. The present training school is in Marlborough Street, but Roman Catholics, by decree of their bishops, do not attend it. Government now aid denominational training colleges, 5600-7. The training is entirely defective, but will be improved, 5608. Of those not trained in the training schools some few were taught in convent and Christian Brothers' schools, some have been pupils or monitors in schools. They must pass a lower third grade examination by the inspector, 5609-11. Describes the system of classification and promotion of certificated teachers, 5612-3. Untrained men may in many cases be good teachers. The trained teachers are mainly Protestants. Gives proportions and the numbers in various classes, 5614-7. The attendance is put down at 1,066,259, but this is greatly exaggerated by duplication, &c. The average attendance is 469,192. Does not believe there are a million children to go to school, 5618-26. The school age is taken for statistical purposes as 3 to 13. This is inapplicable to Ireland. The actual school age varies in different districts, 5627-30. Gives the proportion, &c. of children reading the different books of the series, 5631-9. The old books, which were much objected to by the people, were cancelled or recast about 18 years ago, and those now used are well graded and well designed to teach children, except that the higher do not contain enough instruction with regard to Ireland, 5640-3. Poetry, &c. cannot be kept out of them. They were revised 18 years ago, not since, nor is anyone appointed to revise them, 5644-9. Advocates free trade in school books, subject to State power of veto, 5650-4. Elementary instruction is unsatisfactory, and therefore little can be done in the way of technical instruction. A comparison of the proportion of children in different grades 10 years ago and now would seem to show slight deterioration, but is unreliable from special causes. Originally only literary instruction was contemplated, but the National Board, acting on advice, formulated a wide scheme of industrial teaching. Quotes from the Board's report for 1837 passages showing what was proposed. The scheme has entirely failed, 5655-60. Under it agriculture was somewhat developed, but scarcely any trade teaching started, 5661. Would retain agricultural instruction on farms of 2 to 5 acres attached to rural schools. Gives

KAVANAGH, Professor—*cont.*

numbers, &c. of model schools, &c., 5663-6. The larger State model schools were abandoned as unsuccessful, 5667-9. Elementary schools with attached gardens, under private patronage, have rather increased, and the prejudice against them has diminished, 5670-2. They are under the National Board, and earn fees on results of examination in agriculture by the inspectors. Numbers presented, &c. Several schools are otherwise connected with S. Kensington. Agriculture is not taught under the Intermediate Board, but certain science and art subjects are, though with small results, 5673-6. The Board has recently done good, *e.g.*, the introduction of science primers, &c. The teaching appliances in intermediate schools have much improved as the result of competition. Nautical schools were provided under the National Board. Only one now exists, 5677-8. Recommends compulsory attendance in Dublin, and perhaps in Belfast and Cork, but not in rural districts, where it could not be enforced, and would render education unpopular. The attendance is better than is supposed, 5679.

BARRETT, PROFESSOR; DICKINSON, THE VERY REVEREND DEAN, D.D. Dean of the Chapel Royal; LA TOUCHE, Miss; and MEYBICK, Miss. Pages 115 to 117.

Call attention to the need of a permanent institution for technical education of women. The Queen's Institute for teaching home and other industries to middle class women failed from mismanagement, *e.g.*, the addition of a literary school, 5680-9. Propose to have an institution, without a literary school, teaching various industries (*mentioned*), 5690-2. Rely largely upon voluntary aid, but some paid teachers would be required. Would work for all classes, but chiefly ladies. Such an institution is needed for women who, unable to attend primary schools from death of parents, &c., are called on to support themselves. Hope some pupils will obtain employment as technical teachers. Would teach simple subjects without aid, but hope for Government or other assistance in certain beneficial but costly subjects, *e.g.*, wood engraving. Do not propose at present to teach cookery [this has since been added to the list of subjects], 5693-705. Propose to restore the Queen's Institute (which was supported by Irish subscriptions) upon a proper basis. Would be grateful for Government help, 5706-8.

MURRAY, Mr. JAMES. Pages 118 to 121.

Represents Irish Home Manufacture Association. Describes its composition, &c., 5709-13. Referring to the tenth recommendation in his statement (App. K.), had in his mind the College of Science and the School of Art in Kildare Street, which have failed because working people thought they were intended for a class above them. Although the fees at those schools are lower, and the Government grants proportionately higher than in any other part of the kingdom, the results are less. Technical schools should be bright and attractive, or workpeople will not attend them, 5714-8. The impression might be removed by those interested in technical education. Unless a large effort be made (instances the annual grant of 5,600*l.* by Lyons municipality) technical schools cannot be usefully established, 5719-23. Will send suggestions as to Dublin Science College, mechanics' institutes, &c. (App. L.). There is great objection in Dublin to S. Kensington. Dublin Mechanics' Institute is altogether different from English mechanics' institutes, and had better be left out of account so far as technical education is concerned, 5724-33. Previous literary education should be required of those entering technical classes, but not previous technical instruction, 5734-7. Recommends a system of branch classes in working class districts, giving primary technical instruction as preparation for and under supervision of a higher central institution, *e.g.*, the Royal College of Science, 5738-43.

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CARROLL, Mr. THOMAS. Pages 122 to 125.

Is Superintendent of Agricultural Department of National Education and of Glasnevin Albert Agricultural Institution, 5744-5. Course of instruction, students, &c. at Glasnevin school, 5746-55. Munster agricultural and dairy school is also under direct management of the Board, with local assistance. Puts in papers employed at last examination there, 5756-8. Course of instruction, fees, &c., 5759-60. Besides these two schools there are 74 national schools (*situations mentioned*) with farms attached, whose teachers receive results fees for agriculture. The instruction, founded on "Practical Farming," by Prof. Baldwin, is given to boys of 10 and upwards. It can be effectively given to children of that age. There are also about 20 schools with gardens attached. Agricultural instruction is now compulsory in all rural schools, 5761-80. The theory of agriculture may be taught effectively in schools with no land attached. Agriculture is one of the subjects upon which national school teachers are examined and classified. There are classes for them at Albert Institution. Course of instruction in these classes, numbers attending, &c., 5781-90. School farms are cultivated at expense of teachers. Employment of pupils on them during school hours is forbidden, and would, if attempted, be resisted by the people. They are in some cases owned by the managers, in none by the National Board, 5791-4. There were formerly about 20 schools like the Albert Agricultural School, 5795-8.

KEENAN, Sir PATRICK, K.C.M.G., C.B. Pages 125 to 142.

The large agricultural model schools were gradually abandoned (1) for financial reasons originating with the Treasury, (2) from lack of pupils, 5798a. They were Government property, some of them held on leases for various terms, 5799-800. Does not recommend their re-establishment until the so-far successful experiment of bringing up national school teachers for agricultural instruction to Cork farm and the Albert Institution (a reversion to the original purpose of that institution), and also the rule rendering agricultural instruction compulsory in higher classes in rural national schools, have had a fair trial, 5801-3. The agricultural instruction in schools is not working quite satisfactorily. Gives statistics. The instruction of teachers at the central institution will tend to improve its efficiency, 5804-5. The teachers are sufficiently educated to profit by the instruction given them. They must pass in agriculture to obtain certificates. (*Mr. Carroll*) Hands in questions set to them at last examination, and gives numbers of marks obtained, &c. (*Sir P. Keenan*) The results fees for agriculture are now higher than those for any other subject, 5806-8. The Board has never attempted to establish day schools of the type of the Albert School, 5809-11. Describes a school-garden experiment at Glasnevin which was stopped by the Treasury, who are opposed to the agricultural system altogether. (*Mr. Carroll*) Such school gardens generally resulted in profit. Recommends day agricultural schools, students lodging in the neighbourhood, 5812-4. Agricultural teaching is compulsory in all rural schools under the Board. The number of schools with farms attached is comparatively small. Recommends increased fees for practical agriculture. There are now 2 sets of fees (1) for proficiency of boys, as tested by practical examination by witness, &c. on the farms (2) for results on the farms, 5815-21. Believes the system has increased practical agricultural knowledge in Ireland. Is at present the only inspector of agricultural schools. Gardens are examined by the literary inspectors, 5822-5. Means to recommend results fees for instruction of girls in primary schools in dairy work, &c. Girls are admitted to Cork Dairy School, 5826-7. The literary inspectors know agriculture, 5828-9. The productive power of Ireland is less than it should be, owing to the backward state of agricultural knowledge. The teaching of agriculture in schools would improve the people's minds and make them more intelligent generally, 5830-3. Lord Spencer's scheme of prizes for small farms might, if judiciously worked, do much good. It has been discontinued. (*Sir P. Keenan*) It was carried on at Lord Spencer's own cost

KENAN, Sir Patrick, K.C.M.G., C.B.—*cont.*

for 5 years only, which expired long ago, 5834-5. (*Mr. Carroll.*) No one else has taken it up, 5837. The Royal Agricultural Society has offered prizes for labourers' cottages, &c., not for best kept farms, nor are they likely to do so. The agricultural societies in Ireland are not so intimately and beneficially connected with the people as in other countries. (*Sir J. Lentaigne.*) Several noblemen give prizes for best managed farms, with good results. (*Mr. Carroll.*) The influence of a resident landlord or agent is even more useful than the prizes, 5838-44. Separate accounts are kept for the farm of Glasnevin. The profits have increased. Gives particulars. It is managed on generally applicable principles. Ensilage has been successfully tried. A large silo is being built, 5845-52. An extended system of home feeding would be very beneficial to Ireland, but, involving large outlay, must be introduced gradually. It is dwelt on in schools and colleges, and recommended in national school text-books, 5853-60. Explains objects of, and experiments in progress at, the experimental station attached to Glasnevin model farm, 5860a. (*Sir P. Kenan.*) Has been connected with the Education Department for 38 years, and is now Resident Commissioner of National Education, 5861-5. Puts in copy of memorandum to Lord Lieutenant on technical instruction. (*See 5942a*), 5866-8. Technical instruction should be part of ordinary school course for all, and especially for working class children; it should begin at a very early age, 5869-73. Hopes in a few years to introduce use of tools into all ordinary schools. All national school girls are now taught needlework, and their proficiency is very creditable; 94·6 per cent. passed in needlework, &c. last year. Useful work is not neglected for fancy work. Schoolmistresses are examined in needlework, cutting out, &c. Schools in which needlework was neglected would receive greatly reduced results fees, or none. The inspectors are competent; they are trained for their work. In certain cases they submit the needlework to a jury of ladies, 5874-83. There is no corresponding technical subject for boys except agriculture, which is limited to the highest 3 classes. Every boy's hands and eyes should be trained, 5884. Inquired into education in Malta, and found that certain occupations were taught in primary schools there, though, from lack of enthusiasm, &c., with little effect. Thinks handiwork instruction should be given in Irish national schools, and 6 or 8 weeks since commenced it tentatively at Marlborough Street School, 5885-8. It would not be practicable nor desirable to teach trades, but only "handiness," 5889. The Board would encourage voluntary teaching of trades, &c. by granting use of schoolrooms, &c. It has done so. Believes payment by results for handiness will be introduced, 5890-1. Something of the same kind may be done in schools of Religious Orders. Fine needlework, &c. is taught with great success in convent schools, 5892. The rule that no religious emblems must be exhibited while secular instruction is given prevents certain Orders, e.g., Christian Brothers, from placing their schools under the Board. It is necessary in order to render national schools available for children of all denominations, 5893-5. Over 300 convent schools receive grants from the Board. The Christian Brothers' schools were connected with the Board until 1836, then separated, to obtain freedom in religious matters and in choice of books and to escape official inspection. This separation militates against the comprehensiveness, not the efficiency, of the national system. Regrets it, 5896-7. Would not personally object to inspection by the Board's inspectors of schools not connected with the Board. Reformatory schools are inspected, but not by the Board's inspectors, 5898-902. Describes organization, duties, &c. of inspecting staff, and means taken to ensure uniformity of standard, &c. There is no rule as to the time an inspector shall remain in one district, 5903-14. The inspectors' reports for 1891 show improved results as compared with previous years. Gives statistics of illiteracy, founded on Census reports for 1841-81, for all Ireland and for certain districts, 5915-20. The number of children in higher classes shows considerable improvement, 5921. Payment by results has proved a great blessing, 5922. A modified system of compulsory attendance might

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KEENAN, Sir Patrick, K.C.M.G., C.B.—*cont.*

advantageously be introduced where sufficient means of education exist. Landlords should be compelled to give sites for schools, 5923-6. Payment by results has considerably improved teachers' salaries. The proposal that guardians should contribute has failed. Of over 180 unions only 22 contribute—about 11,000*l.* to about 1,000 schools, 5927-31. Gives average salaries of different classes of teachers, 5932. The English system of school boards could not be introduced into Ireland, 5933. Books other than those published by the Board are used under the Board's sanction in national schools. Political books would be objected to. No book published for the English schools has been objected to. Sketches contents of the lesson books in use. They are revised as opportunities occur, 5934-42. Trades may be fitly taught in industrial schools, &c., and in exceptional cases in rural schools. Every effort should be made to give children such instruction as will fit them for their future trades, 5942*a*.

Evidence taken at Belfast.

JÄFFE, MR. JOHN. Pages 143 to 144.

Trade, &c. would be benefitted by technical instruction of workmen, foremen, and managers. A committee of the Chamber of Commerce have collected funds for establishing a small technical school, beginning with weaving, dyeing, &c. Would include art instruction. The staple trade of Belfast is not flourishing. Improvements are needed to keep pace with the time. Technical instruction would lead to them, and further promote the recent development of the fancy trade. The School of Art has assisted this development. Technical instruction should be extended to all trades, 5943-6.

MUSGRAVE, MR. JAMES. Pages 144 to 159.

Is Chairman of Executive Committee for establishing a technical school in Belfast, 5947. Technical education leads to improvements in manufactures and the introduction of new branches and processes, *e.g.*, the Bessemer and Siemens processes of iron refining. Some of the best manufacturers are prejudiced against it from fear that it will make their trade secrets known. Many Belfast people do not yet understand the advantages of technical schools, 5948-9. The committee have already received funds for establishing a technical school. Will put in report on the scheme, and estimate of cost. (See 5996*a*.) The school will commence in a small way, teaching the processes of the staple trade, and working with the excellent art school, 5950-3. Chemistry is not much sought after. Knows only 2 manufacturers who have studied it; they lead in their branches of trade. Queen's College will be used to train teachers for the technical school, 5954-5. Hopes to have in the classes sons of masters, managers, and workmen, 5956. The classes for workmen will be held in the evening, as at the art school. They will be taught the practical science applicable to their trades, *e.g.*, for weavers, applied mechanics, weaving, and combinations of threads. Men constantly attending machines are the most likely, given sufficient intelligence and knowledge, to invent valuable improvements in them, 5957-63. Is large owner of property in co. Donegal, and has experience in establishment of home industries there, 5964-5. In his district there are the nuclei of several manufactures, *e.g.*, Donegal frieze and white flannel, 5966-7. Frieze and other manufactures would be developed by improved communications. The district has good natural harbours, 5968-70. Springing,

MUSGRAVE, Mr. James—*cont.*

stocking knitting, and glove making are carried on there, 5971-2. Recommends small technical schools to teach elements of handicrafts. Technical teachers should be paid on results by the National Board. A central school could be established for their training. The people should be taught chemistry practically, not by book only, 5973-3. Selected national school teachers or others might be sent to works for practical instruction in trades. Does not know that this has ever been done. The small funds needed for providing technical education in his neighbourhood must be supplied by the National Board; there are few wealthy residents, 5979-86. Boys under the proposed system should be taught carpentry, working in and properties of iron, and drawing; girls, knitting, needlework, plain and finer, and dressmaking. The instruction should be given in the evening. Use of schools could be obtained, 5987-91. A small pier has just been finished at Pulhurrin, lying at the base of a mountain of white freestone; this freestone might be quarried. The country is mountainous, 5992-3. One large room, fitted with simple appliances, could be adapted for teaching several industries. The people are not too much scattered to avail themselves of the instruction. Approves of travelling teachers, 5994-6. The reports, &c. referred to in 5950 follow here. After pointing out the progress and advantages of trade schools in other countries, and the probable effect of technical instruction upon the linen trade, the Committee (*names given*) recommend the establishment of a weaving school, teaching the theory and practice of weaving in all its branches, with departments attached for bleaching, dyeing, and printing. Art school students could here learn practically to adapt their designs for manufacture and chemical students to apply their knowledge to trade purposes. The co-operation of other educational bodies should be encouraged. The school should be managed by a representative council. The Committee recommend that a beginning be made on a small scale, and give estimates of the cost and proposals for meeting it. They hope that branches may soon be formed for other manufactures, 5996a. Then follows a report by the Secretary of the Committee on the technical schools of England and Scotland, describing the arrangements, cost, instruction, &c. at Huddersfield, Bradford, Keighley, Leeds, and Glasgow, 5996b.

EWART, Mr. WILLIAM QUARTUS. Pages 159 to 168.

We have nothing to learn from the Continent regarding manipulation, &c. of flax. Cannot give statistics of imports and exports of linen yarns for 1881-2. Believes the exports have slightly decreased. A technical school would be advantageous as giving its students better opportunities, than apprentices in large mills have, of seeing the whole of the various processes. There is sometimes an indisposition to give information to apprentices, 5997-8. A technical school would be valuable to future overlookers as well as managers, 5999-6000. Those so trained would not have less control over workpeople than others. Opportunities of study at a technical school might lead to improvements in flax spinning machinery, which has been almost at a standstill, both here and on the continent, for 20 years. Looms have improved. The Irish are behind other countries in weaving, especially of fancy goods. The French are far superior in twilling and design of damasks. Linen must be made more attractive; it is being supplanted, 6001-4. A technical school, where different methods of weaving could be shown, would be of practical service. Science might improve bleaching by diminishing the time required and risk involved, and by utilising refuse. Designing has greatly improved, owing to the influence of art schools. Irish dyeing is very backward. Gives instances. Does not think dyeing should be taught in the technical school at first, 6005-8. Flax-spinning operatives are principally women trained from children in the mill; technical instruction would be of no value to them. It would only be useful to intending managers, overlookers, and flax buyers, 6009-12. Lads training

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EWART, Mr. William Quartus—*cont.*

for these positions should go to the technical school for a year or two before entering the mills. This would shorten apprenticeship, and render them more efficient. Evening attendance of those in the mills would be advantageous. Cannot speak as to the influence of the technical school at Lille, 6013-20. Continental protective tariffs place Irish linen yarns at a disadvantage in continental markets, and lower the prices obtainable in Belfast by enabling continental spinners to sell their surplus there at a loss, recouping themselves by the high rates obtainable in their own countries, 6021-9. The exports of flax productions to the continent have decreased. Gives reasons, 6030-3. The shorter hours of labour in Ireland are a disadvantage. Continental, and especially Belgian, flax spinners work too long, Irish too short, a time. The 56 hours now worked might advantageously be increased to 60. The increase would not injuriously affect the machinery. Before the working hours were reduced the spindles were driven as fast as they could advantageously be, so that the reduction in time represents a proportional reduction in output. The people did not generally desire it, and the masters opposed it. Cannot say how it has affected the wage-earning position of operatives. Irish spinners keep pace, in machinery, with continental, 6034-48. The social condition and comfort of the operatives have improved of late years, perhaps from increased thrift and general low prices, 6040-52. The machinery used is equal to that in continental mills, and the operatives and foremen are more skilful in spinning (though inferior in weaving), but not sufficiently so to compensate for the difference in the time worked (56 and 72 hours respectively) and the lower rate of wages on the continent. Believes the cost of production there is lower than in Ireland, but cannot get accurate information on this point, 6053-64. The trade has declined from decreased exports, but believes it cannot be entirely superseded, 6065-7. The superior artistic and scientific skill of continental masters and managers enables them to produce a greater variety of attractive goods, and so beat the Irish in neutral markets. Technical and art education is required to enable the latter to compete, 6068-74.

BEADE, Mr. E. H. Pages 168 to 170.

Is manager of an establishment embracing all branches of flax industry, 6075. Agrees generally with Mr. Ewart. Technical education will be of no value to operatives, but only to overlookers, intending managers, and owners' sons. The technical school will focus the processes, which cannot be so well studied in large mills. Overlookers are not selected from operatives, the latter being females. The instruction should be coincident with, as well as precedent to, practical work. The tenters, &c., having opportunities there of studying looms, &c., would be more likely to suggest improvements in the machinery, and perhaps the preliminary processes. The trade in plain linen goods having fallen off, fancy goods have been taken up. In this branch foreigners are in advance, and to it the application of science and art is desirable, 6076-9. Is member of committee of proposed technical school. Was member of deputation urging (unsuccessfully) a grant to Queen's College, for applied science teaching. The Irish are most behind continental manufacturers in dyeing and printing linen. The establishment of a dyeing school is of great importance, 6080-5. Overseers are specially trained by apprenticeship, not selected from the operatives, who are principally females, 6086-8.

BOYD, Mr. WILLIAM. Pages 170 to 171.

Is a practical flax manufacturer. Does not see how technical education could be of use to ordinary flax mill operatives. Overlookers are trained as such from boys; for these boys only would the technical school be of advantage. They would and could with advantage attend evening but not day classes. The factories are mostly within a two miles radius. Agrees with Mr. Ewart and Mr. Beade as to the importance of the weaving school. More variety must be introduced, 6089-99. A technical

BOYD, Mr. William—*cont.*

school will stimulate the trade, otherwise its present decline (*instances given*) will go on, 6100-1. There is great want of technical education among mill boys, consequently the trade suffers in competition. They should be taught mechanical drawing and mechanics, 6102-6. There is a good school of art in Belfast, 6107-8.

NELL, MR. THOMAS. Pages 171 to 172.

Is a weaving manager. Hand-loom weaving is dying out, and, as this is the best training for power-loom weavers, a technical school is required where it could be practised by future overlookers, 6109-16.

PORTER, DR. J. L., D.D., LL.D. Pages 172 to 176.

Is President of Queen's College, Belfast, 6117. Instruction in natural philosophy, mechanics, and chemistry is most important for masters and managers of mills, &c., and Queen's College is prepared to give it, but increased accommodation is needed for teaching these subjects and also engineering. Mentions certain advantages that would follow from such instruction, 6118. The college has no evening classes, so purely technical instruction would have to be given elsewhere, but it would train teachers and act as a higher department of the technical school, 6119-21. Has visited certain technical schools in England and Scotland. The facilities there, but not the teaching power, are superior to those at Queen's College, Belfast. The great chemical school at Glasgow revolutionized manufactures, as regards dyeing and chemistry, in west of Scotland and north of England, 6122-4. Queen's College should be extended and laboratory accommodation increased by Government grant, to enable instruction to be given to teachers and to managers of bleaching and dyeing works, &c. Such increased facilities would have a very beneficial effect on manufactures, &c., 6125-30. Facilities for obtaining elementary instruction are as great in Belfast as anywhere in Ireland. Instances the Sullivan school—partly intermediate, with endowments, 6131-2. The national schools give sound useful instruction, but the children should be taught handiness. This is beginning to be taught. More attention should be given to drawing, both freehand and with instruments. Science should be taught both by object lessons and methodically, and, as far as possible, practically. Attendance should be compulsory from 4 or 5 to 15. This would be opposed, but is practicable, 6133-41. Workshop instruction, in connection with elementary schools, should be given to children showing aptitude. It should not be introduced into all schools, and should not commence until fair elementary education has been acquired; the age would vary, 6142-5.

McCANCE, MR. HENRY. Pages 176 to 179.

Is manager of a flax spinning mill. Agrees with the greater part of the evidence he has heard. Flax spinning in Ireland is equal to that in continental countries—in finer qualities is far superior. Continental spinners can compete in lower counts in their own and Irish markets (*given reasons*), and in neutral markets when yarns sell at not less than 4s. per bundle, 6146-60. Lille spinners cannot produce yarn at a lower price than Belfast spinners. The latter can drive their spindles at much higher speed than the former. A great advance has been made in Belfast both in speed and machinery, 6161-3. The machinery used is for the present in a satisfactory position. Primary education is becoming so good that children entering mills will soon be more educated than the overlookers, 6164-5. Recommends that employers encourage overlookers to attend technical classes and give preference for employment or promotion to those who have so attended, 6166. The classes should be held in the evening. Was last year examiner in linen manufacture for the City Guilds Institute. No candidate from Belfast was examined, the men thinking that attendance at a class was a necessary condition. Would like this impression removed. An examination in spinning, and the

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McCANCE, Mr. Henry—*cont.*

certificates obtained, would be an advantage to overlookers. Believes they would generally avail themselves of increased facilities for technical education, 6167-72. The technical knowledge of those examined was very small. Instruction in evening classes would be of benefit to present and intending overlookers, 6173-5. Spinners and weavers should be taught mechanical drawing and chemistry. The science underlying spinning is imperfectly understood, 6176-8. Believes French spinners are better informed scientifically than Irish, but lack energy. Their overlookers and managers are not better educated on the whole, 6179-80.

McBRIDE, Mr. Robt. Pages 179 to 182.

Is well acquainted with linen bleaching, 6181. The process is much the same as it was many years ago. He and his predecessor have tried to introduce improvements, but with little success. Bleaching in Ireland is very unsatisfactory. Few master bleachers know enough chemistry, and they and their managers and foremen lack practical and scientific knowledge. Foremen work by "rule of thumb," but with fair success; with scientific knowledge their success would be greater. Does not think they would attend science classes, but the rising young men would, 6181-7. Doubts if master bleachers would assist young men to attend the technical school; they try to preserve trade secrets, mostly not worth keeping. Bleach-greens being scattered over the country, it would be difficult for young bleachers to attend a technical school at Belfast. They might attend before beginning work, and, having obtained a good basis of chemistry, apply and increase their knowledge afterwards, 6188-92. Irish bleachers have climatic advantages over their foreign rivals. The demand for pure white colour in fine fabrics is increasing, and in these the Irish bleachers compete successfully, but are not in a satisfactory position; in coarser goods continental bleachers nearly equal them, 6193-7. Continental bleachers use more roller-washing than Irish, otherwise their machinery is largely the same, and they are not far ahead in the application of science to bleaching, 6198-200. Irish bleachers can compete successfully, but cannot meet the demands made upon them, 6201. Master bleachers would be willing to allow their apprentices, &c. to attend classes on the subject, and scientific knowledge would be very useful, but distance would be a difficulty. It would be better that lads should be educated before commencing work, 6202-5.

EVERETT, PROFESSOR J. D., D.C.L., Ph.D. Pages 182 to 183.

Is Professor of Natural Philosophy at Queen's College, Belfast, 6206. There is a course of, and, degree for, engineering. With present staff evening classes could not be established, nor much additional technical education given. Agrees with Dr. Porter as to value of College for giving higher instruction and training teachers. A laboratory for practical training is needed. Would require an assistant, 6207-9. Managers in every branch of manufacture should have thorough training in kindred branches to enable them to make improvements, 6210.

LETTIS, PROFESSOR. Pages 183 to 185.

Is Professor of Chemistry in Queen's College. Differs slightly from Dr. Everett; agrees with Dr. Porter. Has taught chemistry of woollen industry at Bristol, and seen effects of science upon that industry. Technical education is much needed in Belfast. Few manufacturers' sons, &c. attend the College. Mentions a case in which study there has led to valuable practical results, 6211-2. Manufacturers are beginning to realise the necessity of using existing facilities for technical education. Not many send their sons to other colleges or to Germany for training, 6213-6. Employers in Belfast do not sufficiently appreciate scientific knowledge, hence the lack of improvement in the linen industry. The course of lectures at the College is perfectly full, but laboratories are

LETTIS, Professor—*cont.*

wanting, 6217. There are no technical chemistry lectures, but would be if there were a demand and facilities for them. There are no better students than those of Belfast, 6218-20. Dyeing could be better taught in a technical school than at the College. Is not acquainted with Leeds Dyeing School, 6221-2. A dyeing school at Belfast would be of great value. Ordinary chemical instruction, with practical teaching in the works, would not be sufficient, 6223-4. There is little systematic application of science to the linen industry, and no facilities for teaching such application in the district, and therefore Belfast is at a disadvantage. The manufacturers there do not appreciate the advantages of scientific education of all classes, 6225-30. Had a class at Stroud, at which masters and managers attended with valuable results. Few operatives attended, 6231.

PORTER, Dr., and several other Professors of Queen's College, Belfast. Pages 186 to 187.

Full instruction in practical chemistry cannot be given in Belfast from want of accommodation, &c.; students therefore go to the Continent for it. There are about 200 chemical students, and only accommodation for 15 at a time for practical work, 6232-4. About 600*l.* a year is spent on the library; more could be profitably spent, 6235-7. Students pay about 10*l.* 10*s.* first year, and 8*l.* 10*s.* per annum after, 6238-9. The College receives 8,600*l.* annually from Government, 6240. There are certain scholarships (*described*). About 500*l.* a year is received from private endowments, 6241-4.

BARKLIE, Mr. ROBERT, F.O.S. Pages 188 to 198.

In science master and Educational Superintendent of Belfast Working Men's Institute, 6246. Describes origin, management, &c. of the institute. Introduced and manages the science teaching there, the institute providing rooms, &c., 6247. Science classes held, number of students, &c., 6248-50. To a question why sons of artisans in dye-works around Belfast do not attend, replies, that there is only one large dye-works in the immediate neighbourhood. Fears that the foremen of dye and bleach works (who work mechanically, aided by old receipts) are jealous of the apprentices' knowledge and discourage their attendance, and that masters are not alive to the advantage of encouraging the classes, 6251. There are certain exhibitions from the classes, 6252. Belfast merchants willingly subscribe for prizes or for a local exhibition. Many of the exhibitors have obtained high prizes; the present holder gained highest position in chemistry at the Royal College of Science last year. Fears he will not obtain employment in Ireland, positions in which he would be of use being usually filled by selection from those already employed, who are generally without scientific knowledge, 6253-7. Manufacturers are beginning to appreciate scientific training, 6258. The institute classes have laid the foundation of the feeling in favour of a technical school, to which they would form an introduction, 6259-60. There are certain classes (*named*) connected with the City Guilds Institute. They are not very successful. Gives reasons. A technical school, where the actual machines used in trades were at work, would enable students to obtain a better knowledge, than can be obtained in the works, of the processes as a whole, 6261-3. There has been great difficulty in obtaining technical teachers, 6264. The young men and artisans of Belfast are anxious for, and sufficiently educated to receive, technical instruction; it would greatly benefit the trades of the district. In the linen trade it is especially required, as masters, managers, foremen, and workmen are generally ignorant of the scientific principles of their work. Masters' sons are not receiving better training; the best training now given is that received by apprentices, 6265-71. Suggests employment of organising masters by City Guilds Institute, 6272. The number of students in the technical classes has

XXX ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

BARKLIE, Mr. Robert—*cont.*

increased, but is comparatively very small (33 only), 6273. Technical teachers might receive a short course of instruction on the plan of that at S. Kensington Science College. Technical education cannot be given at Queen's College, Belfast, under its present system, 6274-5. Some foremen and others attending technological and science and art classes do not like to compete in examinations with apprentices, nor to study with them, hence teachers lose results fees. The same applies to other towns. This would be largely remedied if employers were to encourage, not insist upon, their attendance at classes and examinations, 6276-80. More prizes are not required. Merchants have contributed liberally for prizes and local exhibitions. There is one exhibition each year. A prize for technology would encourage attendance at classes and examinations. Has suggested it, 6281-4. The teaching at Queen's College is at present almost worthless for trade requirements, but could be easily adapted to them, 6285-7. Sees no reason, other than lack of technical education, why the linen trade is not progressing, 6288-91. Primary education in Ireland shows decided improvement, 6292-3. Compulsory attendance is practicable and would be generally acceptable, 6294-5. Children of 13 or 14 should be taught agriculture in rural districts, and elementary science adapted to district industries in towns, irrespective of the standards they may have reached. The present rule confining extra subjects to those who have reached the fifth standard is prohibitory. Science classes in towns have done great good by training rural teachers in agriculture. Farmers' sons sometimes attend them, 6296-304. The elementary education in girls' schools is good. Sewing, &c. is taught. Cookery might with advantage be introduced, 6305-8. The intermediate system has not done so much good as was expected. It has led to the establishment of few new schools and has not reduced fees in old ones. The results fees are paid on examinations only; thus schools present and receive fees for students who have not been taught in them. This applies to the whole of Ireland. The examinations should be put on the same footing as those of S. Kensington, 6309-14. There are very few appliances for science teaching, and in many cases no science teachers, in intermediate schools. The children go to other science teachers, and the intermediate schools take the results fees earned, 6315-20. The schools are not available for the better class of artisans, &c., the fees being too high (about 1*l.* 1*s.* per class), 6321-4. There are no higher schools to which promising elementary scholars might be drafted, and only one or two scholarships from primary to intermediate schools, 6325-7. Flax-growing is not specially included in the Science and Art Department's agricultural examination. The teachers of agriculture are thoroughly qualified, and the teaching good, 6328. The weekly lecture at Glasnevin to teachers in training is insufficient, 6329-30.

MACILWAINE, Mr. JOHN. Pages 198 to 201.

Is engaged in shipbuilding and marine engineering (which have recently much increased) in Belfast, 6331-2. His apprentices, &c. attend science classes with benefit; suggests that employers should give advantages to successful students, 6333-6. Engineering has much advanced in Belfast in the last 10 years. Gives particulars. Recommends better education of engineers. Shipbuilding can be learnt in the works only, 6337-8. The technical school would be a great advantage to all trades. Preparatory evening schools, teaching arithmetic, mathematics, &c., would also be valuable. Recommends classes in the technical school for shipbuilding draughtsmen. Does not think Belfast shipbuilders would start them, but understands the Government think of introducing a system of examinations. As the community are taxed for national education, they might be for educating apprentices, 6339-45. Does not advocate teaching of handicrafts, but only such subjects as arithmetic, mathematics, &c. Marine engineering is attracting a superior social class, who attend science and drawing classes, 6346-7. Mentions Germany as a

MACLWAIN, Mr. John—*cont.*

probable competitor in shipbuilding. Knows of no other. Cannot give information as to cost of work or methods of instruction there, 6348-50. Some master shipbuilders are technically well educated, especially the younger. Their education is well provided for in England and on the Clyde, not in Belfast, where the only shipbuilding class is that connected with the Working Men's Institute, which is succeeding. Great efforts are made on the Clyde to educate apprentices, &c., 6351-6. More classes in shipbuilding and engineering for artisans should be established in the technical school. The few requiring higher instruction could obtain it elsewhere, 6357-61.

HODGES, PROFESSOR. Pages 201 to 207.

Is Professor of Agriculture, &c. at Queen's College, &c., 6362. Agriculture in the north of Ireland is more advanced than in other parts, owing to greater intelligence and the operations of local societies. Describes objects, &c. of the Chemico-Agricultural Society of Ulster, 6363-4. The agricultural education under the National Board is of little value, the teachers not being qualified. Recommends small farms attached to schools, 6365-7. Was lecturer at Glasnevin farm when model farms were established throughout Ireland. These model farms failed for want of properly trained teachers. They might advantageously be re-established in connection with model schools, 6368-71. The effect of the instruction at Glasnevin must be very small on the whole country; quotes a paper condemning the system there, 6372-3. Is not personally acquainted with the present system of national school farms, &c.; there are none near Belfast, 6374. Agricultural knowledge in the north of Ireland is advancing, but might be further advanced. Quotes the superior agricultural education of young men in other countries, e.g., Germany. There are no institutions in Ireland corresponding to that at Hohenheim, 6375-7. Flax cultivation has diminished for commercial reasons. An attempt was made to extend it beyond Ulster, but failed, unsuitable soil being in many cases selected, 6378. It might be improved by the application of scientific knowledge, 6379-80. No agricultural instruction is now given in Queen's College. When it was, the lectures were attended by young men from all parts of Ireland. Lectures should be given throughout the country. School teachers might be taught advanced agriculture at the College, and the agricultural teaching in Queen's Colleges might be further developed, but for Government opposition, 6381-6. Efforts are being made to obtain Government assistance for the establishment of stations for experiment, not for teaching. Queen's Colleges would be available for the latter, 6387-90. The agricultural instruction in national school text-books is of practical value; one is his own, 6391. Proper instruction in the practical operations of flax cultivation, and the transfer of its preparation to skilled factors, would be very advantageous. Irish flax produces 3s. 6d. to 9s. per stone, Belgian (from superior cultivation and preparation), 80l. to 100l. per ton. In Ireland the seed is wasted, 6392-3. The price obtained varies greatly according to quality, and this depends upon (1) the soil and its preparation, (2) treatment, &c. of the plant before scutching. Ireland loses enormously as compared with Belgium through bad unscientific management, and by destruction of seed, 6394-6. Government sent instructors into the country to teach the Belgian system. This instruction has been discontinued. Suggests its revival. The rude traditional knowledge of flax management existing in Ulster is wanting in other parts, 6399-400. The agricultural knowledge of farmers has improved in certain districts. It is derived mainly from books and periodicals, not from practical instruction, 6401-2. Differs from Prof. Letta. There is a desire for technical education among Belfast manufacturers. Taught technical chemistry for several years to young bleachers, weavers, &c. Flax fibre has been investigated in Ireland and elsewhere. Irish bleachers are not inferior to continental, 6403.

xxxii ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

GRAY, Mr. Wm., M.B.I.A. Pages 207 to 209.

Is secretary of Free Library Promoters' Committee, and has advocated the adoption of the Free Libraries Act, with the view of promoting technical education. Hands in papers on the subject, 6404-10. Suggestions of Committee as to establishment of library, museum, and art gallery, 6410a.

KENYON, Mr. JOHN. Pages 209 to 210.

Has much experience in printing and dyeing linen, 6411. Managers, foremen, and workmen have only practical knowledge. The linen printing trade is not extensive, 6412-3. To enable Ireland to compete with France and Germany technical schools should be established. Sufficient chemical knowledge can be got from books, &c., 6414. Is not aware that yarns have been sent abroad for dyeing because the required tints could not be obtained in Belfast. There is room for improvement in Belfast dyeing, 6415-7. Much information can be got from books on chemistry and dyeing. Does not think laboratory instruction necessary, 6418-22. Belfast linen printers get their instruction from England and Scotland. New colours come out chiefly in Germany, are next adopted in England, then in Ireland, 6423. Some designs are got from Paris, but many are locally produced, 6424-7. Schools are required for designing; it cannot be learnt from books, 6428-9. There is no school in Belfast where art adapted to linen printing is taught, 6430-2.

PRESTON, Sir JOHN. Pages 210 to 216.

Continental countries can compete successfully with Belfast in linen yarns mainly because they can buy the same machinery at the same price, and at about the same cost for packing and transit, get the best of the Irish foremen, &c., and work 72 hours as against 56 in Ireland, 6433-7. Belgian and French yarns compete successfully with Irish in the Belfast market. Imported over 53,000l. worth of yarns in 3 or 4 months, principally from Belgium, 6438-42. Belgian spinners can beat Irish in coarse numbers by 10 per cent. in many cases, Austrians, though not by so much, in numbers up to 50 or 60, 6443. Continental spinners compete in Irish, English, Scotch, Spanish, and Italian markets in some numbers, but not in the finer (100 to 200), to which their hands are not yet educated, 6444-7. They have no knowledge beyond that possessed by Irish spinners. Continental flax is much better prepared than Irish, 6448-50. Continental superiority is mainly due to the longer hours worked. Cannot compare wages, 6451-2. Shorter hours have not improved the social or material condition of workpeople; few employ their leisure profitably. Does not wish them to work so long as continental workers, but thinks 60 hours a week would be better for them, and would put employers in a better position to compete. Has heard the same view expressed by others, 6453-6. Education, whether of masters, managers, or workpeople, can do nothing more for the trade; everything conceivable has been tried. Does not believe continental workers to be superior in education or natural aptitude, but they do not strike, 6457-60. The trade has suffered from the substitution of cotton and woollen fabrics for linen, 6461. Can suggest no remedy but an increase of working hours to 60. The falling off is due to short hours and large imports of foreign yarn. Never heard of any corresponding falling off before the Act limiting the number of hours was passed, 6462-4. The continental export of yarn is a regular trade for profit, not a forced one, 6465-6. Gives exports and imports for 1869-80. The rate of decrease of exports for six years before and for six years after the passing of the Factory Acts was very similar. The former was due to stocks left over from inflation caused by the American war, 6467-73. In ordinary times compulsory military service does not seriously interfere with continental manufactures. Hands are abundant there. In Ireland they are scarce, and machinery is standing for want of them, 6474-5.

MATIEB, Mr. HENRY. Pages 216 to 219.

Is a manufacturer in the important handkerchief trade. Technical and art knowledge are more important in this than in the plain goods trade, 6476-8. Better knowledge of design and improved printing and dyeing are required. We cannot compete with the French in some colours, 6479. Young men in the trade do not attend the Art School, the instruction given not being practically applicable, 6480-3. The technical school would be of great service in improving designs. Gets some designs from Paris, others are produced locally. The local designers have much improved lately; does not attribute this largely to the Art School. Some have been trained in print works, 6484-9. The young men would willingly attend the technical school, especially in the evening. Would give them facilities, 6490-1. There is little teaching in the Art School of design applicable to the trade, 6492. The French are superior in design and dyeing. Gives an instance, 6493-5. Buyers have to go to the continent for certain goods (not handkerchiefs) unobtainable in Ireland, 6496. More technical education is needed in weaving, designing, and colouring, 6497-8. Trade museums would be valuable. There are none. Manufacturers might be induced to establish collections of specimens, 6499-503. The establishment of a technical school is important for the trade, 6504. The embroidery is done at home by girls. It requires no special training. One girl teaches another. It would not be suitable for teaching in schools. The supply of labour is sufficient. Sewed muslin work was formerly done in Ireland, but is now done by machinery in Switzerland, and sold in Ireland and elsewhere. Attempts were made to transplant the industry, but failed, 6505-13. The colours of certain goods, principally Austrian (*produced*), cannot be so well produced in Ireland. Such goods should be exhibited that manufacturers might be led to make them, 6514-6.

BYLETT, Rev. HAROLD. Pages 219 to 227.

Is a national school manager, 6517. There is a deficiency of science teaching in national schools. The science taught is very poor and unsatisfactory. Does not know of any indisposition on the part of the Board to teach it, 6518-24. Names subjects taught in the schools. Some extra subjects should be introduced. Does not think the teaching of experimental science need be limited to those who have passed fifth standard. Agricultural teaching begins in the fourth class, but the book used is defective and unsuitable. Teachers should be permitted to select their own books. They are practically confined to those selected by certain professors in Dublin, 6525-35. Recommends free trade in books, including those on history, notwithstanding differences of opinion in the country. The Board should have power of veto, but should be reformed first, 6536-43. The books have been in use as long as people can remember, 6544-6. (*Mr. Barkie*.) Teachers are prohibited from using other than the prescribed books. The text-book on natural philosophy was published in 1841 or 1842, and has not since been revised. (*Mr. Bylett*.) The books are defective in science; no history or biography is taught, and no drawing, except as a special subject; hence the children have no disposition afterwards to take advantage of the Art School, 6547. Elementary science should be commenced in the fourth or fifth class, drawing made an ordinary subject, and farming better taught. Prof. Baldwin's book is too technical, and the Board will sanction no other; it should be simplified. Bad attendance is a great defect. Would like to see compulsory attendance, but children now necessarily commence farm work at an early age. They consequently have no desire for technical or scientific education afterwards. Recommends general lectures to spread that desire. Advocates compulsion carefully applied. In some districts opinion is ripe for it, 6548-54. Calls attention to the irregular attendance at national schools. Recommends compulsion, a minimum attendance of 55 days in the summer half-year, and 70 in the winter half-year being insisted upon. Free trade in supply of school books should be established, history added to the curriculum, the agricultural instruction improved, and elementary drawing

XXXIV ROYAL COMMISSION ON TECHNICAL INSTRUCTION

RILEY, Rev. Harold—cont.

and science taught. In country schools increased teaching staff is required; that allowed by the Board's rules is insufficient. The regulations as to extra subjects taught out of school hours require alteration (gives examples), and the regulations are too numerous. Travelling science lecturers should be provided by Government, 6554a.

COMMITTEE OF BELFAST SCHOOL OF ART. Pages 228 to 231.

(*Mr. William Gray, M.R.I.A.*) Recommends more frequent inspection of the Art School. Local manufacturers do not sufficiently sympathise with its work. They employ foreign rather than native artists, 6555. (*Mr. Hugh Robinson.*) The school teaches general principles of design, not their applications. Give instances of past pupils obtaining employment as designers, &c., 6558. (*Mr. Gray.*) The fees are very low, and each subscriber of 5l. may nominate to a free studentship. All do not do so. (*Mr. John Brown.*) The designs are all in the conventional style. Variety should be encouraged, 6557-8. (*Mr. F. D. Ward, J.P.*) Has found the instruction given to Marcus Ward & Co.'s employes valuable. The school might work very advantageously with the technical school which he hopes will be established, in which no art instruction will be given. Weaving, &c. of linen will be taught. Would like to see other manufactures, e.g., woollen, silk, &c., introduced. (*Dr. James Moore, Hon. B.H.A.*) There is plenty of bloom, but it wants to be fructified, 6559-60. (*Mr. Gray.*) From lack of suitable premises, Belfast cannot avail itself so largely as is desirable of the South Kensington loan system. A museum and art gallery is needed, but is not included in the proposals for applying the Free Libraries Act, 6561. The penny rate will yield 2,200l. The building, to cost 16,000l., will consist of a library and two picture galleries only. Suggests that the Commission recommend a technical museum. (*Dr. Moore.*) Recommends a circulating museum from South Kensington. (*Mr. John Jaffe.*) Art instruction will not be given in the technical school, as it is hoped the Art School will supply it. (*Prof. Letts.*) The technical school will, it is hoped, be near the Art School, (*Mr. Ward.*) and the working men's classes be brought into connection with it. (*Mr. Gray.*) So far the technical education movement is entirely independent of the Art School and the Working Men's Institute, 6562-5. (*Mr. Ward.*) The Town Council proposed a free library only, but believes a picture gallery, and probably a museum, will be included. Will be glad of Government aid, 6566. (*The Chairman.*) Good pictures are expensive, and the knowledge necessary for their selection is not always obtainable, while a good and useful industrial museum can always be had. (*Mr. John Brown.*) Suggests obtaining good pictures on loan. (*Mr. Gray.*) A successful museum could be established. (*Mr. Troubridge, Head Master of Art School.*) Encourages students to continue the study of designing. They have a great tendency to give up designing and become painters. Art school instruction might be extended in a technical direction. Most of the leading designers in Belfast are natives, many from the Art School. Although foreigners sell their designs for less than natives there is no danger of the latter being supplanted. (*Mr. Jaffe.*) The Art School instruction has done much good. (*Mr. Gray.*) All classes of design are encouraged, and manufacturers are induced to give special prizes, 6566a.

Evidence taken at Cork.

SULLIVAN, DR. WM. K., D.Sc., Ph.D. Pages 232 to 254.

Mentions various professorships, &c. which he has held. Has paid great attention to technical education, 6567-74. Premiums were given by the Linen Board and the Dublin Society, with great success, for the encouragement of manufactures, but, as no Roman Catholic could be a tradesman in the towns, the trades so established were artificial and

SULLIVAN, Dr. Wm. K., D.Sc., Ph.D.—cont.

ultimately failed. Certain other trades were carried on outside the towns, 6575-81. Suggests encouragement of manufactures by a system, similar to that adopted in Flanders when machinery was introduced for linen manufactures, which would die out when it had served its purpose. All such efforts should be locally established and managed, with State assistance in money and inspection, as at Cork Dairy School, 6582-9. Workshops established upon this system would compete with private industries, which is objectionable, but the exceptional circumstances of Ireland render exceptional measures necessary, 6590-1. It might be enough if, when domestic industries were established by voluntary effort, especially in remote poor districts, Government aid were given upon proof that serious and successful work had been done. The system of payment by results in Ireland is a curse, as under it examination has been substituted for education, 6592-600. In Ireland more attention should be given to elementary technical than to higher technical education, but the system adopted should be such as would gradually develop, 6601-3. The foundation of higher technical instruction has been laid, but there is no intermediate step between the lower and the higher. The Science and Art Department system does not provide one, being mere examination. Efforts are being made to provide Cork, by the *ld.* rate and subscriptions, with a good school of art and science which will supply this want, 6604-7. The *ld.* rate produces 500*l.* to 600*l.* The Libraries Act was applied in Cork in 1855, in Belfast this year, and in no other Irish city, 6608-10. There are both science and art classes. There are other science classes in the town. The papers set at S. Kensington examinations are unsuited to the locality. Mathematics and mechanics are needed, but pupils will not attend to them, more money being obtainable for other subjects. Besides results fees, teachers should receive salaries from local subscriptions or rates. Recommends increased rate for this purpose, and for agricultural and veterinary schools, 6611-5. Good science knowledge lies at the root of technical education. The City Guilds Institute examination papers are not sufficiently practical for Ireland. A useful examination could be devised. Previous science instruction should be required, and to guard against cram the examination should be practical in all possible subjects, 6616-21. The examinations could be held locally, the body providing the money being represented. The Science and Art Department is usefully represented by engineer officers at its examinations, 6622-6. Will supply Mr. Magnus with his views on adaptation of Guilds Institute examinations to Ireland, 6627-8. Legislation for Ireland is not sufficiently adapted to its peculiar conditions, but is improving. The gentry must not be taken as guides, 6629-31. In educational matters local management is the best guide, Government aid being given to any proved good work, 6632. Government should not originate everything, but they should persevere in any good work undertaken. The model farm schools were not a great success, but owing to changed conditions were becoming useful when they were abolished. Centralised government ruined them. They were not adapted to the needs of each particular district, but were becoming so. The whole subject should now be reconsidered, keeping that point in view, 6633-9. Use of tools, &c. should be taught in primary schools, the State paying part of the cost. The superior advantages given to children in reformatories, &c. encourage drunkenness and improvidence, and are resented by the honest poor. Ordinary children are not received as day scholars at industrial schools, 6640-6. Girls in primary schools should be taught domestic economy. The sewing taught in national schools is too ornamental. The Commissioners try to foster plain work, but, from lack of local supervision, without much effect. Visiting committees might be appointed, 6647-52. The children prefer crochet, &c., as they can earn money by it, which is desirable, but witness would prefer to confine them to plain work, 6653-7. More industrial training might be given in workhouse schools. Farms were at one time attached to certain workhouses with good results, but were generally given up. A few workhouses still have farms attached.

XXXVI ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

SULLIVAN, Dr. Wm. K., D.Sc., Ph.D.—*cont.*

The important question of industrial training of workhouse children is in abeyance, 6658-62. A complete system of technical education for Ireland should include something corresponding to German Polytechnic schools. The Royal College of Science does a good deal of work, but should be modified to do more. The attendance is small, and many of the students English, 6663-5. The instruction there is more distinctly practical than that at Trinity College. The latter has a matriculation examination, involving knowledge of Latin, Greek, &c., not required for technical purposes. The College of Science has had great influence in improving the teaching in and around Dublin. It is not sufficiently known and appreciated, 6666-9. Students admitted to Trinity College laboratory without examination are chiefly medical students; those at the College of Science essentially technological. The College of Science was a museum, first of economic geology, then of Irish industry. A technological museum was commenced, but is disappearing. This illustrates the dangerous tendency in Ireland to transform existing institutions without giving them time to develop, 6670-1. Day and evening teaching can be carried on together at the College. Instituted the evening teaching there, which was attended with good results, but politics distracted people's attention, and the institution was modified, hence that teaching has not been developed. The professors still give evening lectures voluntarily. Recommends that they be remunerated, 6672-5. Practical instruction was, but is not now, given, 6676-7. The collections, laboratories, &c., might, with little difficulty and without disturbing the day instruction, be utilized for the teaching of artisans, 6678-9. The evening instruction should be higher than that in science classes, 6680-2. The technological courses at Trinity College are important, 6683. The engineering faculty at Queen's College, Cork, has done much good. A little more development would make it a high technological school. This applies to other Queen's Colleges. The commencement of a technological museum is proposed, 6684-5. The laboratory is open to students, but, like every other part of the College, is too small. There is no special technological course. There was a chair of agriculture, now abolished. The professors are ill paid. Complains of Government action in the matter, 6686-7. Technology could be advantageously taught with regard to chemical manufactures. It is being given up on the continent, having answered its purpose there. Technological teaching is only needed in a transition stage. Agriculture is an exception, since it depends upon several sciences, the facts of which can advantageously be brought together by one man. Model farms are least required where agriculture is most advanced. Government have been unsuccessfully memorialised to re-establish the chair of agriculture, of which farmers now begin to see the utility, 6688-95. Ireland is fairly provided with means of higher technical instruction, 6696. There should be schools corresponding to the German Real Schule and Gewerbe Schule. The Real Schulen are schools for children who remain to the age of 15 and upwards, in which the elements of science are taught. Irish lower middle-class children remain at school till 16 or 17. The intermediate schools do not supply the want. They would if science were well taught in them, but there is no hope of that. In the south of Ireland they have been almost entirely superseded by schools of Religious Orders and secular clergy. There are few Protestant intermediate schools. For high-class intermediate education children are sent to private boarding schools in England or in the neighbourhood of Dublin, 6697-709. Boarding schools are too expensive, and day schools, which would help in technical education, are wanting, 6710-2. Elementary science is taught in the Christian Brothers' school at Cork, 6713. Schools of Religious Orders compete successfully in the intermediate examinations, and many have classes connected with E. Kensington, 6714-5. The Intermediate Board encourage science as far as possible, but it is mere cram, 6716. The system has led to improvement in books, apparatus, &c., and attracted attention to subjects previously neglected. There is no intermediate school with a good chemical laboratory, nor will there

SULLIVAN, Dr. Wm. K., D.Sc., Ph. D.—*cont.*

be unless practical examination is introduced. Has tried to introduce it in the Royal University, but so far, except in honours B.A. examination, unsuccessfully, 6717-21. As facilities increase, and practical examination is introduced at the Royal University, intermediate schools will be obliged, to enable their students to compete for university honours, to provide laboratories, &c. for practical teaching, 6722-3. In the Cork Christian Brothers' school much has been done in the way of technical instruction. The apparatus there is on a more extensive scale than would be generally needed. In remote districts too much should not be attempted, 6724-6. Plots of ground should be attached to all rural primary schools. Few now have them. The pecuniary responsibility should remain with managers and teachers, but greater encouragement should be given to those who manage them properly, 6727-9. Local committees should be appointed to assist the Board's inspectors, who are not generally competent to inspect these small model farms. Glasnevin should be converted into a central normal school for teaching agriculture to inspectors and teachers, 6731-5. Teachers in training at Marlborough Street attend for two hours weekly at Glasnevin. A six weeks' course there would be better, 6734-5. A short course of instruction would enable primary school inspectors to inspect much of the agricultural work. Their qualification should be tested before appointment. A few specialists would still be required, 6736-7. Recommends apprenticeship schools, founded by voluntary effort, State aid being given on proof of good work done, 6738-40. Technological instruction, though only needed temporarily in higher schools, should be permanently given in primary schools. Its need was felt as early as 1837, and in 1847 experiments were extensively made, the National Board encouraging them by increased grants, 6741-6. The instruction for boys was mainly confined to agricultural schools. The piscatory school at Galway was rather successful, but decayed during the troubles of 1847-53. There were also some navigation schools, not always well placed. Gives an instance, 6747-9. Much good was done by the experiments in the training of girls. The Irish lace industry is a survival from the teaching of that time. Instances Kinsale convent school, where lace-making, household industry, and cooking were well taught. Plain needlework was regarded there and at other schools as a necessary preliminary to lace-making. Mentions other trades taught with advantage at Kinsale school. The school exists still, 6750-63. (*Sir G. Colthurst.*) At Cork Exhibition there will be a large exhibit of work done by girls in primary industrial schools where industrial instruction has for some time been carried on, 6764-5. (*Dr. Sullivan.*) Kinsale is a typical convent school, under the National Board, receiving grants, 6766-8. Cannot name a national school with an industrial department. Sewing and other industries are taught in primary schools, but such teaching is not sufficiently encouraged, 6769-72. Drawing is taught, but not sufficiently. It should be as much a part of the system of teaching as writing, 6773. With certain exceptions (*named*) little is done in the way of night schools. Teachers should be encouraged to undertake the work, 6774-6. Is in favour of compulsory attendance. Parents should have liberty to select any efficient school, efficiency being tested by inspection. To this the Religious Orders would submit, with the exception, perhaps, of the Christian Brothers, who have an average of 25,000 children on their rolls. Almost all Irish schools might be brought under inspection, 6777-84. Compulsory attendance is necessary to ensure general instruction, and the towns are ripe for it. Allowances must be made for remote places, &c., 6785-7. The bog-oak ornaments and arbutus cabinet trades suffer from defective design. General art instruction, which should be given in every primary school, would develop them, and so provide employment. The bog-oak industry has not been pursued in many parts of Ireland, 6788-96. The Cork cabinet trade has been injured by want of design and objection to piece-work, 6797. The marble trade has suffered from defective design, but is now reviving, as the effect of the schools of design begins to tell, 6798-9. Irish mines are small and poor, and therefore have been beaten in competition, 6800.

xxxviii ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

FOX, MR. JOHN. Pages 254 to 256.

Is manufacturer of eider down quilts, &c., and member of Town Council, &c., 6801-2. Trade in Cork suffers from lack of skilled labour, general ignorance of chemistry, objection to piecework, and limitation of amount of work to be done in a day, 6803. Manufactures goods in Cork, raw material and cheap labour being readily obtainable there, and exports them to England, Australia, &c. Employs much unskilled labour, which is abundant, but cannot be fully utilised because of the opposition of skilled workmen, 6804-6. Recommends teaching of trades (*e.g.*, sewing-machine work) in day technical schools, and lectures to show futility of opposition to machinery, &c., 6807-11. Manufacturers might combine for this purpose if there were sufficient of one trade. They now import skilled workers, who can dictate their own terms, 6812. Use of tools should be taught in primary schools and school workshops established. Weaving or any trade adapted to district industries should be taught in technical schools, 6813-5. Woollen manufacturers are sufficiently numerous to found a weaving school, which would be useful. Instruction in mechanical engineering would develop manufactures, 6816-7. The Cork Steamship Co. now do little shipbuilding, &c.—ships can be built cheaper elsewhere,—they do less repairs in Cork than formerly, and do not make their own boilers. Irish labourers are as able, intelligent, and persevering as English or Scotch, but their frequent strikes are a great drawback to trade. Gives instances, 6818-21.

JACK, PROFESSOR ALEXANDER, M.A., Q.U. Pages 256 to 260.

Has been for 28 years Professor of Civil Engineering in Queen's College, Cork, 6822. Aims at giving scientific training as preparation for pupils in engineers' offices, 6823. Subsequent occupations of his pupils. Few have been employed in Ireland, 6824-6. They have generally passed through a pupilship with civil or mechanical engineers, principally in England, after leaving him. The plan is a good one, 6827-9. At Queen's College, Cork, no instruction is given to artisans, nor are evening classes held. It was considered to be too far from the town. A shorter route being now available, the matter might be reconsidered, 6830-3. Workmen should be taught the elementary principles of science, with special reference to their trades, and trained to make deductions from them. The present tendency of teachers under the Science and Art Department is to abandon deductive teaching, and hasten on to the teaching of results. The sciences most required are mechanics and physics. Mathematics (elementary trigonometry and simple equations) should be more generally taught as a basis for these. Such mathematical instruction is now given in good national schools. A man having that knowledge would be a better and more intelligent workman, and would take more interest in his work, 6834-44. It is useless to teach results until a knowledge of their scientific basis has been acquired, 6845. Teaching of, or examination in, applications of a science should be preceded by examination in its principles, 6846-9.

LANE, MR. DEBRY, M.A. Pages 260 to 267.

Is secretary of Cork Gas Consumers Company, and a starch manufacturer, and is practically acquainted with many branches of trade, 6850-2. Technical teaching is needed. Opposition to use of machinery, limitation of the amount of a day's work, objection to piecework, &c., arising from ignorance of the simple principles of political economy relating to trade, have greatly injured the manufactures of Cork. Such principles should form part of the technical education of workmen. Ignorance of them is not confined to workmen, 6853-6. Technical education proper should be commenced on a low grade, and should include training of the hand and eye, afterwards the principles governing the work should be explained. Gives instances of ignorance of workmen in matters relating to their trade. They should be taught the need of accuracy in measurement, &c. Cork engineers and iron moulders are

LANE, Mr. Denny, M.A.—*cont.*

inferior to English or Scotch in mechanical manipulations, 6857-60. Technical instruction would not supersede workshop training, but would enable apprentices and others to work more efficiently and economically. Knowledge of the principles underlying their work would cause workmen to take more interest in it, 6861-2. A system of very practical technical education would do immense service to the men of Cork. They are quick at learning, but lack perseverance and ambition, and, unless immediate pecuniary results can be obtained, have no desire for improvement; hence mechanics' institutes and science schools have practically failed there, 6863. If technical classes were established there might be difficulty at first as to attendance, but, given good teachers, some would attend and others would follow their example. Employers might advantageously give slightly increased wages to successful students. Until recently most gasworks managers were Scotchmen, now many are Irishmen, 6864-5. Describes quantity and disposal of certain residual and by-products at Cork gasworks, 6866-70. Gas engineering has recently made great progress. The men connected with it are better educated and pay more attention to its scientific aspects. Many new and improved processes have been introduced, higher purification and more subtle testing are required, and more attention is given to the laws of heat, &c. Hence there is a necessity, not felt before, for technical teaching for all classes of persons employed in the business, 6871-7. Little progress has been made in brewing and distilling. Knowledge of chemistry might lead to improvements and would prevent fatal errors and the adoption of new and dangerous systems. Employed successively two boys from the Christian Brothers' schools to assist in ammoniac testings, &c., who, owing to the technical education they had received there (chemistry, manipulation, &c.), were able in a few days to perform the work required. Knowledge of tools, even though only of their names, is valuable. The Christian Brothers' schools are excellent technical schools as far as they go. The boys perform experiments, and so acquire handiness and intelligence. The Brothers are now establishing a school of a more technical character, in which boys may see the practical application of the physical science they have learned at the now existing schools. Dynamo-electric machinery, a lathe, models of engines, &c. are being provided; 6878-83. The instruction has hitherto been given entirely by the Brothers, but a practical workman is engaged to give lessons in turning, &c. at the new school, 6883a.

POLLOCK, Mr. Hux, junior. Pages 267 to 270.

Was a student at Glasgow Technical School. Weaving, designing, and dyeing are taught there. Theoretical education in designing and weaving can be better got in a college than in a mill. Such instruction is useful to overlookers and foremen as well as to owners and managers, and particularly so in new districts, 6884-7. Had a course of instruction in dyeing at the Young laboratory, having previously gone through a course of theoretical chemistry at Cork. Without the previous chemical instruction, could have understood the practical, not the theoretical, part of the dyeing course. The majority of the people of Cork could not understand the theoretical part of such a course if established, but the practical part would be very useful, 6888-91. The latter could be as well learnt in the dyehouse, except that difficulties which would cause trouble there could be explained and illustrated in the school. Thus, the practical teaching of dyeing in schools, even without theoretical instruction, is useful to workmen and foremen. Dyers try to keep their receipts secret. Hence attendance at a dyeing school would be advantageous to apprentices, 6892-4. Practical men have always been obtainable as teachers. Chemists now communicate information freely to each other (gives an instance), and the teachers would themselves experiment, so that the teaching would not become antiquated, 6895-8. Technical

POLLOCK, Mr. Hugh, junior—cont.

schools in Ireland should commence by training eye and hand, no books, lecture notes, &c. being used, 6899-900. The textile trades would be most benefited by a school which should render unnecessary the training of hands in the works. The woollen manufacturers are scattered but might combine to establish a central school, and would subscribe to it. Government assistance would be advantageous. Government could not be expected to start it, but might assist by a building grant. The regulations as to management, &c. of science and art schools should be relaxed in the case of a technical school in Cork. The City Guilds might also contribute, 6901-13.

POLLOCK, Mr. J. W. Pages 270 to 272.

Agrees with his son's evidence. Is an extensive manufacturer in flax and wool, and employs between 500 and 600 hands, 6914-20. From 5 to 7 per cent. of these would avail themselves of technical instruction. The trouble and expense of teaching hands obstructs the extension of manufactures. Recommends technical schools in populous places where trades should be taught, 6921-3. Hopes for Government assistance. Manufacturers would largely support such schools if they were managed by proper local committees, 6924-5. Technical schools should be founded, open at night as well as by day, where the elements of trades, *e.g.*, weaving, should be taught. Children of 11 or 12 could attend them while receiving literary instruction at other schools. Power looms could be used for teaching, 6928-31. A higher technical school should also be established, giving a regular scientific technical training. The great need, however, is to train the people to industrious habits, 6932-6. The woollen manufacture in Cork is similar to that at Galashiels and Chipping Norton. Wages are about the same, but managers, &c. are paid more in Cork, 6937-9. Cork manufacturers use wool grown in the district (principally long wool) and also wool bought elsewhere. They do not use Belgian yarns. An industrial museum and collection of textiles similar to those existing at continental textile centres would be of service to the trade, 6940-6.

MAHONY, Mr. TIMOTHY. Pages 272 to 275.

Is a woollen manufacturer and vice-president of Cork Exhibition, 6947. Technical instruction for dyers is much needed. Chemical knowledge is of less value to managers than acquaintance with the qualities, &c. of wool. If the chemistry of dyeing were taught at Queen's College it would pay to send one of his staff to learn it. Has about 25 men ignorant of the subject working under one dyer who is responsible for the results. If there were a dyeing school which these men could attend they would work with more interest, be more accurate and useful, and would earn higher wages. The men would attend such a school and the masters would assist them to do so, 6948-57. A central school should be established, and a time set apart at which the men from all the factories should be allowed to attend. The manufacturers would give up the men's time and add something to their pay, but are not sufficiently numerous to establish such a school without help from Government or elsewhere, 6958-64. Aid to theoretical chemical teaching could be obtained by establishing a science school in connection with S. Kensington, and witness has heard that the City Guilds aid instruction in its application. The manufacturers, however, are too few (four or five) to initiate a scheme, but would assist it if it came from outside. The school should be in Cork, 6965-74. There is difficulty in training workpeople, and many when trained go to America. Managers, &c. come from Scotland. Agrees with Mr. Pollock as to additional training which children should receive in primary schools, and with Mr. Lane as to the technical instruction of boys by the Christian Brothers, 6975-6.

MULLINS, MR. THOMAS, and MULLINS, MR. MATHEW. Pages 275 to 277.

Are extensive coach-builders, and one has taken important awards for technology, 6977-8. Evening science classes are needed. An evening chemistry class at Queen's College, if started, would not be attended by workmen. Schools somewhat on the plan of English mechanics' institutes would alone succeed. Know of no chemistry class in Cork. (*Dr. Sullivan.*) There is one this Session, 6979-84. (*Messrs. Mullins.*) The existence of such classes should be made known to workmen. They would be able to understand the instruction, 6985-7. Know of no evening class in practical mechanics. (*Dr. Sullivan.*) There is none this year. Attempts have been made to hold such a class but workmen will not attend. A committee has been appointed in connection with the Exhibition to consider the whole matter, 6988. (*Messrs. Mullins.*) The Exhibition ought to direct workmen's attention to technical instruction. Can suggest no further means of interesting them in it. There is no question of its value, 6989-91. Know what has been done by Mr. Hooper and others in London. Cork is too small for anything of the kind to be done there, 6992-5. Drawing would be necessary. It would be well to teach drawing with instruments, &c. in elementary schools, but lads from 15 to 20 could be better taught, 6996-9. There is a fairly good drawing school in Cork, which they have brought under the notice of boys employed by them. The amount of instruction there should be extended, and mechanics and elementary chemistry taught. Workmen would not attend classes in these subjects at Queen's College. Plain popular schools would be better, 7000-2.

BAGOT, REV. CANON. Pages 277 to 283.

Desires to supplement the information he gave to Mr. Jenkins by evidence on the promotion of dairy education, 7003-5. Munster Dairy School, though of great value, does not go far enough. A higher college is needed to train teachers. In Sweden, dairymaids who have spent 6 months at such a college, and passed an examination, are granted diplomas as teachers. They are eagerly sought for, as, receiving fees from their pupils, they require only small pay, and their pupils do most of the work of the dairy. After spending a certain time at the dairy the pupils receive certificates, and may then, if they so wish, go to college to complete their education and obtain diplomas as teachers. Under this system each farm becomes a dairy school. Suggests the establishment of a similar system in Ireland. There might be some difficulty, as the farms there are smaller. Most Munster dairies employ 6 or 7 hands, 7006-9. There is no such college in Ireland, 7010-1. In the suggested college the scientific part of dairying should be taught to a greater extent than he believes is the case at Cork. One dairy school for all Ireland is insufficient, 7012-3. The situation of the schools would determine itself. Large dairymen would be glad to get diplomaed dairymaids, who would be qualified to teach. A number of dairymaids are now boarded at most Munster dairies. The apprentices in Sweden and Denmark receive very small wages. Believes that dairy assistants in Ireland would, in consideration of instruction by the diplomaed dairymaid, serve for small wages. Mentions the case of two young ladies, about to emigrate, who are receiving instruction on a dairy farm near Hamburg, 7014-8. (*Sir G. Colthurst.*) Cork school would have taken them. (*Canon Bagot.*) They wanted to learn the ice system, which can only be learnt abroad. In several parts of the Continent ice costs nothing, or the system would not pay, 7019-21. In addition to the system of teaching by diplomaed dairymaids recommends that Cork school be developed into a dairy college giving higher scientific dairy instruction, and that numerous dairy schools be established teaching dairy manipulation, &c., 7022-5. In certain foreign colleges the teachers are men, 7026. Hopes many farmers in Munster and Leinster would be willing to pay for instruction of their daughters at dairy schools, 7027-8. Glasnevin would be the best centre

BAGOT, Rev. Canon—cont.

In Leinster for a dairy school, 7029-30. (*Mr. T. Carroll*.) Has been asked to report on the establishment of such a school there and is disposed to recommend it. (*Canon Bagot*.) Suggests payment of results fees for dairying by the Commissioners of Education. A school for dairying, &c. has been established at Navan, not a dairy country, 7031-2. Omagh would be a good centre for a dairy school for the North of Ireland. In Strabane market found the same price paid for bad butter as for good. There is little really good butter there, 7033-4. Does not know of any good centre in Connaught, 7035-6. Does not believe cheese-making will ever pay in Ireland, since the whole world can compete with her, 7037-8. The introduction of Laval's separator, which there is no difficulty in using, appears likely to open up a great future for Irish dairy business, 7039-41. Recommends that girls in National Schools be given instruction in poultry management and bee-keeping. They would receive it with avidity, and it could be given without detriment to literary instruction. Much of the instruction given to girls is misdirected. Gives an instance. Would like to see their education more directed to their practical work, especially in convent schools, 7042-9. Laundry work, cooking, and especially dairying should be included in the scheme of the National Board. Convent schools having interns could teach these subjects more efficiently than ordinary schools. Except for the comparative neglect of such subjects the education in convent schools is good. Is glad to see Catholic children attend them, 7050-3.

CAHILL, Mr. PATRICK. Pages 283 to 285.

Is a wholesale manufacturer of, and practical worker in, metal plate and zinc ware, 7054-5. The use of machinery, by enabling manufacturers to compete with foreigners, would increase the amount of both skilled and unskilled labour employed. Technical instruction would cause workmen to see this, 7056-61. Recommends instruction in machinery and the use of models, and the establishment of travelling scholarships as prizes. The Corporation of Cork could not found such scholarships, the rates there being already very high, 7062-7. A school should be established by Government grant; the local gentry and the corporation might then assist. A thorough English education should be given, including elementary mathematics, and models and mechanical appliances should be provided for educating youths (especially apprentices) in the principles of their businesses. The instruction should be given in the evening and on Sunday. There is no feeling in Cork against Sunday instruction, 7068-73. Suggests as an industry that might be developed the preservation of fish in hermetically sealed tins. About 2,000l. for plant, &c., plus working expenses, would be sufficient. Sprats are plentiful at Youghal, but no one would take an order (to be repeated at frequent intervals) for 100,000 tins of them preserved as sardines. One man there carries on this business successfully upon a small scale, 7074-80. Fears working lads will be shamed at going to the proposed museum attached to the new Art School. If it contains a good collection of models and machines it will be very useful in educating youth, 7081-4.

DORAN, Mr. CHARLES G. Pages 286 to 289.

Technical appreciation rather than technical education is needed in Ireland. The classes holding patronage should be thoroughly educated at their own schools. People know the true artists but will not pay them. Thus 70 per cent. of the engineers on Irish railways have risen from firemen, while in England and Scotland 70 per cent. have been properly trained as engineers. In the building trades Irish workmen are as well educated as those of other countries. Engineers, &c. would alone be benefited by technical instruction. Students in technical schools should receive a common training up to a certain stage, then instruction relating

DORAN, Mr. Charles G.—*cont.*

to their particular trades. Gives instances. Workmen should be trained to think about their work. At present they are mere mechanical appliances for carrying out the thoughts of those above them. At Queenstown Cathedral every figure was worked from the rough block by men educated there at the works. The stone for the sculptures in a large building in Cork was excavated in Ireland, and for no reason whatever sent to London to be carved. Called attention to the injury that was being done to Irish workmen and offered to have the work done, taking all risks, 7085-92. At Queenstown Cathedral trained his workmen up from the figures to the sculptures. Taught them only detailed drawing and the setting out of curves, not modelling. Gave them full-sized drawings for all work. This is the only building in Ireland wholly executed on the ground. Includes the human figures, some of them colossal. Round life-sized figures were executed, by men trained entirely during the progress of the work at the Cathedral, merely with the aid of the flat diagram. Mr. O'Reilly, who was employed there finishing the figures, always worked from witness's diagrams. Other workmen could do the same. The citizens of Cork leave Mr. O'Reilly unemployed and send to London for figures inferior to what he could execute. This shows the necessity for technical appreciation. There is want of knowledge in the class which should patronise art. Gives instances, 7098-107.

O'LEARY, Mr. MICHAEL A. Pages 289 to 290.

Is a cork manufacturer, 7108. Art workmen in Cork are very backward in art education. The old cast gallery was free and open at all times to all, but since it has been brought under the Art Department the school has been open for part of 3 days per week only, fees higher than labourers could pay have been charged, and incompetent masters appointed. It should be always open free to all, and rooms should be added for technical education, &c. Desires no Government grant, since injurious restrictions, &c., accompany it. There is no life school in Cork, 7109-16.

COLTHURST, Sir GEORGE St. JOHN, BART, D.L., and BARRY, Mr. W. H., J. P. Pages 291 to 303.

(*Sir G. Colthurst.*) Munster Dairy School is held in buildings formerly part of Munster Model Farm, and afterwards used as lodgings for the training school pupil teachers. It was established, after some difficulty in getting the buildings, by local subscription and Government grant, to meet the deterioration in Irish butter and its consequent supercession by the products of countries where attention was paid to technical education. Dairy instruction for girls was at once introduced and the school placed under the virtual (not entire) management of a local committee, 7117-22. The school is supported by Government grant, about 500l. a year being locally subscribed for prizes, supplementing superintendent's salary, &c. (*hands in statement of accounts*), 7123-8. For year 1882-3 the Government expenditure was 409l. 17s. 10d. for maintenance of students, salaries, &c., and 242l. 11s. 10d. loss on working expenses; the fees amounted to about 250l., 7129-30. The subscriptions have fallen off, but if an appeal were made could be brought up again. The Cork butter merchants, though at one time more or less hostile, now support and assist the institution. Government should help only those who help themselves. The school should be partly supported and mainly managed locally, under Government supervision. Illustrates the need for local management. Hopes to see similar schools in every Irish dairy district, 7131-2. Would give no assistance in any case, either from Government or by subscription, to localities which did not themselves contribute, or the gratuitous instruction will merely tend to demoralization. Irishmen as a rule do not care for what is given them. Suggests that travelling instructors not paid by Government be

COLTHURST, Sir George St. John, Bart., D.L., and BARRY, Mr. W. H., J.P.
—cont.

sent to distressed districts, 7133-7. The teaching in agricultural schools should be adapted to the wants of the localities in which they are situated, 7133. 134 girls have passed through the school since 1880. It is proposed to devote 6 months of each year in 3 terms to dairy instruction; 23 or 24 girls could be taken at a time. It is now the agricultural students' time. Only 36 of these have passed, owing to the disturbed state of the country, and want of appreciation of the instruction given. The number of agricultural students remains nearly stationary (now 5). (*Mr. Barry.*) The small number is partly owing to the disturbed state of the country. Hopes the attendance will now improve, 7132-42. (*Sir G. Colthurst.*) It is intended to divide the year into 2 terms of 6 months, one for boys, the other for girls. Boys are more likely to attend in the autumn than in the summer, 7143-4. The fees are 7l. 10s. for 4 months for boys, 3 guineas for 6 weeks for girls. The latter fee will be reduced to 2 guineas. Had the Government been satisfied at the start that the dairy instruction would succeed, they would perhaps have supplemented the boys' fees. The dairy instruction was an experiment made by the committee at their own risk. Government would be willingly encourage the teaching of girls as that of boys, 7145-7. It is more important in a dairy country that girls should be taught than boys. Their labour is probably more valuable, but their instruction shows immediate results, while that of boys does not. The new arrangements are for the pupils' convenience. The number of students is increasing, and the fees are now nearly all paid by the farmers themselves, instead of, as formerly, by landlords and others, 7148-51. Bursaries for children from national schools would be very advantageous. Gives instances of the appreciation by, and value to, students and farmers of the instruction given, 7152-4. It is more important to train girls for employment on small than on large farms, but the training which fits them for the latter also fits them for farmers' wives. (*Mr. Barry.*) Had great difficulty in persuading farmers to send their daughters, but explained that the object was to train them to be valuable in their own families. Gives an instance of the success of the school in this. (*Sir G. Colthurst.*) Calls attention to the cookery and needlework classes. (*Mr. Barry.*) They were established and are carried on by a committee of ladies, and are of the greatest possible benefit to the people, 7155-7. (*Sir G. Colthurst.*) The instruction is given by the matron of the institution at the expense of the association of ladies, the institution giving use of kitchen. (*Sir G. Colthurst and Mr. Barry.*) Describe system of examination. Bill of fare with prices handed in, 7158-60. (*Sir G. Colthurst.*) Mentions prizes for dairy work won by the school. Gives an instance of the practical value of the instruction given, 7161-2. Sketches the course of instruction for girls, 7163, and for farm students. Suggests a technical school for the woollen trade, founded and supported by Government grant, in aid of local effort, under local management with Government supervision, 7164-5. Needlework is neglected in national schools for girls. Theoretical instruction in agriculture, which they could apply at home, might advantageously be given to the girls, although practical work in schools is better. (*Mr. Barry.*) It is most desirable to introduce works on agriculture into girls' schools, but theoretical instruction would be of little use unless assisted by practical work; the schools should therefore have ground attached to them. It would be practicable even in remote places to have farms where dairy work could be taught, 7166-75. (*Sir G. Colthurst.*) In establishing technical schools it would be most important to obtain and advertise the approval of the clergy of all denominations. The success of the movement can only be obtained by co-operation of the priesthood, and by keeping it quite clear of politics. An anxious desire has sprung up to develop the resources of the country, but a school taken up by any one party will fail, 7176-80. Under the Tramways Act the Treasury will bear half the cost of any practicable scheme (leaving the initiative and management to the locality), if the other half is locally provided; expresses a hope that similar provisions may be made as to technical education, 7108a.

BARRY, Mr. W. H. Pages 303 to 306.

Farmers, &c. are unable from want of agricultural knowledge to judge the value of land. This leads to competition and overbidding for farms, and has so contributed to the recent national suffering. Lads in agricultural schools should learn the construction of agricultural machinery, which from the increasing scarcity of labour is becoming more necessary, but cannot be profitably used by unskilled hands. The general laying out of a farm, growth of cereals &c., and keeping of accounts should also be taught. Younger sons of landlords should learn the nature of their fathers' properties that they may act as agents. Agricultural schools should be supported by localities with Government aid. There is much prejudice against them, to overcome which, local management is necessary under Government supervision, 7181-4. From the more backward state of agriculture there, agricultural schools are more required in Ireland than in England. It is necessary to show Irish farmers what can be done by improved cultivation, e.g., utilising headlands, &c. Gives instances, 7185-7. The schools should be supported by local subscription, supplemented as required by Government, 7188-91. Agricultural education is so necessary that the funds must be got. The value of the schools gives them an equitable claim upon local rates, but doubts if the guardians would vote the necessary money. Quotes the failure of boards of guardians to contribute to results fees for elementary teachers, 7192-7.

BYRNE, Mr. JAMES. Pages 306 to 309.

Was educated at Glasnevin. Advocates extension of technical agricultural education, for which the present is a favourable time, 7198-202. To increase the attendance of farmers' sons at Munster school, copies of its syllabus should be distributed and exhibitions at Glasnevin established for the best scholars. Many men from Glasnevin are now engaged as stewards, in place of the English and Scotch stewards formerly employed, 7203-6. Although sufficient veterinary science is taught at Munster school and Glasnevin for the ordinary farmer, there is no veterinary school in Ireland, and Cork is very favourably circumstanced for the establishment of one. Veterinary science and forestry should be taught at Munster school, 7207-11. The instruction in agriculture given to boys at national schools is valuable even though only theoretical, 7212-3. Similar instruction might usefully be given to girls. They are now more employed at house than field work, 7217-9. Land could be readily obtained by the primary school managers for practical instruction of children. The schoolmasters should be trained to agriculture, but should not hold the school farms, 7220-4. Cookery, needlework, &c. (in his district principally plain work) are taught to girls in national schools with advantage, 7225-30. Industrial occupations are not, but might advantageously be taught to boys in those schools. Many workhouses have farms attached, 7231-3. In remote parts where unreclaimed land can be readily obtained its reclamation might profitably be taught in national schools. (Mr. W. H. Barry.) In his part of the country farmers prefer to hire labourers with many girls, because the girls are so useful on the farms. (Mr. Byrne.) That is contrary to his experience, 7234-6.

DUNNE, Mr. P. F. Pages 309 to 313.

Has had 17 years experience as a tanner. Now tans only sole leather. Tanning has not been prosperous, owing to the importation of American leather, which is tanned more cheaply than English, the American tanneries being established in hemlock forests. Uses valonia, which is cheaper here than in America. English tanners are the best in the world, 7237-40. Uses machinery where possible, which is not opposed by the workmen. They are all labourers. Fleasing, which is done by hand, requires some training and care, but is not a trade, 7241-5. Has heard of opposition to machinery in building trades, but not in his own, probably

DUNNE, Mr. P. F.—*cont.*

because the men are not organized, 7246-7. Had difficulty in introducing piece-work, but it is now popular with the men, who do double the work and earn more wages, while the work is cheaper, 7248-50. Vast numbers of machine-made boots are imported from England with disastrous effect on the local trade. The industry could be well developed in Ireland, but the people would have to be educated from the beginning. A factory has been started at Waterford, which appears successful, 7251-4. A boot factory has been established in Cork by gentlemen unacquainted with the leather trade. Doubts its success, 7255-7. Science can do little for young tanners, but a technical school for currying and boot and shoe making (a large industry) might be established. Such a school in Cork must begin at the beginning. There is only a very small factory in existence, 7256-61. The waste products from tanning are (1) roundings, used for sizing paper, and (2) fleshings, used for glue making. There were 2 or 3 glue makers in Cork, but, probably through their ignorance (instance given), the business has died out, 7262-3. Chemical knowledge would be very useful in glue making, 7264. No one is now anxious to start a glue factory in Cork. The material obtainable would probably be sufficient to employ 10 or 12 hands. Mentions tanneries from which it might be obtained, 7265-7. Leeds is a great centre of the currying trade. Chemical knowledge would be valuable in currying, 7268-9. Boarding-out is better than industrial training of children in workhouses. Few learn anything there, 7270-1. Local Government Board rules, which do not allow money to be put to the credit of paupers, prevented a number of females in the workhouse being taught match-box making. There was no objection to the industry being carried on, but the women would not work without some inducement. Thinks the rule prohibiting payments might profitably have been modified in this case for a short time. Guardians should have power to teach handicrafts to the inmates, 7272-80.

COLTHURST, LADY EDITH. Pages 313 to 314.

As to female work exhibited at Cork Exhibition encloses a circular and catalogue, and states that there were over 1,000 articles of needlework, &c., in 6 classes. In (1.) plain needlework, excellent specimens were shown from national schools where local assistance had been given to the teachers, and from industrial schools. (2.) White embroidery was very good both in design and execution. The demand greatly exceeded the supply. (3.) Lace was well executed but failed in design. Efforts are being made to improve the teaching of lace designing at Cork Art School. (4.) Art needlework showed (with exceptions) the same faulty designing. (5.) Crochet was not generally good. The decline of the Irish crochet trade is perhaps owing to the use of old and inartistic patterns. (6.) Knitting exhibits do not need special notice, 7281-81a.

DELANY, COMMENTATORS, T.C. Pages 315 to 321.

Is a builder, 7282. In no trade is technical education so much needed as in building. Gives instances. Recommends technical evening schools, supplied with the best machinery and models. The use of labour-saving machinery would not reduce the demand for skilled labour in his trade, 7283-8. There should be one large school for all trades of which the building trades school would form part. Suggests retention of the Exhibition buildings for the purpose. Believes the taxpayers of Cork would agree to a tax of 1d. in the £., which would enable them to borrow £1,600L from Government. This would be sufficient to raise the school and provide machinery, and Government might provide teachers. One gentleman, e.g., Dr. Sullivan, could teach all the trades of the South of Ireland, and tradesmen, for a small sum, would show the practical application of the machines, 7289-97. Has heard of the Central Institution of the Guilds Institute and its probable cost for building, &c. Would begin in a modest way and afterwards increase, 7298-9. If a technical school were

DELANY, Commandators, T.C.—*cont.*

established in Cork, instruction should be given in the principles underlying, and machinery used in, the building trade, 7300. Has heard of the payments for building instruction and grants for apparatus by Science and Art Department, and hopes by their aid to make the proposed school self-supporting. The only reason why classes are not already established is that he and others were asleep. They are now wide awake. As an instance of the desire among workmen for advancement, mentions that they voluntarily gave permission to employers to use what machinery they thought necessary in the erection of the Exhibition buildings, 7301-5. If, by technical education, the men were shown the advantages of machinery, there would be no difficulty with respect to its use. There is no free library in Cork under the Libraries Act. One is much needed. The rate has been applied to music. The School of Art is not made use of, the buildings being ill-adapted to their purpose. A new school is talked of. There is no place where young men can go to read and study, 7306-11. Left school at 14. Boys desire to become tradesmen, not, in Ireland, shopmen or clerks. Went to London and in 3 weeks became foreman and soon had charge of a large business. Found men in the building trades there no better educated technically and less capable of doing good work and doing it quickly than those in Ireland, although they had better means (classes, &c.) of educating themselves. With similar opportunities, which they will now avail themselves of, Cork builders will go far ahead of them, 7312-8. Attendance, as a boy, at a technical [school would have been of great advantage to him, 7319-20. Had he learnt the use of tools while at school it would have enabled him to shorten his apprenticeship. It would be of great advantage to teach this to young boys in primary schools. Would compel employers of 300 hands to provide evening schools for their workmen, failing better provision, and all employers to send their apprentices to technical schools, 7321-4. There are in Cork small classes in machine drawing and building construction. The instruction given, is valuable; his workmen do not understand working drawings, and the instruction would not enable them to do so. Technical instruction is needed by engineers and architects. Employers should, and do, encourage the classes. Several boys in his employ attend the School of Art, but the building is cheerless and the models insufficient. Advocates a collection of models, &c. of various manufactures, 7325-36. Thinks the community might and would willingly tax themselves 1d. in the £, and that the whole cost of maintenance should be borne by Government, 7337. Knows the expenses of Munster Dairy School and that a large sum is annually raised for its maintenance. Its success is attributable to the exertions of Sir G. Colthurst and Dr. Sullivan, 7338-9a. Employers and the public of Cork would willingly tax themselves for the teaching of a great industry. Efforts of the kind should be subsidised proportionately to the local support obtained. Is aware of the Science and Art Department system of payments upon results of teaching. Given a fair start the school he proposes would soon become self-supporting, 7340-6.

HAYDE, REV. JOHN. Pages 321 to 326.

Has practical knowledge of English educational systems, especially of elementary education, and has read a good deal about the Irish system of primary instruction, 7347-53. Primary education is still very defective. Thinks compulsory attendance should be enforced in cities at first, then generally, and believes that to be the general opinion in Cork, 7354-6. Technical instruction is absolutely necessary, 7357. In elementary schools a few general principles of science should be taught, with special relation to district industries. The teaching should be as far as possible a preparation for the workshop. Practice and theory should go together. Boys at work should attend evening technical schools, 7358-60. The teaching under the Science and Art Department requires to be supplemented by practice, 7361. Geometrical and machine drawing are useful but not essential preliminaries. It has long been felt in Cork, especially

xlviiii ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

HAYDE, Rev. John—*cont.*

by the promoters of the Exhibition, that technical education was a necessity, and that a technical school should be established, where each man should be practically prepared for his specific trade. A committee has been formed to draw up a scheme, 7362. It is the general feeling that the school should be initiated and managed locally, Government aiding and supervising. The aid given need not be permanent, and would be repaid by increased industry and loyalty of the people. Gives instances of the effects of technical education at Upton Reformatory. Boys there choose their own trades, after working for some time in the fields. Gives number of boys taught certain trades there. Has difficulties from (1) expense, (2) jealousy of trades' unions. The boys are from 6 to 18 years old, 7363-6. Has to carry on their whole education. They are put to industrial occupations as soon as they are strong enough, even at 8 years old. States time given to school and to work respectively, 7367-70. Some trades, e.g., cabinet-making, by sharpening the boys' intelligence help them in their literary studies very considerably, 7371. Boys in elementary schools should be induced to learn industries, and should as far as possible be taught the practical application of the principles underlying them, the use of tools, and, where it will be their future avocation, agriculture, 7372-4. Does not wish to speak on the proposed technical school, but approves of the general scheme as stated by Dr. Sullivan. There must be evening classes where boys should learn the theory of the work on which they are engaged in the day. Proposes to introduce this system at Upton Reformatory, 7375-7.

SULLIVAN, Dr. W. K., re-examined. Page 326.

A committee has been formed in Cork for the establishment, among other things, of a technical school, and he has been appointed to prepare a scheme. Will send a copy of it to the Commission, 7378-83.

BURKE, Rev. JAMES D. Pages 327 to 332.

His school is both primary and intermediate, as is the case in all houses of the Christian Brothers in Ireland, 7384. Subjects of instruction. The boys pass in gradation from infant school to highest class, the poorer boys leaving before reaching the higher classes. The Order passed last year one-fourth of all the pupils passed in Ireland under the Intermediate Education Act, 7385-8. Has also a very successful drawing school, assisted by the Corporation under the Public Libraries Act. The greatest attention is paid to freehand drawing, but perspective, instrument drawing, and geometry are also taught. The boys are examined by the intermediate examiners, 7389-92. Numbers of establishments and pupils, 7393-4. The City of Cork is fitting up a technical school. The Christian Brothers do not at present teach handicrafts. They are forming a technical museum, and getting instruments to explain the principles of machinery. They teach chemistry and physical science in laboratories, the boys seeing and taking part in the experiments. It is proposed to extend this practical instruction; want of funds is the only drawback, 7395-400. Boys generally leave the schools at 16 or 17, and, except the School of Art, have no place where they can carry on their education. There is no museum. The Christian Brothers propose to establish a private technical school where boys will be taught science and the principles and practical use of machinery as preparation for instruction at the city technical school. Some of the reverend Brothers might qualify themselves to teach use of lathe, &c. They already have a large dynamo which, with certain other machines, will be worked by gas engine; other appliances will be worked by compressed air, 7401-12. The schools of the Order in Ireland are not connected with the National Board, but their industrial schools are under Government supervision, 7413. If infant schools were widely established and children taken into them at 4 or 5 years of age compulsion would not be needed. Parents generally desire their children to be educated, except

BURKE, Rev. James D.—cont.

perhaps among the extremely poor, and children of this class might be got in by providing them with suitable clothing, free instruction, &c., 7414-7. In the schools of the Order the education is free; 2s. to 6s. per week is sometimes charged for repairs, appliances, &c., but the poorer children do not pay this, 7418-9. The Order would be willing to meet any fair requirements of the Government for testing the efficiency of its schools, 7420-1. If their schools were put under the National Board, the Brothers would have to sacrifice their own system (e.g., the exposure of religious emblems at all times), which they are reluctant to do. The experiment was tried, but given up, 7422-5. The boys are not presented for examination in drawing by the Science and Art Department. The Order would be glad to avail themselves of any privileges given by the Department if acceptable overtures were made. Has heard that the Department teaching is not of a practical character, but this does not deter them from adopting its system, nor does the objection to connection with the National Board apply to such adoption. They are very desirous that children should be taught drawing, and employ S. Kensington teachers to teach it, 7428-33. The intermediate Board examinations seem to be the same as the Department's. The intermediate education system has been very beneficial. It precludes crams. The Board insist that science teaching shall be illustrated by experiments, and its examinations test whether this has been done, 7434-8.

O'SULLIVAN, SIR DANIEL VINCENT. Pages 332 to 333.

Is a merchant and exporter of butter in Cork and member of Dairy School Committee, 7439-41. The school is calculated to do immense good by the knowledge gained and disseminated by its pupils. Its effects are already clearly traceable. Will furnish opinions and cases in proof. The export of butter amounts to nearly 1,500,000l. per annum, 7439-47. Is member of the Committee of Merchants. They approve of the Dairy School, and have subscribed, but not liberally. They are now, seeing the good it has done, prepared to give it warm support, 7448-50. It and other technical schools should be supported by local contributions as a condition of Government aid. Technical education is much needed and is interesting the people very much; they are determined to provide it. Testifies to the great ability of the Christian Brothers as teachers, 7451-4.

JOHNSON, MR. PHILIP F. Pages 334 to 337.

Is a commission agent and hotel keeper at Kanturk. Has answered the questions in the Commission's circular, 7455-6. Calls attention to the need of employment for the female members of the families of small farmers and labourers. Suggests basket-making. Rough basket-work is done at Kanturk. Would like to see finer work done there. Instructors might be obtained there if the trade were taken up in other parts, as it might easily be at little cost, 7457-62. The people have plenty of public spirit but no money. If the landed proprietors would take the matter up it might be done, 7463-8. Suggests that a few girls be sent to Germany to learn basket-making, or that a public instructor should go through the country to teach it, 7467-8. The middle class would contribute to the cost if the impulse were given from above or from Government, but will not commence it, 7469-70. Suggests reel-making. This requires little machinery, but the working people have no money, and those who have, lack public spirit, 7471-9. Suggests also the establishment of tweed and saw mills. The prejudice against machinery is less than is supposed and is wearing out, 7481-2. Has not considered the bog-oak industry, 7483. The population of Kanturk is 2,000. There is no drawing school there. 20 years since lace collar and hair-net making and crochet work were introduced, but from changes in fashions were soon given up. Lace collar making is still carried on in Ireland but not at Kanturk. Specimens will be shown at Cork Exhibition, 7484-92. The people are thrifty and anxious for instruction, 7493-4. Lectures on farming would be attended by the small farmers, who are

JOHNSON, Mr. Philip F.—*cont.*

industrious, and would lead to improved farming, 7495-8. There is no industry for the women. Children attend school to 12 or 13, are idle till 15 or 16, then go to America, 7499-500a. Government must take the initiative in technical instruction, but local support and control would be necessary and forthcoming. Recommends that public lecturers, especially on agriculture, be sent by Government, 7501-6.

PARKER, Mr. Wm. D'ESTERRE. Pages 337 to 344.

Has been a poor law guardian, and takes great interest in workhouse and other primary schools, 7507-9. In workhouse schools industrial education, though allowed, is generally neglected, and the workhouse grounds are sometimes let to tenants. Thinks it the duty of Government to see that workhouse children are trained to habits of industry; the neglect of industrial training is a great blot on the system, 7510-2. The reason for this neglect is that the teachers receive result fees for literary education, and the agricultural inspectors are very few, 7513. There is only one inspector of agriculture for all Ireland. There are 7,000 schools and only 74 farms in connection with the Board of Education, 7514-5. This proportion is not satisfactory. Would remedy it by attaching to each national school an acre or two of ground, which could be got without difficulty. The cost should be borne by the general taxpayer. Agricultural education is as valuable as, or more so than, literary. There are only 20 schools having gardens, 7516-21. Recommends that an hour or two of each school day be devoted to hand training. Does not approve of evening instruction. Manual occupation, by relieving mental pressure, would enable boys to learn more in a given time, 7522-4. Use of tools could be taught without difficulty, and such instruction is necessary. School buildings could be easily and cheaply adapted for it, 7525-7. For non-vested schools some indirect compulsion or a stimulus would be required to induce patrons to incur the necessary expense. Would pay the teachers on examination results, 7528-9. Basket-making could be taught in schools; in some places the ground without preparation is suitable for growing twigs, 7530-2. Lace-making is an increasing industry in his district. It gives the girls and old women constant occupation at crochet work; they earn 3s. to 6s. a week. The wholesale houses furnish the designs; does not know where they get them, 7533-7. Lace-making might be taught in girls' schools; it is now taught, most successfully, in convent schools, 7538-9. Sewing, generally plain, is taught in national schools. At one school, members of a ladies' committee attend in rotation daily with good effect, 7540-1. Advocates local inspection and local management of all schools, as giving the upper classes an interest in the lower. The district inspector only visits once or twice a year, 7542-4. Committees of inspection might be elected through the National Board, not at present by popular election. Amazing progress has been made with regard to education. The humblest classes desire it. Letters, &c. from America and the Colonies have partly produced this result, 7545-7. The fees charged in schools are so high as to lead to irregular and non-attendance; labourers with ordinary families find it difficult, and those with large families impossible, to pay them. Education should be compulsory. It should be free for those who cannot afford to pay; it is so under the present rules, but they are not carried out by the managers, 7548-53. The salaries of school teachers and mistresses are much too low, 7554. Knows that teachers now get fees on results. Boards of guardians refused to contribute because the tax is only levied on land and houses, and although the general taxpayer pays masters' salaries and a large proportion of the result fees the guardians object to paying 2,000*l.* or 3,000*l.* a year beyond what they already pay, 7555-60. If that difficulty were removed the teachers' positions would be improved, 7561. The difficulty in promoting industrial employments is due to (1.) land agents and landlords, who take no interest in the matter, (2.) drinking habits, (3.) insufficient house

PARKER, Mr. Wm. D'Esterre—*cont.*

accommodation. The remedies required are healthy homes and technical education. The Steam Packet Company is prosperous owing to the large import of manufactured articles, while the people are idle, and the export of cattle reared on land which, under tillage, would furnish employment. Suggests the training of boys as seamen and of girls in workhouse and national schools to cooking and domestic service; and also the delivery of lectures to adults to teach them their responsibilities as to technical education of the young, 7561a.

FORREST, Mr. T. Andrew. Pages 344 to 346.

Is a butter inspector of Cork, 7562. The inspectors are appointed by the trade. They classify the butter, and would therefore know of any change in its quality, 7563-5. It has improved for 15 or 16 years, principally during the last 10, but farmers still need instruction, 7566. Munster Dairy School is calculated to benefit Munster. Tried to induce farmers to send their daughters; the school and the number of pupils has since increased. After a session there they make much better butter, 7567-8. The prices realized by butter depend much on the way it is made. Technical knowledge and skill may be acquired in a school like Munster Dairy School; the education there is very practical. The methods of butter-making in Munster are still very imperfect. The brands are attached in the market; gives instances of girls who had not previously obtained the highest, but did so, greatly to their advantage, after attending the school, 7569-76. One dairy school in Munster is not sufficient, there should be several in different parts, 7577-81. People gain little information from the travelling dairy school; it is necessary that girls should be under instruction for several weeks. Merchants issue instructions annually as to improvement of butter. Wrote a pamphlet on the subject (*handed in*) in which he drew attention to the Dairy School. Practical instruction is more useful than any literature, 7582-4.

HEGARTY, Rev. Canon. Pages 346 to 349.

Is administrator of the parish of S.S. Peter and Paul, and manager of schools, connected with the National Board, for 700 children. Has paid great attention to schools in various parts of Ireland and in America. In Ireland fees are willingly paid and do not lead to irregular attendance. The people desire technical education. Opened last winter a night school for boys. States what grants may be earned, &c., 7585-90. Teaches in the night school the 3 R's principally, but people flock in to witness experiments, &c. Has spent large sums in schools and on church furniture for the purpose of educating the people. Imported a pulpit, altar, &c. Could not get them made in Ireland, although all the materials exist there. If the rising generation are given a fair start, such orders might be kept at home. Ireland has good materials—bog-oak and 5 or 6 different marbles—but the people do not know how to use them, 7591-2. There is an art school in Cork, which is beginning to be useful. Hopes for better results when the new building is completed and the number of teachers increased, 7593-4. Manual work should be taught in primary schools—girls sewing, &c., boys (in the evening) use of tools, 7595-7. If such instruction were given by elementary teachers in the evening, and paid for on results, progress would be made (gives an instance), otherwise they would be reluctant to interfere with the regular course. Suggests erection of cooking stoves in schools. If Government would give 50l. for such purposes 75l. would be subscribed. There would not be much contention about technical education, 7598-602.

CAREY, MR. RICHARD. Pages 349 to 351.

Is director of the Baltimore Fishery Company. It was started to cure pilchards, but now deals in mackerel, &c. in addition. The plant cost over 2,000*l.* The pilchard fishery lasts from July to 1st November. Women and children are employed in packing, &c., and are paid 2*d.* per hour. The Baroness Burdett Coutts gave money to the fishermen of Cape Clear, &c. to buy boats, and his company buy their fish (mackerel) and send it to England. A Cornish man was employed to teach the people how to cure pilchards, but they have now become so expert that he has been discharged. The company supply seines to the fishermen, receiving half the fish in payment, 7603-10. Would like to see the trade further extended. A good curing cellar, which is necessary for curing pilchards, costs 1,500*l.* A small steam launch now collects the pilchards caught. The country people do not care for pilchards, and the fishermen believe that the oil in the fish rots their nets. The company's nets are tanned, 7611-2. Suggests that the people round the coast be taught to pickle pilchards, which his company would then take at remunerative prices. Tried to teach them, but was too busy. Does not know anyone else who would do so. Is told that the sea at Dungarvan is alive with pilchards, but the fishermen will not catch them as no one will undertake to cure them. The oil and refuse from curing are very valuable. Hopes his statement will stimulate others to take up the work, 7613-21.

BRENNAN, MR. JAMES. Pages 351 to 354.

Artizan evening classes in the usual subjects have been held at Cork Art School (of which witness is head master) since its establishment in 1854. Students, mainly artizans, are prepared for Second Grade examination, 7622-4. The Science and Art Department gives great latitude as to course of study. The prescribed course in building construction and machine drawing is very full, and the students appear satisfied with it and are very successful in the examinations, 7627-8. Believes the classes to be valuable to Cork building trades' operatives, both as to the time at which they are held, and the way in which they are conducted. Gives instances. Will put in number of passes, &c. (see 7635*a*), 7629-30. If employers encouraged their apprentices and workmen to attend the school much good might be done. There is little demand for art designers in Cork. Suggests that intending designers should become acquainted with the technique of the trade to be designed for. Gives an instance showing the need of this, 7631. Gives cases of successful designers trained at the school, 7632. Suggests that manufacturers should give increased wages to employes passing Science and Art examinations, admit promising art students to their works to study technique, and send promising workmen to the school, 7633-4. It is advisable to call the attention of the authorities to the want of an industrial museum. A new art school with museum attached is contemplated, 7635. Gives numbers of students at Cork Art School science classes who attended and passed the examinations from 1875 to 1883.

SCOTT, MR. THOMAS. Pages 355 to 357.

Is a manufacturer of chemicals and chemical manures, employing a fair number of workmen—skilled for management, but mainly labourers. The men enter as labourers; there are no apprentices. Their intelligence is sufficient for the work, but from lack of knowledge they cannot deal with difficulties, 7636-40. Night classes would benefit his workmen, and employers would willingly subscribe to them. The workmen would probably attend them if employers interested themselves in the matter, not otherwise, as they would not see the advantage. The boys are sufficiently educated to benefit by them, not some of the older men, 7641-4. Government should take the initiative on proof of a practical local interest in the matter, 7645. The instruction should be practical, 7646. The instruction in national schools has no special reference to an industrial

Scott, Mr. Thomas—cont.

career; it should have, 7647-8. Recommends optional instruction in use of tools, &c., 7649. Chemical manufactures could be as well carried on in the South of Ireland as elsewhere. There is plenty of money ready for investment in trades but great lack of skilled labour. A technical school would supply this and give confidence to manufacturers, 7650-2. Chemical manures are largely imported. Many other chemical manufactures are suitable to the country, but could not be introduced until there were some good well-trained men. Paint-making is specially suitable because of the existence of barytes mines. Suggests also lucifer-match making, 7653-4.

MINUTES OF EVIDENCE

TAKEN IN IRELAND

BEFORE

THE ROYAL COMMISSION ON TECHNICAL INSTRUCTION.

NINETEENTH DAY.

Meeting at DUBLIN.

First Day.

Monday, 4th June 1883.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., IN THE CHAIR.

Prof. ROSCOE, LL.D., F.R.S.

Mr. PHILIP MAGNUS.

Mr. GILBERT R. REDGRAVE, *Secretary.*

Right Hon. The LORD MAYOR OF DUBLIN (Mr. CHARLES
DAWSON, M.P.) examined.

*Rt. Hon.
The Lord
Mayor of
Dublin.*

4563. (*Chairman.*) My Lord Mayor: We understand that you are prepared to offer some views to the Royal Commission on the subject which has been referred to them?—Yes, sir, I would offer just such suggestions as occur to me. From the very outset of the issuing of the Commission, I was struck by its particular necessity for Ireland, and I am very glad now to see that the inquiry embraces Ireland. I have been always struck with the want of accurate knowledge, and the want of the means of acquiring accurate knowledge for the various trades, and for the operative classes in this country. I think you will find the means to be much more deficient than in England, or in any of the other places,

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where you have been making inquiries. I believe the first step towards progress in any system of education would be the introduction of the compulsory system of primary education, for I believe (and this I have seen corroborated in your Report) that the basis of technical, and even handicraft education abroad, is a good sound primary education; this would open up the intelligence of the classes who are afterwards to use their hands; their hand-labour being very much guided by their mental intelligence. In our systems in Ireland, in the ordinary school, the national school, or any other voluntary system, there is not to my knowledge any provision for technical education: provision is made in special places, which never from their circumstances can I think affect, as much as we would like, the trade education of the country. It is attended to in industrial schools and reformatories, and in both of these there is a peculiar class of people who I think do not get absorbed into the population, and into trades so naturally as the ordinary people of the country. The boys in these industrial institutions are waifs and strays, and when they come out, they do not go into trades in the natural way in which son succeeds father; and in the case of reformatories, the case of the boys who come out is attended with still more difficulty. Sometimes it is done, but not always with good grace or facility. Therefore, I say, that by our system we have not touched the education of the vast masses of the people in bread-earning industries. I think it should not only be a part, but an obligatory part of national education, and particularly of State education, under such circumstances, and with such fair rules as will protect the religious opinions of the people in Ireland who are naturally very tender on that subject. I would wish that all education should be under State rules, as far as requiring certificated teachers, and results, with accurately ascertained religious safeguards. If such a system, making every provision for religious feelings, was established, I should say as a branch of that should be this technical education, that is, the elements of industrial handicraft knowledge should form a branch just as essential as geography, or any other part of the ordinary curriculum. To that, especially in its initiation, should be applied vigorous rules as to the competency of teachers, so as to secure those of ascertained and perfect fitness to teach the matter in hand. They should be certificated teachers. I think also, if it is to be successful, that this branch should be promoted by the State. But, I think, to leave it, as some of the ladies and others suggested, to voluntary associations to initiate, and then, that these should be helped by the State, might suit in countries far advanced in education, say, England, and still more in countries abroad further advanced, but I do not think it would have any chance of success in Ireland. First of all, the people are not awakened up sufficiently to make the sacrifices which it entails, and next, it would be impossible to get people of position to take up the matter, and to secure the hearty co-operation of the vast mass of the people of Ireland. There is no necessity for entering into the reason why; that would be too long a subject, but to try to leave it to such a combination in Ireland, especially, would be perfectly Utopian. So that, I think, technical education should be a portion of the curriculum of the education of the country; that in the national schools it should be obligatory, and that, in fact, compulsory education once being granted by the State, this technical and bread-earning instruction should be as obligatory a branch of it as any other branch that is to be taught. The Chairman said something about drawing. I think drawing has been taught at the schools in Ireland. There was a kind of furore about drawing, drawing from the flat and from the round, but I doubt

whether there was any result for trade purposes. It was rather looked on in the light of an accomplishment. I think there are industries that are suited for young people, such as the manufacture of the wood carvings we get here in such quantities from the Tyrol. These are not from necessity, things that would employ much machinery or great capital, and if young people were sent to work of that kind, in itself very feasible and attractive, it would give them a taste for handicrafts. It would not, as Sir John Lentaigne knows, and as you have reported, in reference to countries abroad to some extent, interfere with trades outside. We might light on a few things that would not come into any kind of collision with the regular trades existing.

4564. (*Chairman.*) You would like to introduce new industries?— It would be well if we could introduce new industries that would not raise the opposition of the working and trade societies, and I think many of these are to be found, such as wood carving, leather work, and mosaic work. There is also glove making. I got a pair of gloves the other day, which I understand were made in Dublin. They are quite equal to the imported gloves, and they were not extravagant in price. I asked the manufacturer here (Mr. Supple) why he had not these in stock, I had to order them, and why the industry was not increased. He told me it is not increased for the reason, that though he got the machine over here, and cut the gloves, yet when he sent them out to the families who make them up, he had scarcely one pair out of a dozen sent back clean enough for the market. I asked him where he got the gloves done that I had bought, and he said at the convent of Highfield Drumcondara. Sir John Lentaigne could tell you how they manage there.

(*Sir John Lentaigne.*) The way they manage is, that they have two basins with hot water, and when the hands get hot, they put them into the water, and thus keep the gloves from being soiled.

(*The Lord Mayor.*) In consequence of this difficulty, Mr. Supple told me he had to give up the trade. He also told me that abroad where he had looked into the glove trade, he found that instead of great factories and enormously expensive places, the glove making is done at the homes of the artisans and farming people, who have acquired the habits of careful and cleanly working in their schools. They commence by washing their hands, and then they go to work with great care and attention. They spread a cloth over the table to ensure cleanliness, and they are able to send us over hundreds of thousands of pairs. No such trade exists in Ireland, although it is quite practicable, and would be one that could be most rapidly developed without risk. There are no trade difficulties about it, and it would be a home industry. I would direct attention to education of a technical character in the schools which would increase home industries, not of a very ornamental character, but which would be reproductive and profitable, and would not conflict with the standing trades of the country. Directly you have done that, and thus succeeded in spreading industrial education throughout the country, then each trade in its turn would be taken up, and the industrial movement amongst the people would be so powerful that no trade societies could conflict with it.

4565. (*Chairman.*) But do you think it would be either possible or right for the government to teach trades?—I think it would be possible and right to teach such industries as I have alluded to. I made a distinction between trades and home industries, those things which are capable of being done at home. In your first report you said that in Paris and other places, the Government had helped absolutely to teach trade for instance in that school under the Christian Brothers.

*Rt. Hon.
The Lord
Mayor of
Dublin.*

4 June 1863.

*Rt. Hon.
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Dublin.*

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4566. There is no State assistance to the Christian Brothers' School. The municipality of Paris has established the La Villette School, but you may have remarked we did not give much favour to that school?—If tradesmen came in as teachers and the scholars were made tradesmen, and not in conflict in any way with the tradesmen, I think that would be a very good thing, but I think you should teach some bread-earning industry. If you only teach the general elements of drawing and that sort of thing, it will end in no practical result. Anything done should be done by the State, and should be done as part of the ordinary curriculum, and not be dependent on voluntary aid at all. I would teach the advantage of bread-earning industries. I rely upon that strongly, and if you simply teach drawing and the like, and the children do not bring home some profitable knowledge, you will not do much good. Whatever you teach should be something that at home could be readily turned into profitable work.

4567. (*Dr. Roscoe.*) I understand you to recommend then that in the national schools in Ireland, a system of handicraft teaching should be introduced. Are you aware that we have recommended in our first report that an attempt should be made in England to carry on such handicraft work in the schools, and that such attempts are actually being carried out in several of the large towns? Now from your knowledge of England as well as of Ireland, do you think there would be a greater difficulty in Ireland than elsewhere of obtaining the services of competent teachers for such technical instruction in Ireland and especially in the country districts in Ireland?—If by technical teaching you mean trades like tailoring and shoemaking.

4568. We do not propose to go into trade teaching; the recommendation we have made is, in reference to teaching manual work, that is working wood and metal?—I think it would not be difficult at present in Ireland, to get persons to teach good carpentering or tailoring, but if you required people to initiate a new thing like wood carving, I do not think you could get at present in Ireland, persons as teachers, nor for glove-making, &c. They might be had, but I think they are not very numerous.

4569. I am speaking more especially of the teaching of the principles of wood work, and working in iron, beginning from the very simplest work; not glove making or tailoring, but exercises in work and exercises in wood and iron, such as would be given by a foreman carpenter and smith; would there be difficulty in obtaining such teachers?—That is so technical a question, that I have some difficulty in answering it. I think, from the education of the people, and from the way trades are now taught, there would be a difficulty. Twenty or thirty years ago, a boy was bound to a man at his trade, he lived with his master in his house, and was brought up at his master's bench, and that was the system which produced good workmen. Now however, what is the case? In many trades young men are bound apprentices where there are 50 or 100 men, and where the personal attention, necessary for making good workmen, is entirely absent. I do not think that the system of binding young fellows in big establishments, is an apprenticeship that will ever turn out men, who themselves can be teachers. There is also, another remark I wish to make. I think that, whatever conditions or provisions the Commission, after examining into the state of things abroad, and in England, think necessary for the promotion of technical and industrial knowledge in England, might very well be applied to Ireland, because if England requires improvement, Ireland requires it a thousand times more. Whatever good and sound conditions

they lay down for the improvement and perfection of technical education in England, I should be very much inclined to think might be very well applied to this country too.

4570. (*Chairman.*) But you would not recommend us to grant any facilities to Ireland unless we were prepared to grant the same for England?—Do you mean monetary assistance.

4571. Rewards or payments for results and so on?—Monetary assistance might be different on account of the state of the two countries, but I am talking of the plans. In England you might depend on a good deal of voluntary aid, from the good understanding between the different classes of the people,—upper and lower, which unhappily does not exist here, and also from the greater appreciation which every class has of good education, and from the greater amount of wealth in England. When I spoke of similarity, I meant as to the mode of action, but as to the payment, and the providing of it, I think there might be exceptional circumstances in the case of Ireland. There is a young man whose name I gave to the Chairman, the secretary of the Bakers' Society, he tells me there is a large class in Dublin, 600 or 700 men,—of whom 200 or 300 are young men, very young men, in his trade. That trade is entirely dependent on scientific and chemical knowledge, and he is very anxious that there should be some place, where young fellows could go after business, and get some scientific and chemical education, of which they are now wholly destitute. They mostly work by night, their business is arduous, and their habits are necessarily such as to sometimes place them more in temptation than others. If they had something to look to, some prize or something of that character, it would improve their class very much, and on their behalf, being very much interested in them, he will give you some information on the subject.

*Rt. Hon.
The Lord
Mayor of
Dublin.*

4 June 1883.

The Commission then adjourned.

TWENTIETH DAY.

Meeting at DUBLIN.

Second Day.

Tuesday, June 5th, 1883.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., IN THE CHAIR.

PROF. H. E. ROSCOE, LL.D., F.R.S.

MR. PHILIP MAGNUS.

MR. WM. WOODALL, M.P.

MR. GILBERT R. REDGRAVE, *Secretary.*

MR. JOHN MULLIGAN, Town Councillor, and MR. ALFRED WEBB,
Town Councillor, examined.

*Mr.
J. Mulligan,
and Mr.
A. Webb.*

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4572. (*Chairman.*) You are both members of the Dublin Town Council?—

(*Mr. Mulligan.*) Yes.

4573. And you are joint authors of a report presented to the council?—Yes. I should say rather it was the report on which was based the letter sent to the Lord Lieutenant. (*See App. J., p. 385.*)

4574. Will you state very briefly what was the substance of the report you made to the town council?—We shewed the defects that exist in the present state of primary education in Ireland, that there is a total absence of all technical instruction, a total want of system and order in regard to the education both of boys and girls. They acquire nothing but a purely literary education, and they go into the world having to begin their way at whatever trade they have to follow or whatever occupation they are placed at, as if they had got no education at all.

4575. You are speaking of the working class of boys and girls?—Yes. That is what we are chiefly concerned about; and I take it, the lower middle class.

4576. You thought it was desirable they should have some technical knowledge before they entered upon their avocations?—Yes, we considered it indispensable, in fact, in the present state of manufactures in general.

4577. Why do you consider it desirable they should have the instruction at school?—First of all, trade has declined in some branches, and is totally absent in other branches in Ireland. No manufacturer could compete with English and foreign manufacturers unless he had boys and girls who might be employed in the trade, who were in some

way fitted for the trade when they come into his factory. It takes so long to place them in training that it is a serious disadvantage not only as regards the manufacturer himself, but there is no inducement for the boy or girl to enter into the factory, they get such low wages, perhaps none for the first year or so. Therefore there is a great disinclination and a natural dislike to go to trade. There is a natural liking, if the boy or girl is in any way clever, to place them at some other occupation; the boy likes to be educated for some little clerkship, and the girls to be monitoresses in schools, and then perhaps to be nursery governesses.

4578. They look down upon manual labours?—Yes, and the mothers and fathers say, “Oh, we cannot get anything if we put them into trade; we cannot afford to put them to trade and get no wages for a couple of years.”

4579. Have you considered that it would be necessary to keep them longer at school, where they would not get wages, but would have in addition to pay some small fee?—We have considered that point, but it does not press upon parents so strongly as the fact of their being at trade and getting no wages. They would willingly keep them a year or two longer at school. The feeling is not so strong on that subject, they would try and provide for them and keep them at school if possible, they have an idea in the other case that the manufacturers are taking advantage of them.

4580. That is a very important statement with regard to the feeling of the parents, and I would like to ask you, what is your authority for asserting it?—So far as my observation goes, I think there is a great deal of truth in it. Mr. Webb and Mr. Winstanley will tell you whether I am right in the main or not.

4581. A great deal would depend on the willingness of the parents to leave their children at school until a later age?—My opinion is based on observation. I come into frequent contact with families of working men throughout the city, and I see children kept at home, neither at school nor at work, and they are kept willingly and supported there because of the unwillingness of the children to go to work. Therefore I take it for granted, if there was an opportunity of improving them at school, they would keep the children there and try to support them, but once you put them to trade, they think they have provided a future for them, and that they should now look after themselves.

4582. Have you had any conversation with workpeople on the subject?—Yes, very often.

4583. It bears out the statement you have made?—Yes, I have been secretary for the last 12 or 14 years of an orphanage committee, who place out a good many boys to trade, and it is my duty as secretary to see these boys placed out. I have had great difficulty in getting places in manufactories for them, as they want some knowledge. The committee has no funds, and they merely provide the education for them, and the boys should provide for themselves when once they get a trade, but in consequence of having no technical knowledge they have no means of earning a livelihood for one or two years. Lately we have taught them drawing, and reducing plans to scale, and tracing, and the like, and in many cases they get good situations.

4584. Would they get situations like those at Inchicore?—Yes, with builders and timber factors, where they would have to make out specifications and plans for contracts.

4585. Could you state somewhat in detail what you consider should be the kind of technical training they should receive in elementary schools?—I consider that in every town where there is a school say of about 150 or 200 on the rolls—of course I do not confine myself to

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the actual number—drawing should be taught in the primary school as a *sine quâ non*; also that instruction should be given in cutting out patterns, and boys and girls should be trained to distinguish colours and shades. Girls ought to be instructed at an early age in sewing, and, in fact, in all the branches of sewing and dressmaking, and everything they could turn into use afterwards.

4586. Are they not taught sewing in the schools at present?—Only in some of the larger schools, such as model schools. I do not think they are in smaller schools.

4587. Are you quite clear on that?—So far as I know, in the country schools they are not.

4588. But in Dublin they are?—Yes, in Dublin they are.

4589. Are you aware that in the Paris schools and also in the Manchester schools instruction is given in the use of tools for working in wood and iron?—Yes, I have read reports on the subject, and I see that is the case.

4590. Would you recommend that instruction of that sort should be given in your schools?—Yes, and I intended to advert to that when we came to secondary schools.

4591. Would you not introduce it into the elementary schools?—I am afraid the schools here are so elementary, so small, and so scattered, and the teachers so poorly paid, that it would not be practicable at present; but it would be very desirable if possible.

4592. Would it not be possible to engage tradesmen to teach the rudiments of working in wood and iron?—I am afraid not, in the country.

4593. Why?—Because, though there might be in a few of the larger towns an opportunity of doing so, yet in the smaller towns there would not be the skill available for the purpose.

4594. But drawing could be taught?—Yes.

4595. What would you call the minimum size of the town in which instruction of that kind could be procured from skilled artizans?—About from 7,000 to 10,000 of population.

4596. In the smaller towns in the west of Ireland you do not think it would be possible?—No; I know, as a matter of fact, if you want a good carpenter, you have to send for him to a large town many miles away, rather than seek some man whose knowledge is most rudimentary and his work expensive.

4597. Have you resided in any town in the south or west?—No; but I have recently got illustrations of that kind.

(Mr. James Winstanley, T. C.) While on the subject, I may mention that I read an account of the building of a new bank in Ennis, county Clare, and the stone had to be carried 60 miles, from Mullingar; there was no man in the town to dress it; and the labourers had to be sent from about the same distance.

4598. What is the size of Ennis?—It has a population of 3,000 or 4,000.

4599. Is not that rather in favour of introducing manual teaching of the kind I name?—It is entirely so; but where would you get the teachers?

4600. If it were possible to train elementary schoolmasters to give instruction of that kind, would you think it desirable?—Wherever it could be done it would be very desirable.

4601. Your only reason for objecting, if we can call it an objection, is that you do not know how it is to be accomplished?—Yes, that is so.

4602. (*Dr. Roscoe to Mr. Mulligan.*) Can you explain this singular fact, that for so many years there has been no apprentice taken in the town of Ennis?—I consider that in that and other towns there is such an absence of manufactures and all progress that there are very few opportunities for a man to take an apprentice. In fact, when a building contract turns up, now and again, we find it much more convenient to employ the casual journeymen who are passing by, men who are on the tramp, so to speak.

4603. (*Chairman.*) Then, if the boys were taught trades, they would have great difficulty in finding employment in their native towns?—No doubt they would, but they would go to larger towns and get employment. Some of them come up to Dublin and get employment, especially carpenters. I know that from a firm which a friend of mine is at the head of.

4604. It would enable them to get employment in the larger towns in Ireland or in England or abroad?—Yes.

4605. You have labourers coming up to Dublin from all parts of Ireland?—Constantly.

4606. Do you find there is much difference in the capacity and intelligence of those who come from the west, say, from Connaught, and those who come from the rest of Ireland?—I cannot speak positively on the subject. I am not able to speak from personal observation.

4607. Have you anything else to say in reference to the introduction of technical instruction into elementary schools?—No; with the exception that, so far as any attempt has been made to give technical instruction, if it is to be called technical instruction at all, it has been given, I think, in the wrong direction. I cannot regard educating girls to be nursery governesses to be technical instruction; but I know in several schools, especially in convent schools, they teach music and French for the purpose of training them as nursery governesses. The result is an utter failure, for they are not taught sufficiently to be successful, and their time is lost. There is an absence of teaching them cooking and mending and making of clothes in any large degree. There may be some small attempt made, but as regards the cooking especially, there is a great absence of teaching; I think, if there was some small prize given for these things, it would be a great inducement to girls, and they would take greater pleasure, and show more willingness.

4608. (*Dr. Roscoe.*) Has the Science and Art Department not instituted any cooking department in Ireland?—Occasionally ladies go out and qualify, and they give a course of lectures, not alone for ladies, but for the humbler classes. Unfortunately, they are not what I call practical. These lectures do not teach the principles of cooking, they deal rather with special dishes. If the lectures were more as to the general principles of cooking, and how it could be economically done, without any regard to special courses, it would be better.

4609. That is rather for adults than children?—Yes. It would be better if some young girl was sent to be taught in the particular points suitable for these children, and then let her come back and teach in the school from which she went.

4610. And teach the children?—Yes.

4611. Have you anything to say with regard to evening schools?—Yes, I think they are highly desirable; and this is especially the case with regard to science classes. There is a college of science here, and the professors taught science both by means of lectures and practice, and especially chemistry by practice, and the classes were largely

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attended. Somehow or other, whether the professors thought the work too hard or not, I do not know; they gave up the work finally. At present they have a short course of lectures, but have no practical instruction. When they were first started I joined them, and I am aware that several others took advantage of them, and became highly distinguished afterwards in the way of science. One or two of them, from the same class as myself, became professors, and the classes were of great advantage to pupils who were engaged in manufactories in Dublin.

4612. You cannot explain why these classes have been dropped?—They were not kept up with spirit, the interest in them flagged, and in place of keeping them well before the public, they allowed them to die a natural death.

4613. Was it the fault of the professors or the public?—It was both, I think. I do not like to place the blame altogether on the professors.

4614. (*Chairman.*) Are you aware that in some of the English towns and in Belfast there are a number of classes of this description conducted under the Science and Art Department; was Dublin an exception that you had only the classes at the Royal College?—There are classes in Marlborough Street which are confined almost entirely to drawing. There is a literary class there in the evening. But what I would call the technical classes there, are the drawing classes, and they are in existence still, but they are not of such wide application as would be desirable.

4615. Before we pass from elementary instruction, perhaps Mr. Webb would like to add something.

(*Mr. Webb.*) I agree pretty much with what Mr. Mulligan has stated, but perhaps I have not so wide an experience in a particular direction as Mr. Mulligan, and my desires run chiefly that the children in the remote schools, and generally through the country, where they are not near large towns, and where the advantage of special instruction in particular trades is not to be had, should be reached by some better system of general teaching.

4616. In what department?—I am particularly anxious that drawing should be taught in nearly all the schools, and that whatever is taught should be taught more exactly. There is a great want of thoroughness at present in the teaching; I have been in business nearly 30 years and have had boys from both the national schools and the Christian Brothers' schools, and I do not think there is much difference between them. I am often surprised to find from boys up to 14, who have been four or five years at school at purely literary work, how little they know thoroughly. I think in the matter of attendance there should be more care, and the children ought to get more credit for attendance. There should be some system by which regular methodical attendance would be more ensured. I think much of the Kindergarten system. It was, I believe, one of the recommendations in your report that primary instruction should be compulsory.

4617. Have you considered that well?—I have given some attention to it.

4618. Do you see any difficulties which are peculiar to Ireland, which make it more difficult to compel attendance: you know it is compulsory now in England and Scotland?—The only difficulty I see is that the system should be so arranged that there should be nothing in the teaching or arrangements of the school that would run counter to the prejudices of the people either in a religious or any other way. That is the only difference I see between England and Ireland in the matter.

4619. What is the way the difficulty might arise?—Parents might say, I do not approve of that school, it is not the kind of school I would like.

4620. I suppose the children are receiving some education during a portion of their lives; therefore, whatever difficulty existed in reference to the compulsory system would exist equally in regard to the small medium of education they are now receiving?—I think it is a very different thing when you seek to force them. It is a different thing if the parent can send if he likes, and he will regard things with much less jealousy than if he were obliged.

4621. Have you considered what steps should be taken before education is made compulsory?—That would open up a very wide question indeed. Generally I think that the system of education in Ireland ought to be thoroughly in accordance with the feelings of the people.

4622. What modification, if any, would be necessary in the existing system of national education in order to place it in harmony with the feelings of the people?—For instance, in most towns there are now Christian Brothers' schools to which, as a rule, parents prefer sending their children, because they know that the education will be more based on religion. There is nothing of the kind in the national school; religion is divorced from the ordinary course of instruction. I do not say it is excluded, for there are particular hours devoted to it.

4623. Is there anything to prevent parents sending their children to the schools of the Christian Brothers?—No; wherever they exist.

4624. Is there anything to prevent the establishment of such schools everywhere?—There is; because they have to rely on voluntary contributions. The school has to be built by the people of the neighbourhood, and the funds must be supplemented to some degree, and the parents must pay some small fee for education.

4625. Before school attendance is made compulsory there must be certain changes in the present system?—I think so; otherwise I do not see how it could be carried out efficiently.

4626. Then we would be glad to know what are these changes, if you have made up your mind with regard to them?—I think it opens up a very wide question, and I hardly like to go into it thoroughly. I think whatever system of education the masses of the Irish people wish ought to be arranged for.

4627. But can you state these wishes; it is very important that we should know what are the elements necessary in order to establish national education?—

(*Mr. Mulligan.*) Practically, denominational education; if you introduce the system of compulsory education, the people will naturally dislike to send their children to schools where their own religion is not inculcated. That is not only so with Catholics, but with Protestants. The Protestants complain that the national system is a Catholic system, and their children are in danger of becoming Catholics, and the same theory is held by Catholics in some parts of the north, where the schools are practically Protestant. I think this difficulty could be met, except in a few cases, where the number of children of a different persuasion would be so small that there would be no way of providing for their special education, and in these special cases there could be some safeguard adopted.

4628. Is that not a difficulty that rests with the people themselves?—It rests with the Commissioners of National Education and the Government, if they like to devise a system which would obviate what people would call defects.

4629. Is it not possible under present regulations to establish Protestant and Catholic schools in the same locality?—Of course it is.

4630. What is the difficulty about doing it?—Very often the population in a district might not be sufficient to support a Protestant and a Catholic

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school in such a way as to have an efficient school for each sect, but there may be quite enough of the entire population to have one good school; if you divide it into two you have two defective schools.

4631. What would you do in such a case?—The State, in order to have the advantage of compulsory education, should devote a little more money to these particular cases, where there are merely a few Protestants or Catholics debarred from having some school of their own, and there should be some safeguard provided which would give them security that their religion was not being tampered with.

4632. Can you describe the safeguard that you would consider necessary or desirable to provide?—There should be a special inspection of these schools so circumstanced; they should be jealously guarded; and the clergyman of the district whose few children might be so affected should have an opportunity of seeing that the children were not tampered with.

4633. In point of fact, it would be only in details; you would require no change of general outlines; the systems might remain as they are now?—Yes, that is so.

4634. And you think, where the numbers of any particular denomination were small, a school should be established for that denomination?—Yes, until the number came down to a small proportion.

4635. And in many cases, where it is not possible now to establish denominational schools for the minority, you think it ought to be done and assistance given by the Government?—Yes, that is in connection with compulsory education.

4636. And that would be your main condition, precedent to compulsory education?—Yes, and I think there should be greater liberty given to the Christian Brothers' schools than at present.

4637. What are the restrictions under which they labour at present?—Purely Catholic schools are obliged to act as if they were mixed schools; no emblem of the Catholic religion is allowed; and the prayers are excluded except at particular times.

4638. In point of fact, what you would like to see in regard to this branch of the question is that the schools of the religious orders should form part of the national system?—Yes, so far as they would carry on a system in accordance with it.

4639. With regard to nuns' schools, would you wish them to be inspected?—They are inspected at present.

4640. They are inspected if they form part of the national system?—Yes.

4641. But you say they are placed under restrictions?—Yes, as regards religious emblems.

4642. What is your view upon that, Mr. Webb?

(*Mr. Webb.*) I think it is a great humiliation that at a particular period of the day the emblems of religion have to be covered up and alterations made. I am a Protestant, yet I do not think that should be so. These emblems are, I believe, considered as necessary a part of education by Catholics as the bible is by Protestants. What would be the effect of a system of education on Englishmen or Scotchmen which compelled the locking up, out of sight, of bibles during school hours?

4643. What are the times when they have to be covered up?—All the time, except during the religious instruction.

4644. (*Mr. Woodall.*) Under the existing Irish national system, schools receiving Government grants are required to obscure the religious emblems within certain hours?—These hours being the hours of secular instruction.

4645. You think the application of compulsion in Ireland would be very much aided if the State were to recognise the schools of the Christian Brothers and other orders, and allow them to participate in the national grants, while at the same time they carried on their instruction in their own methods without any restriction, intermingling the secular with religious instruction?—Yes, with this proviso that they should be inspected with regard to the literary efficiency of the schools.

4646. You think that, if the Government gave its grants, as in England, on the results of examinations in secular instruction, the work might be carried on, and still they might be allowed perfect freedom as regards their religious methods?—Yes.

4647. You are aware that in English schools the hours of scriptural teaching apply very strictly?—Yes, and there should be a provision about free teaching, for very poor people. You cannot compel people to send their children to school unless it is free of cost.

4648. (*Chairman.*) Do you think it would be possible to carry out compulsory education if the Schools were free?—

(*Mr. Mulligan.*) I think people would make excuses to pay no fees if there was compulsion; at present, as a matter of fact, fees cannot be demanded from the parents of any children in Ireland.

4649. You mean that in cases of poverty they must be excused?—Yes.

4650. You would abolish fees altogether?—Yes.

4651. Even where parents are able to pay them?—I would if it was possible to do so, but I think to advance that proposition would throw aside the whole project of compulsory education.

4652. You do not consider that to be an essential feature of compulsory education?—No, I do not.

4653. You said you thought instruction in manual work could be introduced with advantage into the secondary schools?—Yes.

4654. What do you understand by secondary schools in this connection?—This would follow after a child had been, say, four years in a primary school, and I would remark that his or her progress should be attentively watched, not by a system of results, but rather by constant inspection and examination of the child, for I really think payment by results has a very evil tendency, and I think it should be abolished. The result from such a system is that managers of schools will naturally only take up those branches that pay best, or are absolutely required, while other branches which are more useful are taught to a very small degree or are altogether neglected. Another thing is, the child is not thoroughly taught, it is made up for a certain time just before the examination, especially prepared for the examination which the inspector makes, and it very likely forgets immediately afterwards a great deal of the knowledge so acquired. Whereas, if there is constant examination, and the general result of the school is noted by the inspector, who should be prepared to state the entire efficiency of the school, the manager would be rewarded accordingly. I would wish to draw an inference from that, that, in making this inspection and noting the progress the child has made, the inspector should take account of such child's progress, and if he found it highly satisfactory, the child should get a place in a secondary school; that, in fact, should be the reward of his general efficiency during the course of his instruction at the primary school.

4655. How long would you keep him at the primary school?—Two or three years. With regard to the working classes; there are in Ireland 30 model schools, they were established under the national system, and are still existing in various parts of Ireland. There are four in Dublin; they are scattered all over the country in fact, and everybody is aware

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that, as a rule, they have altogether failed. Being altogether secular they found no favour, especially with the Catholic clergy, and the result is that it is only where there are Protestant children that they are frequented by those children, and although in name they are secular schools, they are to all intents and purposes denominational schools. I would suggest that these schools should be made available for secondary schools. There are about 30 of them; that is nearly one for each county; and in the Protestant districts the schools could be made available for Protestants, in the Catholic district for Catholics.

4656. You would make them denominational schools?—Practically.

4657. What you would wish to see is rather a higher elementary school than a secondary school. You would draw a distinction between the schools you wish to see established and the intermediate schools?—Yes.

4658. (*Mr. Magnus.*) Would you give us some idea of the instruction that should be given in these higher elementary schools?—There should be descriptive geometrical drawing and mechanics as applied to the arts, and the use of tools, regard being had to the special needs of the neighbourhood.

4659. (*Chairman.*) You would make them what are called elementary technical schools?—Yes.

4660. (*Mr. Woodall.*) I suppose you would include science instruction?—Decidedly.

4661. And although you would make them higher elementary schools, you think they should be of a denominational character, in favour of the preponderating opinion of the neighbourhood?—Yes, because the children would be of such an age as to be susceptible to religious influences.

4662. (*Mr. Magnus.*) Do you think these schools should be free? Yes; the child goes to the county town, or wherever the model school is situated, the people of the district from which that child goes should raise a fund to provide for the child's support at the school, that is, for its sustenance and lodging immediately in connection with the school. That should be the liability of the people towards these schools; the State should otherwise find all the funds for the maintenance of the school.

4663. You do not think the parents would be able or willing to forego the assistance of the child at home unless it was supported at the school by some external means?—The cleverest child may belong to the poorest parents, and it is absolutely necessary that some provision should be made for his support.

4664. At what age would the child pass to these schools?—Twelve or thirteen years. It would all depend on the time the child was at the primary school, and the progress made there.

4665. You would restrict admission to those children who had shown themselves capable of taking advantage of the higher education?—Decidedly so.

4666. (*Mr. Woodall.*) Do you think the cost of the maintenance of the child should be made a compulsory charge on the community?—No, I think there would be enough local spirit to pay for it voluntarily.

4667. Do you think that, if the schools were adapted to the particular kind of practical teaching, the localities would respond voluntarily by subscribing for scholarships or bursaries?—I think so. If you take any one particular district, it might be so poor as not to be capable of doing that, but if you take a county, there could be a county fund for the purpose.

4668. Could you give us any instance of where anything of the kind has been done?—No, I am not aware of any.

4669. (*Mr. Magnus.*) Do you think these schools would be sufficient for the whole of the wants of Ireland?—I think, as a beginning, they would be. I do not say they would be adequate ultimately, but they would be a fair start.

4670. You do not think it desirable that the schools of the Intermediate Board should have their curriculum adapted to these particular requirements?—No, because they are attended by children of an entirely different class; they belong to the middle class, and very few of them are brought up in the way the children at the primary schools have been brought up.

4671. (*Chairman.*) You referred to the question of instruction in trades in the primary schools; I would like to ask you, do you think the Christian Brothers and the nuns would undertake to qualify themselves to teach the rudiments of trade instruction if some inducement were offered to them by the Government?—I think they would. With regard to the nuns, of course they would not have the same opportunity as the others, but they would provide instruction quite suitable for the purpose. They would get assistant teachers for the purpose.

4672. If a grant were made by the Government?—They would.

4673. With respect to the inspection you speak of, as a test of the progress of the children, would that not involve enormous expense?—The difference is like that of having a continuous audit instead of an audit once a year. I should imagine the expense would be double, what it is now, but in my opinion it would not be money thrown away. It would increase the efficiency of the schools so much that it would be worth the expense.

4674. And even if payment by results were not abolished, you think it would be of great advantage if the inspections were made more frequent?—I do.

4675. Mr. Webb, is there anything on this subject you would like to say?

(*Mr. Webb.*) No. Mr. Mulligan has expressed generally my opinions.

4676. (*Dr. Roscoe.*) You have stated, Mr. Mulligan, that the science and art classes in Dublin do not in your opinion meet the requirements of the people?

(*Mr. Mulligan.*) Oh, they are not at all so numerous as they ought to be, having regard to the use that is made of them in other towns.

4677. Do you explain the cause of that to be partly the fault of the apathy of the people, and partly the want of arrangement of these classes by the professors?—It is attributable to both.

4678. In Belfast, you are aware that the number of individuals receiving science instruction in 1881 was nearly double those who received it in Dublin?—Yes, that is quite true.

4679. I presume the arrangements for the examinations and for carrying on the classes are the same in Belfast as in Dublin?—Yes; it is quite apparent there is not the same incentive in Dublin as in Belfast for these schools.

4680. Would you explain what you mean by that?—In the first place the manufactories in Belfast are so large, especially the linen and damask manufactories, where designs are constantly required, that it is the interest of the Belfast people to have these schools well looked after.

4681. I am speaking of the science schools to which you referred?—Every one is aware that where there is a large amount of manufactories the people are more inclined to learn science than they are when in the listless apathetic state in which they are in Dublin.

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4682. What suggestion would you make, having in view these differences?—Well, I think the advantages should be much more brought home to the people, and in an easier way than at present. Their attention should be drawn to them. I believe the College of Science is not brought under the attention of the people. I speak not only of the working classes, but of the sons of the middle classes. I know there are scholarships in the College of Science at present that young English students come over and take, and there are plenty of Dublin boys who are walking about the town doing nothing.

4683. (*Chairman.*) How are you to get over that?—Really they do not understand the advantages that are offered in that college, and they spend more money in going to a coach to be taught science than they would spend at that college to be taught thoroughly one or more of the sciences that would be necessary for them; for instance, with regard to medical and engineering education.

4684. But you do not make any practical suggestion as to how that difficulty is to be overcome?—The thing should be brought more frequently before the public.

4685. (*Dr. Roscoe.*) By advertisements, or in what way?—In the newspapers and in other ways.

4686. As a whole, you are probably aware that the number of papers coming in throughout Ireland for these science examinations has wonderfully increased. In 1877 there were 555 papers sent in for the whole of Ireland, while no less than 2,013 were sent up in 1881, and in that same year the number of individuals receiving science instruction in Ireland amounted to 6,000 as against about 57,000 in the total of the United Kingdom, so that, taking Ireland altogether, we may say that the science system is working satisfactorily; is that your opinion?—No doubt there has been an increase, but I consider there was a great decline. I know some 16 years ago there was a large number availing themselves of the science instruction, but it fell off, and probably there is a revival now.

4687. I do not think the numbers shew that at all. I find there is a steady increase since 1877?—But I am talking of 16 years ago.

(*Mr. Webb.*) I think that, while in some degree the large attendance in Belfast is to be found in the manufactories existing there, I attribute it, to a large extent, to the fact that the people there are more in accord with the Government than here. There is a feeling among young men here, that, by going to these classes and attending such institutions, they are going in some way to make Englishmen of themselves, or to make Protestants of themselves. I know that feeling very well. I looked into the matter some time ago. I believe the professors of this College of Science were doing their very best to attract people. I see their advertisement in trains and elsewhere, and there is an earnest desire to have the colleges made use of, but I do not think the young men are availing themselves of it, because of that feeling, viz., that by attending, they are doing something that is not national. I think these institutions will never have their proper effect until they are in some way or other made more national.

4688. (*Chairman.*) Without entering into the large subject of nationalism, can you suggest any way of taking up and accomplishing the work of science instruction?—The only way I could suggest would be by having it under some representative Irish board; it might then be considered Irish and not English.

(*Mr. Mulligan.*) The higher system of scientific education is so connected in our views with the secondary system that, if it were carried out, you would have this higher college made use of, I should say, in a few

years. They would not stop at the secondary system, they would go on to the higher system; that is the intention of foremen and managers, and of young men who intended to become experts in science applied to the arts and manufactures. There are three Queen's Colleges in Ireland, and we consider they might readily be made available, one for each of the provinces, the College of Science being one of the system. So far as the application of science to the arts is concerned, there should be special degrees in these colleges. The class of young men who wished to apply themselves to science as applied to manufactures might be obtained from the secondary schools and the intermediate schools. They could avail themselves of these colleges by taking special instruction in science as applied to manufactures.

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4689. (*Chairman.*) You would suggest that, in addition to the course of pure science now given in the Queen's Colleges, there should be a course of applied science?—Decidedly so. That would complete the system with regard to them. Then there is only one other question as regards special industries in Ireland, for instance, butter-making and fish curing; there used to be schools in Ireland for teaching these things. There are now only two dairy schools in Ireland. The one in Cork has 500 acres attached. There should be schools for teaching girls butter-making.

4690. There is one in Cork?—Yes; but that is a very small means of developing that trade: In Cork you see butter at 60s. a cwt. and also going up to 112s. a cwt., or 120s. There is no reason for that but one, it is not the quality of the grass or anything of that sort, but rather the mode of making the butter, and if there was a proper mode established and properly taught, the result would be to increase the quality of the butter throughout the whole of the country.

4691. (*Mr. Woodall.*) You do not suggest that the teaching in the primary schools should fit the girls for that work?—No.

(*Mr. Webb.*) I hope I made it sufficiently clear that I do not blame the professors here in any way.

(*Mr. Mulligan.*) Nor do I. I know some of them personally, and I know they are most active and zealous.

(*Mr. Webb.*) I have always advised the young men to take advantage of these institutions. I lately delivered a lecture to young men in Dublin for that purpose.

(*Mr. Mulligan.*) In regard to the making and repairing of nets and the curing of fish, there is a total absence of education.

4692. (*Mr. Magnus.*) Have you any suggestion to make with regard to the technical education of girls?—I think just as much is required to be done in the improvement of the system in regard to girls as for boys. They should be taught the art of designing, and they should have opportunities of availing themselves of the College of Science for the higher branches of female education, and they should be able to obtain certificates for degrees in science.

4693. (*Dr. Roscoe.*) There is no class of cookery carried on in the College of Science?—No, with the exception that occasionally lecturers come over and deliver a course of lectures on the subject.

4694. (*Mr. Magnus.*) You are not aware of any intermediate girls' technical school which you would like to take as a model for the schools you wish to have established in Ireland?—No, I believe there are such schools in France, but I do not know that there are any here.

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Mr. JAMES WINSTANLEY, Town Councillor, examined.

4696. (*Chairman.*) You are a wholesale boot and shoe manufacturer?
—Yes.

4696. And you wish to give evidence in reference to the technical education you think ought to be given to artisans in your trade?—
Yes.

4697. Would you kindly make any statement you may think useful to the Commission?—I think boys at school ought to learn the names of the different tools. Take, for instance, boys intended for shoemaking: they ought to become acquainted with the different tools employed in it, and also the mode of using them. They should also learn something of the materials used in the manufacture, and, if possible, learn to distinguish the different qualities.

4698. You would wish them to learn all that at school?—Yes, as much as possible, for I find that, when we get boys entirely strangers to the business, we keep them running about the place for four or five months before we can put them practically to work. They do not know anything of the different classes of materials, and it takes a long time before we can put them to business.

4699. Seeing the enormous number of trades in the country, as well as in other countries, do you think it possible the rudiments of every trade might be taught in every school?—I think the children might be taught a little of it.

4700. Enough to be of advantage?—Yes; I think boys from 12 to 14 years of age should be taught.

4701. Would it not be possible for the trades associations to provide the kind of instruction for themselves?—I think it would.

4702. Has that never been attempted?—No.

4703. Do you consider it would be useful?—I consider it would be very useful.

4704. Do you consider it would be useful if there were some combination for instruction of that sort?—It would be so in many ways. The boys should be taught the use of tools, and should get more of a business education. They should be educated, in fact, as if they were intended for business.

4705. Do you mean by the "tools" the tools to be used in your trade?—I mean whatever tools were used in the trade the boys are supposed to be intended for.

4706. (*Mr. Magnus.*) Do you think this kind of elementary education should be given in the higher schools?—It should be started in the elementary schools: boys do not seem to be taught with the intention of fitting them for trades. If they have got a smart boy in the school, they think he should be a clerk or something else of that sort.

4707. Do you not think great difficulty would present itself, considering the number of trades that exist?—There is no doubt that there would be a great difficulty in that.

4708. Do you think your purpose would be served if children at these schools were taught the use of tools generally, without any special regard to a particular trade?—I think it would.

4709. You consider that in the course of their instruction the children should have some manner of exercise which would teach them the use of their hands, which they might afterwards apply to whatever trade they were engaged in?—Yes; and it would be very useful for them to learn to think about going to some trade.

4710. Do you think there is that distaste for trade amongst children attending elementary schools in Dublin which would make them prefer

going into commercial house as clerks?—That is my experience of boys; they have an idea in Dublin that it is beneath their dignity to go to trade.

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4711. Does what you say refer to the Christian Brothers' schools?—I refer to that class of boys; to any boys whose parents can pay for their education; respectable artisans who send their children to one they consider a little higher than the national schools.

4712. You refer to private schools which are of a denominational character?—Yes.

4713. You think the education is too purely literary?—Yes, and they should be taught more with a view to mechanical work, and have their minds more trained for that work. I know that I find great difficulty in getting smart boys for my business.

4714. You would be strongly in favour of introducing some kind of workshop instruction both into denominational and national schools in Ireland?—I think it would be very desirable.

4715. Do you think it would be advisable that special schools should be started for children who have passed the elementary stages of education, in which they might have instruction in the details of the particular trade which they are going afterwards to take up, and do you think such school education could in any way take the place of apprenticeship?—I think they should be taught something better than they are taught now in some shape or other; it would save a great deal of valuable time. If I get boys or girls, they are not of the slightest use for six or twelve months; whereas, if they had been taught the elements of any trade, they could be earning wages at once.

4716. They should be taught the elements common to all trades, and then they could learn the special details of any particular trade?—They ought to get the elements of several trades; the use of ordinary carpenters' tools is often most useful.

4717. Do you think it advisable that those already apprenticed should attend evening classes, and receive instruction in sciences and arts applicable to your trade?—Yes, in some branches; particularly in new designs and patterns.

4718. Could you give us any idea of the nature of the instruction you think might be given in the evening to apprentices and workmen already engaged in this shoemaking trade?—In the cutting department, if they learned drawing, it would be very useful to them.

4719. Is it not possible for the apprentices to learn drawing under the direction of the Science and Art Department?—I think it would be possible.

4720. Do many of your apprentices avail themselves of it?—I do not think there is one.

4721. Do you know of any objection to the drawing taught under the department?—No.

4722. You do not think there is any desire on the part of the apprentices to improve themselves in that way?—They do not seem to pay any attention to the matter at the present time.

4723. (*Dr. Roscoe.*) Might not much be done by the masters to encourage the attendance on such classes?—I think something might be done, but I find boys do not seem inclined to take advice from us outside the works. I think, if these science classes were brought more into harmony with the schools, it would have a very good effect. I do not think the teachers here encourage boys, or teach them to look forward.

4724. (*Mr. Magnus.*) You think a great deal might be done if the schoolmasters and employers of young apprentices encouraged the

Mr. J. Winstanley. attendance of these young fellows at evening classes?—Yes, I think they would become popular; they would tell one another of them, and they would go more than they do at present to these classes.

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4725. (*Chairman.*) You know a good deal about the feeling of the artizans generally in Dublin?—I have had a good deal of experience of them.

4726. Are you of opinion that the supposition is correct that there is much jealousy, on their part, of the kind of instruction, and of the work that is done in industrial schools; for instance, in the Artane industrial school?—There was a prejudice some time ago, but it is dying out now. In my business they were very much against Artane School, for they thought it was teaching too many of my trade. But that feeling has died out; they find, in practice, that it does not affect them.

4727. Is there anything you would like to add?—No; except that the same thing applies to girls; they should be taught very much in the same manner, and should be taught needlework more particularly.

4728. Are they not taught needlework in the convent schools?—Yes.

4729. (*Mr. Magnus.*) Do you attach much weight to the statement that these science classes would be more frequented if placed under the direction of an independent board of management?—I think, if they were made more popular in some shape, they would be much better attended. I believe the feeling at present amongst the working people is that these classes are something above them, and intended for another class of people.

4730. (*Chairman.*) Then you think that, if classes were established in parts of the city where the working people live, they would go to them?—They would go to them then.

Mr. C. Dawson, M.P.

Mr. CHARLES DAWSON, M.P., Lord Mayor of Dublin, recalled.

4731. (*Chairman.*) You are of opinion, I believe, that, in the event of any change taking place in the organization of the national schools, it would be desirable that in Ireland the municipal corporations should have conferred on them functions like those of the School Boards of England?—Yes; the fund now available is confined to the rate of one penny; but if the Government were going to supplement that sum, or were themselves to do the work, the municipality should be brought in for the very reason stated by Mr. Winstanley. The municipalities in the North would be in harmony with their people, and the municipalities in the South would be in harmony with the people there, and that might bring them more into connection with these institutions.

4732. You are aware that it is in the power of any person in the community to organise a science class; it is not necessary that you should wait for any impulse from the Government, or for any new law; you, in conjunction with some of your fellow citizens, would be able to establish a class at once?—Yes.

4733. (*Dr. Roscoe.*) There are a number of schools already established in Dublin where science classes are carried on?—But they do not touch these cases.

4734. Still, it is within their power to start a science class, if they think it advisable?—No doubt it is.

Mr. ABRAHAM SHACKLETON, J.P., Town Councillor, and Mr. ROBERT SEXTON, J.P., Town Councillor, examined.

Mr.
A. Shackleton,
J.P., and
Mr. R.
Sexton, J.P.

4735. (*Chairman.*) You have special experience of the schools attached to workhouses?

(*Mr. Shackleton.*) Yes; the South Dublin Union Workhouse. We are both guardians of that Union.

4736. And you wish to state that there is a great need that technical instruction should be given in these schools?—Yes, we think there is, and that the boys and girls there would derive great benefit from technical instruction. There is a certain amount given at present. There are about 120 boys there—frequently more, up to 150—and about 180 girls, and the amount of technical instruction they get now is very limited. One of the reasons is that, at present, our workhouse is very much overcrowded by increased pauperism; but we are about to build schools on a piece of ground lately acquired, and when we do that there will then be scope and space for better arrangements.

4737. When you speak of increased pauperism, do you mean there is an increase relatively to the population, or that the population has increased?—Relatively to the population; the number of paupers in both the North and South Unions has increased in a much greater ratio than the population has increased within the last few years.

4738. How do you account for that?—From various causes; amongst others, the bad state of trade. It is a notorious fact that there is a great deal of distress in Ireland. It is not confined to the country parts, although a great many of our paupers are moving in from the country to the city; they come here to seek work, and they cannot find it. Some of them actually come, seeking the workhouse.

4739. We are always told that in the country districts the poor people object to go into the workhouse?—Of course they do not like it, but when once they are compelled, they will go into those workhouses, where they think they will get the best treatment.

4740. They would rather go into a large workhouse than into one in a small country district?—Yes; at present we have about 120 boys going to our school; of these about 100 are healthy boys, and 20 are boys under treatment in hospital and coming in during school hours. There are 8 employed in the weavers' shed; we manufacture tweed and frieze. They are employed for a couple of hours in the afternoon. There is a certain amount of intermittency in it, owing to the nature of our workhouse population. There are about 30 in the tailors' shop, but the time for any instruction is very short, and the class of work they are employed upon is utterly useless to them in after-life. They are merely employed in mending and patching, and they are not there more than 9 to 10 hours in the week; they leave school at the age of 15, and are then removed to the adult department.

4741. Nine or ten hours is a very considerable part of the school hours?—The master told me every boy is put first into the tailors' shop in order to learn mending in a rough sort of way, and they are put afterwards to other work. There are about 20 in the shoemakers' shop, and they do very little and very bad work, and there is very little practical result from it. As a matter of fact, our boys do not turn out to be either tailors or shoemakers in after-life.

4742. How do you account for that?—That the instruction is not of a sufficiently systematic or sufficiently technical nature. There are about 40 of the boys employed in the garden, and they really work with a will and do useful work, but the master says very few turn

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out to be of any use as weavers, tailors, or shoemakers. It is a curious fact that there are about 30 workhouse boys barbers, which seems to be a favourite avocation. There are a few that have turned out remarkably well. He knows six boys that went out to be coffin makers, and some of them got on uncommonly well. One of them at present owns two timber yards in Montreal and employs 20 or 30 men, and another went into the service of an undertaker in town, got to be his head man, and ultimately married a woman who had a hotel, and now he is the owner of two hotels in Dublin.

4743. May we take it that perhaps the reason of the want of success of a number of these boys is their previous bringing up; the conditions by which they have been surrounded before they come into the workhouse?—I do not think that is the case, for a large number of them are boys brought up in the workhouse. The master tells me that of his 120 boys at present there are in all about 30 who are permanent inmates. Their parents come and take them out at any time, and they return again; and consequently the instruction they receive is of no use to them in after-life.

4744. What is the remedy for that?—For that there is no remedy under the workhouse system, when the parents go out the boys must be sent out too. There are about 50 who are resident, and the remainder are in and out. Besides it is perfectly clear that the instruction is of no value to the permanent inmates, for there is no system in the technical instruction. These boys, on account of their being in the workhouse, look upon it as a kind of task, and they never go at it with ardour.

4745. How far is it in the power of the guardians to alter this state of things—you say, “if better technical instruction were given;” what is to prevent you giving that better instruction?—I pointed out that there was a temporary difficulty in the matter of space, and there is another difficulty, namely, that the only way would be to have the boys under workmen in the house. Now a great deal of the work is done by inmates who are tradesmen, and it does not do to have them associated with the workmen who are tradesmen.

(*Mr. Sexton.*) They get no remuneration (that is, the tradesmen), and they are perfectly indifferent about employment.

4746. (*Chairman.*) It will be in your power to have a regular carpenter's shop when you get into the new premises?—Yes; it may be right about the carpenter's shop, but I think there would be no means of training them as weavers or tailors; the only way would be to transfer them to some such school as Mr. Mulligan mentioned; some model school where they could be properly taught.

4747. Are you aware that the children from the English workhouses are in a great many instances now sent to elementary schools in the neighbourhood, and that the workhouse school is entirely closed?—I am not aware that that is the case.

4748. The results of that system, I believe, have been satisfactory; is there anything to prevent the same thing from being done in Ireland?—I do not think we have any schools of the character we could send them to.

(*Mr. Shackleton.*) I do not think that that is a subject which any of the guardians have considered. I think there are schools they could be sent to, but my impression as a guardian is that it would be better to have our schools in the workhouse and to teach them there.

4749. (*Chairman.*) What is to prevent you giving technical instruction in the workhouse, or what can this Commission do to assist you to do it?—There is a large Christian Brothers' school in the immediate

neighbourhood of the workhouse, and if there were technical instruction given in that school, I do not see any difficulty in sending the children out there.

4750. (*Dr. Roscoe.*) Would it not be a great advantage to get these children amongst others outside?

(*Mr. Sexton.*) Yes, I think it would be a great advantage to get them out of the influence of the workhouse, and to place them amongst other children, and if any school like the Christian Brothers' school, with technical trade instruction, could be made available, it would be a great advantage.

(*Mr. Shackleton.*) I do not think our boys look upon the workhouse as a punishment. I know boys that were rejoiced to get into the workhouse; they have opportunities which other paupers have not. They are taken out to walk once a week, and seeing that that can be done without injury to discipline, it would be a great thing if such a school as you mention could be procured for them.

4751. (*Chairman.*) Apart from the question of manual instruction, would it not be a good introduction to civil life if these children moved amongst the children at the national school or the Christian Brothers' school instead of being kept by themselves?

(*Mr. Sexton.*) Yes; no doubt it would. The great complaint we have to make is that a number of them come back. We were sending emigrants away recently, and some of them had been 10 or 20 years in the workhouse. They get domesticated there. The system of apprenticeship is nearly obsolete. They merely get a scrambling knowledge of their work.

(*Mr. Shackleton.*) There is a wide field for technical education, if the right plan is adopted, amongst children in the workhouse. There are about 300 children boarded out through the country; of course we are responsible for them; if they are not absorbed into the general population, they are sent back to the workhouse. If technical education was introduced into the national schools, they would get the advantage of it.

4752. (*Chairman.*) Then we may sum up your evidence by stating that technical instruction should be given in elementary schools generally, and that it is desirable that workhouse children should be sent to these schools?—Yes.

Rev. J. McKenna, P.P., Belleek, examined.

4753. (*Chairman.*) You wish to give information to the Commission on the advantages derived by the inhabitants of Belleek from the establishment of the potteries there?—That is one item of the information I wish to impart.

4754. Will you state briefly the nature of any other information you wish to give?—Generally I wish to say that I think technical education in the country would do a great deal of good. I will state briefly the reasons for that. The neighbourhood of my parish is the most replete of any in Ireland with mineral wealth, and I wish to say we have an industrious, intelligent, and respectable population, in comparative idleness for want of employment. I am parish priest of one of the largest parishes in Ireland; the largest in area, 68,000 acres; and its extent is 17 Irish miles.

4755. Seventeen miles in area or in length?—The parish is not so broad as it is long. In addition, its mineral resources are exceedingly well adapted for development if we had factories and trained workers.

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4756. (*Dr. Roseoe.*) Will you give us an account of its mineral wealth, in what does it consist?—We have an unlimited supply of the best limestone; for miles round Belleek the whole country is composed of the best limestone in Ireland. I believe this limestone is said to be capable of being polished into marble. Along with that there is lead ore and iron ore.

4757. Has the quality of the lead and iron ore been tested?—Yes; Mr. Bloomfield, a local proprietor, has made large explorations, and the remains of these trials are still to be seen there. They have opened pits all about the country, where miners have tried, and they have succeeded of course partially, and from what I can learn it was not the want of mineral lode that caused them to stop, but other causes. We have traces of these various attempts at mining in several places, and a company is now about to begin work again there.

4758. Is there any coal?—Yes. I have not seen it myself, but it is said coal can be found in the parish. We have the famous felspar lying unused throughout the country. They are making roads of it, because they have nothing else to do with it.

4759. (*Chairman.*) Was it the existence of the felspar that led to the establishment of the potteries?—Yes, I should think so. And for peat we have thousands of acres of it.

4760. What would you suggest as arising out of the statement you have made?—I think the introduction of practical arts would be a great means of developing many of these resources, as well as constituting an educational development. I think technical instruction is the great panacea for the evils we suffer from. It is admitted it is manufactures we want, and I think that technical education would be a great means towards attaining that end.

4761. How is it factories have not been established?—The Belleek pottery has been established. Up to the present time there has never been much encouragement given to factories in Ireland. On the contrary, there is a wide spread impression that they have been rather discouraged. There is a factory between Belleek and Ballyshannon built on the plan of those at Manchester. It has been completed for 20 years, and it is of no use, because an association was got up for the purpose of buying it up and keeping it from being a rival of England. I was told that. I heard it on good authority.

4762. Some designing person bought it up in order that it might not take the trade from England?—Yes.

4763. About how many years ago is that?—It is 20 years ago. As to the Belleek pottery, I may state that a similar effort was made to injure it. I questioned the manager, Mr. Armstrong, and he said it was true that a proposal had been made in London to buy it up, but Mr. McBirney suspected it. He had to meet it in London. The people believe generally in the country that the Belleek pottery would be closed if it were allowed to be bought up.

4764. You did not understand that it was intended to close it?—He understood that that was the design, but it was not expressly stated so.

4765. How many years ago is that?—It is two years since I heard it. I am giving you public rumour.

4766. (*Mr. Woodall.*) These are given rather as specimens of the credulity of the people?—It is what is generally said.

4767. (*Chairman.*) You say that the English people are jealous of Irish manufactures?—Yes, that is the common impression.

4768. (*Dr. Roseoe.*) Is that the opinion of the working people or of capitalists?—Of the peasantry of the country.

4769. (*Mr. Woodall.*) Do not you think, if outsiders came in to buy up the factories as soon as they were built, it would encourage you to build factories?—It would seem so indeed; we want factories to give employment, I was recently congratulated by Lord O'Hagan on having in my parish the only Irish industry that was worthy of the name.

4770. (*Dr. Roscoe.*) Do you exclude the linen factories?—No, but I place the potteries at the head of them all, both for the artistic and for the commercial value. I have here a pamphlet published at Melbourne, where it is said a prince in Japan gave the palm to Belleek as producing the finest pottery in the world. That gentleman, a prince, has a pottery in Japan, and his name is therein mentioned as having stated that the Belleek ware was the best he had seen.

4771. (*Chairman.*) What can this Commission do?—I cannot tell, but if it would lead to the establishment of factories and industries in Ireland, I believe it would do much for our country.

4772. That is beyond our scope; what we are asked to do is to report as to how people can be instructed. It is not our business to direct the establishment of factories or the employment of public money for that purpose. We have no power in that direction?—I thought that the development of Irish resources constituted the scope and object of the Commission.

4773. Our Commission is a Commission for the purposes of technical instruction?—Well, look at Belleek. For ten miles there are abundant opportunities for factories, and I myself am prepared to give one of the best sites in Ulster for a factory. At Pettigo they have nothing but beggary and want from need of employment. There might be mills along the river for a course of ten miles there if they had the people to work them; but unfortunately they are gone to America. We have a large population, or rather had a large population, of simple-minded, honest, industrious, people, willing to work, intelligent and most agreeable, and, I may add, most peaceful.

4774. They only require to be taught something?—Yes. I have six schools under my own management, and two others are building, and the average attendance at these schools is about 70, half being males and half females.

4775. (*Mr. Woodall.*) That includes boys and girls?—Yes, from the age of 16 downwards.

4776. Are these national or elementary schools?—They are national schools.

4777. (*Dr. Roscoe.*) Is there any education of a technical character given in these schools?—Nothing beyond a literary education.

4778. Would you recommend the introduction of any technical instruction into these schools?—I would very strongly.

4779. Would you give us your idea of what would be suitable?—Instruction calculated to develop the resources of the country.

4780. What would be suitable to your district?—I would say the boys should be taught different trades.

4781. What trade would you propose to teach them?—There is scarcely a trade existing that I would not like to see introduced.

4782. Would it not be difficult to teach these trades in the schools? That is a serious question. In my reply to the Irish circular I stated that I should be happy to see the workshop system carried out.

4783. We are told that a great difficulty is found in getting teachers?—That is a difficulty very easily got over. The whole thing depends on the wages. If you paid them properly, they would come from all quarters.

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4784. You would have to import them?—No, I do not say that; but I say that, if the schools were established, and you were to give sufficient wages, they would come from all quarters; but the residents in the neighbourhood could not teach.

4785. (*Mr. Magnus.*) This importation of schoolmasters would be very extensive?—At Belleek we have skilled workmen who would provide instruction for the district.

4786. (*Dr. Roscoe.*) In other more remote districts what would you do?—I do not say you would find local workmen everywhere capable of teaching.

4787. (*Mr. Magnus.*) Is drawing taught in the schools?—No, but I should be glad to see it introduced. The teachers are not capable of teaching it. Some few were taught drawing in convents.

4788. Are many of the children in the schools taught the business and afterwards taken into the potteries?—No. They are taken up generally at the age of 12 or 13, and are apprenticed in the pottery for some years, but there is no such thing as being trained outside the pottery.

4789. You think it desirable the children in the school should be taught drawing?—Yes, as a foundation for technical instruction.

4790. Is there any difficulty in introducing good drawing instruction into the schools, to commence with?—No, I think there is not. We get drawing materials from the Board under the national system.

4791. (*Dr. Roscoe.*) Why then have you not had this drawing tuition?—The teachers could not generally teach it themselves.

4792. Then would you have to import special teachers?—Yes, I have had one or two female teachers who could teach drawing, and it was astonishing how the children took it up; but we had to discontinue drawing, owing to the want of a sufficient number of pupils.

4793. (*Chairman.*) How is it you have so few pupils?—We have abundant pupils, but so few were learning drawing that the assistant was not continued. We got a few assistants by accident who could teach drawing. It was outside the rules of the Board, and they gave the instruction gratuitously to those children who had a turn for it; and it is astonishing to see how far it has been developed, and how they stick to it even though the teachers are gone.

4794. (*Dr. Roscoe.*) Can you under the present system get from the Education Board sufficient funds to pay for such teaching in drawing. I believe it is part of the rules of the Board that they will pay for drawing?—I know it is, for they send drawing copybooks, and when asked they have made provision for paying teachers to teach drawing; but in the country, in rural districts, it is rarely we can meet with a teacher who can teach drawing.

4795. What would you like to see done in reference to the teaching of drawing?—My own opinion is that, if the teachers of the schools were paid either by the Education Board or from any other source, to teach drawing both to boys and girls, it would be a great improvement.

4796. (*Chairman.*) Do not they get paid now for drawing; do not they get a grant from the Science and Art Department?—The teachers do not care to undertake it at all. We have science in connection with the Department, but no art teaching.

4797. (*Dr. Roscoe.*) There is art instruction in Ireland under the Science and Art Department at Kilkenny, Waterford, and four or five other places. In Belfast, Lisburn, Armagh, Newtownards, and Dunganon, there are schools of art, or art classes carried on in connection with the Science and Art Department?—I was chairman some time, in the parish I left, of the science committee, and it was with great difficulty

that we got permission from the National Board for the introduction of science teaching into the national schools. So much so, that I had to report against it and abandon it in my own school. I always thought that the teaching of science and art occupied too much of the time and attention of the teachers, and as introduced into this country was but of little use.

4798. Have you any science class carried on at Belleek?—We have none in connection with the school.

4799. Why?—Because I had had considerable experience of this in the other parish; I had found that it occupied too much of the time and attention of the teachers.

4800. You think they have not time or energy enough to carry it on?—The whole system of education as regards the rural population was a mistake.

4801. Are you aware there are classes of agriculture carried on?—It is a misnomer; so far as practical development goes, they are no use; and they are looked upon in the country as a humbug.

4802. What kind of class would you like to see established?—I would like to see the children taught the different trades suited to their sex. I have numbers of intelligent children in the parish, and after they leave school, they look to me to obtain situations for them. Had we the trades taught, they could go into the pottery, and paint there, as the children in England do. Or they might be taught to make book markers like these I bought this morning; some of these ribbons were made in Dublin, and others in London. Here is one made in Dublin, and it shows what an Irish girl can do. This, however, is too costly to attempt; but if they could make the dear article, they could make the cheaper one. The ribbons are used as book-markers; girls might be far more encouraged in manufactures of this character.

4803. The Dublin made ribbon is much better and more costly; why could they not make the cheaper?—They are not sufficiently taught.

4804. (*Chairman.*) They give them instruction in the convent which enables them to do that?—Yes; I understand so.

Mr. FITZMAURICE BLOOMFIELD, J.P., examined.

4805. (*Chairman.*) You heard Mr. McKenna's evidence; have you anything you wish to add to it?—What we want to show is the difference in the condition of things at Belleek before the pottery was established there and since the manufactory was established. There is a great mistake made in the way in which national school instruction is given now. I think useful things for the children are very much neglected, and things that are no earthly good to them are taught. For instance, agriculture and things of that sort are much neglected, and anything that is not actually included in the subjects for results fees is not taught. One of the results is that a teacher will take 8 or 10 of the cleverest boys in the school and cram them in order that they may get the results fees, and that he may bring them out as very clever children, clever, totally irrespective of whether the subjects are necessary.

4806. You would like to see two changes made; in the first place that certain subjects should be valued and paid for as results which are not now recognised, and in the second place you would wish more recognition to be paid to the general condition of the school than to the special and favoured pupils?—Yes.

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Mr. F.
Fitz Maurice
Bloomfield,
J.P.

Mr.
FitzMaurice
Bloomfield,
J.P.
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4807. (*Dr. Roscoe.*) What are the special subjects in which you wish to see the pupils instructed?—In the first place agriculture particularly; I speak especially of the South. There are several things that could be taught, such as planting osiers and the manufacture of wicker goods, which bring in money. Everybody knows there are places in Ireland where this industry might be developed, but none of this work is done in Ireland; nearly all of it comes from England. This is a source of wealth that poor people know nothing about. The things that are suited for female children, sewing and that description of work, are entirely neglected in the schools. They are taught reading and writing, and crammed with grammar and everything of that kind, which does them no good.

4808. They must be taught reading and writing?—Yes, but not the higher description of that education, while the industries that their fingers want are totally neglected.

4809. (*Chairman.*) Is there no inspection of sewing?—(*Mr. McKenna.*) Yes, but I believe the inspector is a male, and he is a bad judge of sewing. I think this is a strange thing.

4810. Have you no ladies in the parish who could assist in that?—No, we have no persons more highly educated than the teachers themselves. The Belleek pottery factory has not only made the people comfortable, but it has wrought wonderfully on the moral aspect of the people. It has made them respectful of themselves, and it has lifted them to a higher position and trained their intellects. The establishment of the factory has shed its influence around for a radius of two or three miles. My congregation is of the most respectable character, and yet it includes many of the poorest kind of people. In dealing with the people, their civility and self-respect are quite evident to every one, and this has arisen from the fact that the works have put them into a position of comfort.

Mr.
T. Connolly.

Mr. THOMAS CONNOLLY examined.

4811. (*Chairman.*) What is your present office?—I am Agent for the Government of the Dominion of Canada for emigration purposes.

4812. And you are well acquainted with the working population of Ireland?—Yes, I am a stonemason by trade.

4813. You pursued your trade in England?—I worked in England many years, but I built a mansion for the Earl of Dunraven at Adare in the south of Ireland before I was 30.

4814. Had you any difficulty in learning your trade?—Not the slightest. My father was a builder before me, and I was by his side when he laid the foundations of that mansion. I made many of the drawings. I got a few lessons through the Countess, and I made all the working drawings for the Earl and my father. Mr. Pugin, the celebrated Gothic architect, said it was the best stonework he ever saw.

4815. You are self-taught?—Yes.

4816. We should like to know whether you consider that the artisans of Ireland in your trade and in other trades have all the means of obtaining instruction which it is desirable they should have?—I believe they have all the natural genius to make good artisans to a greater extent than the people of any other country, but I do not believe they have the necessary aids to learning.

4817. Are you acquainted with the Science and Art Department, and with all the aids there might be within their reach if they applied for them?—Undoubtedly.

4818. Do you consider these to be in any way defective?—I believe that they do not reach the people for whom they were intended, and for whom they would be best suited.

4819. How is that?—In the first place, just as those interested in denominational education urge on the teaching of the catechism in the school, so the pupils intended for industrial pursuits should be prepared for these at the time of their primary education; and for that purpose I believe every public school in a reasonable centre of population should teach drawing as they now do reading and writing; for there are certain ideas that no amount of language, however perfectly you may master it, would ever convey with the same effect as the actual representation of them in a drawing.

4820. You consider drawing to be as essential to a working man as reading and writing?—Undoubtedly.

4821. What kind of drawing would you teach the children of working men. Would it be freehand or lineal?—At first freehand, and lineal to those who had an aptitude for it. I never had the slightest aptitude for freehand drawing, though I could make as good a lineal drawing as any man.

4822. The children can learn drawing with a compass afterwards, but all children should be taught freehand drawing?—Yes. Then, with regard to the Science and Art Department, the children who so wish, after passing through the primary school, might go on to those schools to which you before alluded under the Department.

4823. In the elementary schools would you wish the use of tools to be taught?—No, they could not teach that. If they were taught in that way, not one in a thousand would ever arrive at perfection in his trade.

4824. But do not you think it would assist him afterwards to be taught the elementary work of common carpentry?—No. For instance, stone work is very easily learned, and perhaps to teach a boy the use of tools at a very early age might cramp him for the proper use of them when he grows up. Take, as an example, a boy with a weak arm; he gets into a method of sawing wood and doing other heavy work with his weak arm, and it will stick to him when he grows up.

4825. Do you think there is anything in what has been said to us that allowing children to learn the use of tools encourages them to take up trades where otherwise they might wish to become clerks or men who serve in shops?—Nothing in it at all.

4826. You think that the instruction in schools should be confined to the ordinary literary subjects and drawing?—Undoubtedly.

4827. And that the children should learn their trades in a workshop and should receive instruction in the principles which govern these trades in classes like those of the Science and Art Department, after they have left school?—Yes, after they have left school.

4828. In point of fact, except so far as the facilities for drawing go, you think they are now in the right direction?—Yes, I think so.

4829. But you do not think the advantages offered by the Science and Art Department are brought home to the knowledge of the people soon enough?—No, not soon enough.

4830. What do you mean by "soon enough"?—I mean at an early age.

4831. At what age do you think boys ought to be encouraged to attend science and art classes?—At 12 years of age, after they get a

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reasonable education, say in a common school, and get a reasonable proficiency in drawing.

4832. But you would wish them to begin to avail themselves of the instruction given in the science and art classes at as early an age as 10, 12, or 13 years?—Yes.

4833. (*Mr. Woodall.*) But you say they should be initiated in the primary schools?—Yes, I think they should learn there the rudiments of drawing.

4834. (*Chairman.*) You speak of their attending classes in which the elements of science and art are taught from the age of 10, 12, or 13. Would you wish these to be independent classes, or would they be taught these things in the ordinary classes?—Not only would I compel them to get a knowledge of drawing in the schools, but to attend art classes.

4835. (*Mr. Woodall.*) You were asked some questions with reference to the science and art classes, and the reasons they were not reaching the population generally, and you said that these aids did not reach the people because they were not made familiar with them in early life, and that in the primary schools you would have them taught drawing the same as writing; and that, when they have gone to trade, they should be taught in night schools the principles which govern their occupation?—Yes.

4836. (*Dr. Roscoe.*) Are you aware that aid is given to elementary day schools both in art and science?—I am not aware to what extent.

4837. And that the regulation which makes children eligible for receiving art instruction is simply that they must have passed the second grade, and must have been marked in a previous examination good or excellent in two of the subjects of the first grade, and that this would enable children under 12 years of age to take advantage of the regulation of the department?—I am not aware to what extent the department does supply the want I allude to, but I know the want exists.

4838. Are you speaking now of Ireland, or generally of the United Kingdom?—I am speaking of the United Kingdom generally.

4839. And you think that throughout the United Kingdom instruction in art is not sufficiently brought home?—It does not sufficiently meet the needs of the working people.

4840. I should like you to answer with respect to Ireland only?—I have in that case only to repeat the answer I gave before.

4841. (*Chairman.*) That for some reason or other advantage is not taken of the facilities offered by the Science and Art Department?—Yes.

4842. What is that reason?—As I said before, it was the lack of instruction in drawing in early life in the schools. Young children as they grow up have no idea of the arts, or of the uses to which they may be turned.

4843. You mean to say that the teaching of drawing from an early age in elementary schools is the key to all subsequent art instruction, and, that key being wanting, it is no use offering people art instruction at a later period?—Yes; the bulk of the schools at present know nothing of it.

4844. Is there any suggestion you would make, besides that of the teaching of drawing in schools, which would lead up to the working population availing themselves of the facilities offered for instruction in science and art in connection with the Science and Art Department?—You must bear in mind that we have an adult population growing up in ignorance of these subjects in which the future generation will be initi-

ated. I consider that, to meet the needs of these, there should be in every large town a reading room, as there are at Birmingham (the Midland Institute), at Boston, at St. Louis, and in all the United States. Take, for example, the Cooper Institute in New York, where working people, after looking for a job in the morning, can go and read the papers, and take down a book and read it. In connection with the Cooper Institute there are art classes on the principle of the Mechanics' Institute in Dublin.

4845. You have a Mechanics' Institute in Dublin?—Yes.

4846. Are you acquainted with it?—Yes; though it is very good in its way, it does not answer the purpose at all.

4847. How do you account for that?—In the first place, the building is too small; the reading room is very confined; and it may be that a workman has not a penny to pay with every time he may want to go in.

4848. Have free libraries not been built?—Not that I know.

4849. (*Dr. Roscoe.*) Is there a working men's institute in Dublin?—No, but there are clubs.

4850. In Belfast there is an institute, with 300 students, under science instruction?—There are a few clubs and temperance societies, and such like.

4851. (*Chairman.*) The Cooper Institute in New York was the gift of Mr. Cooper, but the other similar institutions are municipal institutions?—In some places; the one in Boston is a gift also.

4852. But there are free libraries established by all the municipalities in the principal American towns?—Yes.

4853. And in Canada also?—Well, the Parliament Library at Ottawa is free to all, and they have agreed to establish a free library in Toronto. They have taken a vote of the inhabitants on it, and they have agreed to it. In the States, and in Toronto also, these free libraries are carried on and established at the expense of the municipality.

4854. Would you like to see the same done in Ireland?—Yes, in every centre of population.

4855. What is there to prevent its being done?—Nothing, except the disinclination of the people.

4856. How is that to be overcome?—You make everything too high; you do not begin low enough to educate the people. Everything that is done in Ireland is done for the benefit of people who are able to take care of themselves.

4857. Why do not you do that in Ireland?—We are a tribal people, full of pride and petty jealousies which prevent us from working together for the common good. Look at the splendid deputation that waited on Mr. Gladstone the other day on the subject of the mail contract. Every argument was used to ensure the comfort of the upper classes; one ship should not be an inch less than the contract size; but I never heard one word with regard to the comfort of the working man passing over from England to Ireland. The cattle going from the North Wall are a great deal better taken care of than the poor Connaught man going over to reap your harvest, and to build up the industries of England.

4858. That is not the fault of England?—No, it is not.

4859. You want more public spirit?—Yes, undoubtedly, and I am pleased this Commission has come over at this particular time, because you may make as many Land Acts in the House of Commons as you

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like, but you will not increase the area of this island; the agricultural resources will remain the same. No sane man could think that the agricultural industry of this country could sustain five and one half millions or thereabouts. If you only supplement the resources of the soil, by manufacturing industries, we shall be as happy here as in England.

4860. You are aware that our warrant only extends to technical education, and not to the establishment of industries?—I know that, but I think it would be a great aid to the establishment of industries if in cities we had reading rooms, such as I alluded to before, available for the use of the ordinary population. You ought to have a proper museum here as in South Kensington, with specimens of the island's products properly displayed.

4861. Are you aware that in the Royal College of Science there is a splendid collection of the Irish minerals?—As I said before, you put these things where they cannot be seen. All your light is put under a bushel in Ireland. I did not know that there was such a place until this morning.

4862. Do you know that they are going to spend 100,000*l.* on a great building for science and art purposes?—I do, and I hope, when they do so, they will do it as in South Kensington, and give us specimens of the products of the country, and give us something like that model room in the Patent Office buildings at Washington, where you will see all the labour-saving machines in the world.

4863. Are you aware that they have left off making it compulsory for patentees to deposit models at Washington?—I am; but I think it was very useful as an educational institution.

4864. Are you aware what was the reason that that was done?—I believe the difficulty was in keeping the specimens in order; the collection was getting so large; but everything, like that in a museum; everything that could assist labour, and assist in the development of the resources of the country, ought to be always kept in view. There are a hundred and one industries that might be made profitable. There is plenty of capital in the country. We have over 30 millions invested in the banks on deposit, and that is invested by our bankers in Venezuela or Turkish bonds, and we have not public spirit enough to employ it for manufacturing purposes. I think, in your Parliament House, you ought to have an apartment decorated with the different marbles of England and Ireland, and your gentlemen in Parliament would be made acquainted with the resources of the nation. There are a thousand and one things here that would be marketable if they were in England, and if, here, we had enough public spirit to work them.

4865. (*Dr. Roscoe.*) The marble quarries have been worked in Connaught, and a friend of mine has spent a great deal of money on them, but it came to nothing?—It depends on the way you go to work.

4866. The marble is so split with fractures that it is not possible to get large blocks?—That makes the larger blocks the more valuable when you get them. Then there is a great deal in the power of the railways. They are not built for the development of the country, but to make so many situations for the board of directors.

4867. Cheap railways you want?—Yes; we are a little island here, and if we could not get out of the island occasionally, to bring home some new ideas, we should remain in our primitive barbarity. The

great drawback in past ages was that those who should be the guides of the people never took the slightest interest in them. They went over to England, and the money they got from their Irish peasantry they spent like Irish gentlemen, and then wrote home to the agent for more. Now, the civilizing influence of the aristocracy in England no man could over-estimate.

4868. (*Chairman.*) Do you see any prospect of a similar influence being exerted in Ireland?—At this time I speak of, I recollect seeing the hills of Clare blazing for emancipation, and I have followed the fate and fortunes of this country from that time to this, and have taken a small part in English politics. I proposed the resolution that added a million and a half to the constituency of England and Wales, at any rate, and I never saw a better prospect than in this country at the present time. We are just like a ship clearing her decks for action; we are clearing away all encumbrances, and getting ready for work. If we have a good harvest this year, you will see how we shall exult through the island. Hitherto, there was complete inaction; the landlords were not dealing with their land as they do in England; they simply gave the raw material, and were careless as to what might become of it afterwards.

4869. You have had considerable experience of the state of things in the United States and Canada; do you consider the technical education there as satisfactory as it is in the United Kingdom?—I do not. I never saw it beaten, except in one school in Boston, a school for managers. In connection with certain public institutions, such as reformatories and workhouses, trades and occupations might be advantageously taught.

4870. In the main, however, you think trades ought to be taught in the workshops?—Undoubtedly; that is the only place where they can be properly taught.

The Commission then adjourned.

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TWENTY-FIRST DAY.

Meeting at DUBLIN.

Third Day.

6th June 1883.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., IN THE CHAIR.

Prof. H. E. ROSCOE, LL.D., F.R.S.

Mr. PHILIP MAGNUS.

Mr. WM. WOODALL, M.P.

Mr. GILBERT R. REDGRAVE, *Secretary.*

Mr. PETER VINCENT O'CALLAGHAN, examined.

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4871. (*Chairman.*) You are the originator and promoter of the manufacture of straw wrappers for bottles, jars, and other goods, as a convenient, good, and at the same time a cheap and expeditious, mode of packing?—Yes, sir.

4872. Were you the inventor also of this kind of envelope?—I cannot say strictly that I am the inventor, for they have been coming from France for a great number of years.

4873. Are they made by machinery?—I have introduced a little frame work for the purpose. The French make them by hand only, but I have made a little frame work, and use a crook to carry the thread through.

4874. Formerly these envelopes were imported?—Yes, they were all imported to the amount of 50,000*l.* worth a year.

4875. To the value of 50,000*l.* a year?—Yes.

4876. What is the value of these envelopes now manufactured in Ireland?—We sell them at 20*s.* and 25*s.* a thousand, the French were getting 50*s.* some years ago. The price now F.O.B. Bordeaux is 13*s.*, delivered in Dublin at 16*s.*

4877. Do you make a quantity equivalent to the quantity got from abroad?—No. The 32 factories are not able to produce enough.

4878. What is the money value of what you produce?—It is not above 100*l.* per week.

4879. That is 5,000*l.* a year?—Yes. We are selling between 30,000 and 40,000 in Dublin and the country factories are doing a little trade through the provincial towns.

4880. Are they also manufactured in England and Scotland?—No; not that I am aware of.

4881. You have not exported them?—No, we have not sufficient to offer. One wine merchant could alone take two millions in the year, but we are not able to supply them. The small buyers give us the highest prices, if we sell to large consumers we have to give them a lower price.

4882. If you could sell ten times the quantity—50,000*l.* worth per annum you named as the value of those imported—would it not pay you still better?—Decidedly.

4883. Why cannot you make arrangements to manufacture the larger quantity?—For the reason that we have no capital. If I had capital I could employ 3,000 or 4,000 hands in Dublin easily. I went into it myself and employed 150 hands, and had them nicely trained, but the establishment charges were too high for the most of that number. I thought I could get hands to work at home in their own houses, but did not succeed, except in a few instances; they do not like the straw in their houses, they are afraid of fire. I had not capital to take a big store where I could employ 5,000 or 10,000 people. The amount of money turned over is so small that the manufacture would not pay unless there was a large number of hands employed.

4884. What is there to prevent capital being employed in the manufacture in this country, as in France and Germany?—Nothing in the world, except that the people have no confidence in it and do not see their way to it. I believe the wrappers are made by the peasantry and in the convict establishments, not in the manufactories proper.

4885. They have no confidence in it?—No.

4886. What prevents them having confidence?—It has not been put before capitalists in the shape of a limited company or in any similar way, as it is a novel industry, limited to what wine-merchants require.

4887. Are these envelopes manufactured by limited companies abroad?—They are manufactured in convict establishments and reformatories. The French merchants buy from the people around their own districts, but the convict establishments send the bottle-covers to Bordeaux and such places, where they are accumulated for the English market by speculators.

4888. Is it a fact that manufacturers in France buy their straw in Dublin?—They have done so.

4889. What straw is best?—Rye straw is the best. That is the sort the French send us. We are able to use for this manufacture straw of every kind, and barley-straw that is of no use for any other purpose.

4890. The French buy rye straw from Ireland?—They have bought straw here and carried it away on steamers, but I do not know what sort of straw it was.

4891. Is there enough rye grown in Ireland to supply all you want?—No, it is only grown for distillers in boggy land, where it grows best.

4892. As a matter of fact there is not much grown?—No, but there is plenty of barley straw grown, which is no good even for manure, and it is particularly well adapted for these envelopes.

4893. You have invented special machines for the manufacture of these articles?—Yes.

4894. How is it you have never attempted to get up a company?—A firm of accountants said it would not be taken up, and so could not be floated, and that the Stock Exchange would not recognise a small capital.

4895. But by getting up a company you invite capitalists to join you?—Unless the thing is carried on to a very large extent it would not pay to have a chairman, with secretaries, and boards, and all that kind of

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thing. I thought it better to make an impression on the country first, and to spread the manufacture through the agricultural districts. My idea was to get it spread over the country, and to have it taught in schools. For instance, in Kiltyclogher we have 100 farmers working their own straw. We taught them how to make the envelopes, and they are a most intelligent people. They are hard working too; they commence at nine o'clock in the morning and work until eight in the evening. In the middle of the day I thought it time for them to get something to eat, but they said they never eat except before coming to work and when they get home from it. They make 20 dozen each per day.

4896. How many of the envelopes can be made in a day by a skilful hand?—Skilled hands can complete them at the rate of two dozen an hour, and if they get hands to close them, they can make three dozen an hour.

4897. That is, a man and child could do that?—Yes, that is, a single man or woman can make three dozen an hour.

4898. How much are they worth?—3*d.* to 4*d.* per dozen.

4899. What would be the value of the straw in the three dozen?—1,000 of them will weigh close on a cwt., so that I should reckon two cwt. to the thousand to allow for waste. That amount of straw, at 2*s.* per cwt., would be 4*s.*, and this with 3*s.* for twine would give 7*s.* as the cost of material per thousand; but in many cases the straw is not worth 6*d.* a cwt., owing to distant markets and bad roads, as in County Leitrim.

4900. They can earn 9*d.* a day?—They can earn 2*d.* an hour, if they work for seven hours, that is 14*d.* a day.

4901. How much would have to be deducted out of that for straw?—Nothing out of that. In the Blackrock factory, they pay them three half-pence a dozen for making.

4902. Is that the Blackrock in the County Dublin?—Yes.

4903. How much a day are they earning on the average at this work at Blackrock?—One shilling; they are slow hands there, very slow hands, and the hands in the towns are not nearly so industrious as are those in the country.

4904. What are the earnings on the average?—4*s.* or 5*s.* a week. Perhaps 1*s.* a day would be the utmost.

4905. Which is the best of these establishments? Where are they earning most wages?—Skerries is about the best managed.

4906. Under whose management is that?—It is under the direction of the clergyman there, and he has a person managing for him. He built the factory for the purpose, by voluntary contributions of the parishioners.

4907. What is the average earning there?—About 7*s.* per week.

4908. They work all day?—Yes, they are paid there by results.

4909. (*Mr. Magnus.*) They are paid by the piece?—They are paid in this way. If there are 3,000 envelopes sold for 3*l.*, the price of the straw is deducted, and they are given the balance.

4910. (*Chairman.*) Is it the case that the manufacture has been tried anywhere, and has failed?—It has.

4911. What has been the cause of the failure?—It has failed principally from waste of material, and from bad management, and want of proper supervision. They have sent out envelopes so badly made that the buyers had to return them.

4912. Had these persons been properly instructed?—They had; the hands do their work very well. Amongst the very worst of them I got lately, out of 3,000 or 4,000 I found a gross perfectly well made.

4913. Some well made, and others badly made?—Yes, and bad judgment was shown in mixing the badly made article with the good and spoiling all. *Mr. P. V. O'Callaghan.*

4914. Whose fault was that?—The fault of the superintendent who inspected them. *6 June 1883.*

4915. What remedy would you propose?—I found a very good remedy in refusing to sell them unless the lot I got was good.

4916. You undertake to sell them yourself?—Yes, I undertake the sale.

4917. Were there many places that sent you up these unmerchantable envelopes?—Yes, they came from nearly every one of them; but some of them are making them perfectly now, and better than the French.

4918. Is the trade increasing?—It is decidedly increasing, and the demand for the article is increasing. The merchants who would not take them some time ago, are willingly taking them now.

4919. But you have not been able to introduce them to the English market?—No, because I have not sufficient to offer them.

4920. Because there is not a sufficient quantity made?—Yes.

4921. Do the railway companies meet you fairly as regards the charges on these envelopes?—They are charging us about 1s. per 100 miles per thousand. It is something about 1*l.* per ton per 100 miles. The northern companies charges are higher. They would not carry them under about 2s. per thousand, nearly double the price of the steamers; but the Belfast steamer prices are prohibitory. They wanted 1s. 9*d.* per thousand to send them by steamer; that was the lowest offer I could get for them, whereas we could send them 100 miles to the west or south for 1s. per thousand. The canal brings them for 15s. or 16s. a ton.

4922. Then the carriage is very much in your favour?—Yes, as compared with the freight on foreign envelopes, but we have to compete with convict labour, inasmuch as the imported envelopes are all of convict workmanship.

4923. Can you suggest any means whereby you could increase the manufacture?—Yes, I think it ought to be taught in all the schools in the agricultural districts where straw is cheap and abundant. The children ought to be taught the use of these little machines, or some machines of the kind, so that every farmer would be able to turn his straw to account, instead of allowing it to go to waste.

4924. What is there to prevent this being taught in the schools?—The National Board rules are against it. I believe they are not allowed to teach any industry in the schools.

4925. Is there anything to prevent it being taught in the school room in the evening, if the local committee take it up?—Yes. I think it is against the rules of the National Board to use those schools for any such purpose.

4926. Assuming that these rules were relaxed, do you think that local committees or other persons in favourable localities would undertake to teach this industry?—I am quite sure they would; for it would save the expense and difficulty of procuring house accommodation.

4927. Would there be much expense in sending persons round to teach the industry in the different schools?—I have been paid, and I have charged my railway expenses. I guarantee to teach them sufficiently well to set a factory going in two days, and I asked 1*l.* a day; but in some cases where they were poor I merely asked travelling expenses.

4928. Have you any certificates from persons who have used these envelopes to show that they are satisfactorily made, and equal to the

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4929. Would you object to put in copies of them ?—Certainly not. I can get any number of certificates. I have given a list of the number of merchants using them largely. Findlater and Co. use 1,000 a week. Gilbey 1,000 a week, or close on it, and so on.

4930. Would it stimulate the manufacture if rewards were given for the best work, either in samples or in bulk ?—It would be a most useful thing if there were some small reward offered, particularly in schools. I selected a few of the Dublin houses I supply. I send to many provincial merchants.

4931. Is there anything you wish to add ?—I think that if these industries were put under the charge of the local authorities, and if the local authorities had power to use the rates to encourage these industries and to make use of the natural products of the district, a great good would be effected. For instance, in districts where straw is abundant, this particular industry could be taught; then in other districts where there is marble, marble quarrying should be encouraged, and the children should be taught everything in connexion with it.

4932. You would recommend that the local authorities should have power to impose a small rate for the purpose of giving instruction ?—Yes; to provide properly trained teachers, who would instruct and superintend industries suitable to the particular district; these teachers should deal with the product of the district as a special thing, and the people of that district should be made acquainted with how that product could be turned to the best possible use.

4933. (*Dr. Roscoe.*) Connected with the national system ?—Either so, or otherwise. There is peat, which could be turned to account very largely for stable or other purposes, but the bulk of the people know very little about the uses of it; and so with the straw—they do not know what to do with it in many cases.

4934. (*Chairman.*) Is the peat used now in the Dublin stables ?—It has been used for years.

4935. Where does it come from ?—From Kildare, and other districts where there are bogs—the bogs of Allen and other places. It is found to be the best material for the purpose. They are also using some portion of it for paper making.

4936. The carriage would be rather expensive from the west of Ireland ?—It could be compressed, we have all our ships leaving Dublin in ballast.

4937. For various destinations ?—Yes. They come here with their cargoes, and have nothing to take out of the country. A few take cattle away, and such like; but if the people knew how to utilize the peat and straw, marbles, limestone, and other natural products, the vessels need not go away empty.

4938. Have you any personal knowledge of the manufacture of peat for litter ?—No; but I used it for litter myself for years.

4939. Do you know how it is manufactured ?—No more than what I have heard and read about it.

4940. Can you tell us what you know about it ?—I understand there is a machine for tearing it up and softening it, and then pressing it into bales.

4941. Is it dried naturally or by artificial heat ?—I am not aware how that is done; but it would cost too much to dry it by artificial heat.

4942. (*Mr. Woodall.*) I am not quite sure whether you said that there was any particular advantage in making these envelopes in

factories, or in the production of them in the homes of the people themselves?—I should prefer the home work for the sake of employment. We work the factories on a system of division of labour, with the consequent greater production as against time.

4943. Are you able to produce them better or cheaper in factories than in the small houses?—It is invariably the case that any article will be produced better and cheaper in a factory; of course they can be produced at home. The system I have adopted in Kiltyclogher and other places where I can accomplish it, is this: I train the hands into making the envelopes, then they take the machines home, and they bring back the articles in an unfinished state, and I have two expert hands for tying and cutting them, and another works the machine for pressing them and making them into bales. The envelopes are brought in an unfinished state, and handed to the two workers, who see that they are correctly made, tie and cut them, and then pass them on to the packer, and in that way they are able to carry on nearly as well as in a factory.

4944. Whenever a certain number—three or four—can be got to work together and divide the labour the advantage is great?—Decidedly.

4945. Is the machine to which you referred expensive?—The value of it is only 2s. 6d. It could be done for much less; but that is what I charge for it.

4946. (*Chairman.*) But the press is more expensive?—About 10s. 6d.; and the machine for cutting to the exact size is only 5s.

4947. (*Mr. Magnus.*) So that the cost of the necessary machinery for making these envelopes is less than 14.?—Yes, 18s. is the cost of one copy of each of the three machines we use in the manufacture of envelopes.

The witness withdrew.

Mr. RICHARD BOURKE examined.

4948. (*Chairman.*) You are one of the Local Government Board Inspectors?—Yes.

4949. And you are also a land owner in Limerick?—Yes; and in Tipperary.

4950. Your duty as local government inspector brings you in contact with the workhouse schools?—Certainly.

4951. You were kind enough to answer questions which the secretary sent you, and you have given us some very useful information; is there anything you wish to add to that?—I do not know that there is any specific recommendation that I am prepared to make to the Commission, but I should be glad to record my opinion that industrial education might be very usefully and advantageously combined with the literary instruction now afforded in the national schools of the country.

4952. And also, I suppose, in the workhouse schools?—Certainly.

4953. How would you set about that?—Well, my own opinion is that in the national schools it should be introduced by private effort in the first instance. In the workhouse schools it might be introduced through the instrumentality of the boards of guardians who would be looked upon as private patrons. I think the work should be done by means of private effort with a certain amount of assistance from the public funds in the way of inspection, and possibly in the way of payment by results. I should be by no means in favour of any large expenditure of public money for the purpose; but there are many

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difficulties that intervene in the bringing into operation of any private effort to introduce hand work, or industrial training into the national school, which the sanction of the Government to some such system might remove.

4954. What are these difficulties?—There would be the introduction of a separate authority, possibly, over the manager. For instance, suppose a committee were to be formed in any parish for the introduction of this sort of work, and that they wish to get it connected with the national school; there must be the leave of the patron and the sanction of the Commissioners of National Education obtained, and such a committee in the present state of things would have no real *locus standi* at all; they would have no authority, and would have to feel their way, and perhaps not succeed in introducing the teaching; whereas if there was the moral support given by assistance on the part of the Government, or even by sanction only on the part of the Government, their position would be different, for they would be a recognised body.

4955. I suppose you would not think it right that any local committee should have power to call upon the patron for the use of the school, except with the sanction of the National Board?—I think that that sanction should be obtained and that the patron's permission should be voluntary; I would not make it compulsory.

4956. Even after the sanction of the National Board had been obtained you would still leave it open to the patron to grant or refuse that permission?—I think the assistance of the patron would be so important to the success of any such institution, that it would be desirable to consult his wishes.

4957. You would wish to enlist his sympathy?—Yes, the greater number of patrons of national schools, by force of circumstance, happen to be clergymen; and I think it is of great importance that their sympathy should be enlisted in the movement.

4958. Then do you think, speaking generally, the consent of the patrons would be granted where there was a *bonâ fide* committee formed in the district?—A good deal would depend on the representative character of that committee having regard to the peculiar social circumstances of the country.

4959. But assuming that it was a representative committee in the way of religious feeling and general social standing?—I think that, as a rule, the sanction of the patrons would not be withheld.

4960. You yourself are a patron of one or more national schools?—Yes, of two of them; one in Limerick, and one in Tipperary. The one in Limerick is the chief one.

4961. I need hardly ask you whether you, under proper conditions, would be disposed to grant the use of your schools for the purpose?—I should be very happy to do so indeed.

4962. Would you lay down any catalogue, if I may use the expression, of industries to be encouraged, or would you leave it to each locality to make up its mind as to what would be most useful to the locality?—I think local parties should make up their minds as to what would be most useful; but at the same time it would be prudent and wise that a certain catalogue should be published by authority, stating what industries would receive aid in the way of payment by results or otherwise.

4963. Have you considered what should be the items of that catalogue?—To a certain extent, I have, but I have not thought it out completely. There should be a combination of purely industrial occupations, and of others that might be considered partly industrial and partly artistic, such as wood carving, leather work, embossing and

stamping, &c. on metals, stencilling, and designing. Of course agriculture would be the chief thing; but there would be local trades in adjoining cities or counties to which persons might be advantageously trained. The particular industry would depend very much on the business or manufacture carried on in adjoining towns.

4964. Do you think it would be possible to give instruction in agriculture without attaching some sort of model farm, no matter how small, to the school?—It would be quite impossible to introduce any useful teaching without land being attached to the school for that purpose; but the farm might be a mere garden. The National Board have limited the farm to two statute acres. At one time I had a farm attached to my school; but subsequently it became necessary to withdraw it and I have not, up to the present time, seen my way to attach that quantity of land to my school again.

4965. There are farms attached to some of the work houses?—To almost all of them.

4966. What is the average size of these farms?—They vary very much. The largest I am acquainted with, is about six statute acres in extent; but, of course, it depends on the area that may happen to surround the union workhouse.

4967. Are these generally worked by the inmates or are they utilized in some other way—are they let?—No, they are very seldom let for agricultural purposes. They are let for meadowing sometimes, when either the numbers in the workhouse are too small to cultivate the ground, or the guardians have no object in encouraging it.

4968. Is that often the case?—They express a great deal of interest, but they do not like to expend the money.

4969. What is your own district?—Limerick is my district at the present moment.

4970. Take your district, what proportion of the workhouse farm land is utilized for employing the labour of the inmates?—It is chiefly used for the instruction of the boys: out of 14 unions under my charge there are ten where the land is used properly for agricultural instruction, and in some cases very advantageously.

4971. But you do not consider that so large a plot as six acres would be necessary for the purpose?—By no means; I think two acres perhaps more than is required in most national schools; for there, only a very small proportion of the pupils would be prepared to spare so much of their time in the afternoon as would be necessary to receive instruction, their services being required on their own farms, if they are strong enough to work, and the National Board would naturally be disinclined to curtail the hours for literary instruction.

4972. Do you foresee any difficulty in providing instructors for these domestic industries or for agriculture?—I do not think there would be any difficulty in providing with the aid of the agricultural hand-book of the National Board, quite sufficient agricultural instruction. In other industries, of course there would be. In those connected with local industries and local manufactures there would be less difficulty, because you could get persons from these manufactories to come and give instruction; but in hand work of a combined industrial and artistic character there might be some difficulty. But if we may accept the statements made on this subject, especially with regard to the United States, and the way things are done there, where the time required for giving sufficient practical knowledge in these subjects is very small indeed, the difficulty disappears.

4973. To whose statements do you refer?—I chiefly refer to Leland's statements in his hand book on design as showing that in his opinion so

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very little is required—nothing really but an artistic sort of facility, and a combination of mathematical and freehand drawing which could be acquired in a very short time.

4974. Have you any knowledge of the system lately adopted by the National Board to bring up their elementary teachers to Glasnevin to be taught the elements of agriculture?—Yes, I have had occasionally an opportunity of meeting the men who have received agricultural instruction at Glasnevin.

4975. Is it your opinion that the instruction has been profitable?—Yes, I think it has been profitable, certainly.

4976. Have you seen any of the schools in which that instruction has been afterwards applied?—No, I cannot call to mind that I have. In one of my workhouse schools I have a teacher who was instructed at Glasnevin.

4977. And what has been the result?—I think that the teaching is much more intelligently given than it would otherwise be, because this man can always give reasons for the recommendations he makes, and for the mode in which he manages the farm, for its rotation and manures. He can always give the scientific grounds of the various processes.

4978. During the time the plot was attached to the school of which you were the patron, was the instruction satisfactory?—No, I think it was unsatisfactory, because the teacher we employed had more of literary than industrial capabilities; but he had been a long time there, and we could not think of removing him.

4979. He could not receive instruction?—No; he was an old man; but we sent up some boys from our own farm to Glasnevin to be instructed, and one of them who had been acting as monitor for a short time got more profitable work as a land steward.

4980. The students from Glasnevin have done very well?—As far as my experience goes, very well indeed.

4981. You are aware, no doubt, that instruction in the use of tools for working in wood and iron has been introduced lately in the French schools?—Yes.

4982. And that that instruction is given out of the school hours, but as part of the school curriculum?—Yes.

4983. Do you think it would be possible in the rural districts of Ireland to pursue a course of that kind, taking into account the fact that the distance from which the children have to come to school is sometimes very great?—I do not think that the distance would interfere at all prejudicially to such extra instruction. Of course there would be more difficulty in winter in having your class well attended; but my own individual opinion is that there would be such an interest felt by the children in learning any of these trades that you would find very ready acquiescence in any arrangement made for that purpose.

4984. But in the small towns you think there would be no difficulty whatever?—None.

4985. As regards attendance?—None whatever.

4986. But what would be the best means of getting competent instructors?—It depends very much on what voluntary agency is employed; but supposing the plan of local committees was organised, part of that organisation would be no doubt to have a central committee in Dublin where instruction could be afforded to teachers who could be sent out as occasion should require, and be paid by this local authority.

4987. And these special instructors would teach the elementary schoolmasters?—Yes, if necessary.

4988. Would it be possible to find volunteers to undertake the teaching of domestic industries?—In a great many places it would, I think.

4989. You could give some grounds for holding that opinion?—I know in my own case that members of my own family would be perfectly willing to do it. I know also that in the adjoining village of Castleconnell such assistance would be rendered; in Adare assistance would be willingly given; as also in Croom and other villages.

4990. Persons would take the trouble of acquiring instruction for the purpose of afterwards teaching these industries?—I have no doubt that in the neighbourhood with which I am connected—Limerick, such aid would be very readily and willingly afforded.

4991. And we believe some members of your own family have already qualified themselves for the purpose?—Yes, and others in the adjoining village are now qualifying themselves in the same way for the purpose, that is in wood carving.

4992. And their operations would be very much aided by their having the use of some public-room in which they could give instruction?—Yes; there might be a difficulty in many localities in obtaining such a room, but in our district there is none. I have a large vacant house which was formerly built for the flax industry before the spinning jenny was introduced.

4993. In your case you do not intend to wait for any recommendation of the Commission or any Government action?—No; being patron of my own school. But I should be very much aided by inspection, and some support, some payment on results, and by some public recognition, either by the National Board or by some other department.

4994. Are the national school buildings generally fit for the purpose?—A great many of them are, and I think that an improvement in the national school buildings is in progress generally throughout Ireland. Where there are a good many people interested in education as in Adare, Croom, and my own neighbourhood, and where the subject of education has been much thought of, the buildings are generally very good. Mine is a non-vested school; my father built it himself, and I have had the management of it. In the same way another school I have in Tipperary we built ourselves. I am not patron of it; I made that over to the priest of the parish, for I live too far away, and I thought he would manage it better.

4995. Is it the case at all in Ireland that the workhouse children are sent to the national schools instead of there being schools attached to the workhouses?—No, that is not done in any part of Ireland.

4996. Is there any objection to that?—Generally speaking, we have more competent masters in the house than in the national schools; but all the children who are boarded out go to the national schools.

4997. Is that a large proportion?—Yes, a very considerable proportion; it is only applicable to orphan and deserted children, but it is, however, an increasing proportion.

4998. Do you believe the Christian Brothers, and other religious orders who occupy themselves with teaching, would undertake to qualify themselves as instructors of manual work?—I should certainly think they would. If the Commission will allow me, I will just mention the case of one of my workhouse schools in Limerick. It is managed by nuns of the sisters of mercy, and one of the great advantages which the guardians anticipated is improved industrial education given to the children; and if it were wished to introduce any particular industry into that school, I have not the least doubt, but that they would get a person instructed for the purpose.

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4999. (*Dr. Roscoe.*) Can you give the Commission any information with respect to the revival of the lace trade for which Limerick has been celebrated in the past?—I do not think I am competent to give an opinion on that subject.

5000. You do not, in your workhouse schools, attempt any lace manufacture such as is attempted in Belgium by the ladies?—We have not done so; and there has been the fundamental objection that the introduction of any occupation into workhouse schools for profitable purposes would be interfering with external labour; so that I think we have generally tried to confine ourselves as far as possible to the elementary and useful part of it—domestic work.

5001. Speaking generally, is it the case that there is an improvement in the country national schools of Ireland?—Yes, I think there is a very great improvement, but the instruction is very much limited to the three R's and the literary work.

5002. But so far as literary work goes, is it tolerably good—fairly good?—Yes, I think so.

5003. Even in the remote districts?—Yes, I think so; inspection under the National Board is very careful and very general; and the payment on results, whether altogether good or not, has certainly stimulated masters to improve their work in view of inspection.

5004. How long has that been at work?—Speaking roughly, I should say about six or eight years.

5005. And the improvement it has afforded is very sensible?—Yes, and the increased anxiety is very great.

5006. Does your district extend at all into Kerry or Clare?—It includes all Clare.

5007. Then, in point of fact, you have some knowledge of schools in districts remote from any great centre of population?—Yes, I have; I visit them occasionally.

5008. And there also you find there is some improvement?—Yes, there has been improvement.

5009. So that even in the remote schools there are signs of progress, so far as literary work is concerned?—Yes.

5009A. And even in remote districts you would have hope of success if domestic industries were taught?—There would be much more difficulty in obtaining instructors, because there are so very few persons whose circumstances give them time at their disposal, and whose education would enable them to teach.

5010. And religious bodies hardly extend their establishments into these districts?—No, they cannot; they are obliged, of course, to limit their aid to places where they have establishments of their own.

5011. (*Mr. Magnus.*) You spoke of the very great advantage to the boys, of instruction in mathematical drawing as preparatory to any industrial teaching. Can you tell us whether any such instruction is given to any extent at present in the national schools?—Not to my knowledge.

5012. Is instruction in free-hand drawing to any extent given in the national schools?—Not to any extent, as far as my experience goes. In some of the national schools in large towns it is given, but not in the rural ones.

5013. You think it would be a great advantage, as preparing the way for the introduction of these domestic industries, if instruction were generally given in free-hand drawing, and possibly also in mathematical drawing?—It would be essential for that purpose that the teacher should know something of design, and if he had the necessary knowledge, it

would be of great importance that he should communicate what he knows to the children.

5014. But considering that the instruction under the National Board is at present so exclusively literary, do you not think that time might be spared from the ordinary hours of instruction for the teaching of drawing to a greater extent than is done at present?—Do you speak of drawing as in connection with hand work?

5015. Yes?—Yes, I think so; and I think the best evidence that is available shows that where industrial pursuits are combined with literary work, so far from impeding, they are encouraging it, and that the literary instruction advances more.

5016. In what way would you suggest that the teachers in these national schools should receive the art instruction that would enable them to teach the children?—I think it would not be absolutely essential that the children should always be taught by the teachers; the teachers might be disinclined, or have no capacity. My hope would be that private effort would supply that want, and that ladies or gentlemen, as the case might be, would come forward as volunteers and assist in this work. If the teachers showed any aptitude for the purpose, they would receive their instruction from them. In cases where there was no local assistance, one would look to the central society to send down a teacher, and persons who did not reside in the locality, absentee proprietors, might subscribe to the expense of such a system.

5017. (*Chairman.*) You speak of a central society; is that already organized?—No. I do not know that there is a prospect of it, but it seems to those who are interested in this hand-work very desirable that it should be united with the effort now being made to afford employment to women.

5018. You think that the persons who have undertaken that work would also be the proper persons for this purpose?—I think the machinery would be adapted for it, and from the communications which have passed between members of my family and ladies connected with that association, I think they would be very well adapted to take it up. If that society succeeded, probably such industrial teaching might be one of the employments for women, which it might succeed in establishing.

The witness withdrew.

Mr. JAMES PERRY, County Surveyor of Galway, examined.

5019. (*Chairman.*) What is the nature of your own instruction?—My early instruction I got in a national school in the country. I got no other education than in the county national school up to the age of between 12 and 13, at which time I was put to work.

5020. What was your occupation?—After I left school, I was occupied as a house painter and glazier in a country town where my father was a workman. He put me to his own business. When I was about the age of 14, my father removed from the small village in the county Derry where I was born, to the town of Belfast. There I was separated from him, and I went to work on the county Down railway. I worked there for two years, and after that I returned to Garvagh, where I was born, and remained there for three or four years. I then left Garvagh, and set up the business of photographer. I built a moveable photographic establishment, my intention being to supply with photographs a number of small towns which could not support an individual photographer of

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their own. I imagined that I should establish a good trade by going round a number of these towns periodically.

5021. How did you learn the process of photography?—I was self-taught. Then I matriculated in the Queen's College, Belfast, in the department of civil engineering, and graduated. I succeeded in obtaining the Dunville exhibition at the close of my first session; my intention was to pursue photography, in order to enable me to attend the lectures; but when I got the exhibition, I gave up the photography altogether, and came to the Royal College in Dublin, and graduated ultimately with first honours (mathematics, pure and mixed, French language, and geology, besides technical subjects under the professors of engineering) in the Queen's University.

5022. I thought it was necessary that you should attend more than one session?—I attended four altogether; one here, and three in Belfast.

5023. What were the subjects you took?—General subjects of civil engineering.

5024. We have heard sufficient of your career to satisfy us you are able to speak with some authority on the matters you wish to bring before us: what would you suggest?—In the first place, I would like to insist on the importance of a good primary education: I believe good primary education is the foundation of all technical education, and I think it would not be out of the scope of your inquiry to recommend that the primary education in Ireland should be generally improved.

5025. That is assuming that we first convinced ourselves that it required improvement?—Yes. The goodness of anything is comparative; there is hardly anything that could not be better. I believe the teachers as a rule are not as high class men as they ought to be; and I think that this is accounted for by the lowness of the present salaries; for if a man is really a good man, he leaves the teaching of a country school, and takes to more profitable employment. I think the teachers ought to be better paid.

5026. Even making allowance for the earnings on results which they now receive?—Yes; and I think the appointments ought to be made by competitive examination.

5027. Would not that involve considerable difficulty?—No doubt it would; it would upset the whole present system.

5028. (*Mr. Magnus.*) What are the average salaries of teachers in primary schools?—I have no knowledge, except from the newspapers.

5029. (*Chairman.*) I suppose 50*l.* a year would not be a bad salary, including all emoluments, in Ireland?—It is rather higher than that.

5030. Formerly it was considerably below that?—Yes.

5031. (*Mr. Magnus.*) Now, the average salary is above 50*l.* a year?—Yes; I believe the average for males is above 50*l.*; for females it is about 50*l.*, or something over that.

5032. Do you think that ought to be increased?—I do. There is another matter that would have value as a means of technical instruction, viz., that the building and everything connected with the school should be examples of good workmanship. I do not advocate the erection of ostentatious buildings. Everything ought to be the simplest kind but of good workmanship, so as to accustom the children to good workmanship; for as a rule they do not see good workmanship in their own homes. A better class of school I see is beginning to be built in the different parts of the country by the Board of Works. They have very much improved on the old style of school.

5033. (*Chairman.*) Wherever the Government aid is granted, you would insist on the schools being of a better character than they have been until now?—Yes. In a school building I would insist on having

the workmanship at least perfect and that would be a very important matter.

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5034. Is it possible in the remote districts to get workmen who are able to work satisfactorily?—I would employ local workmen where I could get them to suit, but I should not hesitate to bring them from a distance; and this bringing of better tradesmen into the locality very often improves the tradesmen who are to be found there.

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5035. You speak more of workmanship than design?—Yes; and of the proper adaptation of means and ends. I would not at all advocate any kind of direct technical instruction in the primary schools, as part of the school business. I think they have got enough on hand; I think their programme is quite extended enough. Of course if the school building could, after the ordinary hours of school be made available for the purposes of technical instruction, it would be very good.

5036. You would object to instruction in the use of tools even, being given as part of the school curriculum?—Yes; during school hours.

5037. But if the children were willing to come after school hours, you would not object to that forming part of the school instruction?—No; I think it would be very advisable; but I do not see how you could in a rural district have one teacher able to do all the things that it is proposed a teacher ought to be able to do; a teacher able to teach geography, grammar, and the use of tools. I am afraid, as a rule, you would have everything badly done.

5038. Would it not be possible under the same management as the literary instruction to have instruction given by local tradesmen?—I do not know.

5039. (*Mr. Magnus.*) Does what you say refer to schools in rural districts or large towns?—In rural districts. In large towns I think there ought to be technical schools separately managed, and I would not recommend much local control of such schools.

5040. You would place them under the Government?—I would; and I would have the instructors regular Government officers.

5041. You know these technical schools are very expensive establishments?—Yes, and it is the necessity to have complete efficiency that would dispose me to recommend that they should be made strictly Government departments.

5042. Then they could not be very numerous?—They could not. I would make the establishment of the school depend on the existing need for the school. In my opinion schools ought not to be established in a speculative way, to foster particular industries that people think ought to be established in particular localities. The need for the school ought to be ascertained before the school is established.

5043. (*Mr. Woodall.*) You think these technical schools should be established in all large towns?—Yes, in large towns only.

5044. Would you say what you would mean by large towns?—Perhaps I had better put it in this way; I would establish such a school in any locality whatever, where there was an evident necessity for it.

5045. (*Chairman.*) How would you consider the evidence of that necessity to be shown? Would it be by local effort, such for instance as local contributions, or would you take the mere existence of a trade in a town as being sufficient evidence?—I should be inclined to have the school as a regular Government department without drawing upon the locality for funds, then the undertaking would be carried out impartially; for instance, the schools established should try to cover the whole ground as well as possible, and should have special regard to the

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particular industries found in special places; for I think that various industries are found in special places for certain physical reasons as a rule.

5046. Will you give an instance?—Take the linen industry: it is specially established in Ulster; why is that? If you look at the geology of Ireland you will find there is generally a bed of limestone, and where you have lime stone you have hard water. The linen industry located itself in Ulster because the water there is soft, and in consequence the trade could be carried on there on an extensive scale. At one time every body made his own linen, and the linen industry spread all over Ireland for the supply of local wants. Political changes induced the men who made the linen a special industry to come to Ireland, but there was no reason why they should establish themselves in Ulster any more than any place else. You will find at one time there were colonies of Quakers all over Ireland. In my opinion Ireland was pretty evenly colonized with small colonies of the Society of Friends, and these men were ready for almost any industry that the locality would favour, and there is no reason, to my mind, why this industry was not established all over Ireland, except for the physical reason that you had soft water in Ulster for bleaching.

5047. That is at any rate one of the reasons?—I think the main reason.

5048. Then you would leave it entirely to the Government to determine where these schools should be placed?—Yes; and I should suppose that the Government would determine this, not on account of prospective industries to be established, but on account of existing ones, and as the need arose, I would establish new schools.

5049. Can you illustrate that by naming some of the centres where you would like to see schools established?—Certainly; in Belfast they are quite ripe for that sort of thing.

5050. Could you name any other?—Well, in Dublin here, of course. I know that Dublin used to be a centre of decorative art, but there is very little that is distinctive about Dublin now. The Dublin decorative workmen were famous in the past.

5051. What do you understand by a technical school?—I understand by a technical school, a school, where the apprentice to a particular business could learn the scientific reasons for his operations.

5052. And you assume that to be a day school?—Not necessarily a day school.

5053. In what way would you differentiate between the science and art classes held in Belfast for instance, in connection with the Science and Art Department, and the technical schools such as you conceive them?—The technical school would be simply an advance on the existing science and art schools. There is payment by results at present, and there is a want of technical education in the teachers: Of course the Science and Art Department are trying to remove that by taking a number of teachers to London and teaching them at South Kensington.

5054. (*Dr. Roscoe.*) Or here in Dublin?—Very little here in Dublin. I do not know that there are any of the teachers taught in Dublin.

5055. (*Chairman.*) But in schools of this kind, would you teach weaving, for instance?—Oh yes, I would teach everything that was suitable to the locality.

5056. Would you consider weaving a suitable thing to be taught in a school of that kind?—Well, I would not teach weaving in such a way that the school would become a manufactory. I would teach the reason for all the operations. I would have the model elements, and try to give the students the science, and let them get the practice

outside. The operation of weaving appears simple, but it is not so really. Various qualities of threads exist. Nearly every spinning mill makes a distinctive kind of thread which suits the varieties of cloth as warps or woofs. The arrangements of beddles for different twill and damask-weaving are very complex. Every workman ought to be brains to the machine worked.

5057. You would wish them to understand thoroughly the construction of implements for various purposes?—Yes, and the reasons for their various operations.

5058. Would you teach bleaching or merely the chemistry of bleaching?—I would teach the chemistry of bleaching in a practical manner.

5059. Before teaching the chemistry of bleaching you would teach general chemistry?—Necessarily you must know the elements of chemistry before you can apply it. Elementary principles are the most general principles of a subject, and in the experience of different men they are grasped in different order. A workman receives his notions in a different order from that in which a so-called "student" meets them, and in this way we have the apparent strife between "theory" and "practice." A workman who has not strung his facts upon a theory has not grasped an elementary principle. On the other hand, the "student" who has not evolved facts from his "principles" is a mere parrot.

5060. You are quite convinced of that?—Yes.

5061. Have you considered that carefully?—Not specially.

5062. But you have no doubt about it?—No, sir.

5063. (*Dr. Roscoe.*) In mechanical engineering would you say the principles must be learned before the application?—Yes, you must have the elementary knowledge of any subject before you take up a special line.

5064. (*Chairman.*) You think theoretical mechanics should precede mechanical construction or engineering?—Yes.

5065. You would not give much for any instruction which pretended at once to go to the practical application?—No, sir; you must first have an elementary knowledge of the scientific basis of the subject; if you take a subject such as is understood by mechanics; theoretical mechanics it is called, and carry it out, you will find it spreads into a vast number of practical subjects. I have passed a number of examinations under the Science and Art Department, and I have got repeatedly identical questions in different subjects. These things spread out, and it is impossible to differentiate between the different subjects.

5066. Is there any other observation you wish to make?—Yes, in the matter of farming. I do not consider that farming is properly carried out anywhere in Ireland with the exception perhaps of Ulster. In Ulster farming is in some localities intelligently carried out, but in the rest of Ireland it is not. I only know of one instance in the county Roscommon, I know it well, where there appears to be an intelligent system of agriculture carried out. In this case the man is the owner of the land he farms, and his place is like an oasis in the wilderness. His land was evidently as bad as the land around it, but you can easily recognise his property from a hill top in the neighbourhood. You can see it by its different colour, a beautifully marked patch in the centre of a grey map.

5067. Is that an extensive farm?—No, about 150 acres, I should say.

5068. When you say that farming is not intelligently carried out, you except large farms managed on the English system and in the hands of very rich men?—No, sir, I do not, because in these cases, in my

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experience, they have been pretty well given up. The system* that was set up, is not continued. The farms that were taken from numbers of small holders, take Mr. Pollock's farms, which I know very well, were, at the commencement, managed intelligently, with a system of mixed tillage and grazing. I believe in the production of cattle where the land is calculated to produce cattle, but I do not believe in the production of cattle by mere grazing. I say that the present system of grazing carried out in Ireland is not an intelligent system. I have made practical my opinion to some extent, for I own a few cattle, and I have tried the experiment to see whether my theories would succeed in practice, and I believe they do.

5069. What remedy would you provide?—It is not easy to suggest a remedy for such a wide defect. My opinion as to the origin of the existing system in Ireland differs from that of most persons. It is necessary to explain how the thing has arisen. The three southern provinces were always grazing. If you go back 150 years you will find it proposed in the Irish Parliament to compel the people to till five per cent.; that would indicate that it was a grazing country. You had the country divided into grazing holdings, holding at low rents and very long leases. European wars raised the price of produce very suddenly, and these holders of grazing leases split up their land into little patches of conacre, and the Irish people who were existing on miserable patches in the backward parts of the country, where they carried on the only tillage existing, and which was of a miserable kind, came and took this conacre, and in that way you have the origin of the present small tenants and the middle men; for these long leaseholders became middlemen.

5070. It is impossible for us to recommend remedies for the economic defects of land tenure in Ireland; all we can do is to take things as they are, and make the best of them, and if you can tell us how to do that by means of technical instruction, we should be glad to hear you?—I have considered the matter very closely, and I find that where there are men like the man I have described, his neighbours more or less copy him, and if you could set up a number of example-farms all over the country, you would in that way best technically educate the Irish farmers.

5071. That was attempted, I believe, by the establishment of model schools of agriculture?—But there are immense difficulties. Suppose you pay a man to take one of these farms; they will say "Very well, that man is paid for taking that land; we cannot compete with him;" and also, if you bring strangers into the country to take farms like that, the influence of that man's neighbours will deteriorate him more readily than he can improve them, and the only remedy I can see, is in some way to set up such model farms.

5072. You do not know what would be the best way to set about that?—No.

5073. But you consider it well worth consideration?—I do. No landlord who farms in Ulster can make it pay. I have never known a single one; but in the south and west of Ireland the landlords can compete with their tenants because they can become graziers, and landlords can make grazing pay. In the north the land does not suit grazing, and the landlords cannot compete with the tenants.

5074. Is there any other point?—In connection with apprenticeships, I would say that in towns these technical schools ought to be established to teach apprentices, and I think it ought to be part of an apprentice's indentures to attend this school, and also binding on the master to give him time to attend.

5074a. But we have been informed that in England and in Ireland apprenticeship by indentures has almost ceased?—It has.

5075. How would you provide then for the instruction of young boys without being indentured?—I would set up indentures again, and I would give certificates from these schools, which would be recognized by the tradesmen themselves.

5076. Would you contemplate any trades union action?—Yes, I would; though I believe that among the existing tradesmen and workmen, who have not had technical education, there would be some jealousy of the new men.

5077. Take your own trade of painters and glaziers. In what way would technical education be of value to them?—It would be of great value to the painters and decorators.

5078. Education in art you would look to principally?—Yes.

5079. Was plumbing any part of your trade?—No; but I could do a job of plumbing too.

5080. Do you consider that plumbing might be advantageously taught; or are there any principles, the science of geometry, for instance, that are useful to apprentices in the plumbing trade?—There is no business that needs more technical instruction. The plumber ought to understand something of the modern development of sanitary science, and he ought to understand a great deal more than he usually does about hydraulics. In my opinion there is no business so much in the hands of people who do not understand it, as plumbing.

5081. You think it useful that the ordinary journeyman as well as the master plumber should have some knowledge of these subjects?—Yes, sir, I would make no great distinction. In my opinion a civil engineer is simply an educated workman, or at any rate he ought to be. Every journeyman ought to become a master. I would give every man the same chance, and I think the technical education ought to be made a State affair. I believe that the ordinary view that is taken of the subject is that technical or professional education is a private affair, and that it ought to be paid for privately, as the man is being enabled to earn a salary or wages. I take a different view of it, and think it ought to be a national affair. If you increase the number of professional men you will level matters, and the public will gain increased facilities of obtaining the opinion of intelligent and educated men.

5082. Is it not an immense affair to undertake the teaching of all trades and professions?—I think not. After all, the rudiments are the same. It is only when you get higher up that the teaching differentiates and becomes complex, and the man's experience continues his education.

5083. As far as possible you would limit the technical instruction to instruction in principles?—Yes, except in special localities like Belfast, where special industries are largely carried on; and there I would give particular attention to matters affecting these local industries: for instance, calico-printing, spinning, and weaving, &c. in Belfast, and chemistry and brewing in Dublin. In Ireland we had the Queen's University at the time when I got my education, and it was comparatively easy for me to obtain a University degree, but at the present time it would be very difficult.

5084. Why?—Because the Royal University has made it imperative to take a degree in arts before they will give a degree in science; they will not give a professional degree to a man who has not taken a degree in arts, and I believe that to be a very great mistake.

5085. (*Dr. Roscoe.*) Is it not a mere examination to ensure a decent school education on the part of the candidates?—It necessitates a knowledge of Latin and Greek.

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5086. Does it include Greek?—It does, sir, and to have a bare knowledge of the two languages involves a very great amount of labour, and in the case of a working man a waste of time. I know one man who has now, I believe, distinguished himself in his profession as a doctor. I knew that man at college, he was there with myself, he was a hackler; he was a very good mathematician. He took first place in the science scholarship in his first year, and that man went to engineering because he could not enter the university without Latin and Greek in any other faculty. He graduated in engineering, but ultimately became a doctor of medicine. For that he had to learn Latin and Greek; I know it was a mere waste of time; he had almost to beg a pass. The Royal University is progress in the wrong direction.

5087. (*Mr. Magnus.*) You think it desirable that a man should be able to take a degree in engineering without learning any Latin or Greek?—Yes. I think an engineer is simply an advanced workman. In the Royal University they make age a barrier, and when a man gets above a certain age, he cannot take a prize. I think both these barriers ought to be removed in some way.

5088. (*Dr. Roscoe.*) You think there is practical value in working-men being able to graduate?—I think there is. I consider a civil engineer is merely an advanced and educated working man.

5089. (*Mr. Woodall.*) Are you able to give the Commission any information as to the extent to which the people find employment in the county Galway?—There is not much industry in the county Galway; there is a popular fallacy that a good deal of fishing is done on the Galway coast, but there is not.

5090. Could you suggest any means by which industry could be encouraged?—Yes; by technical instruction in the evening. The school might be profitably used for that purpose in the evening. There should be a technical school of the higher class in Galway, in which town there is a brewery and a distillery, as also a jute factory. There are extensive grain mills worked by the River Corrib, and I am of opinion that it would be justifiable to set up in Galway what I would call a technical school of a more permanent kind than "Science and Art Classes," and the teachers in which should be workmen as well as theorists.

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5091. (*Chairman.*) You were good enough to say you would put in a statement in reference to the objects of this Commission: of course we conclude you would not do so unless you had personal experience, which would entitle you to speak about them?—I was preparing such a statement when it was interrupted by my discharge from prison yesterday.

5092. We should be glad to know in what way you consider you have acquired a title to speak on the subject?—By my residence in Ireland during the last four or five years, and by mixing very frequently with the people; investigating the character of their primary education; making inquiries into the working of the National School system, and by taking a general interest in the question of popular education in Ireland.

5093. Kindly give us the result of that?—I think, in the first place, that what is most required is a better primary education in Ireland, particularly if we are to have in the future a superior or more practical education in the direction of technical instruction. No good superstructure can be raised upon a bad foundation. I think the books

now in use in the national schools should be removed. They are antiquated and inferior to the books in use in England and America. For instance, I have recently gone over the books that are in use in our primary schools, and I find them to contain over 200 readings in poetry, and only one in manufactures, namely, a reference to the manufacture of glass. I think this tends to teach too much of what is the sentimental use and too little of what should constitute the practical purpose of life. Then the National Board has a monopoly of the supply of these books, and that is not the case in England. I should prefer to have the same system of supply adopted in Ireland, that is, throw the supply open to competition, and that would bring a better class of school books into the national schools. Then the system of teaching in Ireland is very backward. I account for that by the very low salary given to the national teachers: it is not sufficient to induce young men to devote themselves to that study and application which are necessary to qualify them for the proper discharge of, what I consider, one of the noblest professions of civilised society, "mind-trainers."

5094. What remedy would you provide for that?—By making the profession of mind-training as attractive as those branches of the civil service which absorb talents, for the performance of mere clerical work, that would be much better employed in the mental and industrial training of youth; that is by giving to the teachers in Ireland, male and female, a salary equal to that which is given to the teachers in England and Scotland already: the average salary in Ireland for males is under 50*l.*; in England and Scotland I understand it is from 80*l.* to 100*l.*

5095. Or more?—Well, in Ireland the average salary for females is between 30*l.* and 40*l.*

5096. But you know that the salaries paid in England are the result of competition?—When salaries are obtainable in Ireland that will be worth competing for, the quality of the teaching will keep pace with the remuneration given.

5097. What I meant was competition for teachers on the part of managers of schools?—We want in Ireland a school system that will be more under popular control. We want elective school boards, instead of having schools controlled by patrons; a system as mischievous as it is absurd and antiquated, and better teachers and better results will follow.

5098. (*Mr. Woodall.*) But is not the general scale for both labour and living lower in Ireland?—Perhaps it is. The difference between the wages given to labourers and mechanics in the two countries is, however, not at all as great as the difference between the salaries of teachers in England and Ireland. Another fault in our national system is the method of examination. I understand from inquiries I have been making recently, that an examiner may remain in one district for four or five years, and in consequence of this, the teachers may anticipate the line of examination he will take and the questions he will put: and under the stimulus of payment by results, a system of cramming has arisen from this. I would suggest that the examiners should be sent from district to district more frequently.

5099. (*Chairman.*) By examiners you mean inspectors?—Yes. I think one of the greatest evils in connection with primary education is the patron system: some patrons object to a man as a teacher who is suspected of Nationalist tendencies, while others refuse to receive those who have been trained in model schools. I would advocate the abolition of the patron system, and the substitution of control by elective school boards. The monitor system in vogue here in Ireland is another evil. Young men are accepted as teachers without having qualified them-

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selves as such, preparatory to their being employed as monitors. I would not allow any man to become a teacher in a public school without his having previously undergone a training, and having qualified himself before competent judges for the responsible duties which he will have to perform in the interests of society.

5100. Would that not exclude the religious orders altogether?—I do not see that it would exclude religious orders at all. Our best teachers in Ireland are found in the Order of Christian Brothers. Their system of primary instruction is far superior to that of the national schools. They teach the practical concerns of life more fully. Their admirable industrial schools at Artane are a sample of what this Order is capable of teaching. It is as singular as it is regrettable that boys must commit some offence against society before society will trouble itself with providing for them an industrial training. If the trades that are taught to boys in reformatory schools and to youths in prison (as for instance in Richmond Prison, Dublin,) were made a part of primary education there would be fewer criminals. I do not think the Christian Brothers would object to qualify themselves for certificates of capacity as teachers, if paid by the community, and if the examination were to be confined to secular subjects. They might receive instruction in a religious training college for that specific purpose, and be called upon only to undergo the usual examination before the judges or examiners who might be selected for this purpose by the State in return for grants of State money for public teaching.

5101. If you insist on training in a public training school would not the effect be to exclude the religious orders?—Not at all. What I would insist upon would be a proof of adequate training by competent examination. The training might be in a religious or secular college.

5102. Another difficulty would arise, that they could not be trained for two purposes at the same time; they ought to undergo training as teachers at the age at which they should also be undergoing training as priests?—They could undergo training in their own colleges and then submit themselves to the necessary examinations as teachers in order to receive the certificate of capacity.

5103. In point of fact you would wish the Government to ascertain in the case of the clergy or religious orders, whether the school in which they are trained for their religious duties is also furnished with the requisites for training as teachers those who intended to become teachers?—If the public is to supply the money for public education, the public should insist that teachers are properly qualified to give the necessary instruction.

5104. And for that purpose you would wish that they should not be simply examined after having been trained, but that their actual training should, to a certain extent, be superintended by the Government?—I would insist that evidence of actual training should be a condition for examination, and render both essential to the obtainment of a certificate of capacity.

5105. You are aware that according to our English system, it is not necessary that the teacher should have been educated in a training school, provided he is able to pass an examination held in a training school?—I would insist on a system of examination being applied to all men who come forward as teachers of the people for the people's money, in order to obtain evidence of actual training.

5106. And you lay stress more particularly upon examination than upon an inspection of the training?—I would insist on both.

5107. (*Mr. Magnus.*) You think it would be sufficient if he passed an examination for teacher, and you would not inquire where he was

trained?—Exactly. These reforms, along with the sweeping away of the barbarous and antiquated school books, and the adoption of the compulsory attendance, seem to be the first steps toward making popular education practical education in Ireland.

5108. (*Chairman.*) As to the compulsion you wish to have introduced, we have had it in evidence that in some districts in Ireland the children are so badly fed that it would be impossible to insist on their passing some considerable time in school unless food and clothing were given to them. Do you think that that is a valid objection to the compulsory system in these cases?—I think provision would have to be made for such districts, and not only in respect to the obstacle you allude to, but for this additional reason. During seed and harvest time, the attendance in the national schools is smallest, because the farmers have to withhold their boys from going to school in order that they may help them in the cultivation of their small plots. If compulsory education were resorted to in Ireland, care would have to be taken that the poorer classes of tenantry did not suffer in consequence. I would favour the giving of a meal a day to children in poor districts. This is done, I believe, with good results, in the school of the Convent of Poor Clares in Kenmare.

5109. With regard to the latter provision there would be no difficulty, because it is one well known in many countries. In Switzerland, for instance, children are excused during the seasons you have spoken of: but how would you provide food and clothing for the poorer children?—I do not anticipate that we shall always be the very poor people we are now, but for the present that would be a difficulty in a few of the very poorest districts along the west coast of Ireland. Yet I do not think that that is a sufficient reason why we should not have compulsory attendance as a rule in our primary school system.

5110. Would you exclude these districts for the present, or would you propose, for instance, that the boards of guardians should afford assistance in the way of food and clothing?—I would certainly place the expense upon the government.

5111. I believe that, according to the Irish system, the boards of guardians are authorised and encouraged to give assistance by way of supplementing the salaries of teachers, and that has been done to a very small extent?—To only a very small extent indeed; thus showing the necessity for the Government being somewhat more liberal in giving us more of our own money for the purpose of providing our people with better primary instruction.

5112. Or perhaps insisting on the boards of guardians doing more?—Well, the boards of guardians reflect the poverty of the country in that respect.

5113. In speaking of compulsory instruction, you mean compulsory attendance?—Yes.

5114. Is there any other suggestion you would make for the purpose of improving elementary education in Ireland?—I intended first to point out the evil consequences of the present system of primary education, and then to make suggestions on which I shall be happy to answer questions. I think the backward state of agriculture in Ireland is owing partly to the very low standard of education of the peasantry. Of course you know there are political and social causes why we are not as advanced in agriculture as other people. I think the prevalence of ignorance amongst our farming classes is one of the causes greatly against the advance of agriculture.

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5115. You mean ignorance generally: not merely professional ignorance?—Ignorance generally. Then the young men who are forced through the absence of manufactures, and such sources of employment to leave Ireland and go to England, Scotland, and America, are brought into contact there with artizans who have received good primary education, and they are compelled to accept positions as labourers under superior mechanical skill. That I trace to the absence of technical education in Ireland on the one hand, and to the admirable system of education given free by the various States in America on the other. I have met large numbers of Irishmen throughout the United States, with whom I was personally acquainted, before leaving this country, and England, and I have found them as labourers; whereas had they gone out there with a good elementary education, they could have become skilled artizans in the States, and would have had a better chance of improvement socially: Again in our primary schools in Ireland no history is taught, and the consequence of this is, there is no sufficient breadth of mind cultivated; there is no popular acquaintance with the progress of science and mechanical arts, and consequently no ambition after fuller light, no longing after scientific achievements. I would strongly recommend the teaching, not of Irish history exclusively, but the teaching of history as taught in England, France, and America. In our six school books in the national school, there are only scriptural historical lessons given, I believe. Now as to the remedies: first, I desire to see a reform in primary education as pointed out already, in order that technical and scientific instruction shall have solid ground to rest upon for producing results; and next, I would strongly urge the encouragement of Mechanics' Institutes throughout Ireland. What education I have received has been received mainly through self-effort and attendance at a Mechanics' Institute in Lancashire, when I was employed first as a factory operative, and afterwards in the post office. What little instruction I received from my father, I supplemented by attendance at the Mechanics' Institute in the evening.

5116. (*Dr. Roscoe.*) What Mechanics' Institute?—One at Haslingden. I recollect what an immense amount of good was done to factory and other operatives by the establishment of Mechanics' Institutes and the opening of cheap libraries in the north of England some 25 years ago by Sir J. Kay Shuttleworth and others.

5117. (*Chairman.*) In what way would you encourage the Mechanics' Institutes; we are told the one you have in Dublin is languishing?—Unfortunately it is, because it has received no external support.

5118. (*Dr. Roscoe.*) What do you mean by external support?—The moneyed classes in Ireland, unlike those of England, take no interest in such institutions. They do not encourage popular self-effort.

5119. (*Chairman.*) In the first place Dublin is a rich city, and funds are found for purposes deserving of assistance, and in the second place it is open to Mechanics' Institutes and similar institutions in Ireland to avail themselves of the grants given by the Science and Art Department of South Kensington; in point of fact we find at Belfast that there are numerous classes of that kind well attended, and earning considerable grants on results; whereas in Dublin the earnings are very small, and the classes are not numerously attended: why should not this source of income be taken advantage of in a city like Dublin?—Of course what you say in reference to Dublin is unfortunately true, but I am speaking in favour of the extension of Mechanics' Institutes throughout the other provinces in Ireland, and I do so from my knowledge of the benefit they have been to working men in England.

5120. What I have said would apply equally to other towns, so far as payment by results by the Science and Art Department goes?—Well I find that in Cork, and Galway, and Wexford, and I think in Athlone and a few other cities and boroughs, there are what are called Mechanics' Institutes, but they are not very generally attended by the artizans and operatives in these places.

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5121. What I was trying to ascertain from you is this; in what way do you think that more energy could be infused into these institutions seeing that it is in their power to earn Government grants if they do good work?—Well the buildings that I have alluded to in these places are not attractive at all, I think if the Government would advance money to erect suitable and attractive buildings in these cities, it would bring a larger attendance of the artizan and operative class generally, and especially if libraries were attached as is the case with English Mechanics' Institutes.

5122. If it were made known more generally that it is possible now, under the regulations of the Science and Art Department, to obtain building grants in aid of local effort, do you think that would stimulate the locality?—I think so.

5123. Then it would be very desirable in your judgment that a knowledge should be more generally disseminated throughout the country of the conditions upon which money can be obtained not only for current instruction, but also in aid of the erection of buildings?—Decidedly. I am of opinion that as the Government of every country undertakes to punish crime, it ought to supply that instruction that would rescue the people from ignorance: as generally speaking, ignorance is a factor in the production of crime. I think a little more liberality on the part of the Government in the matter of popular education would tend to the minimising of crime. I would also encourage free evening lectures on science and arts for the working classes; and lecturers should go amongst the farmers to deliver lectures on the advantage of chemistry applied to agriculture, and lectures upon the improved methods of cultivation generally. In reference to that matter, I should be in favour of lecturers being sent down to Irish speaking districts qualified to speak in Irish, for at present children in Irish speaking districts are brought to the national schools to be taught English, without first receiving any instruction in Irish. Now I understand that in the Welsh Sunday schools the children are taught Welsh first, and a knowledge of English is afterwards engrafted on their native tongue. I find from inquiry in the West of Ireland that the children who go to the national schools do not acquire the faculty of understanding English for a considerable time, which is lost to their education.

5124. You would give them their elementary instruction in the first place in their own language?—Yes, in order to cultivate the intellect, and upon that improved mind I would teach the English language.

5125. Is it the case that elementary teachers in the Irish speaking districts generally have sufficient acquaintance with the Irish language to be able to give instruction in general subjects in that language?—No, I think not. The Irish language has not been encouraged until recently; now the teaching of Irish is put on the results fees programme, but the encouragement is only a half-hearted affair. There are districts in the West and the islands on the West coast where Gaelic or Irish is the prevailing language—efforts are made there to teach the children English, but the result so far is that the children learn English without understanding it for a considerable time.

5126. You would not wait to teach them something until they had learned English?—Certainly not. In reference to agriculture, it being

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the principal source of employment in Ireland. I think the model farm movement which has failed under the starvation management of the National Board should be reformed, and that the farms should be converted into agricultural colleges. The reason why model farms have failed is, I am given to understand, that the National Board expected they would pay, and in fact produce financial profit, but that is not the way to encourage technical agricultural instruction in Ireland.

5127. Was there not also another reason, namely, that the attendance at these schools was so small as to be illusory?—At that time the tenant farmer had not the same security as he has now, nor had he the same stimulus to industry and exertion. I think there would be a far larger attendance now at such agricultural schools if they were more liberally encouraged by the Government.

5128. You think at any rate, a fresh trial might be made of them?—Undoubtedly; I think it would now have happier and more practical results.

5129. I believe the whole sum devoted to them formerly was only 6,000*l.* a year?—Yes.

5130. And they were surprised because the schools did not give satisfactory results?—Yes.

5131. (*Dr. Roscoe.*) Are these farms and buildings in existence?—I think three of them are still in existence; others have failed, and I am not aware what has become of the buildings.

5132. But there would be no great difficulty in reconstructing them?—No.

5133. (*Chairman.*) It might be done by degrees?—Yes, by degrees. I am also strongly in favour of the establishment in our cities and boroughs of schools similar to the school for apprentices that is in operation in the Boulevard de la Villette in Paris, in which the sons of citizens, are received and prepared for the various pursuits which they intend to follow after leaving the school.

5134. We have seen that school and have made considerable inquiries with reference to it, and we are not altogether satisfied that it is doing much good work?—I cannot put my superficial knowledge of the working of this institution against your practical investigations. Still the plan of such schools is an excellent one.

5135. As you have considerable experience of Lancashire, do you think there is much hope of a school of that kind being able to compete with the instruction boys receive in the large Lancashire workshops?—I think a school of that kind should be encouraged by the manufacturers of Lancashire in order to obtain a higher order of mechanical intelligence. The manufacturers of England have dangerous rivals in Belgium and other countries, competition between manufacturing countries is no longer a question of mere production, but of the quality and design of the goods produced. The linen made in Belfast is the best in the world, but the markings are antiquated, and cannot compete in artistic design with the linens of the continent. Technical instruction will make skilled workmen in most manufactures.

5136. Do not you think it would be better to leave them to work in the factory during the day-time, and to get theoretical technical instruction at night?—For those who have received no previous technical knowledge, yes; but I should be in favour of all boys receiving a general technical instruction as a part of their primary education. Mechanic's Institutes would serve in the other case with free scientific lectures provided for the members during the winter months.

5137. You think that in Ireland especially, handicrafts might be advantageously taught in schools, accompanied by a better system of primary education, though in England and more advanced countries, such teaching might not be likely to be so useful?—I think the quality of the primary education in Ireland should be such as to prepare the boys for industrial pursuits.

5138. Do you think that industrial education might be given in connection with the primary schools?—Certainly.

5139. You were present and you heard Mr. Bourke's evidence?—Yes.

5140. Do you on the whole agree with it?—I do. I agree that technical instruction should be given in our primary schools, allowing if necessary an hour before or an hour after ordinary school hours, for instruction in the use of tools.

5141. Do you see any great difficulty in doing so?—I do not. I have pointed out the difficulty in the way of technical instruction in Ireland; a difficulty, the removal of which might be stated to include a reform of the present system of primary education.

5142. (*Mr. Woodall.*) Would you make the technical teaching part of the regular curriculum of the day, or would you put it under different management and make it merely supplementary to that work?—I would make technical instruction part of the curriculum of the national schools.

5143. (*Chairman.*) Do you see any difficulty about obtaining teachers of technical subjects for the primary schools?—Not if sufficient inducement in the way of salary is offered. You see the Civil Service takes all our best young men from Ireland, owing to the fair salary given, and as the salary given to our teachers is only about equal to that given to the policemen, you cannot expect much better qualified men for such a ridiculously small scale of remuneration. I know that the results fees have stimulated the action of teachers, and have encouraged them to give more attention to the education of their pupils, but it encourages the system of cramming as well.

5144. That is in the intermediate schools?—Yes.

5145. You do not know anything about the curriculum or how far it is technical?—I believe it is intellectual and non-technical.

5146. You spoke of American schools; have you any actual acquaintance with the technical schools in America?—Very little; my information in regard to the education of artisans in America is from contact with them, and from observation of the works and buildings one sees in America, rather than from studying its schools.

5147. But I believe it is the case that technical instruction is in a very rudimentary state there?—So, I understand.

5148. Notwithstanding which they have made great progress in all the arts, except, of course, the decorative arts?—Yes.

5149. You are well acquainted with the different parts of Ireland?—With Leinster, Munster, and Connaught, very well, and fairly well with Ulster.

5150. Do you think there is anything at all in the condition or antecedents of the people of the West which renders them less fit for industrial pursuits than those of the East?—No, I think the backward state of the West is due to these districts having been the most impoverished, and having suffered most by the famines which have periodically fallen on that part of Ireland. I think the people of Connaught are as naturally intelligent as the people of any other province.

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5151. But it is not always the most intelligent people that make the best mechanics?—No; but natural intelligence is a very good ground work for education and industry.

5152. If you compare the Slavonic race with the Germanic race, it would not be contested that the Teutonic race are better mechanics than the Slavonic, although the Slavs are better poets and musicians. There may be a similar difference of race between the East and West of Ireland?—I have not been able to see any difference between Connaught and Leinster in the matter of natural intelligence.

5153. And you have experience of both under more favourable circumstances in America?—Yes.

5154. And there you find the men of the West get on as well as the others?—They get on as well as those from the other provinces, but all the Irishmen from the various provinces in Ireland are at a disadvantage in being placed beside mechanics and artizans in America who have received a better education.

5155. The best men from the West are as good as the best from the East?—Yes.

5156. (*Mr. Woodall.*) The second generation of Irishmen in America become as good mechanics?—Yes, and are able to hold their own in any of the walks of life, owing to the excellent education they receive in the primary schools.

5157. With regard to the subjects to be taught and the methods of teaching in these elementary schools in America, what is your opinion?—I have observed that I cannot speak with authority as to the precise technical knowledge given.

5158. What particular kind of technical education do you advocate?—I think every boy attending school should be prepared for some particular kind of trade. His primary education should be sufficiently technical to enable him to go to the workshop on leaving school, and prepare to perform the serious duties of life. If a boy intends to be a carpenter, let him be taught the elementary principles of carpentry; if a blacksmith, mason, machinist, &c., the principles of such skilled occupations; if a shoemaker, let him learn that which will shorten the time afterwards required to learn his trade; and if he intends to be a farmer, let him be instructed to farm on scientific principles.

5159. (*Mr. Magnus.*) Have you considered the difficulty of ascertaining at the outset the trade which the boy is likely to enter?—I think that at first, instruction should be general in reference to industry and to mechanics, and that afterwards, when the capacity of the boy is understood by his teacher, and the views of his parents as to his after life are known, he should get specific instruction in that industry.

5160. You think the instruction ought to be of a very general character?—Yes, preparatory to the selection of a specific pursuit such as he shows inclination and capacity for.

5161. So as to prepare the boy for trade generally rather than any specific industry?—Yes, but I would favour an ultimate definite course of training for a specified occupation.

5162. You think if he were to work in leather in after life, it would be very useful to him to have learned at school the use of tools in wood and iron?—Yes. The more a boy learns, the more ambitious he becomes to learn. The books that are placed in his hands in the National Schools are more calculated to produce a taste for indulging in idle dreams and fancies than a desire for practical and scientific knowledge. I would recommend you to examine these books, which constitute the class books. There is one book called the Agricultural Lesson Book, but not 10 per cent. of the boys in Connaught and Munster remain in

school sufficiently long to reach the sixth standard, at which they take up this agricultural book.

5163. (*Chairman.*) I was recently told that the best instruction in science in any board school in London was in a school in which Shakespeare was admirably recited, and it was held by the science teacher that the best preparation for science was a knowledge of Shakespeare?—I would hope that a less poetic knowledge would suffice for scientific proficiency.

5164. What he meant, of course, was good literary instruction?—A good literary instruction cultivates the intellect, and a well cultivated intellect receives scientific instruction more easily than an ignorant mind. Anything that prepares the intellect makes mental ground upon which scientific knowledge is the more easily planted.

5165. (*Dr. Roscoe.*) With regard to this subject, you will probably admit that the difficulty of bringing home to the children in their early years ideas, for instance, of glass manufacture or iron manufacture, by mere extracts in a book is very great, and probably you would say that the subjects chosen must be of extreme simplicity in order to be of any advantage?—Of course I am in favour of simplicity of method of instruction in every school, but I think the sooner a child learns the serious duties of life the better; the sooner it is instructed as to the value of industrial habits, and the evils of intemperance and idleness, the better it will be for the future of that child. I do not apprehend any more difficulty in teaching a child the habits of industry and the value of trade and husbandry and all that, than there is now in teaching a child about the foxes that talk and the learned mice which you will find so much about in these six National School books. A great deal of useless information about useless animals is given to children, filling their minds with idle fancies. I, of course, believe in the teaching efficacy of Fable. I would bless a La Fontaine who should arise and weave a new order of fable in which the realities of life might be clothed in the garb of attractive composition. The virtue of industry, evils of idleness and drink, rewards of perseverance, filial affection, &c., could be personified in fable as well as the faults of bears and foxes, and the wisdom and virtues of mice. I should like to know how many hundreds of thousands of poor little sparrows have been tortured by boys in consequence of that abominable fable about the killing of Poor Cock Robin. There is neither common sense nor humanity in these stories for children.

5166. With regard to the subject of home industries, to which you have scarcely referred, we have had much evidence before us with respect to such industries, and I should be glad if you could give us your ideas as to the possibility, especially in these western districts of Ireland, of supplementing the earnings of the peasant population by some simple industry that could be carried on by their families?—I am happy to say I have been instrumental in starting a cottage industry movement in the poorest district in Connaught. Twelve months ago, on my release from Portland, I visited Carraroe on the sea coast of Galway, where the people are in very indigent circumstances, an Irish speaking people, almost exclusively, and naturally intelligent. With money advanced by the Ladies Land League, we enabled a lady (*Miss Yeates*), who is now employed down there, to establish a cottage industry. The teaching is confined, for want of funds, to plain and ornamental needlework, hose, caps, and other such articles. Samples of the work have been exhibited in Dublin, and some are to be sent to the Boston Exhibition. So far progress has been made, and employment has been given in the district to about 60 girls. An effort is being made by the Bishop of Clonfert to establish this industry in the town of Loughras.

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5167. (*Chairman.*) Have you any recent information on the subject ; for in September, Miss Yeates told us she had great difficulties to contend with, but she hoped to overcome them ?—The difficulty was that she had to deal with an exclusively Irish speaking people, and she was not able to speak Irish, and it is very hard, to teach English to Irish speaking children without teaching them in Irish first. She has taught the girls to knit very useful work ; although she could not speak to them in Irish, she has taught them by example. I heard from her this morning that Dr. Duggan, the good Bishop of Clonfert, has invited her to Loughrea, and promises to advance a few hundred pounds towards establishing the industry in that very poor district.

5168. Can you suggest any other industry that could be equally well introduced as a cottage industry in other parts of the country ?—Yes ; basket-making, mat making, wood carving and various other light industries. Then there is the making of turf-litter, which is capable of great development, for we have abundance of better peat for the purpose than is found in Holland.

5169. That could scarcely be called a cottage industry ?—No ; it would not come under that category ; but it would afford a fresh source of employment.

5170. We want some industry that could be carried on, by the girls at home and the men when unemployed otherwise ?—I fear unless such cottage industry gets the kind of help which I have suggested, that it will have a hard fight to be able to live. What is wanted is some association in Dublin of people friendly to such a movement, who would help the industry along until it could become self-supporting.

5171. (*Mr. Magnus.*) Is there any difficulty experienced in selling the needlework done by the girls under Miss Yeates ?—She has experienced difficulty here in Ireland. I believe she sells her work in England. She has to compete with the large manufacturing houses which do work by machinery, and very cheaply.

5172. But even so, it is sufficient to compensate the girls for the labour bestowed upon it ?—Of course they have nothing else to do, and it is better to employ them with cheap work than that they should be doing nothing. There is a great deal of time on the hands of the peasantry, especially in winter time, and it would be of vast importance to promote employment for the women and children in the West, that would enable them to supplement the scanty earnings of the men and boys. Then if nothing else but habits of home industry are taught it will be doing permanent good.

5173. (*Dr. Roscoe.*) Would you think the proper teaching of plain sewing in the National Schools in Ireland, which is not at present carried on very efficiently, would assist such a movement as you described ?—Yes. I think the matter of female education is just as backward in Ireland as is the primary education of the males. I would be very strongly in favour of teaching girls an occupation, as well as boys, in order that if they are compelled to work for their living they should have preparatory instruction.

5174. (*Mr. Magnus.*) The question of encouraging mechanics to attend mechanics' institutes is very important. Can you give any other suggestion by which encouragement could be afforded to the re-establishment of these mechanics' institutes throughout Ireland ?—The only suggestion that occurs to me now is to provide better and more attractive buildings, that would more than compete with the attractions of the public house and places where young men spend more of their time than is good for themselves, or their country. The adding of libraries to such

institutes would be a most powerful inducement to encourage self culture and to supplement the deficiencies of imperfect primary education.

5175. Do you think that if it were known that the Government would assist in the erection of these buildings it would stimulate local effort?— I think it would: unfortunately the wealthy classes, who in England are not unwilling to subscribe to what will tend to improve the working classes, are in antagonism to the working classes at present in Ireland, and we cannot look to that voluntary aid which you receive in England.

5176. (*Chairman.*) Would you make that as an absolute statement; because you have in Ireland wealthy middle classes residing in your good towns; the retail trades of the country are fairly prosperous in ordinary times:—I do not mean in this year or that, but the towns of Ireland are improving: might it not be expected that the tradesmen of the towns would give substantial encouragement to institutions of this kind?—I am sorry that I cannot agree with you as to the prosperous condition of that class in Ireland. I am afraid there are very few evidences of general prosperity in Ireland now.

5177. But there has been a very considerable advance in prosperity as shown by the deposits in savings banks and other banks?—I think you will find such deposits to be from the landed gentry, government servants, and the class of people who are not willing to help in such work as Mechanics' Institutes. The question of education should receive more prominence in Irish public life than in the past. There is not that indifference to education among the masses of Ireland that is assumed in England.

5178. (*Mr. Woodall.*) I understand you to say that the difficulty is not so much the want of wealth as the want of sympathy amongst the wealthy classes?—There is that want of sympathy, and it prevents us getting that local and independent assistance which is so valuable in England.

5179. (*Dr. Roscoe.*) Still you think some money would be available for the purpose?—I think so, I could not promise that the well-to-do people in Ireland would respond as well as you or I would wish, or as is done in England, but I think many parties could be got to subscribe something in aid of extending Mechanics' Institutes if the Treasury would lend a helping hand.

5180. (*Mr. Magnus.*) I suppose you know that not only is the Science and Art Department willing to pay fees on the results of examinations in science in Mechanics' Institutes, but also that the City and Guilds of London Institute is willing to give grants on the results of examinations in various technical subjects, some of which no doubt the artisans of a city like Dublin are studying?—I am not as well acquainted with your educational institutions in London as I ought to be. We have a national prejudice against London control of Irish institutions.

5181. (*Chairman.*) You feel there is a general disinclination to resort to England?—To South Kensington there is, I believe, in educational matters some national objection.

STATEMENT HANDED IN BY THE WITNESS.

Supplementary Observations on Female Education.

Ireland is notably wanting in what may be termed the practical as opposed to the ornamental education of woman. The fault of this is

*Mr.
M. Davitt.*
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Mr.
M. Pavytt.
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not so much to be looked for in those invaluable institutions of religious and moral culture, convent schools, as in the almost total absence of any interest in, or desire for, common sense domestic training in the education of girls on the part of the public sentiment of the country. The fact seems to be overlooked, that it is the duty of parents to see that their daughters are trained in all those domestic arts which will make them practical house-keepers for the men who are to support them as wives. The Irish people have about the worst system of cooking in the world—the fault being the want of anything approaching to culinary education in the schools whither girls are sent. Better cooking would produce less drinking, less dyspepsia, less inducement to resort to stimulants on the part of working men; and a desire to excel in this part of a girl's training should be cultivated in every girls' school. As a rule, the kind of education imparted to a girl is such as her parents desire her to obtain. Its quality or selection does not lie with the nuns, but is regulated by the prevailing taste for what is designated "being accomplished," which means, generally, a style of education for a farmer's or trader's daughter which makes some approach, in the frivolity of its disregard for the serious facts and duties of life, to what is believed to be the education of the people who are known as the wealthy and fashionable.

The force of example is peculiarly strong in Irish character, and the example of accomplished uselessness, and learned indolence, which "accomplished, fashionable education" has set before the female mind of this country, is productive of deplorable consequences. There are few matters in connection with educational reform deserving of more serious attention than the question of imparting sound homestead education, and a love for habits of industry, to those who are destined to exercise most influence upon the individuality of the people. A girl so taught as to be ashamed of owning to her school-mates of being a farmer's or a trader's daughter, or learning to become indifferent to, if not to despise, household industry, is not likely to become the mother of industrious children. The minds of such girls are estranged from the idea of manual work. The numerous evils that spring from habits of indolence need not be particularised. The worst are not those of physical debility, which a cultivated love for industry would often counteract.

Every school in which girls are educated should be encouraged to teach cooking and general homestead occupation, by the granting of results fees for proficiency in domestic as in other necessary accomplishments. Such instruction should also be given as will not only prepare the pupils for the sphere of duty, which society recognises as especially belonging to women, but likewise with a view to their being qualified for those clerical and other light occupations which are rapidly becoming an open field for female labour. The technical knowledge thus acquired would be of immense value in the formation of industrious habits, even should circumstances not call for a recourse to its exercise as a means of subsistence. Lessons on the laws of sanitation are almost entirely neglected in the education of girls, as well as of the kindred subject of hygiene, yet there can scarcely be mentioned matters on which it is more necessary to impart knowledge to those who will have the internal management of houses in their hands. The rate of mortality in Dublin is five per cent. higher than it would be if the education of its women had been attended to on these two vitally important subjects, affecting the health of people living in the crowded streets and lanes of a large city.

Professor JOSEPH PATRICK O'REILLY, C.E., M.R.I.A. examined.

Prof.
J. P. O'Reilly,
C.E.,
M.R.I.A.

5182. (*Chairman.*) You are Secretary of the Royal College of Science?—Secretary pro. tem.

5183. Is the office held by rotation?—By appointment.

5184. You are acquainted with everything done in the college?—I am presumed to be.

5185. How long have you held the appointment?—I have been secretary for about three years, but I have been professor for 16 years.

5186. Of what subject?—Mining and mineralogy.

5187. What is the number of students in all subjects?—Last year there was a maximum of 80, but we never reached that number before; it usually fluctuates about 60, 70, and 75. I am speaking of the day students.

5188. It is satisfactory to know that last year you had an increase on the number of students in any preceding year?—It was distinctly the best year. A certain number are called associate-students following the three years' course, and the balance are students attending distinctly one or other or two courses; in fact such course as they please.

5189. Of the 80 students how many have followed the three years' course?—About 25 or 30 at the very most.

5190. Do they come from all parts of Ireland?—Not a large number come from Ireland. There are always a certain number of exhibitors from England: Last year we had an exhibitor from Belfast: one of the first, indeed, I may say.

5191. Is there an increase in the number of Irish students?—I am not able to say positively, but I do not think there is an increase; the proportion is pretty much the same as it has been.

5192. What is the proportion of Irish students on any occasion?—It is about half.

5193. About half of the associates who follow the three years' course are residents in Ireland?—Yes.

5194. The others came over from England or Scotland?—Yes.

5195. Can you assign any reason for their coming to Ireland in preference to going to London?—The fact of their having won an exhibition from the Department and tenable here. There is also a certain knowledge that there is a very good education given here; the college has the reputation of giving a good education, and we can furnish absolute proof of students coming from England by reason of that fact. One student who took out his diploma here, and whose antecedents were very good, recommended his brother to come over to Dublin, instead of going to Manchester or any of the other places; and the students have expressed wonder again and again that the college should not be taken advantage of more frequently by students in this country.

5196. Are there many Whitworth scholars?—Generally one or two.

5197. One or two who have already taken the scholarship, and avail themselves of the instruction here for the purpose of complying with its conditions?—In compliance with the conditions, and also for the purpose of getting a diploma.

5198. Then with respect to the remainder of the students, do they avail themselves of one or more courses?—They are special: they are either attending specially in chemistry, or specially in the subject of applied physics or natural history, on account of the laboratory facilities given.

5199. Are these all Irish?—They are mostly Irish.

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5200. Are they generally students who have attended the intermediate schools of Ireland?—We have no evidence that as yet the intermediate school has brought us anything.

5201. Where do they generally receive their preparatory education?—They exhibit great diversity, but we have rather to complain of the imperfect education of many coming from Ireland, especially those coming for the associateship.

5202. You have spoken of day students: have you any evening classes?—There has been a series of evening classes in the college, almost from its commencement; it was re-organized at the suggestion of the Department, and courses of a more strictly scientific character were given in chemistry; phisic, geology, and physical geography and including a certain amount of mineralogy. These classes have been continued up to the present.

5203. What is the number of students attending your evening classes last year?—I could not exactly say; but I suppose the total number was about 60.

5204. You have tabular returns?—Yes.

5205. Do they give the number of subjects, and the number of students?—They give the number of regular students; of occasional students and the averages; I should say that the number of students is at times much greater. There have been attendances of up to 100.

5206. Are the students of the artizan class?—For certain subjects, I believe they are.

5207. Are the courses as strictly scientific as those of the day classes, or are they more popular?—They are strictly scientific, and in fact the courses that you might call purely popular have been abandoned.

5208. Do the evening students have any laboratory instruction?—I am not aware whether for some time there has been what is called laboratory instruction.

5209. You have spoken of the three years' course: is that course the same for all students?—All associate students who enter according to the new rule have one set of subjects for the first year, and after that they specialize and take up either chemistry, or manufactures, or engineering or mining.

5210. The courses become special only at the end of the first year?—Yes.

5211. Have you any entrance examination?—None.

5212. How do you treat those students whom you consider scarcely qualified to follow your course?—There is instruction by the professor of mathematics who is able to see whether they possess sufficient acquaintance with the subject, then there is a special course of pure mathematics for those who are working in mathematics; for the main point with all students is a knowledge of mathematics.

5213. But on other subjects you would take a person who is entirely ignorant of the subject when he enters college?—Certainly.

5214. The class in manufactures I believe is somewhat different from any at South Kensington?—I believe the manufactures class is a very unique class in its way.

5215. It is different in kind, is it not, from any of the South Kensington classes?—I do not know the exact nature of the latter; but I do not think there is any strict manufactures class that exactly corresponds to it.

Professor W. N. HARTLEY, F.C.S., F.R.S.E., examined.

Prof.
W. N. Hartley,
F.C.S.,
F.R.S.E.

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5216. (*Chairman.*) Can you tell us what is the meaning of this manufacturing class?—In the manufacturing class the course of instruction deals with such subjects as the students who attend may be called upon in after-life to put into practice in the management of a brewery or chemical works. The course of instruction is general in the first year and in the second year more special. The students get through a large amount of work in practical chemistry and receive certain instruction in practical physics; students in the Faculty of engineering receive instruction in drawing. Then in the third year the work is still more special; the student devotes a very large portion of his time to the chemical laboratory, and the laboratory course of instruction in chemical analysis is chosen so as to make the student familiar with raw products and such analyses as he would make from time to time in chemical works or iron works. In his third year he has only three courses of lectures, one on technical chemistry, applied chemistry as it is termed; and in this class of applied chemistry he is instructed, first in the lecture theatre, with working drawings and models, and by aid of specimens of raw material and finished products, and afterwards in the chemical works. Through the kindness of several manufacturers, we have considerable facilities for instructing students in the works; we are enabled to go and spend a whole day in the works, examining them most completely. There are some five or six works that we visit in this way. At Guinness's Brewery we generally have some one of the staff to accompany us and explain every part of the process and the whole of the machinery, and to shew the whole operations of malting, mashing, and fermenting. I may mention some other works which the students in the Faculty of manufactures attend. There are the works of Mr. Morgan Mooney, where the manufacture of salt-cake, the condensation of hydrochloric acid, and the manufacture of bleaching powder is carried on, and where Weldon's process is carried out; Boyd, Son, and Co.'s, where we have the advantage of seeing Hargraves' process for making salt-cake, and where, also, Weldon's process is carried out very completely, and bleaching powder manufactured. Then in other works, which are close at hand, we see the concentration of vitriol in glass vessels, at Vincent, Paul, and Co.'s, and at Kurtz and Co.'s works, in the neighbourhood, we see the process of making sulphate of ammonia from gas liquor and the distillation of tar. The students are also taken to the gasworks, where the manager meets us, and shows the whole process of gas manufacture.

5217. How long has the Faculty of manufactures existed?—It was one of the first Faculties. It is one of the Faculties originated in consequence of the report of Lord Rosse's Commission, and therefore it has existed from the year 1867.

5218. What proportion of the three years' students has chosen that Faculty?—It is one of the favourite Faculties. If you take the numbers at the end of the second year, say three or four will enter for manufactures, two or three for engineering, and one or two for mining.

5219. Does the same rule apply with regard to the proportion of English and Irish students in the Faculty of manufactures as in the other Faculties?—It is difficult to say as the numbers are so small. I think it depends on their having passed through two years successfully.

5220. The numbers are too small to enable you to strike an average?—I can say simply those who have passed through their three years.

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5221. (*Dr. Roscoe.*) I have had to examine some of the papers of the chemistry classes here for the Department, and I have had much pleasure in saying that I think the tuition is very good, and that I have been pleased with the class of answers sent up. I should like to know whether those papers sent up to the Department as the result of the first, second, and third year include all the students, and not merely those going through the Faculty of manufactures or the ordinary course of chemistry?—Oh, no. All the students pass an examination in theoretical chemistry, if they are associate students, and such others as feel inclined to offer themselves for examination; but my class only have come up for examination in technical chemistry.

5222. Seeing the small number which you unfortunately have in this Faculty of manufactures, have you any suggestion to make to the Commission by which the numbers could in any way be increased. In what direction ought endeavours be made to increase the numbers?—The only difficulty I see in the way of increase in the numbers is the length of time—three years, which is spent in the education. If the students could reduce the time which they spend at the college to two years, probably we should have a larger number attending.

5223. But that would be at the expense of the efficiency of your system?—Yes.

5224. Are there any other institutions in Dublin, or in Ireland altogether, with which you compete—Trinity College, for example. Do they compete with you in any way, or stand in your way?—I believe not. I believe there is no institution that gives a similar course of instruction in manufactures.

5225. To what do you attribute the really very small number, only three or four, who are attending your course?—First of all, the students do not get the training at school which attracts their attention to science; the consequence is that the whole field that is open to them in after-life is a profession such as medicine or law. We see that constantly in Dublin. Dublin is thronged with medical students, but there are very few who enter anywhere even for engineering, which is a subject which commands a large number of students in England.

5226. And also in Belfast?—In Belfast, I believe, there is no similar course of instruction.

5227. In the Queen's Colleges they give a degree of engineering?—Yes, certainly, they give engineering instruction there, but I am speaking with regard to manufactures. There is no similar course of instruction such as we give in the Faculty of manufactures; but whether or not there is a large attendance of students in the Faculty of engineering in Belfast, I am unable to say. I have no statistics, but I believe there are few students altogether in Dublin who take up the subject of engineering. Trinity College gives instruction in engineering and a degree in engineering, and therefore in that respect we may be said to compete with them; but I believe that there the number attending the engineering school is as small as it is in the Faculty of manufactures here.

Prof.
W. F. Barrett,
F.R.S.E.

Professor W. F. BARRETT, F.R.S.E., examined.

5228. (*Chairman.*) Would you like to add anything in the way of explanation as to the small number of students attending here?—I think the number of the day students is small as compared with South Kensington, but the number of evening students compares favourably with the number at any similar institution in England or elsewhere.

5229. Sixty?—No, the actual number of individuals is 130. I have the roll book with the names here.

5230. You consider that 130 is a satisfactory attendance on the evening classes?—For a place like Dublin, subject as it has been lately to great excitement, the number is decidedly satisfactory. I think the number should increase when the times become quieter and people's minds are less disturbed.

(*Professor O'Reilly.*) As to the small number of students attending the College, this is a matter which depends essentially upon peculiar prejudices; upon the training and tendencies of the better educated class in this country. There have been two colleges long competing for the whole of the education. Trinity College, on one hand, with enormous prestige and position, and on the other the various Queen's Colleges, competing by greater amount of facility and cheapness, but with much less prestige. The consequence is that any establishment which does not pretend to train its students to what is called a liberal profession has much to contend with in this country, there being for a very long time an extremely marked prejudice against any vocation which seems to be even connected with trade. The consequence is that very poor people in this country, who have hardly the means of educating their children, will make great sacrifices to give them a professional education. They esteem very little what will give them what you call a trade or commercial training. We suffer and we have suffered from that most distinctly.

(*Professor Barrett.*) I can quite corroborate what Professor O'Reilly has said about trade from the experience of a large number of friends in Ireland. The general impression is that it is degrading to enter anything which smacks of trade or handiwork, and great sacrifices are made to put children to college where they will get what is called a profession. Hence Dublin is full of young barristers, clerks, and others of that class. A change in the habits and customs of the people is the first step towards altering that state of things, and we can only do that by increased primary education and good sense.

(*Professor O'Reilly.*) One of the functions of this place is a very remarkable one. It was instituted as a museum of Irish industry, and of this the college is really an extension. The state of chemical knowledge in the country was such—I have reason to say it on the very best authority—that in the highest reputed laboratory in the place a Liebig's condenser was not known; but the then professor of chemistry having received his knowledge from Liebig, and knowing the importance of it, caused a great change. He brought in all these requirements, and it was not until he showed the way that they were taken up elsewhere; and indeed every step taken in advance by the professor of this college is copied, but not acknowledged; and precisely because they do lead the way, we are subject to most decided jealousy, and are therefore derided. One of the good things done by this establishment from the commencement has been precisely to lead the way in these matters.

5231. (*Dr. Roscoe to Professor Barrett.*) As to the evening classes you say about 130 individuals have attended your evening classes: how many distinct courses have you?—We have four classes I think: physics, chemistry, physiology, and physical geography. The numbers are differently distributed.

5232. Do you in these classes work with the ordinary South Kensington examinations and its science classes in the ordinary sense of the word?—No, by no means. These classes have been in existence since the commencement of the college. In a more or less systematic

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Prof. W. F. Barrett, F.R.S.E. way for the last ten years I have given evening courses on physics every session, attended by students varying in number from 100 to 300. About three years ago the Department urged on us to undertake more systematic evening instruction; for that purpose no funds were available, and we applied to the London City Companies having property in Ireland to aid us in this work. The Drapers' Company very generously responded, and gave us a grant of 100*l.* a year for three years, on condition that classes should be successfully carried on in chemistry and physics. Two other City Companies—the Fishmongers and the Clothworkers—were, I think I may say, on the point of aiding us when disturbances broke out in Ireland. Since then the evening work has thus been undertaken more systematically, and in a letter sent a week or two ago to the Drapers' Company the secretary has given a return of the work done in the evening classes. That letter might perhaps be put in evidence.

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5233. What is the substance of it?—It points out cases of individuals who have benefited by attending the course: the names are mentioned of two or three who have attended these evening lectures, and have subsequently obtained profitable employment in England and elsewhere; statistics also are given in the different departments. In chemistry, for example, during the last three years 46 evening lectures were given, 165 students attending them—total attendance 1,891; and in the other subjects the number is greater, for instance, in physics 255 students attended, making a total attendance of 4,290.

5234. (*Chairman.*) But if you multiply the number of students by the number of lectures you ought to get a very much larger attendance?—It would be much larger.

(*Professor Hartley.*) We were obliged to draw a distinction between those who attend regularly and those who attend occasionally.

5235. (*Chairman.*) How do you account for the smallness of the number of attendances; some of the students must have attended very badly?—I think in each case the total would be double if all had attended regularly.*

(*Professor Barrett.*) The actual attendance of each individual is recorded: at the moment I could not answer without referring to the books.

5236. (*Chairman.*) But it is so: if you multiply the number of students by the number of lectures the attendance would be rather more than twice the number of attendances you have given us?—It would, I find.

5237. Does that not show that the average attendance of each student has been less than half of the total number of attendances he might have made?—It does seem to show that, but I would not like to answer that question definitely; I will see how these figures are compiled. A point, however, I wanted to mention to the Commissioners is that the value of these lectures to the students is testified by a number of letters we have received from students who have left the place and afterwards obtained employment. I have here a letter from a former student, who writes expressing his gratitude, and hoping that these evening classes will be more generally known as, through the

* Note subsequently added by Professor Barrett:—

“ Since giving this evidence I have examined the rolls and find as a whole the students have been extremely regular in their attendance. The discrepancy referred to by the Chairman arose from an inadvertence in the compilation of the return.”

instruction he gained at them, he has obtained employment in America, I may add that there is, however, one thing wanting in this evening instruction: the students cannot handle the instruments and make experiments for themselves, because it would obviously interfere with our day classes, which are quite distinct.

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5238. (*Dr. Roscoe.*) I do not see that it is so obvious that it would interfere with the day class; for instance, in my own college, at Owens College, we have evening classes going on all the winter, in which we have practical illustrations in physical subjects, in chemical manipulation, and in biology, and we do not find it interferes with the day classes at all?—The interference in my case would be simply want of time, and the impossibility of time and strength being given to work day and evening as well. A practical class is very tiring to the teacher. I should therefore require some addition to the teaching staff. The students in the evening are a less educated class than in the day, and would require somewhat fuller and more particular instruction, and the use of rather rougher instruments than those in the day class.

5239. Then I understand you do not undertake to teach evening science classes in connection with the Department?—No, they are purely voluntary classes, and are at present undertaken by a moiety—about half of the professors.

5240. (*Chairman.*) Do not the students coming up prepare for the ordinary science examination?—They may if they choose.

5241. (*Mr. Magnus.*) Do the teachers of these classes receive no payment on results from South Kensington?—(*Professor Hartley.*) They are not allowed to receive any.

5242. Why?—That is the rule of the Department.

5243. Under what rule of the Department does it come?—(*Professor Barrett.*) You will find in our minute books a record of correspondence with the Department on the subject; they refer to the rule under which no officer of the Science and Art Department is allowed to receive payment by results in the classes taught by them; that excludes us.

5244. Would that exclude your assistant from payment on results in the class in which he would teach under your direction?—Inside the college I think it would. The question has not been raised.

5245. Therefore you obtain no subvention for the evening class, and under the present rules you are unable to receive any payment on results?—None.

5246. (*Dr. Roscoe.*) Being well acquainted with the teaching of science in Dublin, do you agree with the opinion we have heard expressed that in Dublin, especially, science teaching—which has spread over most parts of England and in the north of Ireland—is not carried out to the extent we should desire?—(*Professor Hartley.*) I believe not.

5247. But you have taken no steps, as being connected with the Department, that the school shall increase or develop. Have you no teaching yourself in connection with science classes in Dublin?—We have established an evening class.

5248. But these are not the classes I refer to, for we have heard that these are not the classes from which the teacher can obtain grants for results. I am speaking of the ordinary science classes?—We ourselves would be excluded under the rules.

5249. And whatever has been done has been in your individual capacity?—(*Professor Barrett.*) Yes, as an interesting fact, I may mention that some students who have left us have become most successful teachers of these evening classes. I might mention several

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names of former students of our evening classes who are now teaching science classes, and partly supporting themselves in this way by obtaining payment on results.

5250. (*Chairman.*) Is there any chance of that kind of teaching being further developed in Dublin?—I think it has fallen back somewhat lately. The returns of the Science and Art Department are most instructive on the relative attendance in England, Scotland, and Ireland. I find on a careful analysis of them that there were in England and Wales under instruction in 1880, 17,404 students who came up for examination in geometrical drawing, from Scotland there came 2,229, and from Ireland 292; in mathematics, from England 11,081, from Scotland 3,050, and from Ireland, 2738; in mechanics, from England 4,293, from Scotland 1,226, and from Ireland 982; in physics, from England 15,401, Scotland 1,477, and from Ireland 3,212; in chemistry from England 1,732, from Scotland 1,475, and from Ireland 439; in geology, from England 2,092, from Scotland 2,092, and from Ireland 406; in biology, from England 9,336, from Scotland 9,336, and from Ireland 821; in steam, from England 1,539, from Scotland 1,539, and from Ireland 105; in physiography, from England 4,435, from Scotland 709, and from Ireland 1,522; and in agriculture, from England 2,772, from Scotland 548, and from Ireland 3,104.

5251. How do you account for the number of students in physics being so much larger than the number from England and Wales or Scotland?—I cannot understand it. I know that of the science teachers in South Kensington I found a large proportion of the teachers in physics came from Ireland, so that it seems to be a subject for which the Irish people have a special aptitude. The attendance at our evening classes indicates the same thing. In England the majority choose geometrical drawing, but in Ireland physics is the most popular; next to that, agriculture, and very few choose geometrical drawing.

5252. You do not instruct for the examination in physics?—No; in our evening classes there is no stated examination.

5253. Have you any instruction in geometrical drawing in the evening classes?—No.

5254. What is the reason?—The classes are purely voluntary, and the professor of that subject is unable to give his time.

5255. Is that the only reason, or is there any want of accommodation?—I could not answer for my colleague's accommodation.

(*Professor O'Reilly.*) There is a defect of light; the light is a four-branch gaslight, but that defect could be easily remedied.

5256. (*Dr. Roscoe.*) You are aware that in the last year or two the school at South Kensington has been converted into an enormous school for teachers of science. Would your school be sufficient to teach science teachers in Ireland, or would it be desirable that this school should form the nucleus of an institution for science teachers in Ireland, or is there not such a demand for science teachers?—(*Professor Hartley.*) There is a demand to a certain extent for science teachers, and it would be very desirable that they should be taught here; but as a matter of fact, they have their choice to come here or to go to London, and they naturally prefer going to London, as their expenses are paid. It is a fact that we have a certain number of science teachers attending; last year there were 12 attending my class in chemistry, and they all came from Milltown College, the Jesuits' College; they intended I believe, to be schoolmasters, or at any rate to take charge of science classes in the country, and one of them, I have heard, has already been employed

in lecturing on chemistry in one of the colleges near Dublin. At the present moment, even, we have some two or three who are now science teachers, and who intend to graduate in the Royal University. They are attending classes here for that purpose.

5257. (*Chairman.*) But you have no similar course during the holidays for teachers?—Not for teachers.

5258. Would there be any advantage in having a course-like that?—(*Professor Barrett.*) I think there would be, both to the country and to the teachers themselves.

5259. You think it would popularise the institution?—Quite so. I think the less we are brought into conflict with existing institutions the better is it for this place, and as far as possible the education given here should be of a kind that cannot be obtained elsewhere.

5260. Than cannot be obtained in England?—I mean in this country, or in Dublin.

5261. (*Dr. Roscoe.*) We have heard there are certain objections raised by portion of the people in Ireland against an institution having its seat of government in London: do you think that that in any way prejudices your work here?—I do not think it prejudices our work in the slightest; it may cripple us occasionally for want of speed in carrying out necessary reforms, and the difficulty of communicating by letter.

5262. I do not refer to yourselves, I refer to the circumstance that there is a prejudice against you in the country as being connected with the South Kensington Department; that students, on account of political prejudices, do not take advantage of your institution as they might do?—I am well aware there is a most unreasonable and unreasoning prejudice against South Kensington in this country, and it may to some extent affect a few people, who may therefore not send their sons here; but I think when a parent wants his son to be educated, prejudice of this kind will not stand in his way.

5263. (*Chairman.*) The suggestion rather was that it interfered with the attendance at your evening classes on the part of the working population?—(*Professor Hartley.*) That certainly cannot be the case.

(*Professor O'Reilly.*) I am bound to say here before the Commissioners that I have heard from a person having authority—I greatly regret it—that national feeling does interfere with us. The fact of our being under the Government does prejudice us; it is blind, but the fact is the prejudice does exist.

(*Professor Barrett.*) The main points against us seem to be these: first, the want of primary education throughout the country; secondly, the poverty of the country—if the classes were made much cheaper I think there would be a much larger attendance; and thirdly, and, perhaps, mainly, the want of this place being better known—the absolute necessity of its being better known in the town and neighbourhood. It is a surprising fact that some people living in this very Green did not know of the nature of this institution until I told them of it. May I call the attention of the Commissioners to a very remarkable fact with reference to the subject of Irish teachers; I made a careful analysis of the Science and Art Report, and I found the payments by results to science teachers in England amounted to 29,900*l.*, or 14*s.* per pupil; in Scotland to 5,250*l.*, or 14*s.* 2*d.* per pupil; and in Ireland 5,079*l.*, or 18*s.* 9*d.* per pupil. Ireland has the highest payment on results per pupil. In art schools the payment of art pupils averages 2*s.* 3*d.* per head in England; it is 2*s.* 4*d.* in Scot-

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land; and 5s. in Ireland. The only true test it seems to me is to take the payment per head, and that is the result.

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5264. (*Chairman.*) You speak about the cost of instruction being an obstacle in a poor country. What are the fees for the evening class?—(*Professor O'Reilly.*) Purely nominal; each course is 6s. or 7s. The prejudice is the other way in this country. People will willingly pay a high fee, while they will not attend when the teaching is gratuitous or the fee very low; they think it is not useful for them.

(*Professor Barrett.*) There is a little difference of opinion between us there; but as a matter of fact, the theatre used to be crowded to the doors when the fees were much less in the evening classes. The average attendance in one class when the fees were small was about 245 in one year, but since the fees have been raised they have fallen off. No doubt the fee does affect the attendance. It, of course, excludes many people who come from simple curiosity.

5265. Who fixes the fees?—In the evening class we are at liberty to fix them, but the day class fees are fixed by the Department.

5266. What becomes of them?—They are divided amongst the professors.

(*Professor Hartley.*) I may express a different opinion. My experience is, that the lower the fee the smaller the number of students. It is actually so in my case. The fees were never so low as last year and this year; yet in the first two years the attendance was considerably larger and the fees higher.

5267. (*Mr. Magnus.*) Then the lectures are worked at a pecuniary loss voluntarily by the staff?—Except in the case of those who receive a subvention from the Drapers' Company.

5268. You mentioned that you had applied to the Drapers' Company for an increase in the grants which they at present give you?—For the development of the evening classes.

5269. Will you tell the Commission the objects to which you will devote that grant if made?—It is proposed to have a class in mathematics. The grounds on which we sought the increase were to give increased instruction in mathematics, and to make arrangements for giving practical instruction in chemistry and physics.

5270. Are there any candidates sent up from this college for the City Guilds Examinations in technology?—(*Professor O'Reilly.*) Very few present themselves from Ireland, but any there are come from this college.

5271. (*Chairman.*) What are the subjects?—Metallurgy and chemistry.

5272. (*Mr. Magnus.*) The teachers do not avail themselves of the payment on results in examinations in applied chemistry or applied mechanics or physics offered by the City Guilds?—(*Professor Hartley.*) I was quite unaware that there was any.

5273. It is a little strange it should not be known here, considering that the programme is lying in the college?—I always understood the payment was to the candidates and not to the teachers.

5274. I suppose even if the teachers availed themselves of these opportunities of obtaining payments on results, these payments are not likely to be sufficient to enable these evening classes to be maintained?—I should imagine not.

5275. (*Dr. Roscoe.*) I think you said that this was one of the few institutions in which instruction is being given in applied chemistry?—In which there is a definite course of lectures on applied chemistry, and,

as far as I know, it is the only one in which there is a diploma given in manufactures.

5276. I do not know whether you are aware that a definite course of instruction for those to be engaged in manufactures is given in the Owens College, Manchester?—Yes, and at the Andersonian College, Glasgow, and the University College, London. These are the only three institutions I am acquainted with where a definite course is given.

5277. In the day course here in physics is laboratory instruction given to the students?—(Professor Barrett.) Every student is passed through the practical physical laboratory in the second year, but I think the time is far too short for what we have to do in physics; only six hours a week for one term.

5278. (Mr. Magnus.) I suppose the evening students in physics do not get any practical instruction?—No.

5279. Or the evening students in chemistry?—No.

5280. Do you think it advisable they should get practical instruction in physics as well as chemistry?—Yes, I think it is most desirable.

5281. You have no other suggestion by which the evening instruction here or in Dublin generally might be made more popular, and might be more adapted to the particular industries carried on in Dublin, and might be rendered therefore more valuable for the artisans engaged in these industries?—(Professor Hartley.) I believe the instruction would be made more valuable if there was teaching in mathematics, and perhaps a certain amount of practical instruction, but I do not think that otherwise the evening classes could be better adapted for the purposes of the artisans of Dublin.

5282. (Chairman.) What Mr. Magnus means is, whether you could tempt the artisans in any way to come in and avail themselves of the excellent instruction which is really only waiting for them?—Well, I think quite as many come as can possibly give time to it, or have any need for it; and you may depend upon it unless they see some advantage in attending the science classes they will not attend.

(Professor Barrett.) Perhaps I might answer that question also. In Dublin there are large engineering works at Inchicore and elsewhere, the large optical works of Mr. Grubb, and large breweries. In these three different employments a knowledge of physics and, in the brewery, of chemistry, is most necessary. Some 25 of the workmen from Inchicore attended our evening lectures, and we know therefore they are anxious for instruction. What I would venture to suggest is, that if our evening classes were made widely known, especially to the class of people whom they are likely to benefit, if they were opened at some small fixed fee, and if there were attached to each evening class a certain number of scholarships, so that the best students could receive their instruction more completely afterwards in the day classes, we should have many more students than we have now, and we could do a great good for the country. I think a knowledge of practical chemistry, practical mechanics, and practical physics is most important to the country.

5283. (Mr. Magnus.) I think we should like to have the views of Professor Barrett and Professor Hartley on the work of the Intermediate Board, and whether the curriculum of education as laid down by that board is as well adapted as it can be to the wants of the country?

(Professor Hartley.) The only remark I could make is that I have very little knowledge of what teaching is done by the Intermediate Board. I can only speak of what the examinations have done, and I have noticed

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that the marking for classical subjects and for literature is higher than for mathematics and science subjects. I think it would be of great advantage to pupils in schools if the natural bent of the mind had more play, and the marking for the subjects were equalized so that the teacher would be induced to give more attention to mathematics and science.

5284. You do not think that sufficient encouragement is given under that Board to science teaching?—Not sufficient.

5285. And you find the students who come into this college are deficient in science knowledge?—Yes.

5286. (*Chairman.*) Have you noticed the reports of the examiners of the intermediate schools in reference to science?—Not recently. I examined the first report in 1880.

5287. You have not seen the last report?—No.

5288. You would not be surprised to find it is unfavourable in reference to science?—Am I to understand unfavourable to science teaching?

5289. Unfavourable as to the results of the teaching of science.—No, because the marking for science is below that for other subjects.

5290. You think the best men would not go into it?—Yes.

(*Professor O'Reilly.*) My experience is that undoubtedly the intermediate examinations, certainly up to last year, have given rise to an extreme development of the system of cramming, and I express myself not so much from general information as from actual contact with the teacher in one of the subjects, and he deplored that the tendency to cramming is dreadful.

5291. That the tendency of the examinations is to encourage cramming?—Yes, and to benefit the men who do cramming; these men are themselves very imperfectly instructed, and, in fact, they are not teachers proper. I think that is a bad state of things. It is very much spoken against by other people; for instance, Professor Mahaffy has criticised the system very strongly and very energetically.

The Commissioners then adjourned.

TWENTY-SECOND DAY.

Meeting at DUBLIN.

Fourth Day.

Thursday, 7th June 1883,

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., IN THE CHAIR,

Professor H. E. ROSCOE, LL.D., F.R.S.

Mr. PHILIP MAGNUS.

Mr. JOHN SLAGE, M.P.

Mr. WILLIAM WOODALL, M.P.

Mr. GILBERT R. REDGRAVE, *Secretary.*

Mr. THOMAS R. SCOTT examined.

Mr. T.R. Scott.

5292. (*Chairman.*) Mr. Scott, you are a cabinet-maker in the city of Dublin?—Yes, sir. 7 June 1883.

5293. And you are, I believe, a considerable employer of labour?—Yes.

5294. And you have given attention to the question of technical instruction as applied to your trade?—Yes, I have.

5295. The Commission will be glad to hear your views on the subject?—Well, I may state that at the present time the cabinet trade of Dublin is at a very low ebb indeed, so far as regards actual manufacture. There is plenty of good furniture to be seen in Dublin, but the greater part is imported, and this, I need scarcely tell you, is very detrimental both to the interests of the country and to those who are striving to keep up manufactures in the country. Most of the houses here do not make the goods they sell and consequently the city is deprived of a large amount of labour that ought to be possessed by it. It is about 10 years ago since I joined the trade or commenced business. The trade has dwindled down to a great extent through the monster houses, as I would call them, importing such large quantities of goods that very few of the legitimate cabinet-makers were able to stand against them. Consequently, I think, the cabinet-makers' trade has dwindled down to a mere shadow of what it was.

5296. I suppose you have some advantage over the imported goods by avoiding the cost of carriage?—That is a very small matter when you compare the class of goods imported. They are of the cheapest description, and consequently the makers here are not able to compete. In London, and in many of the large cities, there are a great many chamber masters, industrious people, who labour not 10 hours a day,

Mr. T.R. Scott. but probably 16 hours a day, and the whole family in many instances are occupied in the same way—wives, children, and all. These poor people, after a week's work, go out with their goods in a hand cart; a great many are seen in Curtain Road, Shoreditch, hawking their goods, which are sold to the wholesale houses, and these houses send out their travellers, who go all over the country to do business, and consequently the goods in that way are sold cheaply. They are to be got cheaper in London than in Dublin. These are goods that cannot last. For a few years past there has been a considerable improvement in the cabinet trade in Dublin. I personally find that people are demanding a better class of goods, and my own experience is that where such are placed before them, they are inclined to buy the good class of cabinet-making in preference to the cheaper. That is, of course, people who can afford it.

5297. Which class of goods would you wish to see made in Dublin, the cheap or the dear?—I would like to see every kind made. There is no reason why all could not be made, if there were means to assist the rising generation to do it. I may state that all the cabinet-makers are practically without apprentices. There is one exception, Robert Strahan is the only one who has endeavoured to foster legitimate cabinet-making. The other houses, if they have an apprentice—and it may be only one—that boy is seldom a good cabinet-maker. He may see one or two things made, but the place is so small, only three or four men perhaps being employed in the place, that he can learn but little. We have three apprentices and upwards of 40 men, and there is a great variety of work done. The advantages are obvious in favour of the large houses endeavouring to manufacture their own goods instead of purchasing them. If they manufacture a good description of goods they can manufacture them cheaper than they can buy them elsewhere.

5298. Then why do not they do so?—Well, the reason is this; the trade has so declined that there are very few men who will run the risk of setting up a shop and investing capital; there is also great difficulty in getting men. In the first place they must be trained. In Leeds, Glasgow, and London, where men work 52 to 60 hours a week, in nearly every instance they are better paid than in Dublin, consequently they will not leave these cities to come here.

5299. What remedy do you propose for the existing state of things?—I have been thinking over the matter almost ever since this question was mooted, and it is my intention to start a shop for boys, in which they shall study the trade and learn to become good tradesmen, so that we shall be able to get men when we want them.

5300. Would that be permitted by the trades unions?—In my shop I do not recognise the trades union. I have a large amount of machinery in my shop. At one time my shop was not recognised by the trades union, and since then I have not recognised it, though I know that plenty of the men in my employment belong to the trades union.

5301. You employ planing and other machinery in your shop?—Yes. Nearly every kind of machine necessary for the wood work. I may say that these machines are no drawback to cabinet manufacture. They do all the hard work and still a good cabinet-maker is more essential than ever. The hard work is performed by the machine, but still the work for a good tradesman is left.

5302. How would you train these boys?—I think they should be employed a certain number of hours in the shop, and let off early in the evening in order to attend at a drawing school, under the superintendence of a practical cabinet-maker who understands drawing. With

a great many poor people the want of education is a great drawback. I have known many men who were good tradesmen but who could not write their own names—men who still could do a good job. Place a drawing before such a man and he could not understand it. I have known such men, good workmen, and if you were to put a drawing before them they would look on it just as a picture and no more.

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5303. How would you educate these young men?—By a system of technical education in the shop, they get a drawing showing, to a certain extent, the job. They see the sections of the mouldings and so on. Those who do not understand drawing thoroughly will ask questions and become instructed. The man who has a fair education, who can read and write, and who has a knowledge of drawing, is invariably the best workman.

5304. Then how is it that they do not get a good education—or a fair English education—seeing that you have got schools in Dublin?—Well that I am not prepared to say; a great deal is undoubtedly the fault of the parents.

5305. You mean that they do not oblige them to attend regularly?—They do not compel their children to go to school, and through that the children suffer all the days of their life.

5306. You know that in England and Scotland attendance at school is made compulsory?—Yes.

5307. Would you consider it would be possible to carry out a similar law in Ireland?—Personally I should be delighted to see it. Of course Ireland is very different from other countries. It is hard to instil new ideas into the minds of the people. It would be, however, a decided advantage.

5308. Do you think that public opinion is prepared for it just now?—That I could not say.

5309. You have considered the question probably of whether drawing should be made an important element in the education of artisans during their school years?—Yes, I consider that it is quite equal in importance to the other part of their education. For boys, who are growing up to be tradesmen, I consider it quite as essential as the English language. With improvement in drawing will come improvement in manufactures. I know plenty of men who know a little about it and they can see through a job at once.

5310. Who know a little, you say?—Yes.

5311. Something about it?—Yes.

5312. And you say they have the advantage over those who know nothing of drawing?—Yes.

5313. What sort of drawing do you think young boys should be taught—freehand or instrumental?—I think it ought to begin with instrumental drawing decidedly, after that they should go into the other branches, and freehand is a decided advantage. I may state, for myself, that had I not been able to draw I should not be able to keep the position I do.

5314. Where did you learn drawing?—In Dublin and in London. I have many prizes from the schools attached to the Royal Dublin Society.

5315. The schools of which you speak are in connection with South Kensington?—Yes.

5316. Are there many such schools?—This is the principal one, but there are other drawing schools.

5317. They are all within the reach of the working man's home?—Yes. But the one objection I should point out is that the hours do not suit as well as might be wished, so as to enable apprentices to attend.

Mr. T. R. Scott. I allow my apprentices every facility. I put up the ovens giving information as to the school, but I have not been able to induce them to take advantage of it. I would let them off an hour to enable them to come here.

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5318. What hour would that be?—At 7 o'clock, I think.

5319. You would dismiss them so that they could get their tea, clean themselves, and be at the school at 7 o'clock?—Yes.

5320. And that would be of great value to them in after life?—Undoubtedly.

5321. But in order to take full advantage of the instruction to be obtained there, you think they should get some instruction in drawing in the elementary school?—Decidedly. When they are younger and are learning their early lessons they would learn drawing more readily than they would at 16 or 17 years of age.

5322. Do you think it necessary that they should learn design for cabinet-making in the drawing school; or would it be sufficient that they should learn drawing generally and that they could then apply it in the workshop?—In commencing to draw, I think they should be taught merely drawing generally, until they pass the examination in that grade, and freehand drawing to a certain extent; when I say freehand I include designing. It would be of an ornament, or an architrave or something of that sort. I do not mean a picture. But whatever trade they intend to follow, I think they should be taught drawing in that direction.

5323. (*Dr. Roscoe.*) Is that kind of teaching carried on in the classes in these schools?—That depends on the pupils. If there were pupils intending to be stonecutters they would draw bas-reliefs.

5324. (*Chairman.*) Is that encouraged by the teachers?—I believe it is not prevented.

5325. They must have the necessary facilities afforded to them?—Yes, I believe they have the means afforded them, and I should suppose the teachers would be willing and anxious to assist them in a special direction.

5326. Is modelling in clay taught in this school of the Royal Dublin Society?—Yes, it is.

5327. Do you consider it is necessary for your trade that there should be instruction given in the different styles, for instance the French Louis Quatorze, and Louis Quinze styles, in your schools?—Not in the earlier stages.

5328. But ultimately?—Yes. I may say for myself it was only recently that I knew what was meant by the Louis Quinze style, and by many of the orders. Indeed, there are few of the men would know an Ionic or a Corinthian capital. After they go through the elementary class they should know one style from another.

5329. But they ought to be able to draw well before they begin to study the different styles?—Undoubtedly. The styles, I believe, would be of little use to them unless they had already learned all the elementary stages of drawing.

5330. May we understand that there is in Dublin every facility for apprentices and others to learn drawing as best adapted to their respective trades, if only they would avail themselves of the opportunities which exist?—If they were to avail themselves of the opportunities and facilities that do exist they would be better off than they are, but I think the advantages are scarcely sufficient. I think that technical schools attached to the elementary schools would be of decided advantage.

5331. What do you mean by technical schools attached to elementary schools?—I mean training schools. For instance, in our branch of business, it would be a great advantage if boys intended to pursue cabinet-making, had the opportunity of attending an institution in which they should learn the early stages of the work before they came into the workshop. The boy when he comes into the workshop is of no use for 12 months. He is looking on. But if he were taught to a certain extent the preliminaries of his trade in the schools he would go into the workshop at once and commence actual work; whereas now boys are in the shop 12 or 18 months, of the five years they serve, doing practically nothing; and after that they serve five or six years, and even then they do not become tradesmen. They can do a job, but they have to work three or four years longer before they get full wages.

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5332. Then if at the elementary schools they were taught the use of the tools for working at their trade in wood or iron, you think it would shorten their apprenticeship very much?—Yes.

5333. Do you think that instruction of that kind could be given without trenching on the literary instruction, or do you think that the workshop instruction should be given after the ordinary school hours?—It would be of advantage that it should be after the usual school hours.

5334. Do you believe that the Dublin boys could be induced to attend the carpenters' shop after their school hours, as, I may say in France and in Lancashire, we found them to be willing to do?—I see no reason why they should not.

5335. You think they would like the work?—Yes, I think they would rather enjoy it.

5336. They would like making tool boxes and such things?—Yes. The reason I speak with such confidence is that I often see the boys making little boxes and working with men's tools, and if they were in school for the purpose they would be even more anxious. In the workshop, in the early stages, boys cannot get too much attention.

5337. Do you think that the ordinary schoolmaster could be trained to give that instruction, or would it be necessary to give it by means of an artisan. I think the ordinary schoolmaster could not give it.

5338. But in Dublin there would be no difficulty in obtaining artisans as teachers?—No difficulty.

5339. How would that be with regard to small towns in Ireland?—They would labour under disadvantage, because in small towns there might not be a cabinet-maker, and in other towns perhaps where there would be, he would only have two or three men under him.

5340. But where there was no cabinet-maker there would be no demand for cabinet work?—Just so.

5341. But there would be demand for joiners and wheelwrights?—Yes, undoubtedly.

5342. And could joiners and wheelwrights be got to teach the boys during their school time?—I think so.

5343. Even in towns of 8,000 or 4,000 inhabitants?—Yes, I believe it could be done.

5344. How would it be in villages?—Well, I can scarcely say.

5345. But you know the small towns?—Yes.

5346. Take, for instance, Athy, Kildare, or Roscommon?—Yes.

5347. There would be no difficulty in finding a fairly good carpenter or wheelwright who would be able to teach there?—No.

5348. And that would prove of advantage in small towns as well as in larger ones?—Yes. There are very many country boys who, from

Mr. T. R. Scott. time to time, wish to become capable of having a trade, and who wish to get to town to learn their business, but perhaps they grow up to be too old to commence it; and then they could not live on the small wages in the towns.

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5349. And if they had the elementary knowledge of the use of the tools, and had worked in a workshop in a provincial town, they would be of some use when they came to you or to other tradesmen in Dublin?—Yes.

5350. In that way you think the status of the poor people of Ireland could be improved?—Without a doubt.

5351. If there were more hands trained in that way they would be able to obtain good employment?—Yes. There is always demand for labour of that kind. It seems to regulate itself. There are never many men of the kind out of employment. Of course sometimes there are—but take the year all round there are never many men.

5352. There are never many men idle in Dublin in the cabinet business?—I can never get men. I may say there are men, no doubt, not suitable to the trade.

5353. Do you have English or Scotch men in your employment?—Yes, both, but they do not care to live here.

5354. The Irishman is quite as good a workman as the English or Scotch man?—Oh, quite as good, and quite as easily trained.

5355. Do you find that they have good notions of design if they have opportunities?—Yes, after training they would know as well as anyone else whether a thing was right or wrong, or was as it ought to be. They can judge well for themselves.

5356. They have good natural taste, taking all their opportunities into consideration?—Yes.

5357. Is there anything else you would like to say?—Nothing in particular. I have brought some journals here in connection with our trade. You know Finsbury College, of course, in London?

5358. Yes. Mr. Magnus is here?—I was going to quote some of his words, and they equally apply to Dublin. I should be delighted to see something of the kind here. I should be very pleased to render any assistance that I could.

5359. (*Mr. Magnus.*) I would ask one question. For the higher technical education which you think should be given to apprentices in the cabinet-making trade who are already familiar with freehand and linear drawing, can you say what kind of teachers should be obtained? What do you mean by higher technical education?

5360. Take designing. Do you think that designing should be taught by a trade designer or by an ordinary art master?—Quite so. I think the higher branches ought to be taught by persons familiar with the trade if possible.

5361. Who would at the same time have a knowledge of drawing?—Oh, yes, of course; they would be of no use if they had not.

5362. Is there any great difficulty in obtaining teachers of that kind?—I believe that with the assistance of any persons acquainted with the cabinet trade the teachers might be materially assisted.

5363. Are any of the teachers attached to the Royal Dublin Society familiar with the particular details of any particular trades?—Yes, I know from actual experience that one of the teachers is a builder.

5364. You think he is more capable of giving instruction than one who is not familiar with the trade?—Yes, he knows construction and building, whereas the ordinary drawing master would not unless he has studied construction.

5365. You think it desirable that those studying for the cabinet trade should receive instruction from those who are familiar with the details of the trade?—Decidedly. *Mr. T.R. Scott.*

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5366. And that is the distinction between what you call technical teaching and the teaching they would obtain in any other school?—Yes, I may mention that I myself always endeavoured to go in my own groove when drawing. I got a silver medal for an inlaid mirror which I designed. That is only to show that I worked in my own line.

5367. Do you think that you or your foreman would be willing to give instruction to persons wishing to receive it?—Well, I could not, speaking for myself, for my time is too much occupied to render assistance in any permanent manner.

5368. But you think that persons could be found to give the assistance?—Yes, I have every reason to think so.

5369. Are the drawing classes here well attended by apprentices and workmen in your branch of trade?—No, they are not, I am sorry to say.

5370. Do many of those in your employment attend these classes?—No, I am not sure if any are attending now.

5371. You said, I think, that you have 40 men in your employment?—Yes, the number varies between 40 and 50.

5372. And you believe none of these men are attending the art classes?—I believe not.

5373. Can you give any reason for this unwillingness on the part of the artisans to avail themselves of the opportunities of instruction in this city?—Well, it is very much attributable to the fact that the parents do not compel them to attend the schools and to improve themselves. When I was an apprentice my parents compelled me to do what I would not have done on my own account, and I am the better for it now. Boys are left too much to their own will.

5374. Would the offer of prizes in cabinet-making be of service in inducing artisans, engaged in that trade, to attend classes of that description?—I do not see how it would work, for if a man is working for his employer all day I do not see how he would be able to make up work for the prizes. A boy attending a school might make something neat to gain a prize, but I do not see how he would have time to make a piece of furniture to gain the prize, except in his employer's time.

5375. You are not prepared to suggest to the Commissioners any way in which these art classes could be made more serviceable to the artisan classes?—I do not see my way. That is where the difficulty comes in.

5376. Are you acquainted with the Dublin Mechanics' Institute?—No, sir, I have no connection with it. I may just say one word here. I think that the question of temperance is one that affects the matter very much. The children are not properly brought up. Their parents very often squander the money they earn, in an unsatisfactory way, drinking, and so on. The money ought to be spent of course on clean clothing for the children, and instead of that it is often spent in foolish ways. The class of tenements is another drawback. The Artisans Dwellings buildings form undoubtedly a step in the right direction, and a great improvement, and I think it will do a great deal of good in improving matters. I am sure that the children would improve much if compelled to go to school and to keep themselves clean, and I am sure the parents would improve.

5377. (*Chairman.*) Do you think that temperance principles are spreading in Dublin?—Yes, I think so. I have often heard working men say so. No doubt they might say so to please me, but I do not

Mr. T. R. Scott. think so. They have a certain independence. I have heard them say that the public house facilities ought to be restricted, and I believe there is a general feeling amongst them in that direction.

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5378. Have you any total abstiners in your trade?—I cannot say I have any.

5379. (*Mr. Slagg.*) What is the average sort of training the artizans in your trade receive to fit them for their special work?—Well, for years past there has been scarcely any such thing as a regular apprenticeship. That is the case, not in Dublin alone, but throughout England and Scotland. It has been a great evil to the rising tradesmen that there is no special apprenticeship served under a signed indenture. This has been a source of great evil to a number of trades, and has in some cases been brought about by trades unionism. In workshops now, where boys come in so early, they serve five or six years.

5380. But not as apprentices?—Yes, about five years.

5381. Under what condition of apprenticeship do they serve if they are not bound?—Oh, in case they are not bound, there is no time. In that case they work for two or three years, and if the master loses his temper they go elsewhere, where they may get a shilling more. They are kept on the same thing, a washstand or something of that sort. When the work gets slack they go elsewhere, and the consequence is that they never learn anything. But in the shop, where they know they have to serve five or six years, they get every variety of work. They know they cannot run away and they have a better chance of learning their business in a proper way.

5382. Then there is some remnant still of the apprenticeship with you?—Yes, I never take a boy without it.

5383. Do you think it desirable to retain apprenticeship?—Yes. Boys ought to be bound.

5384. Would there be any difficulty in reviving the general application of apprenticeship?—No. The reason why employers have, to a large extent, discontinued it is that if the boys are refractory they become in the workshop a serious evil to the employer. That is one of the reasons, I believe, of apprentices not being bound. Notwithstanding this, I think the masters ought to do all they can to select their boys, and by all means to bind them.

5385. You have told us that the apprenticeship system has practically broken down in England and in Ireland?—It has been broken down.

5386. How are you situated in your trade in Ireland as regards the supply of materials?—We can get nothing in Ireland. We have to buy everything from other countries. All the timber comes from America and Russia—the Baltic. The brass work comes from England, there is no such thing made in this country suitable for cabinet work. It all comes from Birmingham. Then as to glass, there is no such thing as glass made in all Ireland.

5387. As to veneers?—Well, the way we do with that is this, at the time of buying the wood, if we get a good log suitable for the purpose, we convert it into veneer; but for years veneered furniture has entirely gone out of fashion, not only in Dublin, but also in England and Scotland.

5388. Speaking generally, you have to import all the articles required in your trade, from England and elsewhere?—Yes. I may say everything has to be imported. We buy from the large timber importers, of course there are some in Ireland, who bring the timber from America. But all the other things, machinery and so forth, we could not buy it in Ireland. There is no one who makes it. We have to go to England for it.

5388. That puts you at a disadvantage compared with England?—*Mr. T. R. Scott.*
 Yes. There is carriage to pay, but the carriage is not to be taken into account. *7 June 1886.*

5390. What are the capabilities of your market in Ireland for furniture. Do they supply a good outlet?—Do you refer to export?

5391. No, your trade generally in Ireland?—Well, as a rule, it tends towards the cheaper class of goods.

5392. But so far as demand is concerned you could carry on a satisfactory trade if you had the means of supplying it?—Yes, the means and the men.

5393. As to wages, how do they compare in your trade in Ireland with England?—In many English and Scotch towns the wages are on a par with ours, but on an average we work longer hours. When I say longer hours I refer to the principal cities in England and Scotland, take Glasgow, Edinburgh, Hull, London, and Manchester.

5394. What does a good workman earn at cabinet making, and how many hours does he work?—He works 59 hours a week, and earns from 32s. 6d. to 35s. a week.

5395. How does trades unionism affect you, or does it influence you at all?—Yes, I believe it controls us to a certain extent, though I have no complaint to make. I cannot say I have been influenced one way or the other by it, but there is no doubt the societies keep a sharp guard over the trade.

5396. I think you said there was plenty of teaching power, of a mechanical kind, if it could be adapted for the use of the people?—Yes, I did.

5397. What do you think of the effect of Mechanics' Institutions throughout the country?—There can be no doubt but that they are of great benefit to the people.

Mr. JONATHAN PIM and Mr. THOMAS PIM, Junior, examined.

Mr. J. Pim

5398. (*Chairman to Mr. T. Pim.*) Is it your opinion, Mr. Pim, that it would be desirable and possible to improve the instruction of the working farmers in reference to their special employment?—I believe it possible, and that it would be of great importance to the future of the country.

*and
Mr. T. Pim,
jun.*

5399. You think that the raising of cattle and of poultry, and of domestic animals generally might be very much increased?—Yes, and with respect to butter also, the way it is turned out might be much improved.

5400. And you think the people could be taught that?—Yes.

5401. Have you considered at all what would be the best way of accomplishing these improvements?—That is a difficult question. The people here are under the influence, to a great extent, of the priest and the schoolmaster in the small towns in almost everything. I have often thought personally that if the schoolmasters and priests had technical knowledge of matters in connection with agriculture they might give great assistance to the people.

5402. Do you think what is now being done in Glasnevin, namely, schoolmasters being brought there to be taught the elements of agriculture, is a good movement?—I think it is.

5403. Were you acquainted with the circumstances which attended the abandonment of the model farms?—I recollect the circumstances, but I never went into the details.

5404. (*Chairman to Mr. Jonathan Pim.*) I understand you experience some difficulty in having in your employment many men who

Mr. J. Pim
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are deficient in even the ordinary rudiments of education?—I have at present very little connection with the business, but my son remarked to me the other day with respect to that, and in speaking of technical education, that it was hardly possible to commence this because they were so deficient in primary instruction.

5405. And you find that to be the case among your workpeople?—My son could answer that better than I.

(Mr. Thomas Pim.) It is the case that a great many are indeed most deficient, and it is a great pity that they should not be better educated in that respect.

5406. The workpeople you speak of, I take it, write badly and are not fluent at reading?—In some cases they write badly and are not fluent at reading, and in others they can do neither.

5407. And I suppose are not good at casting up accounts?—They are quite ignorant.

5408. (To Mr. Jonathan Pim.) May I ask you, do you think public opinion is ripe in Ireland for the introduction of a law compelling children to attend school?—I think, if it is, the mode of management must be left to some committee chosen by persons in the neighbourhood, and over which the parents of the children will have some control.

5409. You think it necessary that the government of the schools should be popular if education is to be compulsory?—Yes.

(Mr. Thomas Pim.) I think we are ripe for compulsory education in this country, provided the people are met, with respect to their own views in religious matters.

(Mr. Jonathan Pim.) The mode of governing the schools in Ulster would be different from that chosen in other parts of the country.

5410. Do you mean that the government of the schools should be by the people, or that it should be in accordance with the sentiments of the people?—It would be better if it should be by the people.

(Mr. Thomas Pim.) And in that case the government should judge by results.

5411. (Dr. Roscoe to Mr. J. Pim.) That would apply to towns and cities, but what about rural districts?—The mode of government would be the same, but it is evident, if you are to have compulsory education, that the schools must be convenient to the homes of the parents. That would scarcely apply to sparsely populated rural districts.

5412. That is not so now, the schools are not convenient?—No. It would require a great increase of schools in the thinly populated parts of the West of Ireland.

5413. It would be, you think, of advantage to adopt a system for the more densely populated districts, and for the present leave out those which are sparsely populated?—Yes.

5414. (Mr. Slagg.) What would be the nature of the religious difficulty that would come up?—Well, in the Roman Catholic parts, they would like the schools to be decidedly Roman Catholic.

5415. (Chairman.) But that is so practically now?—Yes, practically they are denominational. The number of Roman Catholic children attending a Protestant National school is comparatively small, and the converse.

5416. The difficulty would rather arise in the training of the teacher?—Yes.

5417. And you would have denominational training schools or colleges in Ireland?—Yes, I have always been in favour of that. In fact, as a Protestant, I am in a minority on the subject. You will find, if you ask the question in Belfast, that you will in all probability get a very different answer.

5418. You would have the government of the schools popular?—*Mr. J. Pim*
Yes.

5419. Would not that interfere with the present system of having the schools under patrons?—Well, in England you have two systems, and they might work side by side in this country.

5420. That is to say, when there is not suitable accommodation for all the children you would have Boards established, but in other cases you would allow the present system to prevail?—Well I do not see how you can have compulsory instruction without a school board.

5421. We have it in England in many cases, without boards?—That is to say, there are sufficient schools provided.

5422. Yes. You would not revolutionise the system in order to establish boards all over the country?—No, only where necessary.

(*Mr. Thomas Pim.*) You cannot expect people to be taxed willingly for the education of other children unless where it is in accordance with their views. There is, amongst the Nationalist party in Ireland, an extremely strong wish to introduce manufactures of various sorts; this is very natural, but their views are unsound views.

5423. Crude views?—Yes, crude views. There are some manufactures which are certainly increasing; for instance, the woollen manufacture is decidedly prosperous in this country. I know one or two concerns that are working night and day, and they are able to compete successfully with the productions of Scotland and England in the goods they are making. I suppose that at least one third of their manufactures are sent to England, so that they do necessarily compete with the best manufacturers.

5424. In which part of Ireland are those woollen mills rising up of which you speak?—In Dublin, Cork, and elsewhere; but there are also some in the south. There is one near Blarney, County Cork, belonging to Martin Mahony and Brothers, which is the largest in the kingdom, and is well worth going to see. They are sending their goods all over Europe and America.

5425. What peculiar advantage is there at Blarney for woollen goods?—I cannot say, except it be, as it used to be said, that the Irish wool was very suitable. But in the case of the Blarney goods I believe it is the men themselves who are working the business so well. They are importing the best talent from England and Scotland. At first there was great jealousy of Englishmen and Scotchmen being brought over to this country, but I think the people are learning to see that, if they are ever to learn, it must be from those who are brought over to teach them, and though there has been interference through, I will not say trades unionism, but worse than that, still I think that system of endeavouring to use influence to prevent the employment of Englishmen and Scotchmen is dying out, and nearly all the foremen are Englishmen or Scotchmen, and they now seem to get on very well with the people.

5426. Do you consider that the large amount of water power you have in Ireland is of much value, as an element in reference to manufactures, or do you think the same thing would ultimately arise here as in England, that, owing to the inconvenience of water power, steam would be introduced?—In most of those places steam is introduced, but they use water too. It sometimes happens that the character of water helps the manufacture. In the mills on the Liffey I know they make use of water, and undoubtedly find it very useful. They use water for washing and so on.

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Mr. T. Pim,
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5427. And the quality of water, I suppose, is of importance?—Yes. There are, I may say, a number of small trades in Ireland, capable of extension. There are several men who are making brushes, quite a large turn over. Another man is making wheels extensively by steam power. He supplies some of the hansom cabs in London; he makes the wheels here and sends them over. He has not an extensive business, but he told me he made over 1,000 wheels last year.

5428. Would you consider that there is any kind of technical instruction that could be given to your foremen or others that would be useful to them as manufacturers of poplin?—Yes, I think technical education in dyeing would undoubtedly prove very useful.

5429. (*Dr. Roscoe.*) Do you find it difficult to get master dyers who have a technical knowledge of their art?—There are practically no master dyers here. You must import them from England or Scotland.

5430. Do you do your own dyeing?—Yes, we did. The person who was over it went to Lyons, and was a very practical man. The poplin trade has nearly died out.

5431. How has the poplin trade decreased?—Principally because of the change in style in ladies' dresses. It is not so soft as they require.

5432. It is rather expensive?—Yes.

5433. (*Mr. Slagg.*) What other trades are there that have been developed? You have mentioned the woollen trade; can you name any others that have been or could be developed in a useful degree?—Well, I may say there are a number of small ones. What is wanted in this country is steady labour. Our people, and I speak of all ranks, are not as willing to settle down and work with constant steadiness as others. That tells against us, and then the political atmosphere about the working classes has upset their minds.

5434. But as to the capabilities of the country, are there any trades or industries specially suitable to the country that are not flourishing?—There are many branches, such as the woollen trade, that might be further developed. In the North, of course, there are other great and important industries of which you will hear a great deal no doubt when you visit Belfast.

Mr.
T. Kennedy.

Mr. TRISTRAM KENNEDY examined.

5435. (*Chairman.*) What information can you give us as to the subject matter of our inquiry?—Well, when I had to do with the Marquis of Bath's estate as agent, I found that the condition of things rendered it necessary to direct attention to the question of the education and improvement of the people. I had not been more than three months agent, when I made application to the Board of Education for two or three schools, but the famine set in so very severely that I abandoned every idea of education for the time in order to supply the people with food. Afterwards I applied for eight schools in 1847, and in 1848 I got the grants, and the schools were opened in 1849.

5436. In what district is the property?—In the barony of Farney, in County Monaghan. The bulk of it belongs to two proprietors, the Marquis of Bath and Mr. Shirley. In the selection of sites for the school buildings my object was to afford facilities for instruction not only on the Bath estate but throughout the barony, for I felt I should be doing only half the work if one half the people were not educated. I also developed the lace making.

5437. What was the result?—I published the result in 1855. I should say that I left the estate in 1851, but I continued my attention

in promoting and carrying on the schools. I was in Parliament at the time, and could not get much time for local work. But I had a very good manager there whom I could place reliance on, and I was able to effect the sales in London. I will hand you in this statement, which explains it all. It is entitled, "On the Industrial Training Institutions of Belgium, and on the possibility of organising an analogous system in connection with the National Schools of Ireland (1855)," by Tristram Kennedy and W. K. Sullivan, then Professor of Chemistry to the Museum of Irish Industry (now President of the Cork College). You will see at page 63 the return of seven rural schools and the central school of Carrickmacross. The head mistress was superintendent, and she watched the others.

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5438. How much were the mistresses paid?—The head mistress had 50*l.* a year from the Commissioners of Education, the other mistresses had 8*l.* a year.

5439. Was that all they had?—I am not sure whether they got anything from the estate at first, but afterwards the estate paid 4*l.* extra to each district mistress.

5440. And how did they manage to live on 8*l.* a year, even with that allowance from the estate?—Well to people who have nothing 8*l.* a year is a great increase. Perhaps they might be the wives of small farmers.

5441. Quite so. Did you find persons qualified to teach?—Yes, for this reason. What induced me to take up this branch was that there was a lady there, Miss Reid, of Rahers, who had got up a class for a few years, and managed it in the house of a tenant of the Marquis of Bath. She managed the lace manufacture, and instructed a number of persons sufficient to attract my attention. I called on her for aid to make a beginning, and I got one of her workers to commence teaching in her neighbourhood.

5442. Was lace making taught in the schools?—Yes. I may state that in 1853 the earnings were 963*l.*

5443. Has that been continued up to the present?—I made inquiries the other day, and did not get much information. The schools are still continued. I left in 1851. The central school I hear is now a mixed school, boys and girls. That is a mistake.

5444. Lace making was taught in these schools?—Yes, and the amount that passed through my hands to the workers up to and ending January 1854 was 3,218*l.* 18*s.* 6*d.*; besides this, trained workers, who had left the schools, earned a considerable amount for their work.

5445. You do not know whether lace making is still being carried on in these schools or in their neighbourhood?—Certainly in the neighbourhood, and there is considerable demand for it in London. I have been speaking to Mr. Ben Lindsay on the subject, and I may mention that a glass case containing specimens of the work was, by earnest solicitation, allowed to be taken over lately to London and exhibited.

5446. Have you any knowledge of the amount of trade being done in that neighbourhood in lace?—No, but there is a good deal of it still. The husband of the deceased teacher carries on the business as a merchant, and that I am delighted to see.

5447. I would ask you whether you attribute that to the influence of your schools or whether the trade existed previously?—Oh, decidedly it existed before to a small extent. It was a small trade, but it has monstrously increased since.

5448. (*Mr. Woodall.*) Was lace making the only industry?—No, we commenced with plain working.

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5449. You tell us that in 1847 you applied for these schools, which were brought into operation in 1849?—Yes.

5450. They were schools of the ordinary national type?—Yes, the estate paid one third and the Commissioners two thirds the cost of building.

5451. What Commissioners?—The Board of National Education; they gave two thirds.

5452. In accordance with the usual arrangement for primary schools?—Yes.

5453. I gathered from you that in addition to the ordinary primary instruction there was superadded certain industrial work?—Yes.

5454. Be kind enough to tell us what it was?—Well, we hesitated about allowing any child to take up the needle until she knew something more than her letters. The central school was a girls' school. Our object was to promote the literary and industrial education of the pupils, and we devoted a certain portion of the day to reading, spelling, and writing.

5455. I think you said the teacher of the central school got a larger salary?—Yes, 50*l.*

5456. And you required the scholars in the first instance to have a fair literary knowledge?—Yes.

5457. Did the pupils come freely?—Yes, the manufacture of the lace was the inducement to four-fifths of them to come to the school. I am strongly in favour of that principle of encouragement rather than the forced system of education.

5458. You found your system was an incentive to parents and children to come and obtain the ordinary instruction when they found they could earn something in addition?—Yes, when they were able to get their 2*d.* or so a day, as beginners, they endeavoured to improve in order to earn more.

5459. You began with needlework?—Yes, being work they could get from the neighbourhood. In some cases we spoiled coarse material to work with.

5460. The schools took in work?—Yes, and we supplied material to the children, who were very deficient.

5461. Tell us what particular industries were taught. You have mentioned needlework of the simplest and most useful kind for the neighbourhood?—Well, nothing but the use of the needle to enable them to pass on to the lace making.

5462. Preparation for lace making, and was lace making the only industry of commercial value?—Yes. The other was merely a cipher preparatory to the lace making.

5463. (*Mr. Slagg.*) Did they make all the lace at school or afterwards at their own homes?—Afterwards at their own homes; if they could at all use the needle they were allowed to take the work home.

5464. Was there anything in the nature of a workshop or factory established?—No, nothing but an ordinary large schoolroom.

5465. But when they had learned the art of lace making did they afterwards establish a *dépôt* or factory?—No, when once they were adepts in the art they worked at home, and their retirement left a vacancy in the room for others.

5466. Did they get any art instruction in connection with the lace work in the way of drawing?—I waited on Lord Clarendon and asked him to obtain a grant for a school of design. That was in 1850, and he took it up most warmly, and applied in the proper quarter for a grant, and they granted us 100*l.* for getting a teacher on condition

that the master here, Mr. M'Manus, should be the person sent down to give the instruction. Mr. M'Manus attended in 1850. He only paid nine visits, staying several hours, and we encouraged the ladies to come in and get lessons; and here is a prize founce.

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T. Kennedy.
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5467. Then you did establish an art school?—Yes.

5468. The children who learned lace making were all taught drawing?—Oh, yes, that was the great object.

5469. (*Mr. Woodall.*) Were all the children in these eight or nine elementary schools taught drawing?—I cannot say they were all taught. The school was opened in the court-house at Carrickmacross.

5470. (*Mr. Slagg.*) I understand you to say that all the children who learned lace making in these schools had some instruction in the school of design?—Yes, I take it for granted that they all rushed in and learned drawing. I have no doubt they all attended.

5471. Do I understand that these designs you produce were worked by the children in the school of design?—Not in the school of design; but after they went home. We announced prizes for the best founce design, for the best lace trimmings, &c. The people who were competing did the work, and we had nothing to do but to bring it to Dublin and get it lithographed.

5472. Did they work them?—Oh! Yes.

5473. (*Mr. Woodall.*) Were these original designs made by the children?—Yes, in this way. I went to several lace merchants in London, and got the privilege of going behind the counter and taking my rubber and rubbing off in a few minutes sufficient for my purpose. I found them exceedingly obliging.

5474. Then the probability is that these are copies of examples of lace?—With this difference; that the work-mistress, a very clever lady, would sometimes take two or three patterns to be thrown into one, and would thus make a good design from a combination of others.

5475. The girls did not merely copy the design of the work-mistress?—They were told to take a sprig here and a sprig there and to incorporate them into one drawing.

5476. And that is the prize design of one of the girls?—Yes.

5477. (*Dr. Roscoe.*) You have described the results obtained in the schools. Are we distinctly to understand that the same system of instruction—industrial instruction—is carried on at the present time in these schools?—I cannot say what has actually happened since 1855. Five years after I left the agency I continued to look after the schools. I was not satisfied to leave this experiment till I had established it on a trading basis.

5478. You cannot inform us if it is continued at the present moment?—Well, a great many of the people carry it on, I have no doubt, but whether the system of training goes on still I cannot say.

5479. So far as your experience went there was no objection by the parents or the Board to such instruction?—Not the slightest.

5480. Did you find that this instruction was of a useful character?—Most useful.

5481. And can you give any other instance in the whole of Ireland of a similar school for home industry in lacemaking having been carried on?—I cannot give any account whatever of what has taken place in school lace-making in Ireland since 1855, but this book (*produced*) contains some useful information on the question. It contains, as far as we were able to collect it in 1855, an accumulation of valuable evidence on the point up to that date.

5482. But you can give us information carrying us from 1855 to the present day? Can you give any information as to how far the

Mr. T. Kennedy. Industrial training has been carried on in consequence of your suggestion or why it has not been carried on?—I cannot account for its not having spread, for the value of it was quite understood.

7 June 1888. 5483. May I ask you, does it come within your knowledge to say that such industrial training has not spread?—I cannot venture to say positively.

5484. (*Mr. Woodall.*) Have you any information as to what these girls were able to earn?—Their earnings were but small at first. I have here a table exhibiting the earnings of workers, the details in which are gleaned from the Reports made to the Commissioners of National Education by their Inspectors. I think it right and fair to the Board of Education to say that nothing could have been more satisfactory than the cordial co-operation I got from them. I look upon the national system as the system you should avail yourselves of for the training of girls. You must adopt a different system in their case to that of boys.

5485. (*Dr. Roscoe.*) Your attention was chiefly directed to the girls?—Yes; I could not sufficiently group the others. The place I speak of was the only place where lace work was satisfactorily carried out in National Schools, that I am aware of, and my observations apply to 28 years back.

WAGES TABLE handed in by Witness.

		s.	d.	s.	d.
In 1850-1	- 12 received at lace-work	-	5 0	to	7 0 per week.
	18 " " "	-	8 0	"	5 0 "
	20 " " "	-	2 6	"	8 0 "
	40 " " embroidery	-	1 6	"	— "
	60 " " "	-	0 6	"	1 0 "
In 1851-2	- 12 " " lace-work	-	5 0	"	8 0 "
	30 " " "	-	2 0	"	5 0 "
	38 " " "	-	1 0	"	2 6 "
	14 " " "	-	0 4	"	1 0 "
In 1852-3	- Skilful and diligent workers	-	7 0	"	9 0 "
	Average good "	-	5 0	"	— "
	Ordinary workers of a year's standing	-	2 6	"	3 0 "

RETURN handed in by the Witness exhibiting the Amount earned by Females attending the CENTRAL and DISTRICT SCHOOLS of CARRICKMACROSS, in the Barony of Farney, and County of Monaghan, on combining Literary Education with Industrial Instruction; seven out of the eight Schools referred to being the ordinary National Schools, open to and attended by children of both sexes.

Name of School.	Number School capable of accommodating.	Date		Work-mistress's Salary now Payable by Board yearly.	Number of Females on Roll on 31st March in each year receiving Literary and Industrial Training.					Amount earned by Female Workers pending the period in which their Industrial Training was promoted by Mr. Kennedy.					Total Amount earned by Workers to January, 1854.
		Of Building School.	From which Salary awarded by Board.		1849.	1850.	1851.	1852.	1853.	1849.	1850.	1851.	1852.	1853.	
					£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
1. Carrickmacross	150	1849	Feb. 1849	50 0 0	157	234	178	117	140	25 0 4	257 10 9½	173 4 0	340 8 5	519 4 0	1,216 16 6½
2. Drumlusty	150	1849	Feb. 1849	8 0 0	—	244	163	88	104	111 14 7	228 19 7	79 8 7	174 3 6½	164 10 1	869 10 4½
3. Blackstaff	100	1849	Nov. 1849	8 0 0	—	318	87	76	70	—	83 18 7	23 6 0	61 4 6	63 8 8	265 17 4
4. Ballymackney	109	1849	Jan. 1850	8 0 0	—	164	93	78	88	—	127 18 7	100 9 2	151 7 8	208 18 7	468 14 0
5. Kildaminaba	100	1850	April, 1850	8 0 0	—	125	101	87	87	—	23 18 1	29 9 6	40 6 4	35 18 9	329 13 8
6. Broomfield	100	1849	May, 1853	8 0 0	—	65	46	69	55	—	5 14 0	21 1 4½	49 0 8	58 0 11	128 56 11½
7. Aghnastareon	100	1849	Feb. 1851	8 0 0	—	—	47	44	35	—	4 13 5	8 17 6½	10 18 8	15 8 8	34 11 9½
8. Ashburton Agricultural School	100	1849	Feb. 1851	8 0 0	—	—	59	48	35	—	3 4 8	9 6 2	7 10 30	4 16 7	17 17 10
			Totals	106 0 0	167	1,020	753	603	508	188 8 11	833 14 2½	436 16 4	845 9 7½	988 14 4	3,358 18 6

REMARKS.—The reduced amount of workers' earnings in 1851, as compared with that of either the previous or succeeding year is accounted for by a partial suspension of operations on Mr. Kennedy's retiring from the district, and from the direct management of the Schools, in January, 1851.

MINUTES OF EVIDENCE.

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Mr. THOMAS ROCHFORD examined.

5486. (*Chairman.*) You are a manufacturer?—No; I am a farmer in the neighbourhood of Nenagh, and this is a purely charitable business in which I am interested, and which I will as briefly as possible bring under your attention. It is the work of a charitable committee.

5487. What is the work carried on by the committee?—I will first of all hand you in a couple of documents; there you have the origin of the industry, and there are our circulars. (*Papers produced, with reference to straw-work.*)

5488. I see. In November you issued a circular, of which you had in a copy; the object being to establish a local industry in the neighbourhood of Nenagh?—Yes; to give employment to the poor; and the chief reason was that we anticipated a partial failure of the potato crop. The Reverend Father Flannery was the originator of it; his attention was called to the existence of such an industry as this by Mr. P. O'Callaghan, we thought it practical and issued that circular. We received subscriptions and brought down Mr. O'Callaghan, who got the people instructed, and we commenced with 30 or 40 workers.

5489. Mr. O'Callaghan has been here?—Yes. This (*handing in a document*) shows the result of the work we have been able to do. We were obliged to stop on the 17th of March in consequence of the want of materials.

5490. I see you received in subscriptions 156*l.*?—Yes.

5491. And by the sale of goods, 177*l.*?—Yes.

5492. You paid in wages and for straw 211*l.*, and you had in hand at the end of your operations on the 17th of March, when you stopped for want of straw, 123*l.*?—Yes.

5493. Will you kindly state with respect to the 211*l.* for materials and wages, what proportion was for each?—I am afraid I have not that here.

5494. Can you tell us roughly?—As far as I can recollect it was about 100*l.* I can show you the analysis for the last three weeks work. Of course at the beginning the workers had to acquire skill. The analysis for the last three weeks is very striking. We sold straw envelopes at about 2*s.* a thousand, but we do not consider we could keep this trade in the country unless we could do it for 20*s.* The analysis of the three last weeks that we worked shows that in the first week of these three we made 12,912 envelopes. The cost of production, including the cost of carriage to Dublin, was 8*l.* 5*s.*, not including the cost of straw. The number of workers in the first week was 29. In the second week 11,160 were made, the cost of production was 7*l.* 8*s.*, the number of people employed being 30. The third week the number of envelopes made was 8,868, the cost of production was 5*l.* 9*s.*, and the number of workers was 31. The cost includes carriage to Dublin and price of twine. The quantity of work done varied. It takes three tons of straw to make one ton of envelopes. The cost of straw is 30*s.* a ton, and waste straw will sell for one pound a ton.

5495. Have you anything more to tell us about this particular industry and the principle on which you proceed in carrying it on?—Referring again to the analysis of work for three weeks, I find, that at the rate of 20*s.* a thousand, the envelopes produced in the first week, and which cost 8*l.* 5*s.* exclusive of straw, were worth a little under 13*l.* From the cost of production (8*l.* 5*s.*) and the net cost of straw (3*l.* 12*s.*) it is evident that the envelopes were produced for 11*l.* 17*s.* In the

Second week the envelopes would have a value of a little over 11*l.* The cost of production was 7*l.* 8*s.*, and the net cost of straw not more than 3*l.* 5*s.*, and the envelopes were produced for 10*l.* 13*s.* In the third week the envelopes would be valued at close on 9*l.* The cost of production was 5*l.* 9*s.*, the net cost of straw not more than 2*l.* 10*s.*, and the envelopes were produced for 7*l.* 19*s.* I arrive at the net cost of straw, which can be bought in the neighbourhood of Nenagh at 30*s.* a ton, by allowing three tons of straw for every 10,000 envelopes, which weigh about a ton, and by deducting from the first cost of the straw (4*l.* 10*s.*) 2*l.* for two tons of waste straw which can be sold for 1*l.* a ton. When trained, the workers, who were all women and mostly young girls, were able to make from 12 to 15 dozen of envelopes in 8 hours and to earn from 11 pence to 13 pence a day of 8 hours. I also wish to draw attention to the fact that if this industry was carried on by small farmers in their own houses and with their own straw, whatever straw did not actually go into the envelopes would be quite as good for farm purposes as the straw used in the envelopes and there would be no waste. I therefore feel that I have proved that what we said in our report is true, viz., that for the sum of 33*l.* an important industry has been introduced and that the workers in Ireland are able to earn fair wages and to produce the envelopes at a price which ought to secure the entire trade of the country, amounting to at least 30,000*l.* a year.

5496. Is there any other statement you would like to make to the Commissioners?—Round Nenagh we have large water power and a great many idle mills. There is a great field for an opening in the woollen trade. We want a liberal grant to assist us in founding an industrial school and a depôt to receive goods made at home, which we propose to put under the management of some religious body like the Christian Brothers at Artane. I should also like to make a statement on the general question. The real cause of the miseries of Ireland, the true reason of her poverty and periodic famines, is the fact that she possesses no adequate source of employment for her people. More than half her population remain steeped in abject poverty because the only property they possess, the labour of their hands, cannot be turned to account, but is locked up, to the danger and detriment of the entire country. The labourer can find no market for his labour, except one that is precarious, insufficient, or occasional; the small farmer has not sufficient land to employ, to advantage, his own labour or that of his family. The insolvent tenant has no capital with which to employ labour of any kind. It is therefore necessary to discover some practical means by which this vast amount of labour can be turned to account. This is the hinge upon which the whole question turns, and on the discovery of these means depends the solution. To make labour a source of wealth, the first requisite is capital, but the same difficulty exists now as always existed, so well described by Mr. P. Scroope in 1847. He said "It appeared that capital would not flow freely into Ireland on account of the insecurity of personal property, and that property was insecure there from the want of employment and thus the circle was complete. The question was how to break that circle up." In these few words the real difficulty which prevents Irish resources from being developed is very well expressed. No private capitalist will risk his capital in the employment of labour, no matter how profitable a field for its employment there may be in the country, where the misgovernment of the past and the mismanagement of the present have produced a state of insecurity which individual action cannot adequately cope with; and this state of insecurity will always continue until a large amount of

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employment is given throughout the country. Moreover, it is beyond all question that when any attempt is made to introduce an industry into Ireland the English houses in the same trade at once produce at a loss in order to crush out the infant industry, and as they have a large capital at command they nearly always succeed in accomplishing their object. Thus, as Mr. Scroope said, the circle is complete, and it is quite clear to me that the circle can only be broken up by powerful machinery, specially formed for that purpose, and by liberal assistance on the part of the State. This is surely a case in which the words of John Stuart Mill would apply, for by adopting a course "in which the Government can most surely demonstrate the greatest good of its subjects by doing these things which are made incumbent on it by the helplessness of the public, in such a manner as shall tend, not to increase and perpetuate, but to decrease that helplessness." Now in my opinion one of the best ways to make a beginning is to introduce smaller industries by State aid. It is quite certain that there are a great many small industries which could easily be introduced and in which workers can easily be instructed, such as straw envelope making, basket making, tin plate working. The money annually paid to foreigners on this account amounts to a very large expenditure. For straw envelopes alone at least 30,000*l.* is paid to France and Spain, and all this money could be kept at home if the proper means were taken. I will endeavour to define what these means ought to be. The Government should in the first place prepare an exhaustive report, in which all the small industries suitable to the country should be enumerated and described, and precise and accurate information given as to the cost of materials. The conditions of production and the probable range of price to be obtained for the goods made should be included, and this report should be widely circulated. For instance, in the case of straw envelope making the information wanted is as follows: The amount of straw required to make a thousand envelopes, the amount of twine and the cost of both materials, the number of envelopes that can be made in a day by a woman of average skill, the price that can be obtained for the envelopes when made, and the extent of the market. Precise information as to how the industry can be introduced and what plant is required. Having obtained the necessary heads of knowledge the next thing is to carry out their development, and I think it ought to be done in this way. In each town or neighbourhood let a local committee be formed and let this committee decide on introducing some suitable industry or industries, taking into consideration the number of people who require employment, and all the peculiar circumstances of the case. The committee should lay before the Government all they have to say on the subject, giving an exact statement of their requirements, recommending a system of management, and stating the amount of pecuniary assistance they require. In the first place there should be a technical school established, in which workers can be taught the various industries, and when instructed they should be sent to work at home, and replaced by others who would be instructed in the same way. Combined with the technical schools there should be a *dépôt*, at which the articles made by the people at home might be sold. Then the Government should make to each school a liberal grant. I would throw on some government body the responsibility of seeing that the Government money was properly expended, and I would make the manager of the school responsible to the Government, in the same way as at Artaué, and other industrial schools of that kind. It is to be observed that the amount of money such committee would get from the Government must

depend on the strength of the case they were able to make, or on their ability to shape details. It is also to be observed that when an industry became in this way established, if there was money to be made by it, private enterprise would soon take the matter up and the committee would proceed to introduce other industries in the same way. The committee would be an originating and directive body without financial responsibility. I am aware that the introduction of the smaller industries can only afford employment on a very limited scale, and that the real field for employment is in the development of agriculture. But these committees would very soon proceed to develop agriculture, and when they had established a vigorous and powerful agriculture, and in this way laid the foundations of national wealth, the same line of action would introduce a larger industry such as the woollen trade. In this way I entertain no doubt that a powerful industrial movement might be originated. When we ask the Government to force this movement into existence, and to assist it liberally with money, we ask simply for justice. We ask that the misgovernment of the past, the mismanagement of the present, should be considered, and that our people should have an opportunity of living in their own country in happiness and comfort. We deplore emigration, we deny its necessity, and we believe that it is the fruitful source of moral danger. The policy of emigration has failed in the past, and it will fail in the future. Not only has it failed but it is rapidly becoming a source of great danger to the empire. We believe that it is not yet too late to reconcile Ireland by the concession of her just demands. Reproductive employment is what the Irish people want, and without reproductive employment they will never be content.

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5497. I would like to ask you one question on that statement; kindly define what you mean by "mismanagement of the present" in reference to industrial matters?—The Government does not accept the principle that we require, under our present circumstances, State assistance to force industries—private enterprise will not suffice.

5498. (*Dr. Roscoe.*) As to forming technical schools, would you kindly give the Commission your opinion as to the number and manner in which these schools should be formed?—What I should say is that we should take action ourselves. We should form our own committees and state our own case to the Government. That must of course vary in different neighbourhoods. In our own district in Nenagh, which is the capital town of the North Riding of Tipperary, the number of inhabitants was about 6,000 in 1879, and in 1880 about 2,000 of these were on the relief books, so you can imagine the state of poverty which existed. Around Nenagh there are a large number of small farmers whose condition cannot be improved until some strong effort is made on their behalf.

5499. (*Chairman.*) What is the average size of the farms in that neighbourhood?—From 20 to 30 Irish acres.

5500. Are there any very small?—About 30 per cent. are under £4 valuation. It is not what you would call a congested district.

5501. There are farms of five acres?—Yes, but a great many more of 15 or 20. The farms are large enough if there was capital as well.

5502. Have the farmers generally built their own farm buildings?—Yes.

5503. The landlords have not done anything in that way?—Not much.

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5504. Has there been any draining done?—Not very much. It is a part of Ireland that may fairly be considered one of the better parts, but there is a great field for improvement.

5505. Nenagh is in what county?—It is the capital of the North Riding of Tipperary.

5506. Is it anything like what is called the Golden Vale?—Oh no. It is tillage land. The bulk of the people can only be helped by devising means to exchange their labour for money. They are a people very industrious, intelligent, and deserving. Indeed there is no part of Ireland where they are more deserving of help, or more likely to respond to any effort to help them. Our experiment shows this, as our workers were quite untrained at first.

5507. Are you yourself a practical farmer?—Yes. I may state that around Nenagh we have much water power. Our position is this, we have come out of four months' work with 120*l.* to our credit; and we want to establish in Nenagh a technical school to introduce these small industries, and a depôt at which the work made in the country can be sold. We propose, as I think I said before, to put this under the management of some religious body, such as the Christian brothers of Artane, and we trust that the Government when they know our case will grant us some assistance.

5508. (*Mr. Magnus.*) We should like to know what sort of instruction you propose to give in such a technical school as you wish to introduce at Nenagh?—Well, basket making, straw-envelope making, tin-plate work, something like Artane.

5509. (*Mr. Slagg.*) What has become of your envelope works?—We had to stop from want of material, but we shall begin again after the harvest.

5510. At present it is in abeyance?—Yes. We want to have a system of management. Up to the present Father Flannery has undertaken the management, but that cannot be expected to continue. If the Government do not give us help we must manage something ourselves, and afterwards we shall try to get the work into the houses of the small farmers themselves.

5511. (*Mr. Magnus.*) How long does it take to teach a child this work?—About a week.

5512. You can scarcely suggest that a technical school should be established for that?—Well, there is basket making, tin-plate working, hand-loom weaving. Basket making would be a most excellent and suitable industry. Osiers could be grown.

5513. Do they grow in that district?—Well they could be made to grow there; there is plenty of suitable land. These cottage industries connected with the land would serve most excellently for a commencement.

5514. (*Mr. Slagg.*) Would your statement as to State aid apply to this industry?—I am an advocate of a liberal amount of State aid. We will take what we can get. We think a large sum is due to us.

5515. Do you find industries such as you speak of depreciated by deficient means of railway communication?—Not in our particular district. There is great want of good communication in the west. Any little assistance is better than nothing, and so I would be for accepting any aid, but I would not ask the State to advance a penny without a scheme being put forward that would satisfy them.

5516. (*Mr. Magnus.*) Has any attempt been made to introduce basket making into the villages of Ireland?—To no very considerable extent that I am aware of. As to the agricultural question, which is

the real question; if you want to cut out this cancer of poverty, and to get at the real difficulty, you must do it on the land. The secret of profitable farming is in the lines of a single proposition,—that it is very much more profitable to feed sheep and cattle on the produce of cultivated crops than to allow them to roam at large, provided that the clover and rye-grass crop of the rotation be used in the green state, because the feeding power thus given, which is now lost, gives a direct profit by feeding more stock, and an indirect profit, by additional manure thus obtained, which increases the standard of fertility and profits all round. There is, I may mention, great need of education on agricultural matters in connection with the primary schools.

5517. How do the small farmers carry on their work?—Generally poorly enough; tillage very bad, and no stock.

5518. (*Dr. Roscoe.*) Where were you educated?—In Northumberland. I took a tillage farm in 1873,—about 200 acres of good tillage land,—good turnip land. I farmed this for five or six years in the ordinary way, and got a loan of 950*l.* from the Board of Works. They treated me very well, which enabled me to build farm buildings. In 1879 I tried the system I have referred to,—the soiling system,—in a small experiment, and was struck by the fact that clover and rye grass would feed three times as much stock, if it were used in the house, than if grazed. That struck me as an economic fact of great importance. I found that where formerly I could not make ends meet, I could now see my way to work, ultimately with great profit, by feeding a large quantity of stock in this way. I think that the condition of small farmers could also be materially improved by attention to the subject. In a pamphlet which I am preparing on the subject, I set out my opinion, and I would propose to read a portion of what I have written as conveying what my views are. “It is very much more profitable to feed stock on the produce of the cultivated crops than to allow them to roam at large, provided the clover and rye grass crop be used in the green state instead of being made into hay, because the additional feeding power thus obtained, which is now lost, gives a direct profit by enabling more stock to be kept, and because the additional manure thus obtained raises the standard of fertility and enables all crops to be grown at a profit.” If this be true, and if all Ireland were farmed in this manner, with adequate capital and skill, it needs no further demonstration on my part to prove that the difficulty would be not to find employment for the people, but to find people enough for the magnitude of the work to be done. It therefore becomes a question of the greatest importance to discover what are the difficulties to be overcome, what are the means to be taken to set free this latent wealth. To make labour a source of wealth the first requisite is capital, and means must be taken to make labour and capital meet. In order to do this two things must be done. Those occupiers of land who have sufficient capital of their own must be induced to change their system of farming and to adopt that system which is so much more profitable in itself and which will employ labour, and the State must provide sufficient capital to employ the labour of the rest of the people until such time as the country is sufficiently developed to afford employment to all her people without State assistance. To induce those occupiers of land who have sufficient capital of their own to change their system of farming, it is necessary to convince them that it is very much to their advantage to do so, and to show them how to do it. The working of a small experiment in giving prizes for well-managed farms, made when Lord

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Spencer was Lord Lieutenant in 1870, is very striking, and I feel convinced that it is by developing a system of this kind that we shall find the only practical means of effecting our object. The working of this system has been well described by Professor Baldwin in the journal of the Royal Agricultural Society for 1877. The success which undoubtedly attended the working of the Spencer prize system clearly shows the very great results that might be confidently expected if the same scheme was developed, and an organisation was formed to carry it out, on a really comprehensive plan. And as there is no doubt that, even as they now farm, the Irish would secure much better results if they possessed more knowledge, how much more important does agricultural education become when the whole prosperity depends on the introduction of a system of mixed husbandry now entirely unknown. In order to make the Royal Agricultural Society a really powerful organisation, and to obtain for it that influence over the direction of the labour of the country which is so essential, its programme must be very much modified and its rewards very much increased. The primary object should be to increase agricultural production by educating the farmers to the fact that it is very much more profitable to feed stock on the produce of cultivated crops than to allow them to roam at large. Local societies should therefore be formed everywhere in connection with the parent society in Dublin, and should be managed by the ablest men in each district. They should offer prizes equivalent to the money that may be collected (and there is no doubt but that if the organisation began to do real work, this money would soon amount to a very large sum) for the best managed farms on which the soiling system is carried out, and in this way they might effect that economic revolution to which this plan is the key. Moreover when a beginning is made it will soon come home to people how much more profitable the new system is than the old, and what they did at first to obtain a prize they will continue to do for its own sake. Just as an employer of labour, if he knows how, can direct his labourers to make wealth for him and for them, by paying them to execute his work, so can an organisation, if it knows how to direct the labour of a country to the best advantage, secure similar results. And in this way, and this way alone, can a practical means be found to induce those occupying land who have sufficient capital of their own, to change their system of farming. Again, the Land Act of 1881 gives power to the Board of Works to lend money to the tenants for works of improvement, on their own security, if satisfied that the security is adequate. This money is to be paid back by a terminable half yearly rentcharge, covering principal and interest. On nearly every townland there is a great deal of work, such as drainage, levelling of fences, &c., which might be done by the labour of the tenants themselves, and which, when done, would give a large return. The value of the work done by the farmers themselves, or whatever portion of it has not been required for their subsistence, (and as they are now able to live in some sort of way, as things are, it might in many cases save all this value) would be available as capital, since the increased production accruing from the work done, would be more than sufficient to pay back the money due to the Government. But as matters stand at present no results will follow from this borrowing power unless the tenants are shown how to set about it. It would therefore be a most important part of the duty of this organisation to direct the tenants in this matter, to examine into the feasibility of the work to be done,—to prepare the plans,—in fact to do all these things that an educated person would do for himself if he

obtained a loan to improve his own property. Under these circumstances this power largely and properly worked might be made a means of making labour and capital meet. The organisation would act as a great industrial union in which all classes might join for their mutual benefit. Let us see what the effect of its action would be. In every district, besides the gentry who are engaged in farming, there are a considerable number of farmers who have more capital than they require for the working of their farms under the present system of management, and this money is for the most part deposited in local banks, where it yields a very small interest, only one or two per cent. The rest of the tenants, and by far the greater part of them, are living from hand to mouth, deeply insolvent, and without any reasonable hope of bettering their condition. They are obliged to keep a horse or two in order to get on at all, but these horses are half their time idle, and the labour of their own families also is only half employed. Now so soon as the gentry and richer class of farmers realise the fact that it is very much to their advantage to change their system of farming in the direction indicated, they would gradually begin to break up their grass lands and to increase their farm capital. Every acre broken up in this way must give employment, and extra labour would have to be got. In this way a field for the profitable employment of the manual and horse labour of the poorer farmers would gradually be opened out. Concurrently with this the improvements carried out under the Board of Works would afford employment and supply capital to these poor people. They would soon begin to buy stock and to farm in the same way as their richer neighbours, and the whole face of the country would be soon changed.

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5519. (*Chairman.*) I gather from what you have said that you are acquainted with Lord Spencer's system of granting prizes to small farmers for the best cultivated farms?—Only through reading of it.

5520. And from what you know of it, do you approve of it?—Yes, it is the only means of bringing about an improvement.

5521. And would the local agricultural societies do it?—Yes. I am doing it myself in my own neighbourhood.

5522. And you think that these prizes and the example of farms like yours would act as an incentive to small farmers to improve their holdings?—I do not know that the example of a farm, such as mine, would be of much effect. It would be the example of farmers themselves that would be of use, you must put it on to their farms.

5523. You think that prize farms would be a better example than the operations of large farms like yours?—Quite so.

5524. Do you think that instruction in agriculture can be advantageously given in the primary schools?—Yes, it is absolutely necessary.

5525. Can that be given by text books alone, or is it necessary that small plots of land should be attached to the schools?—Plots should certainly be attached.

5526. Is it possible to have the necessary instruction given by the primary teachers, or is it necessary that persons should be specially appointed for the purpose of giving it?—Something could be done by the ordinary primary teachers, but at the same time it would be necessary to instruct in agriculture, and that, of course, would require to be done by a person qualified.

5527. Are you aware that primary teachers have been invited to come to Glasnevin to learn agriculture?—No, I was not, but I should imagine it was so.

5528. Do you think that is a good movement?—Yes.

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5529. And are you clearly of opinion that there should be some land attached to the school on which practical demonstration could be given?—Yes, I hold that very strongly.

5530. (*Dr. Roscoe.*) Do you know of any system, at present being worked, by which instruction can be or is given on the lines laid down by the Government Department, or any way in which such practical instruction can be given, so that the energies of the teachers be not wasted?—Something has already been done, as you suggest in your question, but it has not, I believe, been well worked or pushed.

5531. Do you know any of the text books used on the subject?—No, not particularly. I think, in the ordinary national school books, any information on agriculture is very meagre, and that is a great defect.

5532. (*Mr. Magnus.*) At what age should children commence?—The sooner the better. At about 12 I should say.

5533. They are found to be willing in ordinary districts to take to it at that age?—Yes, or up to 15. Between 12 and 15.

5534. And between 12 and 15 you would proceed to give instruction in agriculture?—Yes.

5535. (*Mr. Slagg.*) Are there no means of popular education in agriculture?—There are. There is Glasnovin. The other agricultural schools have been closed in Limerick and Kilkenny. The present would be a most suitable time to take the measures I have suggested, because the security of the Land Act is beginning to tell. Farmers are beginning to try experiments, and in my own neighbourhood I was struck by the anxiety of the farmers to obtain knowledge. That only requires to be pushed to develop good results.

5536. What are you doing yourself; you said something to the effect that you were offering prizes?—Yes, I have offered a prize of 10*l.* for the best managed farm, with cattle fed on green food in the summer. Five small farmers are taking it up, and there is every reason to suppose that next year we shall raise subscriptions and establish a large competition. We are only in our infancy at present.

5537. Have you a local agricultural society?—Yes, and I am doing it under the auspices of the society. We shall be able to develop it.

5538. Your subscriptions are small?—Yes, only about 2*s.* 6*d.*

Mr.
C. Mathers.

Mr. CHARLES MATHERS examined.

5539. (*Chairman.*) Kindly state what is your occupation?—I am secretary to the Bakers' Association.

5540. Is it composed of working bakers?—Yes, operative bakers.

5541. What is the object of the association?—The principal object is mutual benefit, but the second is to be able to furnish the employers in the city with competent men; and for that reason I would wish that the members, if it were possible, should be educated in chemistry, which is at the foundation of the business. To neglect having the "ferments" to a proper degree of perfection would have the effect of spoiling the bread.

5542. Do many of the operatives share the desire you feel for the necessity of instruction of this kind?—There are, I believe, a good many who do. Yesterday I laid the subject before the committee.

5543. Was there any expression of opinion given on the subject?—Yes; that they would like very much that the subject should be brought forward and developed.

5544. Was that the first time that the subject was considered by them?—I think so. It must be remembered that in consequence of the way they work at night they are, of course, a class of men who have not the same opportunities as other tradesmen.

5545. So that any opportunities of improvement which might be available for the members of other trades are scarcely at your disposal?—Yes. In consequence of our night work.

5546. Have you considered how that difficulty could best be overcome?—The only way would be to have a place of instruction open in the daytime.

5547. What is the number of operative bakers in Dublin?—In the Association there are 600 members.

5548. All of whom are employed at night and at liberty during the day?—Yes.

5549. And if opportunities were afforded of instruction in chemistry during the daytime, do you think that many of them would avail themselves of those means?—Yes, for the association would encourage the movement.

5550. Are there any other trades in Dublin similarly circumstanced?—Not that I know of, except the printers.

5551. (*Mr. Magnus.*) Have you ever had brought under your notice the instruction of the City Guilds' Institute? Were you aware that examinations were held in breadmaking?—No.

5552. Do you think that if they were aware of the fact, the members of your association would be able to avail themselves of such instruction?—Yes, provided time allowed.

5553. You were not aware that the prizes offered are to those who show knowledge of chemistry in breadmaking?—No.

5554. Are any members of your association competent to give instruction in this subject?—I do not think there are any who are sufficiently well versed in science to give instruction.

5555. How would you propose that such instruction should be obtained?—I think the only possible way would be to get a practical chemist. There would be no use in selecting a man from the trade, for he would be merely adopting the old system, and in some cases they are not able to explain what is the cause of fermentation. They merely know that by doing so and so a certain result will take place. There are a great many things which they are not competent to detect, and which affect the making of bread.

5556. You would not be able to get a man engaged in the trade, because he would not understand the theory underlying it?—No.

5557. Would it be possible for a chemist to make himself sufficiently conversant with the details of breadmaking to become a competent person to give the necessary instruction?—Yes, he would be the proper person. It is the scientific part of it that it is necessary should be taught.

5558. (*Chairman.*) If any of the Commissioners could, in their individual capacity, persuade one of the professors of chemistry resident in Dublin to give instruction to yourself, for instance, in theoretical chemistry, and afterwards on the application of these principles to breadmaking, would you feel disposed to qualify yourself to become a teacher?—I doubt whether my time would permit me. I am secretary of the association, and there is a lot of work to be done.

5559. Is there any other intelligent man amongst you who would avail himself of the opportunity afforded of becoming a teacher?—Well, I do not know. I am not aware that they would be able to get the time sufficient, for they are all working men.

Mr.
C. Mathers.
7 June 1884.

- Mr. C. Mathers.*
7 June 1883.
5560. (*Mr. Magnus.*) But you are disengaged during the day?—The men are, but I am not.
5561. (*Chairman.*) Is there not one of your men who would be sufficiently intelligent to obtain and qualify himself to give instruction?—Yes, I think there is.
5562. Would you like us individually to make the attempt?—How do you mean?
5563. To make the attempt to induce some practical chemist to give that instruction?—Yes, decidedly; but I think the proper method would be if the professor would take a class. For instance, he could utilize our committee room for the purpose. In fact, I think our men would pay more attention to instruction, coming from a professor of the science, than they would to the instruction of one of their own class whom they associate with.
5564. Have you ever had any communication with any of the professors of chemistry to ascertain if he would instruct you either gratuitously or for such remuneration as you could afford?—No.
5565. Would it not be possible?—Yes, I think it would.
5566. Then is there anything else that would be necessary, if you found some gentleman prepared to instruct you?—No, that is all that would be necessary.
5567. Do you know any of the professors of chemistry?—No, I do not, but I have attended various lectures.
5568. (*Dr. Roscoe.*) What lectures?—At the Royal Dublin Society.
5569. In what?—Chemistry, and other subjects.
5570. What is your opinion of the value of these lectures? Did you derive any benefit from them?—Yes, I did.
5571. Do you think there is any means by which the numbers attending these science classes could be increased, and the knowledge derived from them spread amongst the artizans of Dublin?—Well, the fact is I have found from mixing with various tradesmen that they are ignorant that such lectures take place.
5572. Could you suggest a means by which the knowledge of these lectures might be more widely known?—The only way would be to circulate pamphlets through the city, and that the employers would bring it under the man's notice.
5573. We have been told by a cabinet maker that the programmes of the Science and Art Department were placarded in his workshop, and that, though he has 40 journeymen and several apprentices, not one attended the instruction given. Are you aware whether similar means were taken in your workshops?—No, I never saw anything of that kind circulated through any of the bakeries where men work.
5574. How was your attention directed to the subject?—Well, I served my apprenticeship in O'Brien's, of Leinster Street.
5575. What is he?—A master baker, and I am a baker by trade, and part of my time I put in by day, and during that time I sometimes in the evening used to attend lectures given here in the Royal Dublin Society on various subjects. Then my employer gave me a ticket for the library, and I then got into the School of Art, and by that means I got a knowledge of various subjects.
5576. Do you know anything about the Dublin Mechanics' Institute?—I have been a member of it.
5577. (*Dr. Roscoe.*) What is your opinion of it?—If it was conducted better it would be more attractive.
5578. What is the government of it?—The committee is elected annually.
5579. Out of the subscribers?—Yes.

5580. (*Mr. Magnus.*) Are any lectures in science given under the auspices of the Mechanics' Institute?—Yes.

5581. But you think that the work is susceptible of improvement?—Yes.

5582. Can you suggest any method by which it could be done?—No.

5583. (*Dr. Roscoe.*) Do you think that if lectures in chemistry were given in reference to bread-making, the members of your association would attend them?—No, for the reason that the men are working principally at night.

5584. Suppose they were given in the daytime your men could come?—They are rather nervous about going into strange places. The only way to bring it under the notice of the men is that the teacher should come to the association.

5585. (*Mr Magnus.*) Have you adequate accommodation?—Yes, the committee room would hold upwards of 60.

5586. Have you a laboratory?—No.

5587. Well it would be desirable to have one, if such instruction were to be given. You have not considered that?—No.

5588. (*Mr. Slagg.*) Is your association a teaching body at all from the apprentice point of view? Is it a sort of guild?—It teaches nothing; the apprentices are bound and serve their time.

5589. Is it just a mechanical training?—The apprentice must be a competent baker at the end of five years.

5590. The association regulates disputed points?—Yes.

5591. Is there anything special in the condition of the bakery trade in Dublin that does not apply to that trade in other places; in England, for example?—No, nothing that I know of, except that we get great praise for the quality of the bread we turn out.

5592. You say it is very good?—Yes, superior. Gentlemen who have travelled through the United Kingdom say the bread of Dublin is superior to that of any other place.

5593. Do you find that deficiency in elementary education is an obstacle to the advancement of your men, in the higher spheres of bakery?—Yes, for some of them are very backward.

5594. As to reading and writing?—Well, the fact is such. They forget it, being sent to the trade early, and not having any occasion to use the education they have received.

5595. You think the condition of elementary education in your trade is not satisfactory?—Yes; there is another point I would wish to draw attention to. I suppose it would come under the head of chemistry, namely, the detecting of impurities in flour. In many cases the blame falls on the men when it should be attributed to the impurities in the flour sent in by the miller.

5596. (*Dr. Roscoe.*) Has your trade ever employed Dr. Cameron?—We have very seldom had necessity to do that. When the bread is baked it is not easy to detect an error of the kind I refer to.

5597. (*Chairman.*) Is there a master's association as well as an operatives?—There was some years ago; it does not exist now.

Professor KAVANAGH, C. U., examined.

5598. (*Chairman.*) You were at one time an inspector of schools?—Yes; I have been professor of the Catholic University for 24 years. I was head of the Model Schools, Marlborough Street, for four years;

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district inspector for two years; and head inspector and senior of my grade eleven years.

5599. When did you cease to be inspector?—In 1868, and I have been since 1859 in the Catholic University.

5600. Now kindly state what is your opinion of the present state of primary instruction in this country?—I can speak of the primary instruction, as it has been going on for 50 odd years, and I would ask you to look at it in the natural order, the condition of the school-houses, furniture, and surroundings, the qualifications of the teachers, the classification of the children, the quality of their attendance, and the result of the examinations.

5601. Kindly make your statement on that?—Most of the houses were built by the people of the locality, and the Government have no legal control over them; others were built by aid from the State, and these are called vested schools. The former are the overwhelming majority. Of course as to the houses whose erection was aided by the State, the greater number have all a very fair claim to be regarded in Ireland as decently fair schools, but some of the others are in a most deplorable condition. I may state that the vested schools amount to 2,156, or 27 per cent. of the whole, and the non-vested schools amount to 5,813, or 73 per cent. These latter schools may cease at any time to be connected with the State.

5602. You are now describing the present condition?—Yes; from the Board's report of the 31st December 1882, the last report available. I will state nothing from mere memory, but confine myself to the official evidence. Well, 7,959 school houses (one district, Sligo has been omitted) are thus described. As to *buildings and repairs*, and so forth, good, 4,676; middling, 2,087; bad, 612. As to *furniture and apparatus*, good, 4,228; middling, 2,523, and bad, 624. Now the *premises and play-grounds* are much the same, 3,304 good; 1,917 middling; 691 bad, while 1,663 had no play-ground whatever. The next item, *space accommodation or floor area*, is described as good, 5,057; middling, 1,465; bad, 706. Now, sir, the next is a most important point, and I want to call attention to it. The *out-offices*, so essential to a school, are thus described, 3,333 good; 1,745 middling; and 529 bad, while in the case of no less than 1,768, or more than one-fourth, "*none at all*." You are to understand that a large number of these houses are wretched thatched cabins at the road side, quite unenclosed, without garden or play-ground. But I am bound to say that there is often great difficulty in getting sites, and the blame may be said to be divided. From this summary we learn that only little more than one-fourth of the houses are permanently for school purposes, while 74 per cent. are "got up with a temporary connection," and you see the report of the condition of the buildings, out-offices, and so forth. Now, as to the *supply of books*, the figures are, good, 4,613; middling, 2,245, and bad 507. The next point is as to the teachers and their training. I need not tell you, gentlemen, that, "as the teacher, so will be the school." There are 10,532 Classed teachers in Ireland, by the last report, and of these, 3,491, or 33 per cent., are trained, and 7,041, or 67 per cent., are not trained. I ask you, is not this a lamentable condition of the country, contrasted with England or Scotland in this important respect?

5603. (*Chairman.*) I would like to know what is meant by a trained, and what is meant by an untrained teacher in Ireland?—Training was introduced under the National Board in 1833, in a lane off Merrion Street, exactly 50 years ago, in a renovated stable just near us now, (Royal Dublin Society), at the back of where the Land Commission Court holds its sittings, in the house where the Duke of Wellington was born. The training of masters went on there during four years

and lasted for a short session of three months, but when I was head master of the model schools, 1841-44, it was extended to four or five months. It never was longer. Now they have extended it to 10 months, the longest period of training. Nearly all the 33 per cent., especially the Roman Catholics, were trained for the old short period, as will be presently explained.

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5604. Where is the present training school?—In Marlborough Street since 1837; one branch for masters, the other for mistresses.

5605. Is that for Roman Catholics?—No, for all creeds, but aid to Denominational Training Colleges, promised since 1860, has been ceded this year by the Government, as in England and Scotland since 1839. In the year 1862, the Roman Catholic bishops by solemn decree, decided that none of their clergy from that date were to be parties directly or indirectly to sending any teachers for training to Marlborough Street, and that brought the whole business to a dead lock in relation to Catholics.

5606. And that is the principal reason the number of teachers is so small?—Yes; there are about 8,000 Catholic teachers, of whom only 27 per cent. were trained, while of over 2,000 Protestant teachers, 52 per cent., or nearly double that proportion, have been trained, and for far longer periods.

5607. But even those who were trained only received training for a year, actually 10 months?—Yes; and only a few of the Catholics.

5608. In support of your statement, kindly describe the state of things in Ireland?—Well, the supreme importance of the training is acknowledged on all hands, as you see by the last movement of the Government and of the National Board, admitting it to be entirely defective. It will be made more liberal under the new schema. I have done with buildings and teachers; now I would rather take, in connection with the teachers, their classification.

5609. I would like to ask you whether it may not be possible that some of the 7,000 teachers, who have not been trained in the national training schools, may have been effectively prepared in some other way for their profession?—No fraction of them worth speaking of; some mistresses were taught in the excellent Convent schools, and some masters in the Christian Brothers' schools, but they form no considerable fraction of the thousands of untrained Catholic teachers.

5610. What kind of education do the others receive?—Some of them had been pupils in the National schools, some as monitors; and then, in the absence of any others, the manager in the exercise of his right will appoint some smart boy from the locality to take charge of the school.

5611. They undergo no examination?—Yes; they must pass the lower third grade. Formerly there was a probationary grade. Now, a lad is on trial, and gets a provisional certificate until the inspector comes about, and formally examines him, or, if it is more convenient, the manager sends him to the inspector's residence to be examined.

5612. There is no such thing as a collective examination?—Oh, yes; one in whose organisation I took a leading part.

5613. Kindly state what it is?—There are three classes of certificates: the first with two grades; a second class with two grades; and a third class with two grades. That is six grades of certificated teachers. If the teacher's skill be favourably reported on by the inspector, as to results, general school management, and so on, the teacher gets promotion, a grade, and he afterwards may give notice that he goes in for what you call collective examination, for promotion to the next higher class, and these examinations are held by the inspectors.

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5614. But though the teacher is not trained in the strict sense, he may be a good teacher?—Yes, that is possible, and no doubt such is the fact in many cases. Men are sometimes qualified by nature for the office, but you would not propose on that account that there is no need of training for that most important of all arts. As an outcome of your question, I may remark, in connection with the status of the untrained, that, of the whole, 33 per cent. are trained, and I want you to distinguish the fact that 67 per cent. are untrained. Out of these 3,491 trained teachers, 2,144, the vast mass, or over 60 per cent., are Protestants, and the remainder are Catholics, whilst the Catholics are 80 per cent. of the pupils in the schools.

5615. (*Mr. Woodall.*) Give me the proportions of the trained and untrained teachers?—There are 52 per cent. Protestants trained, and 48 per cent. not trained. These are great contrasts with the figures referring to Catholics, of whom only 27 per cent. are trained, and 73 per cent. not trained.

5616. (*Chairman.*) What is the result of all this as to the efficiency of the schools?—I have only one item to give on this point; the want of training and so on, and you are to remember that classification in Ireland as well as in England does not necessarily represent the teacher's skilfulness, for many good scholars are inefficient teachers, but, as a general rule, the classification reflects the man's skilfulness. Of 10,899 teachers, principals and assistants, only 1,021, or 9 per cent., are in the first class.

5617. Is the first class the highest?—Yes. There are 3,555, or 31 per cent., in the second class, and 5,956 in the third class. That is in round numbers nearly 60 per cent. in the third or lowest class. Having spoken of the number and classification of teachers, whether trained or untrained, we now may face the question of results.

5618. I would like you to give the attendance?—The aggregate attendance in Ireland is usually termed the number on the roll. The figure is put down at 1,066,259. This is greatly exaggerated by duplication, migration of children from one district to another, and so on.

5619. That cannot affect it very much?—Yes, it does. The mode of keeping the accounts is quite different in both countries. In England a child's name will not remain on the roll, if a fortnight's absence has arisen. Here, if he is three, or even nearly twelve months away, the National Board allows an attendance.

5620. But they are not a migratory population?—No, not very much, but are migratory from school to school.

5621. Therefore it cannot affect the numbers very much?—This was long a matter of dispute, but it is no longer so, for Sir Patrick Keenan, in his address at the late meeting of the Social Science Congress in Dublin, exposed the fact that a child's name might be on 3, 5, or 20 times in different schools, as I have urged for 25 years.

5622. But in point of fact that cannot happen very often?—Yes, in towns, to a great extent, and in populous rural localities where schools are numerous.

5623. Is there no record of the average attendance of the children?—The fullest; it was I who drew up the present books of school accounts; in 1856.

5624. Give the average attendances?—It is 469,192, or less than one-half the number on the roll.

5625. Is any deduction to be made from that?—No; I firmly believe, taking all and all, there are no more reliable common school accounts than the Irish, as regards average daily attendance.

5626. My impression was that the attendance was under 400,000?—No, it is 469,192. I may mention to you that there was such classing

of returns under the three systems, Scotch, English, and Irish, that the Lords of the Treasury gave instructions to bring out a broadsheet, like this, now attached to the Annual Report of the National Board (*shewing sheet*), in order to have some idea of the comparative working of the three systems. As to the actual number on the roll being one million, if you ask me for my opinion, I may say in proof that there are not a million children to go to national schools, and that disposes of that, as the whole population is little over five millions.

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5627. What is considered to be the school age?—In Ireland we are obliged to take your statistics, from 3 to 13. Now that is wholly inapplicable to Ireland. There are only 24 per cent. of our population in towns. The young children cannot go to school such distances and in such weather as they sometimes have to face. In England and Scotland more than half the population live in cities and towns.

5628. What is the actual commencement of the school age?—It varies greatly. They go early and are taken away early in towns, whereas in rural districts they go late, attend more irregularly, and remain to a later age.

5629. What is the age?—I should say that the girls are sometimes left at school until 15 and 16 years old, in the rural districts.

5630. When do they begin?—At about six in many cases.

5631. Have you a distinction between infant and other schools?—Oh, the fullest, and you will perceive that the distinction must be made in the case especially of town as compared with rural districts where so many children are necessarily engaged at farm work. As to the classification of the children, I think there are, *bonâ fide*, 750,000 *distinct individuals* going through the National Schools in the year, and no more. They are obliged, in Ireland as in England, to give an account of the number of children who made even one attendance within 14 days of the inspector's examination, for results, and these amount to 678,970. There are 48 per cent. of the children classed, in the *Primer*, or first book, which I now produce, limited to words of one syllable.

5632. One syllable?—Yes.

5633. Half the children are learning that?—Yes, 48 per cent.

5634. (*Mr. Woodall.*) Up to what age are children to be found reading that book?—The average age would not be more than seven.

5635. What is the extreme limit upwards of those who are reading that book?—You would find children eight or nine years old trying to read words of one syllable, and a large number of them not knowing the whole of their letters. I have brought all the books that you might see for yourselves. I thought it the best way. The number in the primer, or 1st book, are 48 per cent.; the number reading 2nd book 15·3 per cent.; the number reading 3rd book 12·7 per cent.; the number reading 4th book 9·4 per cent.; and the number reading 5th book—divided into lower and higher—lower, 6·9 per cent., and higher, 3·6 per cent., making 10·5 per cent.; and the number studying the 6th or highest book is 4·1 per cent.

5636. You have nothing beyond that?—No.

5637. Are you quoting the figures of last year?—From the report of 31st December 1882.

5638. Was it presented to Parliament?—Yes; House of Commons.

5639. At what date?—It is a "Command" paper, 3651. Report, National Board, 1882.

5640. (*Dr. Roscoe.*) What is your opinion of these books of the series?—I think they are well graded. I think a great effort has been made to remove the very profound objection the people of Ireland had

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to the whole series, up to 15 or 20 years ago, when the series was re-cast, and revised.

5641. (*Chairman.*) What was this objection?—The books were all written by Englishmen or Scotchmen, chiefly by the late Archbishop Whately and his family, and the little which they contained with regard to Ireland showed no sympathy with the feelings, traditions, and wants of the country. The whole of these books were ultimately cancelled and re-cast.

5642. How long ago?—About 18 years ago.

5643. From an educational point of view, and apart from political or such questions, are the books now used well designed to teach the children?—On the whole, yes. You will find no books perfect. I think the series by Chambers, that I saw in use in England and Scotland, by Burns and Oates, the Christian Knowledge Society, and others, are, on the whole, a little better from a didactic point of view. The one thing I complain of is that the higher books do not contain enough of moral or material instruction with regard to Ireland. In this respect the Christian Brothers' series are very much better.

5644. (*Dr. Roscoe.*) Is there too much poetry in them?—Well, we are a poetic and an eloquent people, and poetry and eloquence cannot be kept out.

5645. (*Chairman.*) Have they been revised?—18 years ago they were recompiled, but have been scarcely ever revised since.

5646. Not since then?—No, not since then.

5647. Is it anybody's business to revise them?—No. In the first place it is no function of the State to compose or revise school books.

5648. Is anyone appointed for the purpose of revising these books?—There was a committee of two or three inspectors—

5649. At the present moment is there anyone who has been appointed to revise them?—No, not currently.

5650. (*Mr. Woodall.*) You would advocate a system of free trade in the matter of these books?—Yes; it was advocated by London publishers more than 30 years ago, and has been demanded by Irish Catholics for the last 50 years.

5651. (*Chairman.*) Yes, by the publishers; but in the present condition of Ireland would it not be wrong to introduce free trade in books of the kind, except under very strict safeguards?—Well, I do not consider that we are different in culture from the English, and the private competition of publishers would, in Ireland as in Great Britain, always keep up a succession of the best and most suitable books.

5652. Suppose the doctrine were introduced that England had always tyrannised over Ireland, and that it was the duty of Irishmen to emancipate themselves from English rule as soon as possible?—I doubt if anyone in Ireland would claim that State aid should be given to a school where disloyalty was taught.

5653. Then you agree that it should be within the power of the State to forbid the use of such a book?—Yes. The State paying public money should have the power of veto. But the objection should be a serious one. But it is an outrage against the feelings of Irishmen that in the manuals brought out under the National Board there is not enough to enable a child to understand the rudest outlines of the history of Ireland. Up to 1866, in the fifth book, in which boys were to be finished, as you might say, as to literature and English, the name of Ireland occurred but twice, and each time it was in a statement which was as untrue as it was offensive.

5654. There is no use going back to that?—Except to show the previous abuses; that something has been done, and to give credit for the reform that has taken place.

5655. Of course you are dissatisfied with the state of elementary education in Ireland?—Yes, deeply.

5656. And you think that not much can, as things at present stand, be done in the way of technical instruction?—Very little, while popular education is at so low an ebb.

5657. (*Mr. Woodall.*) I wanted to ask whether this proportion in the different grades you have given has shown a considerable modification within the last 10 years. You know that in England they have means of showing the standard?—Yes.

5658. Does this show an upward tendency like England?—As to the higher grades, I think it is much as it was 25 years ago, or rather higher. That is owing to special causes, chiefly the results system.

5659. It would answer my purpose if Professor Kavanagh would tell us if the 48 per cent. of children, now being taught out of the simplest primer, is more or less than the percentage of 10 years ago?—In one sense I think it is higher; but I think the increase in the infant schools in towns would alone modify it. I want to guard against misrepresentation, lest it should seem that I said the schools have gone down. They have rather advanced.

5660. We may take it the comparison would not be reliable, because of the fact of emigration on the one hand and the multiplication of infant schools on the other?—Emigration does not affect it very much. I may say that Lord Stanley (Earl of Derby) never contemplated that anything but pure literary instruction should be given; the National Board found, however, that, in the opinion of those best qualified to judge, in a country like Ireland this would not do. They then formulated a very wide scheme of industrial instruction. I will read for you a few passages in which they early introduced the proposed scheme of industrial and technical instruction in the National Schools. These extracts are of the very highest value in reference to your Commission, and prove, in connection with the total failure of the scheme, after 50 years' trial, the Utopian nature of the idea of engrafting technical instruction, in your sense, on a low standard of primary education like that which obtains in Ireland. Such may, however, and might be attempted in cities and the larger towns, and agricultural instruction should be given generally in rural districts, but beyond these, there is no rational demand, I grieve to say, for technical instruction in Ireland.

The Commissioners of Irish National Education, in their Fourth Report, 1837, when the new system had been only six years in operation, stated:—"It is our intention gradually to divide the National Schools, in general, into two classes; the one to consist of primary, the other of secondary schools. The primary schools to afford elementary instruction; the secondary, scientific, and instruction also in manual occupations. A portion of land for garden husbandry, to be an indispensable adjunct to each secondary school, unless situated in a city or town. Instruction, however, in manual occupations to be encouraged in the primary schools also; and a female department, under a female superintendent, to be annexed to each. The females to be taught work suited to their sex, in addition to reading, writing, and arithmetic."

This proposed division and the establishment of secondary or elementary technical schools has never since been attempted; and passing from the ordinary National Schools under local management, the Board, in the same report (1837), thus sketches the foundation of a great central technical school, in connection with their sole training institution, Marlborough Street, Dublin, under their exclusive direction, then about to open in Dublin.

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"We intend that our Normal Establishment (Marlborough Street), which we hope will be completed in January next, shall consist of two departments—one for elementary, the other for scientific, instruction, and that the latter shall teach, in particular, those branches of science which have a practical application to husbandry and handicraft. We also purpose having a school for industry in the immediate neighbourhood of Dublin (Glasnevin), with workrooms and a farm of from 40 to 50 acres annexed to it, and that those who attend it shall be practised at stated times in different descriptions of manual work and in the general business of agriculture.

"Our object is not to teach trades but to facilitate a perfect learning of them by explaining the principles upon which they depend, and habituating young persons to expertness in the use of their hands.

"Considering, too, the very backward state of agriculture in Ireland, and that it forms the only source of employment for a vast portion of the labouring poor, we think it particularly desirable that a better knowledge of it should be promoted, and that the schools under us should tend, as far as practicable, to bring forward an intelligent class of farm labourers and servants."

In the general sense here indicated, this scheme has utterly broken down, the results in Glasnevin, as regards that model farm, being the only outcome. As to trades, handicraft and expertness in manual work, nothing of the kind has ever been attempted.

In that same report for 1837, the National Board formulated for the first time a large scheme of 25 district model schools, to be erected and managed by themselves, and in all of which manual occupations as well as ordinary elementary instruction should be given. The report thus introduces the scheme:—

"We intend that each model school shall consist of two departments—one for elementary teaching, the other for scientific instruction in manual occupations. We, therefore, intend that there shall be a workroom annexed to each, and also a portion of land, which those children, whose parents may so direct, shall be taught to cultivate.

"We further propose, when establishing each model school, to make such an arrangement, if practicable, as may enable us afterwards to connect it with a model farm of about 40 acres, should we be authorised by a future grant from Parliament so to do.

"The expense of providing the necessary buildings, implements of husbandry, stock, and crops for the model farms would probably amount to about 600*l.* each, so that the whole expenditure for providing these most desirable establishments throughout Ireland would come only to about 15,000*l.* No future grants would be required for the purpose of maintaining them. Our plan would be to let each farm to the head master of the model school, at a rent proportioned to the value of the land and the outlay upon it, to bind him to a proper course of management, and to take security for having it rendered up to us when demanded, duly stocked and cropped."

The model schools, so sketched in 1837, commenced to be opened only in 1849, until by 1856 some 26 of them had been established at enormous expense in different parts of Ireland. To eight of them farms were attached where agriculture was taught, but by order of the Government all the farms have been sold, save in the single case of Cork. No technical nor industrial instruction outside of these schools had been given; and the failure of the whole scheme, literary and industrial, was so complete that the Government in 1866 forbade the Board to establish any more model schools, and insisted on the curtailment of the expenditure on those tolerated.

5661. What resulted from that scheme?—Agriculture was somewhat developed, but no other scheme of industry, no other teaching the principle of trades, nor anything of that sort, was started, or at least in only a few schools.

5662. As to agriculture, what can you tell us?—I have been on nearly every model farm in Ireland. I would retain the instruction on a small scale on farms of two and three to five acres attached to rural schools.

5663. How many model schools were there?—There were three classes formerly—State managed; those under local managers with farms; and those with gardens only.

5664. How many agricultural model schools are there at present?—Three: Enniskillen, Cork, and Dublin, or rather Glasnevin.

5665. How many elementary schools with gardens attached?—Three: State model farms, Dublin, Cork, and Fermanagh; the last, however, is only three acres; really, there are only two. There are 73 agricultural schools under local management, and 19 with school gardens, and that is the whole extent of the instruction, notwithstanding the programme of 1837, which I have just quoted.

5666. Are there plots of ground attached to the 73?—Yes; they range from one statute acre to 30. The great majority are under 10.

5667. (*Chairman.*) As to these model schools; the model schools were abandoned?—Yes, the larger model schools under the State; they were unsuccessful and costly; and their surrender and sale, owing to the extravagant character of the buildings, led to enormous loss by the State. Their erection must have cost 150,000*l.*

5668. What happened to them?—The whole of the results are stated in that document.

5669. They were abandoned because they were unsuccessful?—Yes. To call them *model* schools was a gross misnomer. I wish here to pay a tribute to my old friend Professor Baldwin. An abler or a more practical man could not have been put over them; yet they failed.

5670. As to those schools under private patronage, the schools with gardens attached, have they diminished or increased?—They have increased rather, on the whole. But what is more important, I think, there is growing confidence in them. There is one danger, namely, that of the schoolmaster using the time of the pupil, when it is pressing to save crops, and so on, when he should be teaching him. However that is not much done.

5671. Does the schoolmaster take the crops?—He does, of course. I will give examples from memory of excellent school farms. There is one under Lord Bessborough at Pilltown, another under him at Garryghill in Carlow, one under Mr. Tighe in Kilkenny, one under Lord Claremont in Louth, and various other ones.

5672. Are they in existence still?—Oh, yes. The breakdown was occasioned by the absurd course adopted. The people when they saw the cattle provided with cut stone houses superior to the dwellings of wealthy farmers, the pigs going upstairs, and so on, only laughed at the thing as a farce. I wish, however, to give my testimony in favour of the wisest agricultural instruction suited to the wants and circumstances of the people.

5673. (*Chairman.*) At whose expense are these small farms conducted?—Mainly for the ultimate benefit of the children, but directly they are of personal profit to the teacher. The pupils are examined in agriculture, and there are result fees. It is a sort of extra subject. Of the million or more pupils on the roll of all the National Schools in 1882, only 45,715 were presented to the inspectors for examination in agriculture, of whom 21,962, or less than one-half, passed.

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5674. Are they under the National Board?—All of them.

5675. Is the examination under the National Board or South Kensington?—Under the Irish inspectors. Several schools are otherwise connected with South Kensington. I may mention that the returns show that 47·5 per cent. passed in agriculture.

5676. They have nothing to do with South Kensington?—South Kensington subjects are extra subjects. I may say that the Intermediate Board have not agriculture on their list, but they have physical science, drawing, domestic economy, and other things, and their teachers show that 47·5 per cent. passed in agriculture.

5677. We find the examiners' reports are very unfavourable as to science?—Yes, but I must say that for the past three or four years there has been a decidedly satisfactory work accomplished through the Intermediate Board and its examinations. I can speak more particularly for the Roman Catholic colleges and schools. There has been a great advantage derived from the introduction of those excellent manuals and primers, hitherto scarcely known, dealing with rudimentary chemistry, light and heat, electricity, &c. I may say, with confidence, having now been an examiner for three years under the Intermediate Board, that the improvement is noticeable in a marked way, as also in the case of the excellent Wesleyan schools in Stephens Green, and the Erasmus Smith School in Harcourt Street, the Christian Brothers Schools, and others.

5678. Is the Commission to understand that the appliances for teaching are very much improved in the intermediate schools?—Yes, the result of the pressure of competition. The department which I may describe as mural appliances is also deserving of attention, and if you had an opportunity it would be important if you visited Sullivan Brothers in Marlborough Street, and Brown and Nolan's in Nassau Street, who supply a vast quantity of materials. I may mention that Nautical Schools were provided, on a report of mine in 1851, but they declined. They were under the National Board. There is one still continued in Marlborough Street, but the rest have gone down.

5679. Now as to compulsory education?—It is Utopian to think of applying it to Ireland, at least as it is applied in England, so far as the rural districts are concerned. I should be delighted, however, to see it applied to Dublin, and perhaps to Belfast and Cork. The National Board has never suggested its introduction to Ireland; but the Resident Commissioner, Sir Patrick J. Keenan, has, mistrustfully however, in his recent address, in 1881, at the Social Science Congress in Dublin. The proposal was submitted to a meeting of the Irish Catholic bishops, and rejected as unsuited to their flocks and the general circumstances of the country. More than three-fourths of the population being rural and living by agriculture, compulsory attendance could never be enforced. It is not strictly enforced on the Continent of Europe, nor in the British colonies, and is unknown in the United States, nor is it enforced in England or Scotland, as I know from personal observation. Its enforcement, in a poor country like Ireland, subject to periodical distress amounting to partial famine, and with the climatic vicissitudes of agricultural labour, would be utterly impossible. Magistrates would not convict the parents, nor could fines be enforced, while education and its machinery would be rendered highly unpopular; and, further, the quality and regularity of the attendance in the National Schools is far better than that represented. If the million pupils, alleged to be on the roll, be purged down by the excision of duplicates, &c. to about 750,000 distinct individual pupils, an average daily attendance of 469,192 of these is not bad, considering the condition of Ireland, while it is further to be recollected that many pupils die in the year; not a few are ill for long periods; some emigrate, and a number, in the earlier

part of the year, withdraw from school altogether. If all these be deducted, as they should, the ordinary current school-going pupils attend much better than is supposed.

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Professor BARRETT, the DEAN of the CHAPEL ROYAL, Miss LA TOUCHE, Prof. Barrett, the Dean of the Chapel Royal, and Miss MEYRICK attended to give evidence with reference to the movement for the technical education of women. Miss La Touche, and Miss Meyrick.

5680. (*Chairman.*) Professor Barrett, and you, ladies, have come to make a statement with reference to the movement in which you are engaged with respect to the technical education of women?

(*Professor Barrett.*) We wanted to bring under your notice the necessity that exists to help women to earn a livelihood. Miss La Touche, who is present, I may mention, is the honorary secretary of the Association for the Relief of ladies in Distress through non-payment of Rent in Ireland, by which some 1,023 Irish ladies were relieved.

(*Miss La Touche.*) Part of the work of this association is to try to find employment for ladies in distress, to put them in the way of earning a livelihood. But our funds are now nearly exhausted, and hence the necessity for a more permanent institution for the technical education of women, and it would be a great matter if we were assisted in our endeavours to accomplish that object.

5681. There was an institution known as the Queen's Institute?—(*Professor Barrett.*) Yes.

5682. What became of it?—Well, it ceased to exist, practically it was wound up.

5683. How was it that it ceased to exist?—(*Miss Meyrick.*) Mismanagement was the cause of it. It is more than 10 years since I was connected with it. We prefer being silent in the case, it is rather a personal matter.

5684. (*Chairman.*) The reasons that caused it to cease to exist are not reasons that would militate against the establishment of another similar institution?—(*Professor Barrett.*) No. It was an institution that, properly managed, could have been made most beneficial to the country.

5685. The object was to teach industries to women which they could practice at home?—Yes.

(*Miss Meyrick.*) Not at home altogether. There was telegraphy and scrivenerly.

5686. (*Mr. Woodall.*) Were they women of the higher class?—They were of the middle class.

5687. Were the women instructed there, young or advanced in life?—Some were young, some more advanced in years.

5688. But it was not a school, properly so called? It was not an institution in which their literary education was continued?—That was one of the points on which the mismanagement arose, because a school was added to it.

5689. That caused it to be unsuccessful?—(*Professor Barrett.*) Yes. For the first three years of the institution there were 495 pupils and of these 261 obtained employment in technical pursuits.

5690. You now propose to have an institution which will accomplish the industrial objects and be free from what proved to be the burthen of a literary school?—(*Miss Meyrick.*) Yes.

5691. (*Dr. Roscoe.*) Would you inform the Commissioners exactly what you propose teaching under the auspices of this proposed institution?—(*Professor Barrett.*) The subjects suggested by the London Society for Women including scrivenerly, addressing envelopes, circu-

lars, &c., copying MS., law writing, book keeping, diagram making, photographic printing, and, if possible, shorthand for reporting lectures, carving, and wood engraving. Needlework is taught in the School of Art here, and there are special institutions for the training of nurses.

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5693. (*Chairman.*) You rely in a great measure upon voluntary aid?—Yes; though we must, I believe, in order to succeed, fall back on some paid teachers.

5694. Would your association undertake teaching?—Yes; the institute, however, was founded with the object of helping women to find employment, and being impressed with the need of this, it took action.

5695. You do not propose to confine your action to any particular class in society?—No, but at the same time it is for the benefit of ladies we chiefly work.

(*The Dean of the Chapel Royal.*) Another thing. In many cases, even in a family, hitherto fairly well-to-do, the parent dies and a crash comes. Then it is important that some of the family should become self-supporting. Perhaps the young women of the family are between 20 and 30. They cannot avail themselves of the primary schools, they must have an institution where they would receive that technical training which will enable them to support themselves. Many cases have come under my notice, in connection with the Queen's Institute, of sudden necessity, arising from present circumstances in Ireland, where young women, after a short time, have qualified themselves in scrivenery, painting on china, and things of that kind, when they could not have gone to primary schools.

5696. (*Chairman.*) This is an institution having altogether different aim from that of any technical school associated with primary schools?—(*Professor Barrett.*) The aim is the same but the circumstances are different.

5697. Inasmuch as you have rather to teach adults than growing girls?—Yes, that is the case.

(*Miss La Touche.*) If technical education is to spread throughout the country there must be a demand for trained teachers. That is one of the objects we have in view—that our pupils may get employment as teachers.

5698. (*Chairman.*) In that case would you think it right that the Government should give you any assistance?—(*Dean of the Chapel Royal.*) In any case we think that would be right and fair. We wished, however, by all the efforts we could make, to show the Government that we are such persons as the Government ought to trust with money. If we do our best in a worthy work, then we can with justice say "help us."

5699. You mean as regards funds?—Yes.

5700. You would justify your demand by showing results?—Yes, and show ourselves to be persons who strike out for ourselves.

(*Professor Barrett.*) We want to teach self help. There are obviously certain subjects which we cannot hope to teach properly. Wood engraving is, for instance, costly to teach. There is such a great scarcity of wood engravers in this country that a great deal of the work done in that department has to be sent to England. If the Government could aid in that direction it would be most useful. While we wish to teach all simple subjects, such as scrivenery, we confidently hope to obtain assistance from the Government to aid us in teaching those subjects which are costly to teach and which would be beneficial to the country.

5701. If not from the Government you would be willing to receive help from rich corporations?—Yes, if it can be obtained. I may mention that, so far as art is concerned, the teachers in the Irish schools receive 5s. per head, in payment of results, whereas in England they only receive less than one half of that, showing the natural taste for art here. As to cookery, I may say that it is a subject contemplated, but not intended to be taken up at present.

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5702. (*Mr. Magnus.*) Why do you propose to postpone the teaching of cookery?—(*Dean of the Chapel Royal.*) Though cooking is a very useful thing, we do not want to teach people to become domestic cooks.

5703. (*Dr. Roscoe.*) Why not? is there anything more important for women to learn than that?—We should then perhaps have to teach housemaid's work too.

5704. (*Mr. Magnus.*) Well, I was going to ask that. It would be a good thing?—(*Dean of the Chapel Royal.*) There is rather a difficulty about mixing ranks.

5705. Is it not an acknowledged fact that there is a want of persons having a good knowledge of cooking in Ireland, and would it not be better to teach women something practical and useful of that kind, by which they could obtain a good livelihood?—(*Miss Meyrick.*) We do not ignore it; but in commencing we cannot do more than take up a few branches.

(*Chairman.*) Another reason may be that you could find many who would be willing to learn the other subjects but would not learn the cooking.

(*Dean of the Chapel Royal.*) They could learn cooking at the confectioners. The way people learn cooking is by becoming kitchen maids. We do not intend to take in that class.

(*Professor Barrett.*) In the South Kensington schools, no doubt, gentlewomen are taught cooking, but in this country the feeling is behind England in that respect. There is a much greater wish to enter professions than in England, and that tells too in the case of women; anything that is imagined to lower the social status is avoided.*

(*Mr. Magnus.*) But I was curious to know whether, in the opinion of these ladies, it is wise to encourage this feeling in Ireland, especially in the case of those women who are, as you say, looking for the means of earning a livelihood.

5706. (*Chairman.*) At any rate, you think there is sufficient scope for the development of your scheme in the subjects that have been mentioned?—(*Miss Meyrick.*) Yes.

5707. Your intention is to restore the Queen's Institute upon a proper basis?—Yes.

5708. It was supported by Irish subscriptions?—(*Dean of the Chapel Royal.*) Yes, it fell into the hands of persons who mismanaged it. It had however all the elements of success. We should be, of course, most grateful for any help the Government would extend towards our present effort.

Adjourned.

* Foot Note by Professor Barrett.—We have now added cookery to the list of subjects taught, in accordance with the suggestion of the Commissioners.

TWENTY-THIRD DAY.

Meeting at DUBLIN.

Fifth Day.

Friday, 8th June 1883.

The Commissioners met at 10 o'clock, at the Royal Dublin Society's House, Kildare Street.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., in the CHAIR.

Prof. H. E. ROSCOE, LL.D., F.R.S.

Mr. PHILIP MAGNUS.

Mr. JOHN SLAGG, M.P.

Mr. WM. WOODALL, M.P.

Mr. GILBERT R. REDGRAVE, *Secretary.*

Mr. JAMES MURRAY called and examined.

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5709. (*Chairman.*) You represent the Irish Home Manufacture Association?—Yes.

5710. Of whom is that Association composed?—It is composed of a number of manufacturers and traders carrying on business in this city and in other parts of Ireland, who meet weekly for the purpose of discussing subjects connected with Irish manufactures, and of endeavouring as far as lies in their power, to encourage and promote the trade and manufactures of Ireland.

5711. Can you name some of the manufacturers who so assist in carrying out the objects you have mentioned?—I may mention our treasurer, Mr. Pugh, who is, I believe, the only flint-glass manufacturer in Ireland, Mr. Briscoe, a manufacturer of carriages, and several others. I should observe that I have been but a short time connected with the Association, but I think I can represent pretty accurately the opinions of working men upon this matter of technical education, as during the last five years I have been secretary of three organisations composed largely of working men; and I am therefore thoroughly acquainted with their views in reference to the subject.

5712. Are working men also members of the Home Manufacture Association?—Yes.

5713. Can you inform me what trades are represented upon it?—Well, almost all trades. We have delegates from the different trades coming to our meetings.

5714. You have sent in a very interesting statement, and you have expressed your willingness to give any further explanations that may be needed?—Certainly; I shall be most happy to give any information in my power.

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5715. Your tenth recommendation is as follows:—"That the system adopted be in sympathy with the people, and that no obstacle be placed in the way of those wishing to join such schools (meaning technical schools) for want either of previous instruction or of position"?—Yes. (See App. K, p. 386.)

5716. You say that this last suggestion may, in the minds of some, seem unnecessary, but that when you consider the number of well-meant schemes which have been launched amongst you, and which have proved but a waste of public money, you wish to emphasize it in the strongest manner, and you proceed to say that if the Commission wish to have these and other points explained, you would be glad to give any explanation that may be required?—Yes.

5717. We think this tenth head is almost the only one requiring explanation, because the others are all very clear; and in asking you for an explanation of this tenth suggestion we shall be glad if you will avoid all "burning questions" as much as possible?—Certainly. What I had most in my mind when I wrote that last suggestion was, the College of Science in Ireland, which with a large staff of professors and a very considerable grant from Government, has nevertheless proved an utter failure. This is a well-known fact; and the reason of it I believe to be that it really was not intended for the working people. It was intended for the higher class. In Ireland the working people are peculiarly sensitive, and their character requires a good deal of study. I believe they thought the College of Science was a place above them—a place intended more for persons who could avail themselves of university education, and therefore they avoided it. The chemistry and other classes held there in the evenings during the winter months had comparatively small attendances. That is one point I may refer to in illustration of my meaning. Another is the School of Art held in the building in which we are now assembled. The School of Art ought to be much more largely attended than it is. The attendance at the classes is very small, owing, as I believe, to a similar cause. If I might be allowed to offer a suggestion, it would be that in establishing a technical school the external appearances, which have really a great deal to do with the success of the institution, should be attended to. The place should be bright and attractive, for really if working people after their day's work see a dull building with dull surroundings, they are afraid and are deterred from going into it.

5718. The difficulty of adopting your suggestion is, that these buildings are available, and the staff already provided, and they are receiving a considerable grant of public money; and it would be difficult to replace them by non-existent buildings and a non-existent staff, and you will note also that the fees of those schools are lower, and that the grants of public money are proportionately higher than in any other part of the United Kingdom?—I am quite willing to admit that, and also that the results are considerably less. I say that is the result of the fear the working classes have of entering those schools.

5719. Do you not think that if the persons who are interested in the progress of technical education would take the matter in hand, they could overcome that fear on the part of the working people, by pointing out to them that there is really nothing aristocratic or exclusive about those schools?—I believe they could; but I believe also that unless

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something of a heroic remedy is adopted, there will be very little use in trying to establish such schools.

5720. What do you mean by a heroic remedy?—I mean that a large and broad effort should be made. In the town of Lyons, in France, which has a population about equal to that of Dublin, the grant to the technical schools is 5,600*l.* a year.

5721. But that is a grant by the municipality and not by the State?—Yes; the municipalities are on a different basis altogether in France from what they are in this country.

5722. I presume you would not wish to wait until you were deprived of the right of nominating your mayor, because you know in Lyons the mayor is nominated, not by the people, but by the Government?—Yes, we are better off, no doubt, in that respect, but not as regards technical education.

5723. (*Prof. Roscoe.*) Do you think there would be any possibility under any circumstances of getting such a sum in aid of technical education from the municipality of Dublin?—I am not prepared to say.

5724. Do you think that something, at any rate, might be made of the Science College of Dublin to popularise it and make it more generally useful in the city?—There might.

5725. (*Chairman.*) Will you kindly consider the matter and let us have your suggestions addressed to our Secretary, at the South Kensington Museum?—Certainly. (*See App. L, p. 388.*)

5726. I may say, by way of parenthesis, that there is no connection between this Commission and South Kensington, except that we find it convenient to have offices there?—I have no objection to it; but I may observe that in Dublin there is a very great fear of South Kensington, a very great objection to it.

5727. Will you please address to our Secretary at South Kensington any suggestions of a practical nature which in your opinion would render the existing institutions more popular and acceptable to the working classes of Dublin?—With pleasure.

5728. (*Prof. Roscoe.*) Will you kindly include in your suggestions, not merely the Royal College of Science, but also the Mechanics' Institution of Dublin?—With regard to the Dublin Mechanics' Institute, I would recommend you, as far so technical education is concerned, to leave it altogether out of account.

5729. That is a question we would wish to discuss and on which we shall be glad to have your opinion—how far the present condition of the Dublin Mechanics' Institution might be ameliorated and the institution itself rendered more effective. If you are acquainted with the circumstances of the working classes in Dublin, could you not include in your remarks any suggestions which might strike you for the purpose of improving the condition of the Mechanics' Institution? You are aware that in England the mechanics' institutions have played and still play an important part in the education of working men?—I am; but the Mechanics' Institute in Dublin is a totally different place from the mechanics' institutions in England; as different as it is possible to imagine.

5730. Will you let us know how you would modify the Dublin Mechanics' Institution or whether you consider it capable of modification?—I do not think it is. I think it should be entirely changed.

5731. Let us hear from you what in your opinion those changes should be; I do not mean now, but will you be so good as to think over the matter and give us your opinion in the statements which you propose sending to our secretary?—Certainly.

5732. (*Chairman.*) Even if you cannot say what could be done to make the Mechanics' Institution a popular school of science, you might suggest the creation of some institution which would fulfil the purpose which, from its name, one would suppose the present Mechanics' Institute was intended to fulfil?—I shall do so.

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5733. Before you leave, I wish to state that we consider all the suggestions you have made as being very practical, unless we except, perhaps, the tenth of which we are not able to judge until we receive some further explanation from you?—I shall be happy to afford it as far as in my power.

5734. You have stated that want of previous instruction should not be an obstacle in the way of artisans obtaining instruction in the technical schools which you would like to see established?—Yes.

5735. The same proposition has been advanced frequently elsewhere—I mean in England?—Yes.

5736. And we have never yet been able to hear of any definite plan by which persons should be enabled to obtain technical instruction who have not previously had some general instruction; and if you can show us how that can be done we shall be very glad; but we are of opinion that you would scarcely succeed in devising any plan by which sound technical instruction can be given without some previous elementary literary and scientific instruction?—I quite admit the correctness of that as regards literary instruction; all I meant to say was, that persons should be received into the classes who have not had any previous technical instruction. I quite admit the propriety of their having had previous literary instruction.

5737. Then what you meant was, that the technical instruction should begin at the elementary stage?—Quite so.

5738. (*Mr. Woodall.*) Are you aware that in Birmingham there are branch technical classes, scattered in various districts occupied by working classes?—I have heard that.

5739. Perhaps you will consider whether some such system as that would be applicable in Dublin?—I will do so. I consider it would be a very good plan.

5740. A number of branch classes in various parts of the city, under the supervision of the central institution?—Yes, quite so. I think that would be most valuable and really the very best method that could be adopted, of establishing a system of technical instruction in this country, namely, by opening a number of branch institutions in those parts of the city where the working classes could conveniently attend them.

5741. (*Chairman.*) You would wish to see the classes established in the midst of the working population?—Yes.

5742. Those classes should be so arranged as to impart primary technical instruction, preparatory to higher instruction, in some central institution?—Yes.

5743. (*Dr. Roscoe.*) The Royal College of Science is in a sufficiently central position is it not?—It is. I think that it might be made most valuable in that respect.

The witness retired.

The Commissioners proceeded at 12 o'clock to visit the Albert Model Farm, Glasnevin, where they were received by Sir Patrick Keenan, K.C.M.G., C.B., Resident Commissioner of National Education; Sir John Lentsigne, C.B., Commissioner; Mr. Thos. Carroll, Agricultural Superintendent; Professor Cameron, City Analyst, and Professor E. Percival Wright, Lecturers in the Institution.

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Mr. THOMAS CARROLL called and examined.

5744. (*Chairman.*) You are the superintendent of the Agricultural Department of National Education in Ireland?—I am.

5745. You are also superintendent of the Glasnevin Albert Agricultural Institution?—Yes.

5746. Will you state as briefly as you can what is the scope of the instruction in agriculture under the national system in Ireland in the first place, and in the second place, what is the scope of the Glasnevin school of agriculture?—I will answer the second part of the question first. The objects of the Glasnevin school are to teach the science and practice of agriculture to sons of farmers and others who are likely to be engaged in agricultural pursuits after leaving the institution.

5747. Over how many years does the course extend?—One; but pupils who pay fees may attend more than one year's course. The year is divided into two sessions of four and a half months each. There are two classes of pupils—*a*, paying fees, *b*, free; those belonging to the first class pay a fee of 7*l.* 10*s.* per session.

5748. You say the year includes two sessions?—Yes. During those two sessions the professors give courses of lectures. First the professor of chemistry and geology gives a course of lectures on agricultural chemistry, and a course of lectures on geology; and Dr. Wright, our lecturer on natural history, gives a course of lectures on botany and natural history. We have also a lecturer on veterinary science who delivers two courses of lectures each year.

5749. The entire course is one year?—Yes.

5750. (*Prof. Roscoe.*) What class are your students chiefly composed of?—Chiefly farmers' sons.

5751. (*Chairman.*) I think you said you had two classes of students?—Yes. One class obtain admission by competitive examination; questions are set to them by the authorities of the school, and the pupils are examined in those questions under the superintendence of the district inspectors, and those who obtain the highest place in that examination are admitted as pupils without fee.

5752. The other class are paying students?—Yes.

5753. State in round numbers how many students of each class you had last year?—We have generally from 40 to 50, of whom 25 are free, and about 20 paying, in each session, but there are besides a number of externe pupils who pay a fee of 2*l.* per session.

5754. What is the number of interne pupils?—Between 40 and 50, paying and free pupils.

5755. Can you give the number of each class separately?—There are 25 places reserved for free pupils, and that number is generally complete; and there are from 15 to 25 paying pupils.

5756. Dismissing the subject of classification altogether, as you have put in papers with reference to it, and as we have also had information on the subject from Sir Patrick Keenan, will you give us an outline of the system of agricultural education in Ireland as connected with the National Board?—In addition to the Albert Institution, I should mention that there is another establishment under the direct management of the Board, associated with a local committee of gentlemen of the neighbourhood. I refer to the Munster National Agricultural and Dairy School, near Cork, which has now been in operation two years, and its success has been very great.

5757. Is that connected with the school at Blarney?—No; there is no school at Blarney. I am sorry to say that the school at Cork has

been confounded with a great many other institutions, and there has been some confusion in the minds of the public with regard to it. As evidence of the class of instruction given to the pupils of the Dairy School, I have got here copies of the questions which were set to the students at the last examination at the Cork school, and some of the papers containing the answers of the students to those questions.

5758. Will you kindly put them in evidence?—Certainly.

(*The witness handed in the papers.*)

5759. Into how many sessions is the course in the Munster school divided?—Two for men and two for women students; the men have two sessions, each extending over four months, and the women two sessions of six weeks each.

5760. Is it a boarding school?—It is. Young women pay three guineas per session, which, as I have said, lasts six weeks. The men pay 7l. 10s. per session of four months. The number of females attending the school has increased very much since it was founded.

5761. Are those the only two schools in Ireland which are purely agricultural?—Yes, as boarding-schools under the National Board.

5762. State shortly what other efforts are being made by the National Board for the agricultural education of Ireland?—I have a list here of 74 national schools that are under local management, for which the teachers receive result fees for examinations in the theory and practice of agriculture.

5763. Are those 74 schools scattered pretty generally over the country?—Yes. They are chiefly in the north-eastern portion of Ireland, but they are pretty well scattered over the whole country.

5764. Are there any in the west?—Yes; you will find the counties mentioned in the list.

5765. Can you state approximately the number of such schools in each province?—There are 27 in Ulster, 17 in Munster, 22 in Connaught, and 8 in Leinster.

5766. Have you any in the County Kerry?—Yes, there are four in Kerry.

5767. Are there any in Mayo?—Yes, seven in Mayo.

5768. In what part of Mayo?—Generally the west; in the north and west of Mayo.

5769. Are there any in the extreme west?—No, not in the extreme west, in the north and mid-west.

5770. Can you state briefly what are the limits of the agricultural instruction given in those schools?—Do you mean as regards the scope of teaching?

5771. Yes?—The teaching is founded on the book sanctioned by the Board of National Education, "Practical Farming," by Professor Baldwin. The programme of education is published by the Commissioners and issued to teachers. I have here the questions that were asked of the different classes at the last results examination, and also some of the papers the pupils gave in.

5772. At what standard does agricultural education commence in those schools?—In the fourth class; the boys are from 10 to 13 years of age.

5773. Do you consider instruction can be effectively imparted to pupils as young as that?—I think so.

5774. Is it the case that plots of ground for educational purposes are attached to those schools?—Yes, to 74 of them, and there is, in addition, a number of schools, about 20 in all, with plots of ground cultivated as gardens.

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5775. I thought you said the total number of schools was 74 in which agriculture was taught?—I said there were 74 schools under local management having small farms attached, the teachers in which receive results fees on examinations of the pupils in the theory and practice of agriculture.

5776. In speaking of 74 schools, you spoke only of those schools to which small farms were attached?—Yes.

5777. But, in addition to those schools, is instruction in agriculture given in all rural schools in the country?—Yes.

5778. Is that compulsory?—It is compulsory at the present time.

5779. You stated just now that, in addition to the 74 schools which have plots of land, which may be called small farms, attached, there are other schools having small gardens?—Yes.

5780. About how many?—About 20.

5781. I wish to have your opinion whether you think it is possible to give instruction in agriculture effectively in any school to which some land is not attached?—I believe it is possible to teach the theory of agriculture effectively in all schools, provided that proper means are afforded to the teacher of acquiring the knowledge himself.

5782. Are you providing any means to enable teachers to acquire that knowledge?—Certainly. Agriculture is one of the subjects upon which the teachers are examined. It is a subject entering into the classification of the teachers, and the Commissioners of Education have opened classes in the Albert Institution, to which the teachers in national schools are admitted two sessions in each year. The teachers in training are also obliged to attend at the Albert Farm twice each week.

5783. What is the length of the sessions?—Six weeks each.

5784. How many teachers have you receiving instruction in those classes in the present year?—About 50. I should state that about 130 teachers have passed through the classes since the opportunity of attending them was afforded.

5785. Has that been in operation only for a year?—No, it has been in operation for two years.

5786. What is the nature of the instruction given to the teachers in those classes?—They are instructed in practical agriculture; they hear lectures in chemistry and botany; and I believe it is in contemplation to increase the number of lecturers in scientific objects connected with agriculture.

5787. Do they work on the farm?—They do.

5788. What is the length of the session?—Six weeks.

5789. They come up, I suppose, during the Christmas and Whitsuntide holidays?—No. The first session is from the 15th May to the end of June; and the next session is from the 1st July to the 15th August.

5790. How do the teachers manage to come up here in May?—The teacher is obliged to find a substitute for his school during his absence, and the Board pays the teacher's expenses to the institution, to and from. They are provided with free board and lodging while in the institution.

5791. At whose expense are the small farms which are attached to the schools cultivated?—At the expense of the teachers.

5792. Have you any safeguard against the teachers employing their pupils on the farms at times when they should be engaged in study?—They are not allowed to employ pupils on the farm during school hours, and I think the country people know that very well, so that the teachers dare not do it.

5793. They would resist it, I suppose, if any such thing were attempted?—Yes. In some cases the managers of the schools own the farms and let them to the masters.

5794. But in no case are the farms the property of, or hired by, the National Board?—In no case of the 74 schools I have mentioned are the farms the property of or hired by the National Board.

5795. Is it not the fact that formerly there was a larger number of schools like the Albert Agricultural School in Ireland?—Yes, I believe so.

5796. Can you tell us approximately, how many such schools there were in former times?—I should say about 20.

5797. How long is it since they were given up?—They were given up at different times; they were not all given up simultaneously.

5798. Without expressing any opinion as to the propriety of these schools having been given up, can you state what was the reason alleged for it?—I cannot, from personal knowledge, say anything on that question, but I think you will find it explained in the reports.

Sir PATRICK KEENAN, K.C.M.G., C.B., examined.

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5798a. Are you able to give us information respecting the reasons for abandoning the model agricultural schools?—There were two reasons alleged for it, one was of a financial, the other of an educational character. The financial consideration originated with the Treasury, who at all times resented the institution of the agricultural schools. The second, or educational consideration was this, that whilst accommodation for resident pupils was afforded in nearly all the schools, the difficulty of inducing pupils to come to them was so great, that many of the schools were absolutely empty; and the Departmental Committee of the Treasury, which sat in the end of 1873 and beginning of 1874, and investigated the whole organisation of agricultural education, accordingly strongly recommended the gradual discontinuance of the schools. A previous recommendation had been made by Lord Powis's Commission to the same effect. The Board, acting on these recommendations, superseded the large agricultural schools from time to time as opportunities occurred.

5799. Were they the property of the Government?—They were; but some of them were held on lease at high rents.

5800. Were they held on perpetual leases?—They were held on leases for varying terms.

5801. I would like to ask you whether under the altered circumstances of Ireland, you think it desirable that a limited number of model farms, somewhat similar to the Albert and Cork farms, should again be established?—I think it would be exceedingly desirable that the experiments on which we are at present engaged in connection with the farm at Cork, and the other, not less important, in connection with this great institution here, should, in the first instance, have a fair and reasonable chance of trial. I should observe that these experiments were commenced a few years ago, when it was thought that agricultural education in large institutions like this and the Cork school was utterly impracticable. However, as a sort of forlorn hope, in co-operation with an influential local committee, we tried an experiment in dairy farming in Cork, and so far it has gone on admirably, and we have tried an experiment here also, in another important direction which is succeeding very well.

5802. You speak of an experiment which is being tried, may I ask you to explain?—An experiment in the way of bringing up the teachers

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from the national schools to receive practical instruction in agriculture ; in fact, restoring the institution to the purpose for which it was originally established. It would take too long to go back to the history of the institution, but you will, I think, find such a history in pretty ample detail in a letter of mine which Lord Spencer has sent to Mr. Jenkins for the use of your Commission. (*See Vol. II., p. 271.*)

5803. Then I gather that the scope of the institution now is somewhat different from what it was when first established?—It was originally established, I may say, briefly, for the purpose of training schoolmasters, who came up from the country not only with a view of obtaining a normal or didactic course of education, but also of receiving instruction in the theory and practice of agriculture. By degrees that was changed, and it became purely an agricultural college for students who intended to pursue agriculture as a livelihood. We are now trying to restore it in some measure to its original purpose. Until, therefore, the experiments we are making at Cork and here have had a fair and reasonable trial, and further, until we see what may be the effect of the rule made a few years ago, that in all rural schools the boys in the fourth, fifth, and sixth classes, should, as a matter of course, receive instruction in the agricultural class-book, I do not think it would be wise to re-establish any of those schools ; but if we succeed here and at Cork, and if we succeed in the experiment of giving a good elementary knowledge of agriculture to the boys in the rural schools, in the classes I have mentioned, then I think we might fairly be in a position to reconsider the question of re-establishing institutions of this kind in different parts of Ireland.

5804. On that matter I would like to ask you two or three questions ; in the first place I wish to know whether you consider that the rule you have laid down with reference to agricultural instruction in the rural elementary schools is working well?—Well it is improving, but it is not working to our entire satisfaction. As I have observed, instruction in agriculture is now compulsory in rural schools with the boys of the fourth, fifth, and sixth classes. Last year there were 44,493 boys liable to examination in those rural schools, and of those, 21,135 or 47·5 per cent. passed. Relatively, that is unsatisfactory compared with the measure of proficiency in other subjects of education ; for instance in reading, 92 per cent. passed ; in writing 94·7 ; in arithmetic (in which our examinations are pretty stiff) the percentage was 76·6 ; in spelling 82·4 ; in grammar 63·3 ; and in geography 62·3 ; so that relatively our agricultural classes are not in the same condition of efficiency ; but we need not be much surprised at this when it is remembered that it is only within the last few years that the subject of agriculture has been introduced as a compulsory subject.

5805. I suppose you will say also that the new scheme of bringing up the teachers themselves to be instructed at the central institution will tend to improve the future efficiency of the classes?—Enormously ; I may observe with regard to this experiment of bringing up the teachers, that when we designed it, the purpose we had in view was simply to give them such instruction as would enable them to teach intelligently the little book on agriculture which is the text book in the schools. Our ambition is really nothing more than that, but while doing what we can to accomplish that, we manage also to give them the great advantage of hearing scientific lectures from our eminent professors, and of imparting to them a good thorough practical instruction on the farm through the expository teaching of Mr. Carroll and his assistants.

5806. The second question I wished to ask you was, whether you think your elementary school teachers generally have sufficient education

to profit by the instruction they receive here?—I think so. As Mr. Carroll has observed, agriculture is a subject which enters into the examination of a school master for his classification, and whether he likes it or not, he is obliged to know it. But by coming here and seeing the actual processes of agriculture, and hearing the principles of the science explained by the professors, the probabilities are that he will like it, as well as know it.

5807. When you say that it enters into his classification, is it necessary that he should pass in agriculture in order to obtain his certificate?—It is absolutely necessary.

(Mr. Carroll.) If you will allow me, I will hand in a list of the questions asked at the last examination for classification of teachers. The total number examined was 1,028, of whom those who made 60 marks and upwards were 26·75 per cent. of the entire number; 40 marks and under 60, 30·25 per cent.; and below 40 marks, 43 per cent.

5808. What is the maximum number of marks?—One hundred.

(Sir Patrick Keenan.) With regard to the question which was put just now, I should state that no male teacher can be employed even as an assistant in a national school who does not pass an examination in agriculture. When we tried this experiment of introducing agriculture as an obligatory subject in the ordinary national schools, in order to give an increased stimulus to the teachers, we, with the sanction of the Treasury, increased the results fees, and now the fee is 4s. in the 4th class for agriculture, the highest fee in any other subject being 2s. 6d.; 5s. in the 5th class, the highest fee in any other subject being 2s. 6d.; and 5s. in the 6th class, the highest fee in any other subject being 3s.; so that we are making every effort to encourage the study of agriculture and even to make it a paying subject to the teachers.

5809. The third question I wish to ask is, whether the National Board has at all contemplated establishing schools of the type of the Albert School, but which should not be boarding schools?—That has never entered into the contemplation of the Board.

5810. Do you mean that you have rejected it, or that you have never considered it?—I cannot say that it has never been considered, but it has never been attempted.

5811. Are there any valid reasons against it?—Well, the failure of those model farms in different parts of the country I have no doubt influenced the action of the Board a good deal in not contemplating an experiment of that kind.

5812. One would suppose that it would be much less expensive, or at all events, somewhat less expensive, if you did not make them boarding schools?—It might be natural to suppose so; but I do not think that any plea of comparative inexpensiveness would have attracted the favour of the Treasury to the agricultural system. In point of fact, we had been carrying on in the village of Glasnevin, an experiment on lines, very faintly analagous to your non-boarding idea. It was a very small affair but this was its history. A garden of three acres was attached to the ordinary village national school, which was the sole property of the Commissioners, and it was cultivated almost entirely by the boys of the school. Arrangements were made by which little plots were assigned to different sets of boys, and the produce of those little plots was distributed amongst the boys. However, the Treasury had a decided objection to the continuance of the agricultural department of the school. The Board, on the other hand, expressed a unanimous opinion that the experiment, being, as they believed, a valuable one, should be continued, but the Treasury replied in very decided fashion that it

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Sir P. Keenan, K.C.M.G., C.B. should not. The Board with equal vigour returned to the charge, and declared that they had resolved not to abandon it. The Treasury, however, had the ready means of defeating the intentions of the Board, for they refused to insert the cost of its maintenance in the estimates.

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(*Mr. Carroll.*) It is in my mind to recommend to the Board a system such as the Chairman speaks of, that encouragement should be given to schools where agriculture would be taught efficiently, and in the neighbourhood of which pupils might get lodgings; something similar to the system in operation in schools I have recently seen in Denmark.

5813. You are speaking of the higher grade schools?—Yes.

5814. (*Mr. Woodall.*) I should like to ask a question in reference to what has been mentioned about the resistance of the Treasury to the experiment of school gardens; whether the general experience was that such gardens resulted in any profit, or was there a charge occasioned by them to the department?—Generally the result was a profit.

5815. Is the teaching of agriculture compulsory in all rural national schools?—The teaching of agriculture in schools depends upon the wish of the managers of the schools or the school teachers; but when once they are placed under the Board they are obliged to conform to the rules of the Board.

5816. (*Chairman.*) I observe that the number of schools to which farms are attached is only very small at present, compared with the number of schools in Ireland?—Yes.

5817. I wish to ask you whether in your opinion it would be desirable for the National Board to take any action in order to encourage the managers and teachers to attach farms and gardens to the schools?—I think it would, and I have had it in my mind to recommend the Board of Education to increase the fees now paid for the teaching of practical agriculture. I am convinced teachers do not make the profit they might do as ordinary farmers, in consequence of their time being taken up with school teaching, and in order to make the teaching of agriculture more effective, additional fees would be required.

5818. Do I understand that you propose that a higher result fee shall be paid in those cases where there is a farm attached to the school than where there is not?

(*Sir Patrick Keenan.*) That is the case at present.

(*Mr. Carroll.*) Yes. There are two sets of fees paid to the teachers of those schools; one set of fees being for the proficiency of the boys, the other for results on the farm.

5819. (*Prof. Roscoe.*) How is the practical proficiency of the boys tested?—They are taken out on the farm and examined carefully on its working and management.

5820. By the teachers?—No. They are examined by myself and by the literary inspectors.

5821. Do you go down to the schools for the purpose of holding those examinations?—I do.

5822. (*Mr. Slagg.*) Do you consider that, under the impulse of those schools, the practical knowledge of agriculture is increasing satisfactorily in Ireland?—I believe the schools have been very serviceable in that respect. I have not been sufficiently long in my present office to be able to form an estimate of the improvement attained, but the result of my examinations of the schools has been upon the whole fairly satisfactory, and the pupils who have come under my examination show a fair amount of knowledge of the theory and practice of agriculture.

5823. (*Chairman.*) Are you the only inspector of agricultural instruction?—At present I am the only one inspecting agricultural schools.

5824. I suppose you contemplate the necessity of getting assistance if the number of schools to which farms are attached should increase very much?—If they increased very much, assistance would be required.

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5825. The 74 farms and the gardens at present in existence you are able to manage yourself?—I do not examine gardens. They are examined by the literary inspectors.

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5826. (*Mr. Woodall.*) I wish to ask whether any teaching in dairy work is given to girls in primary schools?—I mean to recommend it, and I hope the Commissioners will see their way to giving results fees for such departments of agricultural instruction as would be useful to females.

5827. (*Chairman.*) I think you mentioned that girls are admitted to the dairy school in Cork?—Yes.

5828. Are the literary inspectors who examine the garden schools acquainted with agriculture?—They are expected to know the subject of agriculture.

5829. (*Mr. Magnus.*) As a matter of fact, are they acquainted with it?—Yes. I have met a good many of the district inspectors, and have had conversations with them, and I find they have an intelligent knowledge of the subject.

5830. (*Mr. Slagg.*) Do you consider that there is very great room for improvement in the agricultural knowledge of the Irish people?—Certainly.

5831. Is such knowledge in a backward state at present?—It is. I believe the teaching of agriculture in the schools would have a considerable tendency to improve the minds of the people generally, and that those persons who have to subsist by agricultural pursuits would derive great advantage; it should also make more intelligent labourers and more intelligent artisans.

5832. In your opinion is the productive power of the country less than what it ought to be?—Very much less.

5833. It is less than what it probably would be under an improved system of education?—Much less. Any one going through the country and seeing the way in which the simplest and most ordinary agricultural works are done, will be satisfied that a very small amount of agricultural and scientific education would have the effect of greatly improving the modes of farm labour, rendering them much more effective and promoting an economy of labour also.

5834. (*Chairman.*) I want to ask your experience, if you have had any experience, either personally or by report, of the prize scheme instituted by Lord Spencer some years ago for encouraging the improvement of small farms?—I have no personal experience of it, but I have read the reports, and I believe such a scheme might be made very useful, but it is a matter that would require careful administration. There are elements in it which if judiciously worked might be made extremely useful, but if hastily or carelessly carried out, it would do more harm than good.

5835. Does Lord Spencer continue it still?—No, it has been discontinued.

(*Sir Patrick Keenan.*) Not discontinued. Lord Spencer when introducing the scheme expressed his intention of continuing it for five years, which expired long ago. I should mention that it was carried on entirely at Lord Spencer's own cost.

5836. (*Prof. Roscoe.*) It was not taken up by any other person?—(*Mr. Carroll.*) No.

Sir P. Keenan, 5837. (*Chairman.*) It was not taken up by any of the agricultural societies?—No.
K.C.M.G., 5838. Does the Royal Agricultural Society offer prizes for the best
C.B. kept farms?—No. It has offered prizes for labourers' cottages and land
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5839. I presume you are aware that the Royal Agricultural Society of England offers prizes for the best cultivated farms?—Yes, but it is not an institution of the Agricultural Society. It is generally done by the localities in which they hold their shows.

5840. The prizes are contributed by the local committees, and the Royal Agricultural Society awards them?—Yes

5841. Do you think there is any prospect of the same thing being done by the Royal Agricultural Society of Ireland?—No, there is very little probability of it. I am very sorry to say the connection between the agricultural societies here and the people is not at all so intimate nor so beneficial as in other countries, for example in Denmark. There the people generally subscribe to the societies. The societies have a great deal of influence and effect a vast amount of good in consequence.

5842. The small farmers take an interest in the societies?—Yes.

(*Sir J. Lestaigne.*) I may mention, in reference to the question asked with regard to the prizes offered by Lord Spencer, that several noblemen in various parts of the country give prizes for the best managed farm in their respective localities. Amongst those who do so are Lord Fitzwilliam, the Earl of Bessborough, and the Marquess of Headford. I think Lord Erne has done the same thing at Lisnaskea.

5843. What has been the effect of those prizes upon the people in the locality?—Very good. At Lisnaskea especially it has been very good.

5844. Does it cause small farmers to take a pride in the careful management and good order of their farms?—(*Mr. Carroll.*) It does, undoubtedly. I think there is a greater effect due to the personal influence of a resident landlord or agent of an estate, than even to the prizes. The influence of a sensible resident landlord or agent is generally very useful.

5845. Are separate accounts kept for the farm of Glasnevin, apart from the college as a teaching establishment?—Yes.

5846. What are the results?—The profits have increased from 200*l.* in 1877, to over 1,000*l.* in 1882.

5847. On how many acres?—About 180 acres. I can give you an abstract of the accounts, taken from the books.

5848. In the profit you have mentioned after paying rent?—Yes. The rent is 723*l.* a year.

5849. I suppose your profit arises in a great measure from the fact of being in the vicinity of Dublin?—Yes. The milk produced on the farm is sold at a high price.

5850. In fact, it is more an accommodation than an ordinary farm?—Well, I do not think you can call it so. It is managed upon principles on which a farm at a distance from Dublin could be managed. It is not managed merely as a suburban farm. The rotations are rotations applicable to the various circumstances of Ireland. I should mention that there is on this farm a very useful institution, a small farm of about six acres, cultivated just as a farm of that size should be cultivated in the country. This farm supports four cows all the year round, which is a great deal more than the average land of Ireland at present supports. The rental value of that farm has been increased by over 100 per cent. in consequence of the high system of farming pursued on it during the past 20 years.

5851. (*Mr. Woodall.*) Have you tried the system of ensilage?—Yes.
 5852. What is your opinion of it?—Quite favourable. I believe it has elements of great success. We are at the present time engaged in building a large silo.

5853. (*Mr. Slagg.*) What share of importance is attached to the system of green cropping and home feeding?—I believe that for a large extent of Ireland, a system of home feeding would be very serviceable.

5854. Is it largely adopted in the country at the present time?—No, not nearly so largely as it ought to be. In my opinion home feeding, if adopted over a large portion of Ireland, would be very beneficial.

5855. Do you think a reform might be introduced in regard to the introduction of that practice?—Yes.

5856. Is it, in your opinion, a point worthy of considerable attention?—I think it is; but it would necessitate a large outlay in buildings in various parts of the country.

5857. (*Chairman.*) It would have to be done by degrees, I suppose?—Yes.

5858. Do you dwell on that point in the course of instruction you give in the schools and colleges?—We do. A remarkable illustration of the utility of the system is this, that, by its means, the small six acre farm now makes a profit of about 100*l.* a year.

5859. Is attention to it enforced in the national schools?—Yes; and I should say it is recommended in the books which are used in the schools.

5860. In the text books?—Yes.

The commissioners then proceeded to view the several departments of the farm, accompanied by Sir Patrick Keenan, Sir J. Lentaigne, Dr. Cameron, Professor Wright, and Mr. Carroll.

5860a. Mr. Carroll, on the subject of the experimental station attached to the farm, said: The experimental station attached to the farm of the Albert institution was established about ten years ago. It is devoted to carrying out experiments of interest to agriculturists, reports of the results being from time to time published by the Commissioners of National Education. The plot of ground at the present time contains experiments on manures applied to grass on the principle of the celebrated Lawes and Gilbert investigations at Rothamstead; also experiments on manures in potato cultivation, and investigations as to measures recommended for adoption in the prevention or mitigation of potato disease. New varieties of potatoes obtained from the seed of the apple are now in course of development, and a system of cultivating the potato devised by M. Jensen, in Denmark, which is said to possess remarkable merit in averting or mitigating the disease, is on its trial. The principle of the system is based on the assumption that the disease germs or fungus spores are carried in the air, to the potato foliage, from which they are washed to the earth, and reaching the tuber, cause the disease. M. Jensen conceived the idea that, if he protected the young tubers from the washing down of the disease-producing spores, the crop might be made tolerably safe, and that by bending over the tops so that the foliage would discharge the spores into the space between the potato drills, those spores could not reach the tubers. This theory has been tried in some places with varying success. A matter at the present time interesting us is the influence of kainit or potash salts in the cultivation of the potato. Valuable results are obtained through its

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use on soils deficient in potash. A very interesting matter for the scientist is observable in the plots where kainit is used. In all cases where kainit is applied, the colour of the foliage is very much affected, being much lighter, and the well known property of nitrogenous manures in darkening plant foliage is considerably modified by the use of kainit or potash, in conjunction with nitrogen. A simple system of experimenting with manures, singly and in combination, is also in operation on the farm. By applying the manures in the direction of the length of the drill, and then crossing the drills with the same manures in bands, we get several combinations together with duplications, which are desirable in all experiments. Experiments on the growth of turnips with soluble and insoluble phosphates were made last year. The results of these experiments are carefully recorded, and are always available to the pupils.

Subsequently, the Commissioners proceeded to the National Model and Training Schools in Marlborough Street, where they were received by Sir Patrick Keenan, K.C.M.G., C.B., Resident Commissioner, Dr. Newell, C.B., Secretary, Professors O'Sullivan, Corbett, Joyce, and Doherty, by whom they were conducted through the various schools and departments of the institution, after which—

Sir PATRICK KEENAN, K.C.M.G., C.B., was further examined, and gave the following evidence :—

5861. (*Chairman.*) You are Resident Commissioner of National Education for Ireland?—I am.

5862. How long have you filled that office?—Since 1871.

5863. I believe you were previously one of the Commissioners?—I was Chief of Inspection.

5864. What is the total length of your service in connection with the Education Department?—Thirty-eight years.

5865. Your experience therefore is very considerable, and you are able to compare the present with the past?—Yes.

5866. I believe you have considered the question of technical instruction very carefully?—I have, as far as my opportunities have enabled me to do so, in different countries.

5867. You have come to conclusions on the subject, which you have embodied in a memorandum to the Lord Lieutenant?—I have.

5868. You will put in a copy of that memorandum for the information of the Commission?—With pleasure.*

5869. I believe I am right in the supposition that you consider that there is an intimate connection between the ordinary instruction given in schools and technical education?—I think technical instruction should be part of the ordinary education given to a child in his school course. You have observed it in the school which you have just visited. It begins with the infant at the Kindergarten school, and is continued at every successive stage of an ordinary primary education; the better the child is prepared in the elementary school, the more successful he will be afterwards in any higher technical education he may attempt.

5870. Do you think such instruction desirable for those who will not have in after life to follow manual occupations?—I do. I consider it desirable that everybody, from the peer to the peasant, should be taught whilst at school to be "handy," so as to be able in after life to turn to account any little training he receives in childhood.

* See page 141.

5871. Such instruction is of course especially valuable for those who have to gain their livelihood by manual labour?—Certainly. It is especially valuable to that class. *Sir P. Keenan, K.C.M.G., C.B.*

5872. You, as representing the department, are fully alive to the utility and necessity of technical education?—Quite so. 8 June 1888.

5873. Confining ourselves to elementary technical instruction, you have shown by what you are doing that you consider it ought to begin at the very earliest age?—I am strongly of that opinion.

5874. Omitting the intermediate steps, you are of opinion also, I believe, that it would be useful to teach the use of tools in all elementary schools?—I have a strong expectation that we shall in the course of a few years be able to take a step in that direction in all our ordinary schools through the country. When those young men of the Training College whom you saw here to day at work return to their respective schools, able, as I hope they will be, to impart to the classes under their care the instruction they have received here; we intend to devise a scheme of results fees payable for proficiency in the use of tools. At present every girl in the national schools is taught needle-work. Every schoolmistress must pass an examination in needle-work, cutting out, and all that, before she can obtain the ordinary certificate to become a schoolmistress. The girls in that respect are well provided for. I will also add that I think on the whole the proficiency of the girls in the ordinary national schools in needlework, even in the remotest parts of the country, is very creditable.

5875. If we should be told by any one that the attention of the girls in national schools is more directed to fancy work than to plain work, would you think the statement was a mistake?—I should say it was a great mistake, for I at once turn my thoughts to remote parts of Ireland, say Galway, Mayo, and Donegal; the opportunity for high adornment in work does not present itself in those districts, and the children are confined, in their school exercises, entirely to ordinary sewing and cutting out.

5876. Do you believe more is done now in the way of teaching needle-work to girls than was the case in past times?—Certainly; because we are most rigorous, in seeing that the subject of needle-work is attended to. If an inspector reported that in a girls' school he found reading, writing, and arithmetic superbly taught, but that needle-work was neglected, we would either refuse results fees altogether, or cut them down to such a degree as to frighten the teacher and make her attend better to the needlework for the future.

5877. Do you consider your inspectors competent to form a judgment on the proficiency of girls in needlework?—Certainly. It is a simple matter.

5878. Have you ever had the assistance of ladies in the matter?—When our inspectors have been conducting the examination of the pupils of Model Schools in needlework and cutting out, it was a common practice to submit the articles to a jury composed of some of their lady friends.

5879. You say it is incorrect to state that the girls in ordinary national schools are taught ornamental and fancy work, and that useful work is neglected?—Certainly. The statement comes upon me quite by surprise, for, as I have already stated, in most of the schools, especially in the districts I have now in my mind—Galway, Mayo, and Donegal,—there is little or no opportunity for indulging in that high style of work.

5880. Is it the case in other districts—in Dublin, for instance?—I have not observed it. I have been in great numbers of the large schools, and while they attach importance to that higher class of work—

Sir P. Keenan, and very properly in my opinion—nine-tenths of the work, however, is the ordinary mending, sewing, cutting, and stitching. Allow me to draw attention to the results of this branch of instruction last year; of 136,065 girls examined for results fees in needle-work, cutting-out, &c., 128,843 passed. That is 94·6 per cent. I hold it that such a percentage does not represent failure.

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5881. If the inspectors are competent?—Oh, the inspectors are quite competent.

5882. Of that you have no doubt?—I have no doubt in the world about it. Every new inspector, before he starts on his work, has to pass a considerable time in training, under the guidance of experienced inspectors and head inspectors, and he is on probation for about a year before we place him in charge of a district.

5883. And in that way he becomes acquainted with needle-work?—He becomes acquainted with the satisfactoriness or unsatisfactoriness of the value of the needle-work done by the children.

5884. Proceed now with the parallel you were about to draw between the technical education of girls and boys?—As I have already stated, of the total number of girls examined, 94·6 per cent. of them passed so satisfactorily as to earn results fees for their teachers in this subject of needle-work. But there is no corresponding technical subject for boys, unless we turn to agriculture, and instruction in agriculture is limited to the three higher classes. I told you at the farm to-day the numbers examined last year in agriculture and the numbers that passed. Our success up to the present is not as great as we hope it will be by-and-by; but *that* agricultural education, at all events, is our limit of technical education for boys. Now, I hold it that every boy ought to be taught to be handy. If he has been taught to be a thorough master of his fingers, hands, and eyes, then no matter what he turns to in after life, whether he is a labourer, a tradesman, or engaged in any higher occupation, that early training will be of service to him.

5885. I believe your attention has been directed to those portions of our First Report bearing on this subject?—Very much.

5886. And also to some of the principal technical schools on the continent?—Yes, in various countries. In 1878, as Commissioner on behalf of the Secretary of State for the Colonies, I made an inquiry into the primary, intermediate and university education of Malta. In the primary schools I found an attempt at technical instruction. I found that printing, wood-carving, chip basket making, and other occupations were taught. The success was not very great, but I was of opinion that, with a little enthusiasm and perseverance, real success might be attained. The subject has been simmering in my mind very much since that time, and I have come to the conclusion that we ought to try instruction in some sort of handiwork in our Irish National Schools. We have accordingly begun it in the way you have to day seen in our Training College.

5887. I understand you have only begun it within the last six weeks? For about six weeks or two months. It took a long time to prepare for it. I was for many months in great difficulty about getting a man to undertake the task. At last it occurred to me that the carpenter whom we employed on the establishment under the Board of Works might be able to work the thing. I sent for him, found him very intelligent, and engaged him on the understanding that at the end of the year, if the experiment be successful, we should recommend him to the Treasury for some special honorarium. He has no salary at present.

5888. The plan of instruction is for the present tentative?—Entirely tentative.

5889. As I understand, you do not intend to teach trades?—No; you have in your question exactly represented what is passing in my mind, that any attempt in an ordinary day school to teach boys a particular trade would neither be practicable nor desirable, but that the object should be to train them, for instance, in lineal drawing and in such practices of “handiness” that when they become apprentices to trades, whether carpenters, bricklayers, or stonemasons, &c., they will be sure to learn their trades with comparative ease, and become successful in them afterwards. If we do that I think our function is properly fulfilled.

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5890. Without pledging yourself definitely on the subject, do you think that if voluntary efforts were made, especially in poor, congested districts, to teach trades, facilities might be granted by the National Board, as, for instance, by permitting the use of your vested schoolrooms for the purpose and in other ways encouraging and assisting the experiment?—Decidedly. We are constantly doing that. Some years since when there was a good deal of distress in the country, some benevolent Scotchmen came to Donegal and started embroidery and various other industrial occupations suitable for girls and young women. We not only authorised the use of our schools by the girls and young women, anxious to attend the classes, where these occupations were pursued before and after school hours, but we admonished our teachers to be civil to them and to co-operate with them in every manner possible. Of course we shall always be prepared to do anything of that sort.

5891. The system of payment on results, I think, you say you would rather reserve?—I would rather reserve it, but I have it strongly in my mind that we shall be able to organise a system of payment by results for *handiness*.

5892. Do you consider it probable that something of the same kind may be done in the schools belonging to the religious bodies?—Certainly. The board is in connection with a vast number of convent schools; and I venture to say that in no part of the world would you find needlework, and cutting out, embroidery, and, in some instances, lace-making, taught with more exquisite taste or with greater success than in these schools.

5893. Is the impression a mistaken one that the fact of religious emblems being used in the schools of those religious bodies has prevented them from placing themselves under, or from being accepted in connection with, the National Board?—There are some orders in the country, especially the Christian Brothers, who desire to have entire liberty in the use of emblems and books, and also to be free from official inspection, and such orders do not approach us. Any community, whether of monks or nuns, that approaches us must conform to our rules, and one of those rules is that during the ordinary hours of secular education there must be no religious emblems exhibited.

5894. What is the reason for which that rule was established?—It is a very ancient rule of the Board, and its object was to enable children of all denominations to frequent every National School in the land.

5895. I wish to ask you, whether in those cases in which the schools are purely denominational, from the fact of their having no minorities, you think that rule might be relaxed with advantage?—It would be only natural and reasonable to think so, but you can never guarantee that a school will not have a minority to-morrow. In about 50 of the convent schools, there were Protestant minorities last year.

5896. Then we are to understand that there are some schools, known as convent schools, which receive grants from the National Board?—Yes, upwards of 200. I may mention that the Christian Brothers were

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in connection with the National Board until 1836, but that they then separated from it on the grounds I have mentioned; they objected to official inspection, they wished to use books of their own, and to be at all times of the day without restraint on any religious considerations.

5897. Do you consider that the fact of those schools not being in connection with the National Board militates much against the efficiency of the national system of education in Ireland?—Only against its comprehensiveness. We have a million of children at the National Schools. If we embraced the Christian Brothers' schools we should have thirty or forty thousand more. I wish we could embrace them for the Christian Brothers were the *avant garde* of the reformers of primary education on the Continent, and, I may add also here in Ireland.

5898. You are aware, no doubt, that according to the regulations in force in England, it is possible for a voluntary school to receive no grant and yet to have the benefit of Government inspection on application?—Yes, subject to the observance of the conscience clause, and all the other provisions of the code.

5899. You would not object to inspect schools though not in connection with you?—Well, that is a very important question. For instance, the industrial and reformatory schools are a separate organisation and are not under our jurisdiction or inspection.

5900. But are they inspected?—They are inspected by their own inspector.

5901. The reason I ask the question is this, that if compulsory attendance should be introduced into Ireland, it would be necessary that you should be able to certify that certain schools were efficient, although they might not be in union with the National Board?—Personally I should not have the slightest objection to allow the inspectors of the Board to inspect a school not connected with it. I think it would be pedantic to refuse an official inspection in any case where we were invited to aid a good work; but that is my private opinion, and it may not be the opinion of the whole Board.

5902. That is your opinion?—Yes, and I have expressed it to the Commissioners on Reformatory and Industrial Schools. The same question turned up at their recent inquiry, that is, whether our inspectors might not inspect those schools.

5903. With regard to your inspection, I believe you have a number of inspectors who take districts?—Our inspectors consist of two classes, district inspectors and head inspectors. Every district inspector has a district containing a certain number of schools—about 120 or 130 on an average—under his direct control, and his business is to inspect every school in his district at least once, but if possible, three times a year. He is consequently very much brought into association with the teachers and managers, and is mixed up more or less with the general operation of the schools in his district. We have, besides the 66 district inspectors, six head inspectors, each of whom has 10 or 11 districts in charge, and whose chief function is to see that the district inspectors discharge their duties satisfactorily.

5904. The head inspectors have charge of what the English inspectors would call a diocese?—We call them circuits. Whenever a case of breach of rule or any serious irregularity occurs in a school the district inspector is requested in the first instance to report on it. If the Board look upon it as a very important case, the head inspector is sent to inquire into it in association with the district inspector, and in that way the Board become well informed through the two officers of inspection upon all important cases. Another function which the head inspector

has to discharge is to see that uniformity of ideas exists amongst the inspectors, especially in the examination of the children and the standard of the questions put to them. In order to bring that uniformity about, we have adopted the plan of bringing the head inspectors to Dublin once a year, to debate amongst themselves the details of the duties of an inspector, and their conference usually ends by the actual inspection of a school in all its details, going through the process as if a school in a remote part of the country was being inspected.

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5905. You are speaking of the head inspectors?—Yes. When they break up their conference and return to their respective circuits, they in turn invite their suffragan inspectors to assemble in conference upon all essential points of duty, but especially upon the question of a proper standard of questions for the children; and again there is an inspection of a school, under the guidance of the head inspector, conducted by one or other of his suffragan inspectors. In that way we hope always to maintain something like a uniformity of standard.

5906. You believe that that system ensures a uniformity of standard through the country?—It does so to an enormous extent. When one takes up a book of statistics and finds that of the whole number of children examined last year 76·6 per cent. passed in arithmetic, of course that represents the opinion of the 66 district inspectors founded on their examination of 376,070 children, but we believe it to be correct in consequence of the pains we take to ensure a uniformity of standard. Some inspectors might be regarded as easy markers, others might be regarded as hard markers; but I have always proclaimed to the inspectors that what we want is neither hard nor easy markers but just markers.

5907. Do your district inspectors remain for a long time in one district?—Sometimes it is for the public interest that a man who has special local knowledge and who may have various other personal advantages should be permitted to remain in a district a considerable time; but that does not occur often.

5908. What is the rule as to that?—There is no rule. It is entirely a matter of discretion. Sometimes we remove an inspector in the public interests, when he has been only five or six years in a district, sometimes even less. It is a great break up to an inspector in his household arrangements to be removed from his district, and accordingly it is not to be done unless there is some considerable public advantage to be gained from it.

5909. How many district inspectors have you?—66.

5910. How many visits is a district inspector supposed to pay to each school in his district every year?—There must be one full inspection of every child in the school who has made the requisite number of attendances. We, however, expect two other visits, although of minor importance, to be paid to each school.

5911. Do you say each head inspector visits every school in his circuit?—No each head inspector visits each district in his circuit, and visits some of the schools in each district. That reminds me that I should add to my previous answer on the uniformity of standard, that it is the duty of the head inspector either to follow a few days after, or to precede by going a few days before, the inspection of a school by the district inspector,—the head inspector thus makes a thoroughly independent report, and when he sends it up to us, we compare his marks with the marks of the district inspector, made either a few days following or preceding.

Sir P. Keenan, 5912. He does that with some school in each district?—Five or six
K.C.M.G., schools in each district.
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8 June 1883. 5913. Have you surprise visits?—Yes. We call them incidental visits. No inspector does his duty satisfactorily who does not make them by the score.

5914. We have only seen as yet the Report for 1881 laid on the table of the House of Commons, giving the results for the year 1881. I hope the Report for 1882 is about to be shortly presented to Parliament?—I believe it will be presented to-night.

5915. Are you able, comparing the results of last year with those of previous years, to say whether there has been an improvement?—Yes, there is a decided improvement all round, as shown by the inspectors' reports. But we are able this year to present a most interesting feature in our report, that is a statement of the decrease of illiteracy in the last decade. I have here, before me, a table in which the illiteracy in 1841, 1851, 1861, 1871, and 1881, is represented.

5916. Is that from the Registrar-General's reports?—From the Census reports. It is as follows:—

Percentage of the population five years old and upwards who could neither read nor write—

In 1841	-	-	52·7
In 1851	-	-	46·8
In 1861	-	-	38·7
In 1871	-	-	33·4
In 1881	-	-	25·2

Now, I think, that is a very gratifying and remarkable statement. You will observe that during the last decade the improvement has been 8·2 per cent., which is the largest that has taken place in any decade, and it is also gratifying to find that the improvement is considerable even in the remotest counties.

5917. Is there a similar return for children of school age, for the return you have read applies, I presume, to the entire population?—It applies to the entire population.

5918. Of course if you took the children of school age only the returns would be much more favourable?—I thought it of importance to take the trouble of adding up the number of illiterates from 16 to 20 years of age, as we to a certain extent are responsible for their education, and I find that—

In 1861, of the portion of the population from 16 to 20 years of age, the number of illiterates was	-	-	-	27·3 per cent.
In 1871	-	-	-	17·5 per cent.
In 1881	-	-	-	12·4 per cent.

These figures will appear in our report. I may observe that this great improvement extends to every part of Ireland, even to the remote districts. For instance, in the county Galway, in the year 1841, the illiterate part of the population comprised 76·6 per cent.

5919. That is of the entire population?—Yes, of those five years old and upwards. Now it is down to 45·8, and considering the enormous difficulties we have had with regard to national education in the West of Ireland, I hold that to be a very respectable return.

5920. Have you a return of the population between 15 and 20 in Galway?—I have not. There is one of the Connaught counties bordering Leinster, I mean Leitrim which has had very considerable

opportunities in the way of national schools, and tolerably well-conducted schools, and it shows a remarkable contrast to Galway, for while in Galway, as I have just said, the illiterates were 45·8, in Leitrim they were only 22·5 per cent. in 1881.

5921. Has there been any marked improvement of late years in the number of children in the upper classes?—A very considerable improvement. At present in the fourth, fifth, and sixth classes, we have 24 per cent. of the entire number of children attending school. I cannot at the moment recall what it was in former years, but it was very small compared with that.

5922. Do you consider the introduction of the system of payment by results has contributed materially to the improvement of elementary instruction in Ireland?—I think the greatest educational blessing that ever befel Ireland was the introduction of that system.

5923. Do you think the country is now ripe for the further step, already taken in England, of requiring the compulsory attendance of children at school?—I have already expressed my opinion publicly on that matter. I think the time has come when a modified system, which would be suitable to the circumstances of the country, might be adopted.

5924. Do you hold that it would be possible to adopt such a system at once in the remote districts, or that you should proceed by degrees? You are no doubt aware that it was done very tentatively in England, until at last we made it compulsory all round. Do you think it would be advisable so take corresponding steps in Ireland?—Certainly, I think it would be rational to do so.

5925. You would not at once introduce the compulsory system over the country?—I would not at once render it obligatory in any district where the means of education did not fully exist, and adequate means of education, I may say, do not exist at present everywhere in Ireland. No satisfactory system of compulsory attendance at school can, however, be adopted for Ireland until a law is passed compelling landlords to give sites for schools.

5926. You are aware that there is such a proposal now?—It has been under consideration a long time. I think such a provision ought to form part and parcel of any Act enforcing attendance at school. The two ideas were certainly associated in Mr. Forster's great English Education Act of 1870.

5927. With respect to salaries of teachers I believe that there has been a considerable improvement in their salaries in consequence of the system of payment by results?—A very considerable improvement.

5928. The proposal that the Boards of Guardians should contribute has been a failure?—It has been a great failure. Out of over 160 unions in the country, 63 or 65 became contributory soon after the Act was passed, but the number at present is only 22.

5929. What is the average contribution?—Last year the total contribution of the unions then contributing was 11,000*l*.

5930. To how many schools?—About 1,000.

5931. That would be an average contribution of 11*l*. a school in the few unions that contributed?—Yes.

5932. Is there any table of the salaries of schoolmasters and mistresses?—Yes, there are three classes of teachers, each of which has its own salary attached to it. The classification is determined partly by the

Sir P. Keenan, scholarship of the teacher, but to a large extent by the schoolmaster-
 K.C.M.G., ship he may exhibit. The income of a teacher is derived from three
 C.B. sources; his class salary, which is fixed; results fees, which depend
 8 June 1883. upon his efficiency as a teacher; the school fees of the pupils and local
 contributions which depend upon his popularity and efficiency. In our
 Report for 1881 we gave a table of the average incomes and the number
 of the principal teachers under the various heads:—

	£	s.	d.
100 first class male teachers, average income	-	149	17 4
330 second of first class	-	103	8 6
1,537 second class	-	80	14 10
1,761 third class	-	61	10 10

Then as to the female teachers, the numbers are as follows:—

	£	s.	d.
75 first of first class female teachers, average income	114	15	0
255 second of first class	-	84	7 6
1,003 second class	-	67	7 8
981 third class	-	52	7 4

Then there are assistant teachers, but as they are to a large extent simply apprentice teachers, and are paid on altogether different terms and conditions from the principal teachers, their income should not be brought into average with the salaries of the regular teachers. The average pay of an assistant master is 46*l.* 4*s.* 7*d.*, and that of an assistant mistress 36*l.* 18*s.* 6*d.*

5933. Do you think it would be practicable to introduce into Ireland the system of school boards as in England?—It would be quite impossible.

5934. Is it the case that in the schools in connection with the National Board, the use of the books published by the Board is compulsory?—Certainly not.

5935. Is it the case that other books are in fact used in some of the schools?—Other books are used under the sanction of the Board, which sanction would not be refused to any book having literary merit and free from political or religious objection.

5936. In speaking of political objection, I suppose you are very liberal in your interpretation of what you consider admissible?—Decidedly.

5937. (*Mr. Magnus.*) Would you rather say “disloyal” than political?—No; political is the word. We should not like a book to be political.

5938. (*Mr. Woodall.*) Have you objected to any of the books published for the English schools?—I am not aware of any such book which has been submitted to us for our approval and which has been objected to.

5939. (*Prof. Roscoe.*) I suppose you choose books which have special reference to Ireland?—The lesson books now in use were revised some 17 or 18 years ago, with the special purpose of introducing an Irish element into them. There are in those books descriptions and illustrations of Irish scenery. Then there will be found in them numerous poems by eminent Irish poets,—by Thomas Moore, Goldsmith, Gerald Griffin, Denis Florence McCarthy, Mangan, Sir Samuel Ferguson, Curran, Callanan, Aubrey de Vere, R. D. Joyce, Wolfe, Lover, Dr. Murray, Lady Dufferin, and others. From Thomas Moore, alone, there are, I believe, some 23 or 30 most attractive and suitable pieces. Whilst

the Irish poetic element is so strong in the books, it must not be understood that the great British poets have been ignored. Far from it. Indeed we devote a whole volume to selections from Shakespeare. Perhaps in explanation of having so much poetry in our books, I ought to observe that the form in which knowledge is most attractive to the mind of an Irish child is that which is expressed in poetry.

But whilst our books contain so goodly a store of Irish and English poetry, they also contain an abundance of lessons, in a popular form, descriptive of manufactures, trade, industries, &c. The Irish element, here too, is conspicuous. There are lessons on the herring fisheries of the Irish coast; the salmon fisheries of the Shannon, the Blackwater, the Liffey, and other Irish rivers; the cod, haddock, and mackerel fishing; flax cultivation, and the linen manufacture; the lead, silver, and copper mines of Wicklow, Cork, and Kerry; the manufacture of bottles and flint glass in Dublin. Then from Sir Robert Kane's "Industrial resources of Ireland," there are taken very valuable lessons on the coal-fields of Ireland; on peat, its formation, extent, and uses; on the decline of the Irish iron manufacture and its causes; on other metals found in Ireland, and so on.

Besides these lessons, peculiarly Irish, our books contain lessons on the principal industries of the world, viz. on manufactures from wool, flax, hemp, cotton, and silk; from india-rubber and gutta-percha; from the date, palm, and cocoa-nut trees; on candles, gas, and lamps, on George Stephenson and the manufacture of steam engines; on gold, silver, lead, platinum, copper, bronze, brass, tin, zinc, mercury; the pearl fisheries, the first attempts at commerce; and on physical science as an aid to manufacturing and mechanical pursuits. Then there are lessons on bee-keeping, honey, and wax; on tea and coffee, their cultivation and preparation for food purposes; on spices, how obtained and prepared for food; on the management of poultry; on laundry work; on cookery; and in the interests of girls we devote a valuable little volume entirely to an exposition of the art of "cutting-out." In such a manner and to such an extent was the effort made to introduce lessons of what might be called an industrial and technical character.

5940. Do you think that that might be advantageously carried further?—It might, but there does not appear to have been any complaint made that there was not a sufficiency of that class of lessons in our books.

5941. I presume everything you state in them is still suitable to the circumstances of the country?—I think so. There are also, I may observe, some very valuable and interesting lessons on political economy; a subject very closely associated with the interests and fortunes of the people.

5942. (*Chairman.*) Do you think the time has arrived for a revision of the books?—I may observe that whenever opportunities are presented to us of doing so, we avail ourselves of them.

EXTRACT from a MEMORANDUM by SIR PATRICK KEENAN, K.C.M.G.,
C.B., Resident Commissioner of National Education for Ireland.

5742a. Technical education, in the strict sense, means giving a practical direction to the studies of scholars, giving, say, drawing and mensuration to the intending mechanic; arithmetic and book-keeping to the

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Sir P. Keenan, intending trader; chemistry and agricultural and veterinary science to
K.C.M.G., the intending farmer, &c. &c. &c.

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In large towns, those appropriate studies may be aided and illustrated by museums, by visits to workshops and mills, and to markets and great warehouses, &c. &c. In country districts such studies may be promoted by agricultural shows, botanical and geological excursions, &c.

But in town or country, the technical work of the school or seminary is confined to *instruction*, assisted by such diagrams and appliances as any well-organized educational establishment is supplied with.

I have made these remarks chiefly with a view of relieving the subject of technical education from the discussion of a topic, which, although popularly associated with it, is all the while, quite irrelevant, that is the question of teaching actual trades to children in school, teaching them to become carpenters, cabinet-makers, tailors, shoemakers, saddlers, &c. This sort of instruction may be fitly given in industrial and reformatory schools and orphanages established on a large scale, having pupils of a labour-age in sufficient numbers to justify the employment of skilful artisans as teachers, and also having the command of markets near at hand for their products. It may also be given, even in the ordinary rural schools, in districts in which, through the exceptional energies of enthusiasts, a manufacture of some light description, such as the making of toys or chip-baskets, or the knitting of gloves and stockings, has been introduced with success, and has obtained a ready market. There are districts on the continent, and even in Ireland, where something of this kind has happened. But it is in my opinion absolutely impracticable to make such a system general.

The most that may be accomplished, and to accomplish it every effort ought to be made, is to endow children with the knowledge which will specially fit them for their future trades or professions, or for domestic or agricultural life.

Adjourned.

TWENTY-FOURTH DAY.**Meeting at BELFAST.****First Day.**

Saturday, 9th June 1883.

PRESENT :

PROFESSOR H. E. ROSCOE, LL.D., F.R.S., IN THE CHAIR.

Mr. PHILIP MAGNUS.

Mr. JOHN SLAGE, M.P.

Mr. JOHN JAFFE called.

Mr. J. Jaffe.

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5943. (*Chairman.*) I understand you are President of the Belfast Chamber of Commerce, and in that capacity, and also in your position as one of the leading merchants of the city, you have had, no doubt, much experience as to the question of technical education. Perhaps you would kindly give the Commission some account of your views with reference to the assistance which may be looked for from technical instruction with regard to the general trade of this important part of Ireland?—I have given a good deal of thought to this subject, and I think that undoubtedly the trade and manufactures would be very much benefited by a thorough technical instruction both of the workmen and the foremen, and also of the managers. We have commenced to see the benefit that technical instruction has been to manufacturing districts on the Continent, and we have started a movement here regarding it. We held a meeting, about nine months ago, of the Chamber of Commerce, when a committee was appointed of which Mr. James Musgrave is the chairman, and we took the subject specially in hand. We have gone so far that we have collected funds to start a technical school in a small way. We intend to take, first, the weaving department, and also the dyeing, bleaching, and printing department; two departments of our staple trade which will be likely to benefit most by technical instruction. On the whole the Belfast trade has been mainly a trade of staple articles, but latterly our manufacturers have gone a good deal in the direction of fancy goods, and undoubtedly with success; and that, I think, should encourage us to widen this instruction amongst the artisan and apprentice classes, so that more fancy goods, and a greater variety of goods, can be taken up here at any time. My own view is that technical instruction should also be extended to all trades; that the plumber, the builder, the carpenter, might all have an opportunity of learning the principles of their trades during their school years or immediately after, so that this country might keep pace with the other parts of the world. At present our staple trade is not in a very flourishing condition; not much improvement of machinery or in manufacturing generally has been made during this generation; and, with the world advancing, I think we must have improvements in all departments of

Mr. J. Jaffe. our trade so as to keep pace with the time. I think that is all the information I can offer you.

9 June 1883. 5944. Your experience, Mr. Jaffe, of continental technical schools leads you to the belief that the effects which they are known to have produced, and which are generally acknowledged by all manufacturers there, would apply to similar schools, or to similar instruction, at any rate, if given in your neighbourhood?—Most decidedly so, and in fancy goods the Continent certainly surpasses us. These have been made here in great variety, and it is there where fancy goods of fine quality and design were first made from linen yarns.

5945. In that, no doubt, the School of Art and technical education generally is of great consequence?—I am sure in the advance we have made lately the School of Art has been of great assistance.

5946. Then you would include such instruction in art as would apply to your particular industry?—Most certainly; drawing and art generally.

*Mr.
J. Musgrave,
J.P.*

Mr. JAMES MUSGRAVE, J.P., called.

5947. (*Chairman.*) I believe you are Chairman of the Committee which was appointed to consider the question of establishing a technical school?—I am Chairman of the Executive Committee.

5948. Would you kindly give the Commission such information on the general subject as you may feel inclined?—Mr. Jaffe has told you to a great extent what has been already done as to furthering the object in view. I would rather tell you what I think would be the advantage to this community of the introduction of a technical school. I do not know any town so ripe for a technical school as Belfast. With the exception of Glasgow, I am not aware of any other town with such a variety of manufactures. We have first an excellent position as regards the sea; then there is the intelligence of the population and also the abundant supply of labour, which give us a great advantage as a manufacturing or commercial town, and we have already in many departments acquired a great amount of technical skill. What our committee want to do is to spread these advantages amongst the community at large. There is amongst some of our very best manufacturers a slight prejudice at present against the introduction of technical education, and I myself as a manufacturer feel it to some little extent; that is, we have manufacturers who have so improved their individual processes that they have acquired a very prominent position in their respective trades, and they feel that they are perfectly competent within their own workshops to teach the young men all that they require to know, and those manufacturers do not care very much about causing that information to be spread over the community at large. Our committee take an opposite view and say, "We would like this technical knowledge spread amongst the community so as to develop the latent intellect of the whole country, and we are anxious that technical schools should be introduced." I have been often asked, "What advantage would technical education be," and my reply has been that, if you take the best manufactory and send a young man there, he gets the run of the workshop and receives information up to the standard his master has acquired before him, but it is only now and again that a workman or manager strikes out beyond the standard of work he has been taught. What we want is a place where they will not only procure practical knowledge by seeing things done, but where, by the additional advantages of science brought to their aid by competent men, we may hope to go far

beyond what has yet been accomplished; because it is only by fresh minds being brought into contact with each other that we can expect any real advancement. I am one of the vice-presidents of the School of Art, and I had the honour of meeting a short time since Mr. Armstrong, who is Director for Art in the Science and Art Department at South Kensington; in the course of the interview I received some valuable information from him, and he told me that, if the linen people here would only look abroad and see what the manufacturers in other countries were doing, it would lead to an immense development here. Many of the linen merchants in this town and district are running neck and neck to produce, at the lowest possible prices, white linen and sheeting, which forms the great bulk of the trade, but fortunately there are some special branches, such as damasks and handkerchiefs, where taste, skill, and invention can be introduced, and for which goods higher profits are obtained. Mr. Armstrong also told me that there is a class of goods manufactured from a mixture of flax and silk which makes one of the most beautiful fabrics possible. They may be making it here and not saying anything about it, but I am not aware that such a fabric is manufactured here at all. I think, by our combining practical knowledge with the artistic skill of our School of Art, you would have the study of design and the working knowledge of the weaver under one management; you will teach the designer what he ought to design and the practical man what he ought to provide for, and that is what we hope to secure; I may say that in my own particular trade theoretic knowledge is a stimulus to invention.

5948a. We are aware that you have introduced an entirely new branch of trade into your business?—Yes, a new branch of manufacture in this country; indeed, a new manufacture altogether. What we want the Belfast people to do is to understand the advantages of a technical school, for many of them do not now believe in them at all.

5949. Then it is for you to make them?—That is what we are trying to do. Take the refining of iron by one operation. The best illustration of the advantage of technical knowledge is probably that given in the case of Bessemer. Before his time for hundreds of years iron was refined by a most tedious and expensive process, that is, they allowed the cast-iron to cool, it was then remelted, and then they kept tumbling it about in puddling furnaces for the purpose of refining; Bessemer comes in with his scientific knowledge, asks what the double heating is for, and then says, why not do the whole thing with one process, so he continues blowing into the iron when melted and eventually produces the refined iron, and thus has done more to maintain the supremacy of England in iron manufacture than any man before him. Then Siemens came in and applied his chemical knowledge to still further improve the practical process. If I were to talk for two hours, I could not give you a better illustration than that.

5950. To revert to the special business of the committee of which you are chairman. I understand you to say that you have already received funds for the purpose of establishing a technical school. You will perhaps put in a report on the scheme, showing what you have already received, together with your estimate of the cost of such an institution?—Yes. (See page 150.)

5951. I presume that has been gone into?—We have had estimates prepared of what sum will be likely to be required, but I may say that we are not going to begin with putting up an expensive building; we are going to begin in a small way, and when once the school is started, and manufacturers begin to see the advantage of it, the money will come, I am sure. The amount we have already received is quite encouraging,

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and even manufacturers who are not in favour of it have come forward and subscribed.

5952. You have formed no estimate of the exact nature of the education to be imparted?—No; we are going to start with practical weaving, bleaching, and dyeing, and possibly spinning also; in fact, all the processes of the staple trade.

5953. And connected with that you propose to have freehand and mechanical drawing?—Yes; if you look at the School of Art, you will see that it is an excellent institution, and that the results are extremely gratifying. Persons who are interested in the one also take an interest in the other. We want both institutions brought into harmonious action so that we may have an efficient system of instruction in both science and art from which practical results will follow.

5954. You have already in the Queen's College here Dr. Letts, in whom you have a most excellent chemist, and in Dr. Everett an accomplished physicist?—We know that.

5955. And I presume the higher class instruction may be given by Dr. Letts?—I am sorry to say that chemistry is not much sought after by the sons of our manufacturers. I only know two manufacturers, and most successful manufacturers they are, who studied chemistry, and they have taken the lead in their special branches in consequence of that. We recognise the great value of Professor Letts and Professor Everett; in the meantime they are beyond us, but we are going to use them and the resources of the Queen's College in training others who are to be teachers in our technical school.

5956. (*Mr. Magnus.*) To the working classes this school would be particularly valuable?—We hope to have in the classes not only the sons of manufacturers and the sons of the managers, but the sons of the working men.

5957. I suppose the classes available for the workmen themselves will be exclusively evening classes, as the workmen are engaged during the day?—Yes; in the School of Art the artisan classes are all in the evenings. We have classes for young ladies and gentlemen in which the fees are a little higher, but my idea is that the evenings should be devoted to cheap classes open to all who choose to come.

5958. Do you propose that the workmen themselves should receive instruction in the practical processes they see exemplified daily in the mill?—Certainly; the man who knows weaving will not come to us to be taught weaving. He will come to us for the practical science that can be applied to his trade.

5959. Would you tell us something about the practical science that can be applied to weaving?—That would be more a knowledge of machinery and the treatment of it, and a varied combination of threads.

5960. You think instruction in applied mechanics as to the machines employed in power-looms would be of advantage to those daily engaged in attending to them?—I think that weavers are the very best men to invent looms.

5961. You think generally the principal inventions in new machines may be made by those in the constant habit of attending those machines and of seeing their wants and requirements?—Yes, if they have intelligence and sufficient scientific knowledge to know what has been accomplished in the way of mechanical combination, they are most likely to make most valuable improvements. I do not remember the history of Jacquard, but I should be surprised if he was not a weaver.

5962. But I suppose that, in addition to practical instruction in weaving itself, you would also give instruction in the general principles

of mechanics which the students might afterwards have an opportunity of applying to the machines they would be in the habit of using?—We should give such instruction.

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5963. You would be prepared at once to introduce applied mechanics?—That would be one of the first things which we should be inclined to introduce. We are beginning in a small way, but that is only because our funds are small. If we had funds, we would soon have the whole thing in operation.

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On Monday the 11th of June Mr. MUSGRAVE was re-called, when he gave the following evidence:—

5964. (*Chairman.*) You are a large owner of property in county Donegal?—I am.

5965. And you have had some experience in the question of establishing home industries in that district?—I have.

5966. Can you give the Commission your opinion on this subject, and the results of your experience with regard to the introduction of such home industries and of such an amount of instruction as may be necessary to assist the peasantry in that district to earn a livelihood?—I have thought much about that subject. In our district in Donegal there is the nucleus of several manufactures. For instance, there is Donegal frieze, which is a sort of gray tweed. It, or an imitation of it, forms an extremely fashionable dress which is largely worn. It is extensively used as a shooting dress.

5967. What amount of it is at present manufactured in that county?—I do not know the money value of it, but I am sure every family possessed of sheep makes at least one web in the year, say 70 yards at 1s. 6d. to 2s.; that would be some 5l. to 7l. They also make white flannel, worth about 1s. per yard.

5968. And has there been anything done in your district or in the rest of the county to increase this manufacture?—No, nothing has been done except in one particular district. We have operations going on which I think will at all events open up a way to trades being developed in the district. Our idea is first to get communication with the outer world, and for that purpose, I may say, there is a natural harbour in the middle of our property. I refer to Teelin Bay, which is on the very edge of the Atlantic. No matter how stormy the Atlantic may be outside, when you get in there you are perfectly safe. You have in Teelin Bay about 40 feet of water at low water at the broadest part.

5969. (*Mr. Slagg.*) How large is it?—It is about half a mile broad near the entrance, and it runs some two miles into the country. [*Here Mr. Musgrave produced to the Commissioners a coloured map which had been prepared for the Chief Secretary for Ireland in 1880 to show how county Donegal might be developed by the introduction of narrow gauge railways.*] The coast line of Teelin Bay is composed of cliffs, some of which are about 2,000 feet high. Then there is also Killybegs, which is a perfectly safe harbour.

5970. By improved communication with the outer world you consider that not only would there be an improvement in the manufacture of frieze because of improved demand, but also that other things could be developed in your far distant district?—Yes. There is weekly communication by steamers between Liverpool and Glasgow and Sligo, passing between Rathlin Island and the mainland, and the moment we get sufficient accommodation for those steamers to call in Teelin Bay to take away the produce of the district there would be an improvement. At present those people have to cart their produce to a distant

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railway, *en route* to Derry, which costs them 2*l.* 10*s.* 0*d.* per ton to Derry.

5971. (*Mr. Magnus.*) Is there any other manufacture?—Yes, there is what is called sprigging, a kind of sewed muslin work, and in the Glenties there is a large industry in the knitting of stockings.

5972. (*Chairman.*) Also gloves, probably?—In our own district a Mr. Patterson of London came down about two years ago and established a glove factory. He sent down a lady to teach the people, and he told me that she said she never saw girls so quick in learning the process.

5973. (*Mr. Magnus.*) In what way do you think those home industries might be best introduced into the villages in which they would be likely to be carried on?—Well, my own opinion is, you might have a small technical school in every parish; but I may here say that parishes in Ireland are quite different from parishes in England. Here (*referring to the map*) is a parish of 30,000 acres. Upon our own property there are about 20 national schools, and I believe that, if you take the best of those schools in each parish, and have there some simple, but very practical means of educating the people in the elementary stages of various handicrafts, the best results will follow, and that it will either lead to manufactures being started on the spot, or induce the people, when partially educated, to go to Belfast or other parts of Ireland, where they would find ample employment.

5974. How do you think the teachers of technical schools should be paid?—In the Teelin School, on our property, the master gets, I think, 60*l.* a year from “payment by results.”

5975. Under what system is that?—Under the national system; the pupils pay so much, or are understood to pay so much, per week for instruction, but practically they pay little or nothing.

5976. You think the payment by results should be extended to the teaching of those trade subjects?—Yes.

5977. And that the funds for the payment of the fees should come from the National Board of Education?—Yes; but then the mere payment on results will not do. You would have to send down people to teach and train the pupils; but do not let it be a cumbrous thing; send down teachers who really know their subject, and are not above teaching it in a simple way.

5978. Would there not be some difficulty in establishing training schools for the instruction of teachers in a variety of industries?—I do not think there would be any difficulty in having a central establishment for the training of teachers. We should like to have the people taught chemistry in a laboratory. That is most important. There is no use in teaching chemistry by books; it must be taught in a laboratory where the students can take up a natural substance, reduce it to its primary constituents, and produce fresh results by their re-arrangement.

5979. I presume it would not be difficult even to obtain teachers, and to train them in works rather than in schools. Suppose, for example, in your district, that it should be considered desirable that this system of teaching the knitting of gloves should be brought forward, it would not be difficult, would it, to send up one of your national school teachers to Dublin, or elsewhere, where such a trade is carried on?—No.

5980. And that she should there have practical instruction in some works where the manufacture is carried on?—Yes.

5981. Has that ever been suggested?—I do not know that it has.

5982. You have never, yourself, sent up any of your own schoolmasters or schoolmistresses to learn one of those trades?—No, and I do not know that such a thing has been done; indeed, I was not aware that there was any place where they could be taught.

5983. But I presume such places could be found?—I may say that I have taken a young carpenter from that district of ours, one of the most remote in Ulster. I put him into our pattern shop in Belfast, and within two or three years he went off to Manchester as a skilled workman getting the highest wages. I consider that proper training. He just got the run of the place.

5984. Do you think the patrons of those schools in the districts adjoining your own would give the same support to the provision of technical instruction in those schools?—We are not patrons; the local clergy in every case are. We have very few resident people of wealth there, and they are the only ones who can be expected to find means for such purposes. You cannot expect people struggling on their farms, and scarcely able to support themselves and their families, to give money for anything of this kind.

5985. You think the whole funds would have to be supplied by the National Board?—I do, but I think the funds would be moderate; they need not be large, and I am certain they could not be spent in a better manner.

5986. At all events, as an experiment, it would be an interesting thing for a man to be sent up to learn a special handicraft applicable to a district?—Yes, but you need not send down a teacher, unless you send one of capacity for that particular class of teaching.

5987. (*Mr. Magnus.*) Should that instruction be given in the school hours, or in the evening?—I think it would be better that it should be given in the evenings, and I can imagine no better amusement for those boys and girls in the summer evenings than being taught practically subjects of that kind.

5988. There would be no difficulty in obtaining the use of a school building for such a purpose?—None whatever.

5989. (*Mr. Slagg.*) What sort of domestic industries would you enumerate as being desirable to be taught under the system we have been discussing now?—I should like to have the boys taught the elements of carpentry, although that is scarcely a domestic industry, but what I want to do is to make a large supply of intelligent labour, and there is not a part of the world where you will have a supply of more intelligent lads capable of being taught than at that place. I would have them taught the forging of iron, the use of the file, mechanical construction, and generally those branches which would give some idea of the capacities of iron, something beyond what they would get in a blacksmith's shop in the country; something more theoretical. Then, I think, they should be taught drawing, if that could be done. Drawing I look upon as the basis of all improvement. Then the girls should be taught knitting and sewing, not only common sewing, but the finer branches also.

5990. And embroidery?—Yes. I should like them taught higher class sewing and embroidery.

5991. And plain dressmaking?—Yes, and plain dressmaking also, because the people now are beginning to buy ready-made clothes. Formerly the peasantry used to get them made from a home material, and an exceedingly nice material it was. They dyed the wool themselves in various colours, and made their own clothing, but now they are buying second-hand clothing, or getting clothing ready made.

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5992. Are there any special industries applicable to particular districts where natural products are to be found, such as wood, marble, and iron?—That just brings to my mind that the "Piers Commissioners" have just finished a landing place at the point marked Pulhurrin on the map; it is a very simple small country pier, to the erection of which we contributed, and the object of it is not only for the bringing in of seaweed and for the fishermen to land at, but it lies at the base of a mountain of white freestone; and our purpose, hereafter, is to have appliances by which that freestone can be exported elsewhere. The people of the district occasionally make scythe stones out of it, and they also quarry the stone for building purposes. When a chapel or public building is to be put up, they come and quarry the stones, and then prepare them. Now that, I believe, could be turned into a great industry by opening up that entire mountain of white freestone which lies close to the edge of the sea, where vessels could come for loading. The people of that district have naturally an aptitude for stone-cutting, and many of them show considerable ability as stonecutters.

5993. Is the country flat?—No, it is a mountainous country.

5994. To teach industries of this varied nature would, of course, require important provisions in the schools. In what way would you have workshops applicable to the industries of each place? What is your idea?—My own idea would be to get a great big room, something like a barn, and have it so fitted up that one part of it would apply to the teaching of one class, and another part to the teaching of another. I would have a carpenter's bench and a portable forge. The great fault with many of these things is that they are gone about in too elaborate a way. A man with the slightest appliances in the world can teach how to weld iron, which is a great step in the knowledge to be acquired by a blacksmith.

5995. Would there not be some difficulty owing to the scattered nature of the population in that country?—In the populous districts the people are not so much scattered. I could easily obtain for you a hundred people any day upon short notice.

5996. (*Chairman.*) Do you think that a peripatetic teacher going about from one place to another, and being one winter in one place and another winter in another, would be a good thing?—I consider it an admirable idea.

REPORT of the COMMITTEE appointed to inquire into QUESTION of ESTABLISHING TECHNICAL SCHOOLS in BELFAST, together with SECRETARY'S REPORT on SCHOOLS VISITED.

COMMITTEE.

The Mayor of Belfast, Sir E. P. Cowan, J.P.

James F. Corry, Esq., M.P., President of the Chamber of Commerce, and Chairman of General Committee.

*James Musgrave, Esq., J.P., Deputy Chairman and Chairman of the Executive Committee.

*Rev. J. L. Porter, D.D., &c., President of the Queen's College, Belfast.

Sir Charles Lanyon, J.P., President of the School of Art.

Sir John Preston, J.P.

* Members of Executive Committee.

James Barbour, Esq.
 *George Benson, Esq.
 Dr. Samuel Browne, R.N., &c.
 Charles C. Connor, Esq.
 *Adam Duffin, Esq.
 *Professor J. D. Everett, M.A., D.C.L., &c.
 William Ewart, Esq., M.P.
 *William Q. Ewart, Esq., Vice-President Linen Merchants' Association.
 Professor G. Fuller, C.E., &c.
 Thomas Gaffikin, Esq., Chairman Working Men's Institute.
 *James Glass, Esq.
 *E. J. Harland, Esq., J.P., Chairman of Harbour Board.
 Professor J. Hodges, M.D., &c.
 George Horner, Esq., J.P.
 *John Jaffè, Esq., Vice-President Chamber of Commerce.
 Alexander Johns, Esq., J.P.
 *Professor E. A. Letts, Ph.D.
 *J. Loewenthal, Esq.
 Henry Matier, Esq., J.P.
 *Finlay McCance, Esq., J.P.
 *Robert McGeagh, Esq., J.P.
 Robert L. Patterson, Esq., J.P.
 *R. H. Reade, Esq.
 *J. Theo. Richardson, Esq., J.P.
 W. B. Ritchie, Esq., M.D., J.P.
 John J. Shillington, Esq., J.P.
 Thomas Sinclair, Esq., J.P.
 Robert Thompson, Esq., J.P.
 Thomas Valentine, Esq., J.P.
 *F. D. Ward, Esq., J.P.
 John Young, Esq., D.L., J.P., President of the Linen Merchants' Association.
 *Robert Young, Esq., C.E.
 *R. K. Knox, Esq., LL.D.
 Saml. Johnson, Esq., J.P.

F. W. SMITH, *Sec. pro tem.*

7, Donegall Square East, Belfast.

REPORT of the COMMITTEE appointed to consider the question of TECHNICAL EDUCATION, as applied to the MANUFACTURES of the Town and District of BELFAST.

The Committee, having been for some time engaged in investigating the subject of Trade Educational Schools, and inquiring into the position of those already established in England and Scotland, and having collected a good deal of information with regard to the general plan and working adopted in British and Continental schools, beg to submit a brief statement in reference thereto. The Committee ascertained that the English schools have to the present time chiefly dealt with textile manufactures, and, the linen trade being our most important local industry, it was desirable to learn in what way the establishment of schools similar to those in England and Scotland would benefit it. With a view to acquire such information and to form an opinion on the subject,

* Members of Executive Committee.

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the Committee instructed Mr. F. W. Smith (who has been acting as Secretary *pro. tem.*) to visit those already in working order in Yorkshire and Glasgow, and the result of that visit has confirmed them in their opinion as to the desirability of establishing similar schools in Belfast.

From all that they have been able to gather respecting this question, which of late years has received so large a share of public attention, and is at present a subject of inquiry by a Royal Commission, the Committee are strongly impressed with its importance to the mercantile community of the North of Ireland. Considering the importance of the great industries in this district, of which we may well be proud, it is most desirable that nothing should be left undone to conserve their interests, and retain for our productions a foremost position in the markets of the world. Great interest has been awakened in regard to technical education by learning how much Continental countries have long been doing for their people, and what splendid institutions of this kind are to be found in numerous centres of industry. Stimulated by these examples, English and Scotch manufacturers have been for some few years past working in a similar direction; important benefits have already followed their efforts, and from small beginnings they have developed and improved their trade schools, so that in several of the manufacturing districts large sums of money have been expended in the building and equipment of most complete institutions of this kind.

Taking, in the first instance, the manufacture of linen, the object aimed at would be to improve our staple trade, by the production of goods of a higher quality and in greater variety, and in that way stimulate the demand for yarns. To vary our manufactures; to alter, as circumstances require, the machinery of the factories to produce new fabrics; to lead rather than imitate Continental or other competitors; to strike out new courses and thereby create fresh channels for our products, to suit the varying tastes and requirements of the times, are all matters of great importance and intimately associated with a movement of this kind. The Committee recommend that a Weaving School should be first established, and, as soon as it is fairly started, that departments for instruction in bleaching, dyeing, and printing should be added. In the Weaving School the pupils would be taught the theory and practice of weaving, both by hand and power; and the class of fabrics woven should not only be of flax, but of wool, silk, cotton, jute, and other materials, so that the range of instruction might be as comprehensive as possible. In this way, not only will a much greater interest be taken in it by the pupils themselves, but the foundation for new industries may be laid, and existing machinery may be altered to produce other fabrics, as commercial enterprise may suggest, or public taste demand.

Students in the School of Art, whose studies might be directed to the designing of patterns for textile fabrics, would have facilities for applying their work to the most practical result by learning in the Weaving School to adapt their designs to the mechanism of the loom. A connecting link would thus be formed between both schools, of immense advantage to the trade of the district. Pupils attending classes for the study of Chemistry in other Institutions in the town would also have the opportunity of applying their knowledge, in the most direct form, in the Schools for Bleaching, Dyeing, and Printing, in connection with these trades.

The most cordial co-operation with all local educational bodies should be encouraged, with a view to obtain for our artisans and others those advantages which the requirements of the present day demand. The Committee, on a careful review of all the circumstances, and guided by

the experience of those best qualified to give an opinion, have come to the conclusion that, to insure the successful working of the proposed Technical Schools in Belfast, they will require undivided attention on the part of a Council, which should be of a thoroughly representative character.

As regards the financial question, the Committee do not advise the erection of costly buildings, until the practical value of educational training of this kind has fully established itself in public favour; but they recommend that some suitable premises should be rented for a few years, and a beginning made as previously indicated. A sum of from 600*l.* to 800*l.* per annum will provide a Weaving School, and when the Bleaching, Dyeing, and Printing Schools are added, the expenditure would probably be increased to 1,200*l.* or 1,500*l.* From one-half to two-thirds of these amounts would be required to be subscribed locally, the balance being made up by fees received from pupils, as schools of this kind are only to a limited extent self-supporting. A fund of about 2,000*l.* would purchase the necessary plant to give the scheme a start, so that, having regard to the various advantages which would flow from an institution of the kind, the outlay is comparatively trifling for a great manufacturing district like this. The City and Guilds of London Institute for the advancement of technical Education holds examinations in Weaving, as well as in the Dyeing and Printing of linen goods, and the Committee have reason to believe that some support to the School will be given from payments to teachers on the results of the examination of their pupils. Whilst the Committee recommend that weaving and allied industries should first be taken up, they desire it to be understood that technical instruction, as applied to many other manufactures, demands earnest attention; and they hope, when the School is started, that branches may soon be formed to meet the special requirements of many other trades.

The Committee would strongly urge the importance of this subject upon the attention of the commercial community of Belfast and the North of Ireland.

REPORT of the SECRETARY on visit to TECHNICAL SCHOOLS in ENGLAND and SCOTLAND.

In compliance with the instructions of the Committee, I visited the schools of Huddersfield, Bradford, Leeds, Keighley, and Glasgow, in which technical education, as applied to trade and manufactures, is carried on, and in all places was received in a cordial manner, and supplied with the fullest information required in regard to their working.

The first one visited was that of Huddersfield, which is a department of the Mechanics' Institute of that town. In connection with this society, science and art classes have been in working order for upwards of 30 years, and the course of instruction is that laid down by the South Kensington Department. The several classes are opened in September and closed in May. The report states that—

“Students enter, upon the conditions that they qualify themselves for examination, by attending at least 20 times, and attend the examinations on the evenings fixed by the Science and Art Department. There were classes in the following subjects in the session of 1881–82, the attendance being—Chemistry (Theoretical and Practical), 68; Geometrical Drawing, 17; Machine Construction, 29; Building Construction, 28; Applied Mechanics, 0; Magnetism and Electricity, 86; Physiography, 11; Mathematics, 29; Botany, 15; Sound, Light, and Heat, 13.

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J.P.

9 June 1883.

Mr.
J. Musgrave,
J.P.

9 June 1882.

"The School of Art is intended to meet the requirements of all classes in the study of art, as applied to industrial occupations and art manufactures, as a part of general education, and for the training of those who desire to make art their chief occupation or pursuit."

Besides the science and art classes, there are elementary classes in English, and advanced classes, for both sexes, in languages, shorthand, book-keeping, &c. The usual advantages afforded by institutions of this kind, in the way of a news-room, library, amusement room, &c., are, of course, provided. The Technical School, in connection with the textile manufactures of the district, established about six years ago, engaged my chief attention, and I ascertained that it was most warmly supported. The last report states that—

"The continued success of the classes in designing and weaving augurs well for the prosperity of this department in the new schools and institution, now in course of erection, in which will be provided better accommodation and fittings for imparting a knowledge of the whole technology of cloth manufacture. There has been throughout the year a steady attendance of nearly 100 students in the various classes. The interest evinced by the pupils in their studies, and the progress manifested at the different examinations, have been worthy of all praise. A day class, meeting on Thursday, from 2.30 to 5.30, was established in September last, for the sons of manufacturers, merchants, and others, in lieu of the one meeting in the evening. It has been very successful, 21 students being enrolled. There were 44 candidates for the Technological Certificate in Cloth Manufacture of the City and Guilds of London, instituted in May last, and several were highly successful.

"The evening classes in cloth manufacture are from 7 to 9.30, the following being the *First Course of Instruction* :—Plan making; drafting and colouring of single cloths; also backed with welt only. The elementary principles of weaving. The loom, its parts and appliances, with practical weaving on small looms. Materials, wool, clothing, and lustre. Properties of wool, mungo, shoddy, mohair, cotton, &c. Calculations of quantities.

"*Second Course of Instruction*—Combinations of different makes in single cloths for striping and checking. Double cloths in various makes, with equal number of ends and picks in face and back, also, backed 2 and 1, and 3 and 1. Practical weaving in the hand-loom. Analysis of patterns and reproductions in fac-simile, also with alterations. Calculations of costs, &c. Theory of colouring with the principles of harmony of contrast.

"*Third Course of Instruction*—The principle of the Jacquard machine, with its application to woollen weaving. Designing patterns and card-cutting. Practical weaving on the Jacquard loom. Designing for velvets, plushes, lambskins, sealskins, &c. Principles and practice of colouring (continued) for all fabrics. Calculations for different thicknesses of yarns for various weights and qualities of cloth.

"Classes in Mechanical Engineering and Steel Manufacture (including cutting and edge tools) will be opened as soon as a sufficient number of pupils present themselves."

A large number of the merchants, manufacturers, and others in Huddersfield subscribe from one to two guineas and upwards, which produces a revenue of over 300*l.* per annum, but as the receipts and expenses are mixed up with the general working of the Mechanics' Institute as a whole, I was not able to find out the actual cost of the department directly connected with the local textile trade. The present building being quite too small for these special branches, a new one is

in course of erection, which, when finished, will cost about 20,000*l*. In this will be provided ample accommodation for all the classes. The central portion of the ground floor will be devoted to the power and hand-loom departments, the rooms in one wing being portioned off for science lecture, and weaving lecture rooms, and the opposite wing for the chemical laboratory and dyeing rooms. The first floor includes reading room, library, mechanical and other class rooms, and the upper floor will be devoted to the art class and other rooms. The building is rapidly approaching completion, and it is expected that it will be opened early in the autumn. I was presented with a plan and elevation of this new building explaining the details of the handsome structure, the erection of which affords strong proof that these special schools are highly appreciated by the trades of Huddersfield.

From this town I proceeded to Bradford, and attended at the Mechanics' Institute, where the Technical Weaving School is at present temporarily located. Here I had an opportunity of seeing classes in working order. The lecture room is on the top floor of the Institute, and affords accommodation for about 100 students. About 30 were then present, and the instructor, Mr. Ashenhurst, was giving a lesson in weaving, by means of a black board, marked off in groups of squares 8 by 8, making 4,096 squares, in the aggregate, each of which was pierced so that pegs, with coloured heads, could be inserted, and the instructor was explaining how by changing these pegs from one position to another, indicating the mode of disposing of the warp threads in the loom, the various classes of patterns were produced. The students copied the patterns into books—specially ruled to correspond with the black board—by means of coloured crayons, and the instructor gave them propositions in the principles of weaving which they were required to work out at home, and bring to him with their own explanations as to how these were done. After the students attended the lecture they went to the weaving room, which is situated at the basement of the building, where I saw a number of others engaged at the several power and hand-loom, the former being driven by a gas engine, which I was informed answered the purpose admirably. The classes being at present too large to work in the same department at the one time, one section was occupied in attending to the theoretical instruction whilst the other was employed at the practical work. The students do all the work, from the mounting of the warps to the working out of the design; two are usually at each loom, one being more familiar with the mechanism of the loom, and the other possessing more knowledge of the figures or styles of weaving; in this way they mutually assist, and more rapidly obtain the required information. To instruct them in the mechanism of the power-loom the students are allowed to take the machine to pieces and build it up again, and are also taught by diagrams on the walls representing the wheels, full size, how to calculate speed, and the driving power required to produce certain work. Other diagrams illustrated the harmony and contrast of colours. In this and other ways a most complete instruction is given to pupils who are desirous of making themselves fully conversant with the principles of weaving, and the practical work as well, and this in a far more complete and thorough manner than they could possibly obtain in a power-loom factory.

The council of the Bradford school being impressed with the great value of such an institution, for the great textile trades of which it is a centre, took steps to erect a building which would be capable of affording the greatest facilities for carrying on the work in the most complete manner. This building is now almost finished, and arrangements are in progress for a grand opening in June by their

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R. H. the Prince and Princess of Wales, when an Art and Industrial Exhibition will be held. Mr. Ashenhurst conducted me over the building and explained the arrangements for the several class and lecture rooms, &c., and in it spinning and practical dyeing as well as designing and weaving will be taught, so that all branches of the textile trades will be represented. Mr. Ashenhurst, who has written several works on weaving, and has assisted in the formation of schools elsewhere by giving lectures, &c., kindly stated that he would be happy to assist in a similar way the movement in Belfast, if the Committee so desired. The Technical Schools, when opened in the new building, will be quite separate from the Mechanics' Institute of the town; though the latter is regarded as a very valuable one in itself, the Committee considered that these special trade schools were more likely to fulfil their purpose by not being identified with any other institution embracing a diversity of objects, many not harmonising with the special training sought to be developed in these technical schools. The new buildings will cost about 30,000*l.*, of which 3,000*l.* has been given by the Clothworkers' Company of London. A portion of the building will be devoted to a technical library and a museum for art and industrial products, intimately bearing upon the textile trades, so that students will have every opportunity of learning what other countries have been and are doing to meet the requirements of the times. The number of pupils attending the Technical Weaving School has been upwards of 300, and no doubt when the various other branches are taken up in the new building there will be a considerable increase in the attendance. Several printed papers were given to me by Mr. Ashenhurst, which state in full detail the work which they have specially taken up. From some of these I append a few extracts, showing the plans intended to be carried out when the new building is opened:—

Art Department.—"In this department art will be studied, not only in its widest sense, but design will be taught in all branches, from the artistic production of the 'composition' in form and colour, to its application to the loom. The course of instruction will include Free-hand drawing. Mechanical and architectural drawing; Design; Theory and harmony of colours; Modelling."

Science Department.—"Classes will be formed for the study of Mathematics; Geometry; Chemistry; Chemistry of dyeing, with practical experiments; Nature and properties of wool, hairs, fibre, and other materials; Metallurgy."

Mechanical Department.—"Course of instruction will include Cleansing; Scouring; Combing; Preparing and Spinning; Weaving by hand and power loom; Building construction; Applied mechanics; Machine construction and practical engineering; Steam; Mining and Surveying."

"The intelligent student, having received the ground-work of his instruction in the elementary day school, or in the evening classes of a Mechanics' Institute, and become an apprentice, the Technical School will enable him to pursue with profit, and often with enthusiasm, the science that will teach him the principles of his calling. The knowledge of drawing—"the mainspring of a technical education"—will be imparted in the art rooms; the student, whether designer, decorator, mason, joiner, or mechanic, will apply his knowledge in the workshop, or in the affairs of life. The sciences of Mechanics, Building construction, Steam, &c. will be taught in the class rooms; but the students will turn to their own account, at the bench or the forge, the theoretical knowledge they receive. The dyer, manufacturer, analyst, &c. will each study practical and experimental chemistry in the laboratory, but

will apply their information, in their own way, to useful purposes. With reference more particularly to the textile industries—apart from the many other advantages which a school of this character must offer to a manufacturing and mercantile population—the weaving department will be of incalculable benefit to the young men of the district. It cannot but be a gain to the worsted trade—of which Bradford is the centre—when, on the one hand, the art student, with no means of entering a weaving establishment, has every inducement afforded him to apply his artistic productions to the loom; and when, on the other hand, the practical weaver, with no means of entering the designing room, is stimulated at the school to learn to make designs of his own. A weaving school will encourage originality of design and manipulation on the part of the capable few, and will promote greater taste and proficiency on the part of all who attend its classes.”

From Bradford I went to Keighley, which is the centre of a machine-construction district; and the teaching there has a special reference to the mechanical and engineering trades. The Mechanics' Institute in this town has been in existence nearly 60 years, and is a model institution of the kind. The science and art curriculum of South Kensington is adopted. The attendance of pupils is very large; and the results, judging by the reports, seem highly satisfactory. The Weaving School is, however, on a small scale; and looking to the splendid institutions of this kind at a short distance from Keighley, and that in the latter district comparatively little textile manufactures are carried on, it is not likely the Weaving School will attain to any degree of importance. The school has only been a short time opened, and has been attended by 13 students, most of whom were “overlookers” or the sons of employers.

I next visited Leeds, and had a long interview with Mr. Beaumont, the head of the textile department of Yorkshire College, who kindly explained their mode of working, and brought me through their new building in College Road. The lecture theatre is capable of seating 100 students, and the instruction is by means of plain black and pegged boards, the same as in the other towns. In the practical department, one room, 40 feet by 30, contained 30 sample looms, suitable for weaving by hand a variety of cloths. In another weaving room, 80 feet by 40, there were 17 hand-looms, several being of large size, and about ten power-looms of different makes, the latter driven by a gas engine. The sons of merchants and manufacturers usually attended the morning classes, and the workpeople the evening classes. From the last report of work done, I subjoin a few extracts to show the kind of instruction given.

Advanced Day Class.—“The students of this class have attended in the mornings for lectures, and in the afternoons for practical work. The instruction given has embraced designs, as resulting from a combination of weaves, the characteristics of double, treble, and ornamental fabrics, and the theory of colour, with its application to textile goods. The work done by many of the students shows a real knowledge of the art of designing, not only in fancy woollen and worsted coatings in both single and double cloths, but also in vestings, mantle cloths, and pompadours.”

Elementary Day Class.—“The students in this class have been instructed in the nature of raw materials, and in the combination of small weaves for single all-wool truserings, worsted coatings, and single and double cotton warp over-coatings. Examples have also been given in ladies' dress goods. Practical weaving on the small hand-looms has also been well attended to, and those students who have been attentive

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in keeping a regular account of the patterns woven obtain an amount of practical experience which must be very useful to them in after life."

Elementary and Advanced Evening Classes.—"Were well attended. A fair number of the young men are engaged in the mills in the district during the day, and some of them have been carrying out, at the mills where they are employed, the knowledge they have acquired at the college; thus testing in a most practical manner the value of the information they have obtained."

In the Dyeing School I saw the Instructor, Mr. J. J. Hummel, who was very obliging in explaining the general working of his department. A number of students were there at the time and work was in full swing. Several of them were experimenting with dyes on a woollen fabric, specially supplied to the school for this purpose. After the shade is produced the student subjects it to various tests in the way of scouring, milling, action of light, &c., comparing results with the original shade; in this way they are encouraged to work out for themselves an independent course of study, rather than to follow any standard receipts or formulas. The student preserves in a reference book a small portion of the shade produced, and opposite to each the quantities of dyeing material are entered, so that each student, as stated in the report,—

"According to the time spent in the dyehouse has received from 1,000 to 3,000 dyed patterns together with the corresponding receipts. With these he has formed for himself a pattern book which will always be useful as a book of reference, whatever the special branch of wool-dyeing in which he may be engaged. The aim has been to give each student a practical acquaintance with the numerous simple shades obtainable from the dyewoods in common use, when employed in conjunction with various mordants; an acquaintance which is essential before the composition of, and methods of obtaining the more complex shades can be properly understood. The practical dyeing of last session has, however, been only preliminary work. . . . A course of 60 lectures has been given on the textile fibres, the natural and artificial colouring matters, and the processes of bleaching and scouring cotton, wool, and silk fabrics."

The Weaving and Dyeing departments only are in the new buildings, College Road, the Science and Art Classes being held in the old buildings, but ultimately, when the new are finished, all will be transferred there.

The only other school which I visited was at Glasgow. Here the weaving branch is very interesting, and seems to be worked at a minimum expenditure. The subscriptions amounted last year to 370*l.*, including 150*l.* from the Clothworkers' Company, and 162*l.* received as fees from students. The expenditure (exclusive of interest on the building) was only 47*l.* For this a surprising amount of work appears to have been done. Mr. Macanlay, the Instructor, very kindly pointed out the plan of work, which was quite similar to the English schools. In the weaving shed there are 15 power-looms driven by steam, 11 hand-looms, and several model looms. The variety of fabrics made in this school, in silk, wool, and cotton, makes it a most desirable one for pupils to attend. As the Instructor's Report for last year describes the nature and variety of work done, I beg to subjoin some extracts.

"Close and earnest application to work has characterised the conduct of the students. . . . The following sections of studies may be stated as examples among the various departments treated of in the institution. . . . The means to be employed towards the production

in the loom of the best quality of plain cloth, in various textures, embracing instruction on tappet-forming, warp-entering, looming, shedding, &c., the principles which guide to the formation of fancy twills, with numerous examples of these; together with a correct choice of the most suitable raw material and yarns; the production of a variety of fabrics, such as dress cloths, shawls, coatings and tweeds, with examples of some of these products in the loom. The principles of pile weaving have been largely entered upon, as in the study of Brussels carpeting . . . also the study of plush, velvets, imitation skins, and corduroys. Gauze weaving has been taught. . . . Designing has been taught for tapestry in curtains and furniture cloths, shawls, and handkerchiefs in silk, in wool, and in combination materials, and for dress cloths, tweeds, &c. . . . Card cutting for Jacquard and Dobbie work has also been in operation. . . . Numerous cloths have been subjected to analysis, &c. . . . Instruction has been given for the gristing of yarns in warp and weft to suit various fabrics . . . and as to the best methods of finding yarn weight and quantities, and all other matters connected with the rating of woven goods. . . . The winding, warping, beaming, and card cutting machines have received special attention; and several power-looms, with their Dobbie appliances, have been constantly placed in the hands of the students for taking down into their several parts, and for reconstruction."

A Printing and Dyeing School is in process of formation, so that the textile trades of the district will be greatly benefited by this excellent institution. Manufacturers' sons, mill managers, and overlookers attend the schools, both here and in England, for, in many instances, persons occupying important positions in factories were found very deficient in the *technique* of their business, but quickly learned in these schools, and obtained higher pay as they acquired better skill.

From all that I could learn these institutions have proved eminently useful in their several districts, and their practical value is fully recognised. Apart from the benefits which the establishment of Technical Schools would confer on the linen trade in its several branches, the prospect of the foundation of other textile industries being laid, and successfully carried on, is in itself a very tempting inducement to take up the matter here. To proceed in a tentative way for a few years will involve a comparatively small outlay, having regard to the important results which may reasonably be expected to flow therefrom.

F. W. SMITH, Sec., *pro tem.*

7, Donegall Square East, Belfast,
May 15, 1882.

Mr. WILLIAM QUARTUS EWART called and examined.

5997. (*Chairman.*) You are, we understand, largely connected with one of the staple industries, namely, flax spinning. The Commission would be glad to hear any remarks you may have to make in addition to the statements already made by the two witnesses who have spoken? —I do not exactly know how to make a statement upon the matter, for I have never seen a technical school, so I cannot say how it could be applied. I could, perhaps, give you a sketch of the trade at present. I have a general idea of the whole of the processes as they are all carried on by the firm to which I belong, William Ewart and Son, from the buying of the flax to the shipping of the finished goods. I exclude printing, because there is no firm that includes printing. The linen trade consists of several processes, the spinning of the yarn, the weaving

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of it, then the bleaching, dyeing, and printing, and afterwards the ordinary folding, pressing, and packing, which, of course, could not be benefited by technical education in any way. As to the position of our trade, we naturally compare ourselves with the Continent at present, because we have suffered most since the Exhibition of 1851 by the growth of Continental competition in the linen industry. I have visited the linen centres in France and Belgium, and, so far as flax spinning goes, I do not see that we have anything to learn from the Continent; on the contrary, we are more advanced than they are in the handling of the flax, and afterwards bringing it into yarns. They have, no doubt, great advantages on the Continent that I need not go into, longer hours, and probably lower wages; but, as regards the manipulation of the flax and bringing it from the rough flax into finished yarns, I do not think we have anything to learn from them.

5997a. There is one question I might ask you regarding yarns. It has reference to a statement made in an article contained in the last number of "*The Nineteenth Century*," in which a table appears, giving the amount of linen yarns exported every year since 1869, and from which it appears that the quantity of exported yarns reached the maximum of 37,000,000*l.*, and has steadily decreased down to the year 1880, when the amount of exports was only 16,500,000*l.* I should like to ask you whether you could furnish us with the figures of exports and imports for linen yarns for the two succeeding years, for 1881 and 1882?—No, I could not; the Secretary of the Flax Supply Association can, no doubt, give you all the figures regarding the trade.

5998. (*Mr. Magnus.*) You are not prepared to say whether there is any increase since 1880, without giving the exact quantity?—No, I do not think there is an increase; I should be inclined to think that, if anything, there is a decrease to such countries as France, Germany, and Russia, to a considerable extent. They now get our machinery and are supplying themselves. Although I do not think that we have anything to learn in the process of spinning from the Continent, I think young apprentices to the spinning trade would have great advantages if there was a school, such as I imagine a technical school should be, where they could see with their own eyes the various processes going on. It is a tedious thing for a boy coming from school at, say, 15 years of age to have to serve six years' apprenticeship in a mill. The most of the places now are so large that he cannot see in an interesting way all the processes that are going on. So far as I can remember, the largest number of successful managers that I have known have been brought up in small places, and I suppose a technical school is like a small spinning concern, where the youth has a chance of seeing the continuous process and the same chance of receiving instruction, and where it would be more interesting to him. For instance, a boy now goes into one department of a mill, and nearly all the mills have their special kind of flax, one mill works one kind of flax and another mill works another; he will, perhaps, be two years in that department, though after six or 12 months any intelligent boy has seen as much in that department as could possibly be seen. However, on that point I shall be followed by managers who have spent their lives in the trade. I may say, from my own personal experience, that at the time I was sent to our own mills I had not time to spend several years learning all the processes. In flax-dressing I had the advantage of having beside me a man like a schoolmaster. I had an opportunity of examining and working the different kinds of flax, of seeing the results of dressing, and of following the flax in all the processes through the mills. It would, of course, be impossible to do that generally. You could not maintain discipline if

boys could run through the works, so I suppose a technical school would be something like what I went through myself. Apprentices have another great disadvantage. I do not wish to say anything offensive, but I have known many cases in which there has been the reverse of a disposition to give them any information, and in which difficulties were placed in their way. That may be one reason why so very few apprentices turn out successful in after-life. I should say, from my own experience of mill apprentices, that not one out of five turns out worth much.

5999. Do you refer to those going in with a view to the career of managers?—Yes, and I think a technical school would be useful to them, and useful also to some of those boys who might take the position of overlookers, for, after all, very few managers are required, and some apprentices might become overlookers, and in the mills there are salaries given in those situations ranging from 110*l.* up to, say, 160*l.* a year. I know two cases of boys who served their apprenticeship as managers, but being unable to get situations, took situations as preparing-masters rather than be idle, and they made very efficient preparing-masters.

6000. Is that the same as overlooker?—Yes, one of them bided his time and obtained a good situation as assistant manager.

6001. There are other qualities required in a man to make him a good manager?—Yes, but I do not think educated boys would have less control over hands than an uneducated man who has been promoted. I am speaking now altogether of flax spinning, I am not touching upon weaving. I think, if educated and thoughtful young men had the opportunity of studying at a technical school, there might be something also done towards improving the machinery of spinning mills. I know, practically, that if you made out a specification 20 years ago for flax machinery, and make a similar one out now, the foundry have really just the same machinery to supply. There may be a few details different, but during that time, while immense improvements are said to have been made in cotton and woollen machinery, in the linen trade we seem to be almost at a standstill in that respect.

6002. Do your remarks apply to flax spinning generally in this district?—Yes, flax spinning generally.

6002*a.* Do you imply also that even on the Continent we do not see a great advancement made?—No, not even on the Continent. I speak of flax spinning apart from weaving, for there is an improvement in looms. Yarns are woven now of a quality so poor that it could not have been woven 20 years ago. I think we are backward in the weaving also, particularly of fancy goods, and, so far as I can learn, it is the intention of the technical school here to begin with weaving. I had an opportunity at the Paris Exhibition of 1878 of seeing the woven products of all nations, and certainly we are behind other countries in skill as weavers. It is a complicated art, and in the case of damasks especially the French far surpass us. A New York merchant told me some time ago that they were obliged to take Continental goods in the fine qualities, as nothing in our country is equal to them. Their ingenuity in weaving is surprising. There were specimens at that Exhibition of 1878 where the shading produced in the damask was almost equal to steel engraving.

6003. In what way is that effected; is it by the machinery being of a more delicate and suitable character?—The machinery is the same, but the arrangement of the threads is different. It is in what is called "twilling." We are willing to work with merely two or three twills in a damask, whereas, in some of those, M. Casse said there were as many as 15. The designs are better also.

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6004. Do you know where the manufactory is?—Near Lille. What we want is to make the linen more attractive. People engaged in the manufacture of other fabrics have made them more attractive, and little by little they have supplanted us. I do not think that the linen trade can ever be entirely supplanted, but I do not think we are holding our own.

6005. You think the establishment of a technical school, where the different methods of weaving could be shown to the young men, would be of practical service to this district?—I believe it would. As regards bleaching, I cannot speak in a practical way, but I shall be followed, I suppose, by Mr. McBride. However, we all feel that we must be behind the age in bleaching. It is exceedingly tedious in the present process. If you send out a lot of goods to bleach and finish, you must calculate on your money being locked up for three months. It will be that time before you receive back the linen. Bleaching is also a very risky process altogether. The linen is bleached in large kieves or vats, not in the rope like cottons, and by the mistake of a single night you may have damage done to the amount of 500*l.* or more. If science could come to our aid and diminish the risk, it would be of immense importance. Then there is another matter. From what I know, a great quantity of refuse in the liquids is now allowed to run into the rivers. I think something useful might be made out of this waste, and that those residuals might be turned to account. Someone spoke of designing, and the advantages of the School of Art. There is no doubt of those advantages. We have advanced in skill in designing very much. During the Exhibition of 1878 I was walking through the building with a co-juror, a French spinner. We were going through the English Department, where there were great quantities of woven fabrics shown, and he said, "Your Schools of Art have done immense service to your country during the last 10 years." I said, "Yes, but France always stands at the head for taste and design." "You have," he replied, "advanced far more during the past 10 years than France has done." I think that with a technical school we might make a great advance. As regards dyeing, I cannot speak, but to show you our ignorance in this matter, I will mention an incident that occurred with ourselves. A considerable quantity of union goods are made here, that is, goods with linen one way, and cotton the other. Our firm received a sample of union goods. It was dyed, and did not seem to be a very difficult shade, and we were offered the contract for it, if we undertook to give the exact shade. We accepted the offer. We got the yarn in Manchester and sent it out to be dyed—I cannot remember whether it was to an English or Belfast dyer—and it came back almost the right shade. But it would not do; and when the goods were all made they were thrown upon our hands by the person who ordered them. We thought the matter was worth following up, and accordingly we ordered some more of the grey cotton yarn, and sent test quantities to two of the best dyers in town, with a sample of the yarn taken from the cloth, and neither of them succeeded. We then sent samples to our office in Manchester, and asked our representative to send to some of the dyers in Manchester. He sent test quantities to four, and not one out of the six dyers could give the colour to us.

Our representative wrote back, "These are Belgian goods; the yarn is bought in Manchester, and dyed and manufactured in Belgium, where it seems they have special facilities for dyeing."

6006. What was the shade, may I ask?—It was light straw colour, or rather between a pale sage and straw colour; but not one of those six practical dyers could give it to us. I think there is something

wrong in the rule of thumb way that we work. As regards the dyeing of linen yarn, we never think of it, yet in France there is a very large trade done in deep blue linen, which is used by the peasants for blouses.

6007. Dyed in the yarn?—No, in the piece, I think.

6008. Is it an indigo dye?—Yes, I believe so. There is another shade in linen that it is impossible to obtain here. We have had samples sent to us of fine slate drills, a pale slate colour for South America, and in no case have we been able to get the linen yarns dyed to produce the same effect, yet the Belgians produce them in large quantities. In the first instance, I do not think it would be either necessary or wise to begin dyeing in the technical school; but it may be added afterwards when we have made some advance in weaving.

6009. (*Mr. Magnus.*) With regard to flax spinning, which you thought might be taught in the technical school, proposed to be established in Belfast, I may say we have been generally told that flax spinning is a very mechanical operation, and that very little instruction could be given to those employed at it which would be of service to them. Can you tell us what kind of instruction, if any, would, you think, be of service to the flax spinners, that would also be of use to the trade. I am referring now, not to those who enter a mill with the view of becoming managers, but to the operatives themselves?—I cannot see that there could be much done for the operatives themselves. Perhaps they might be trained as to the best mode of dressing flax, which is the foundation of success in flax spinning. They come in as boys of about 15 years of age, and serve five or six years. Flax is not like cotton. If you take cotton you expect the whole bale will be similar, but in a bale of flax you will have three or four qualities, and it requires considerable skill and knowledge, both of sight and touch,—and a good deal of that knowledge comes from the handling of the fibre—to separate its different grades. That is one of the most essential points for the flax manager to understand. I think a good deal might be done in a technical school in that way, but that would be, after all, chiefly for managers. I do not see that any advantage could be found in it for operatives.

6010. Would you tell us the kind of education that would be most useful for training good operatives in a flax-spinning mill—I mean the common hands—the person, for instance, who attends the spinning frame all her life?—I do not see how she could be improved at all. She goes in probably as a half-time child, learns gradually to be “doffer,” then a “spinner,” which is a very mechanical operation, and she remains a spinner during the rest of her life. I do not see how any technical training could help her.

6011. They are principally women, of course, who are engaged at that?—Yes; and that is one reason, I may remark, why we have such a position in ship-building; there is so much employment for the fathers and brothers of the mill-hands.

6012. Technical education, then, in spinning is more for those who enter the mill with the view to becoming overlookers or managers?—Yes, I think so. The processes themselves are very mechanical, except in the dressing of flax, where judgment comes in. I think a technical school might also be useful in training boys who are to become flax buyers. On the part of flax buyers a good deal of skill is required.

6013. I should like to ask you whether it would be, you think, advisable that those youths who enter the flax-spinning mill with the object you have indicated should go to a technical school before they enter the mill, or attend evening classes during the time they are

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occupied at millwork?—I think it would be no disadvantage if the boy went into the technical school first. It would show whether he had a taste for manufacture, and it would quicken his interest after seeing the work; but I think an earnest boy would attend in the evenings as well. As a rule, we do not like to take boys above 15 years of age, so that they are out of their apprenticeship before coming of age, as after 21 we have no control over them.

6014. You think he should go to the technical school for a year or two, and then pass on to the mill?—I am now speaking without knowledge; I have never thought about that point, but I would prefer that course myself, for boys. The six years appear to me to be spent in a very wearisome way. I have known of one boy who became an experienced, successful manager, the first part of whose time was spent in a high class merchant's office in London, where he got a general idea of doing business. After that he was placed in a small mill belonging to a relative.

6015. You believe his attendance at the technical school for a year or two would probably tend to shorten the period during which it would be necessary for him to attend at the mill, and would ultimately make him a more efficient manager?—I think it probably would.

6016. Do you think, if the youths were to attend these technical classes in the evening, it would make them more efficient overlookers?—Yes, and I think they would come to use their minds so as to be able to suggest improvements in the machinery.

6017. In fact, you think one advantage of boys attending at the evening classes in a technical school would be that they would thus undergo a process of education, having special reference to the trade in which they are occupied, and that they would thus learn the theory and practice of the work in which they are engaged?—Yes, and they would not have that great deterrent, the unwillingness of some overlookers to allow them to learn.

6018. You were speaking of a very eminent firm at Lille which turned out better work in finished damasks than were being manufactured in Belfast?—Yes, in design. I did not say in quality.

6019. Are you acquainted with the technical school in Lille?—No, I never saw the technical school there.

6020. You cannot, therefore, say whether the instruction given in the technical school there has any influence on the industry there carried on?—No, I cannot tell.

Mr. EWART was afterwards re-called, when he gave the following evidence:—

6021. (*Mr. Slagg.*) The Commission is anxious to know the main reasons that contribute to the comparative want of success of the Belfast linen industry at the present time. We are informed that Continental spinners are able to compete successfully with the spinners of this country?—They are.

6022. And to the extent of exporting their production into Belfast itself?—Yes; and the reason they can export to Belfast is that they have a protective tariff which more or less prevents our yarns from getting into the hands of the native manufacturers, who are thus obliged to pay whatever price the spinners there require, and the surplus production they can sell at a cheaper rate.

6023. But there is one particular point I want to arrive at; do you think that that excess production, which you say is exported to Belfast, is exported at a loss in order to relieve their production, or at a profit?

—In many cases it must be exported at a loss, because we know the qualities of the flax they use, and their cost as compared with ours; and, even with the advantages of long hours and cheaper wages, there must in many cases be a loss.

6024. (*Mr. Magnus.*) You do not agree with the witness, who said that the foreign manufacturer was unwilling to work at a loss; that while the Belfast manufacturer would continue to work at a loss the French manufacturer would close his works?—The loss on what they send to us is only on a portion of their production.

6025. (*Chairman.*) You mean that in consequence of the high protective duty they are able to sell at a high price a large quantity of their goods, and that the remainder they are able to sell here at a loss without incurring loss on the total output?—Yes.

6026. (*Mr. Slagg.*) You consider that the export of Continental yarns to Belfast is not a legitimate, but a forced trade, involving no profit to the exporter as a rule?—As a rule, I believe it is, because it is their surplus production.

6027. Then this bug-bear of successful rivalry with English industries is, so far as your experience goes, a fallacy?—No, it is a very serious reality.

6028. I mean as competing with home industries on their own ground?—I believe that in the yarns that they sell to us they are sending them, as a rule, at a disadvantage. Unfortunately their surplus is very large, and, whatever the price of the lowest may be, it fixes the price in the market here for all. Take, for instance, the average of what we call "number fortys;" it is largely used, and the price of the Belfast-made "fortys" here is very much regulated by the price that the Belgian spinner is inclined to take for his surplus. Then, if we send our "fortys" into France or Germany, the duty there, to put it in another way, adds to our cost of production 18 per cent. and 38 per cent. respectively.

6029. This industry then does you mischief?—It does.

6030. Then I am afraid we cannot help that. Nevertheless, there is a falling off in your total exports of flax production to Continental markets?—Yes, we formerly had a very fine trade to Italy, Spain, Germany, and France.

6031. And that has declined?—Yes, very seriously.

6032. How do you account for that?—Germany and Russia, and France too, are producing their own yarns, which we formerly supplied to them. In the case of Spain and Italy there is not so much extension of spinning going on; while in that case, in a good many instances, at least, there is a tendency to substitute cotton and to use cheaper yarns sent in from Austria and Germany. In the case of Spain, I think, on account of the relations between England and Spain at present, there are more favourable terms for the Germans than for us.

6033. A disadvantage throughout the whole Spanish territory?—Yes.

6034. Can you name any special points, such as hours of labour, class of machinery, skill of workpeople, or rate of wages, which tend to the disadvantage of your industrial position here? We will begin with the hours of labour. How do you consider the hours of labour compared with those of Continental countries?—Are they to your advantage or disadvantage? They are to our disadvantage on the whole.

6034a. Do you consider that, if you had the power to work longer hours, say 12 hours, as they do on the Continent, you would be better off?—I think that would be too long. I speak from what I have seen in Belgium, and also from what I have seen in French mills. But while I think our hours—speaking for purposes of competition, and not

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Mr. W. Q. Ewart. taking any other view—are rather short, I also think theirs too long. I should be very sorry to see a set of mill-working hands in Belfast as drooping and worn-out as the same class of individuals that I have seen in Continental towns.

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6035. Which do you refer to?—I refer specially to Belgium.

6036. In spinning, the restriction of the labour hours really does not apply, because it only has relation to women and children?—Yes, but you cannot get on without them. It is not like cotton mule spinning, done by men; it is done entirely by women and girls.

6037. Then what do you consider is the proper limit of hours that can be worked, taking into consideration the physical, moral, and intellectual well-being of the workpeople?—I think not above 60.

6038. Is it now 56?—Yes.

6039. And you consider the extra four hours would make a considerable difference?—Yes, I think it would; it would come to about 6 per cent. It is said that there are about five millions sterling sunk in the plant of the Irish linen trade, and if you take 6 per cent. of that, it is a very considerable amount.

6040. But is that a correct way of putting it, because we find that in the cotton industry, when the hours of labour were limited, the people worked with greater energy and intelligence, and not only maintained the same rate in the shorter hours, but in some cases exceeded it, so that really we are producing in that industry as much under that shorter system as was done in the longer one. And further, it is alleged, and I should like your opinion on the point, that with this excessive rate of running machinery it is not desirable in the interest of the plant to run it such a long time as you would have it at such speed; that, in fact, the machinery, like a human being, is better for a little rest, and that you exert the functions injuriously if applied too long or at too high a speed; and I should like to know if such a statement has any application to your trade here?—I dare say the principle of running night and day, as in Russia, is bad for the machinery, but I cannot see that the fact of stopping machinery at 56½ hours, as compared with 60, could make any difference to it. I have heard of the point you refer to, that since the hours were shortened, the spindles have been driven faster in proportion. That is not our experience; we were driving before as fast as we could drive in justice to the material, and we had by the change a loss in the “turn off.”

6041. Then your loss is in exact ratio to the stoppage of the time?—Just about that.

6042. And do you consider that the workpeople might, with advantage to themselves and advantage to the trade, work the extra four hours?—There was no general desire amongst the mass of the workpeople at that time to get the Bill for the short hours.

6043. Do you think they would revert without difficulty to the old system?—That I cannot tell; I was a good deal engaged at that time with the negotiations about it. There was no general desire on the part of the people themselves for the change.

6044. Did it receive the general opposition of the masters?—It did.

6045. And by no means the cordial support of the workpeople?—No, no such thing as mass meetings were held in support of it.

6046. How do you find the wage-earning position of the operatives to be since that change, do they earn more or less, or do they maintain their position?—I cannot tell you that.

6047. Have you kept pace with your Continental rivals in the matter of machinery?—Yes, quite.

6048. You cannot tell the Commission whether the hands earn more or less under the present system?—I cannot, but this I know, from having asked the question very soon after the change in the Act, that we did lose, and practically in the same proportion as the hours were reduced.

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6049. As to the social condition and comfort of the operatives, have they sustained any change of late years, and for better or worse?—Yes, for better.

6050. With respect to their food, appearance, clothing, and other things?—Yes, I do not see one operative out of doors now with bare feet for every 20 I used to see.

6051. It is probable then their earnings have kept up?—They are perhaps more careful and pay more attention to dress and comfort.

6052. They could not do that, of course, without the money, and then, also, things are cheaper?—Yes.

6053. Then you state to the Commission that, in your opinion of machinery, you are certainly equal to your Continental rivals?—Yes.

6054. Now as to the skill of the workmen?—I consider they are not equal in spinning. In weaving and some other things they surpass us.

6055. Take your foremen?—I believe our foremen are better than theirs.

6056. Better educated?—I cannot say that, but more skilful.

6057. More skilful in their business?—Yes.

6058. Then as to the operatives, how are they in industrial skill and efficiency, compared with yours?—I think ours are better.

6059. You would prefer a mill worked by your own operatives to those of any other country you are aware of?—Yes, any I have seen.

6060. Would you not be satisfied with the results of your own operatives in the shorter hour system as well as with Continental mills, with Continental hands, on the longer hour system?—No, I think the difference between us is too great. I think the difference between 56 hours and 72 hours, and the fact that they are content with lower wages, seems to counter-balance our greater skill.

6061. Have they an advantage in lower wages as well as in longer hours?—Yes, they have; they have higher wages for their 72 hours than our hands have for 56½ hours in many cases, but on the whole they have lower wages in proportion to us.

6062. How does that compare with the cost of production? Can you tell the Commission the difference in cost per pound of producing any article common to the two industries?—I cannot accurately, but I have reason to believe they are cheaper. Nothing of the sort has been published like a wage list to show that.

6063. Do you not think that information could be obtained?—I doubt it.

6064. What is your test, what leads you to that impression?—I tried about a year and a half ago to obtain an accurate statement of the number of spinning mills and spindles in each mill in Russia, to compare it with the number at home, but I could not get even that information.

6065. Then, from the fact that you are ceasing now to supply Continental countries, your trade is restricted?—Yes.

6066. Is there no extension of mills?—None whatever.

6067. The trade is altogether on the decline?—It is, but I wish to guard myself, as I said before on this point, that, although it is a shrinking trade, on account of Continental causes, I believe also it is a permanent trade. There have been trades which have been superseded

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by other industries, but I believe the flax industry never can be superseded entirely.

6068. What in your opinion could be done, either publicly or by the Government, or otherwise, locally, for the amelioration of your trade?—So far as technical education goes, I think what we want is to make linen goods more attractive by variety, and with the present knowledge of the overlookers, managers, and others, we see no prospect of our being able to produce greater varieties. The Continental manufacturers are more skilled in that way, and I am sorry to say that, practically, we are merely imitators in matters of variety.

6069. Have they superior artistic skill?—They have.

6070. And scientific skill?—Yes.

6071. On the part of masters or workmen?—Not on the part of the operatives, and probably not on the part of the overlookers, but I should think that, on the part of the masters and managers, there is more brain work given to it and more scientific knowledge.

6072. Do you attribute that to any natural advantage of an intellectual order or to natural taste, or are those matters such as could be learned?—I think in one way it is to be attributed partly to natural character, but I think we are all so much alive to the necessity of making some great change that that difficulty would be much got over if facilities were given. I may mention now that, when I was out in Mexico 9 or 10 years ago, a gentleman there told me that he remembered when there were 30 or 35 important English houses in Mexico, and these had then dwindled down to one; and he went on to say the other houses are chiefly German and French, they get their own goods. He said, "You English turn out enormous quantities of one monotonous article, but as for these German and French people, they put all kinds of attractive things before you, and take any amount of trouble to turn out things in variety."

6073. Do you find that in neutral markets, where all pay alike, French, Belgians, and English, that you are beaten through the superior artistic excellence of your rivals?—Yes, in cases where art can come in.

6074. And that the application of artistic education is, therefore, very desirable?—Yes, of vital importance.

Mr. R. H. READE was next examined.

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R. H. Reade.
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6075. (*Chairman.*) I think you are connected with the manufacturing department of the flax industry?—I am manager of an establishment that embraces all the branches, from the flax spinning to the shipping of the goods.

6076. Are you going to give us special information on spinning?—I do not propose to touch upon spinning at all, but I am prepared to answer any question in a general way about the other departments.

6077. You have heard the evidence Mr. Ewart has given us; do you generally agree with him in the opinions which he has expressed, or do you wish to make any remarks in modification of anything he has said?—I generally agree with the remarks he has made, but I am prepared to state distinctly my own opinion that technical education will be of no use to the people actually engaged in the manipulation of the various processes, and that its benefits will be for the overlookers, those who propose to be managers, and the sons of owners. I think the technical school will focus the processes which are diffused, especially in large places. Mr. Ewart has found in a general way that the most successful managers are those trained in smaller places, and it is very difficult, no

doubt, in a very large establishment for any one engaged in it to become acquainted with all the processes. In the first place it dislocates all the arrangements, and the departments are too widely dispersed for a person to examine into them all.

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6078. But the present overlooker is, I presume, obtained from the best class of hands that the workers can produce?—The workers are females and the overlookers are males. Mr. Magnus asked whether the instruction should precede or be coincident with the work of the people. I have no opinion adverse to the teaching preceding, but I think the most useful instruction would probably be that which is coincident with it, because they then fully see the points they want to experiment upon. I will take one particular class of people; they are called tenters, and they each attend to some 60 or 70 looms. Their duties are two-fold, for they have both to overlook the weavers, to supply the looms with the warps, and to see that the looms are kept in thorough working order. I do not think there is any class of men who would be more useful in suggesting improvements, because they have an opportunity of seeing where the defects are; but I think, as a general rule, they have little time to think of this. They put in their apprenticeship, and the nose of each is well kept to the grindstone. After their apprenticeship they have to work very hard, and they only see that particular department in which they are engaged. If they could afterwards quietly look at the loom working, without the desire of driving it, so as to get through as much work as possible, they would have time to study it, and the teacher in the school could point out the principles of mechanism that ought to guide them. Another thing would be valuable to this class of people. They have served their time in the actual weaving department, and there are a large number of processes that yarns goes through before coming to the loom. It would be a great thing if they could get an idea of the nature of those processes, so that when they saw the yarns they might be able to know whether they were in a right state, and might probably even be able to suggest improvements in the preliminary processes. The linen trade here is chiefly confined to plain goods. That is the great staple trade to-day; bleached linens and linens furnished in various ways. For various reasons that trade has fallen off, and we are now obliged to go more into the branches of fancy manufacture, and there it is that we find foreigners in advance of us.

6079. And it is in that branch that the application of art and scientific knowledge is to be desired?—Yes.

6080. Are you connected with the committee of the proposed technical school in Belfast?—Yes, I am a member of the committee.

6081. It is the idea of the committee that the Queen's College should form the highest link in the chain, and that there should be a communication in some way that you have not clearly defined?—We are so strongly of this opinion, that when President of the Chamber of Commerce, I was appointed one of a deputation to accompany the President of the Queen's College to wait upon Mr. Forster, when he was Chief Secretary for Ireland, to represent to him the desirability of extending a grant to the Queen's College, to teach applied science.

6082. Did you get the grant?—No, to my very great regret we did not. The one branch in which, I think, we are most behind is the imparting of colour by dyeing or printing. In that branch the people on the Continent are much in advance of us.

6083. You are speaking of linen dyeing?—Of linen dyeing altogether.

- Mr. R. H. Reade. 6084. You think the establishment of a dyeing school would be of importance in that respect?—Of very great importance.
- 9 June 1888. 6085. (Mr. Magnus.) Do you know that there are no dyeing school in Germany?—No, I am ignorant of that subject.
6086. (Chairman.) I understood from Mr. Ewart that the greater number of your hands, both in spinning and manufacturing, are females. I should be glad if you could inform the Commission of the method you adopt in choosing your overseers. You must have some special method of training your overlookers or foremen?—The apprentices have a certain number of years training, ranging from five to seven years.
6087. (Mr. Magnus.) You are not able to select them from the ordinary operatives in the linen industry in the same way as is done in a mechanic's shop, or in a variety of other trades?—No.
6088. They must be specially trained?—Yes.

Mr. WILLIAM BOYD called.

- Mr. W. Boyd. 6089. (Chairman.) You are a practical flax manufacturer?—Yes.
6090. And you are able to give information on the subjects on which we have already heard evidence?—Yes, on spinning and weaving.
6091. And do you generally agree with the evidence given by Mr. Ewart and Mr. Reade?—Well, I say with regret that I agree with Mr. Reade as to technical education for mill workers.
6092. Those engaged in spinning mills, or those employed in the weaving establishments?—Yes, even when both are together only in one department. Of course I exclude working in the mill proper. We have only one department in which men are employed, except as overlookers, and that is the department for hackling the flax. The flax is first divided in a rough way by a class of men called roughers. Then it goes to the machines that comb it, and thence to a class of men called sorters, whose duties are to clean out the dirt at the end of it and sort it, hence they are called "sorters." The manager then adjudges upon it, and so it afterwards is classed as sixes, eights, nines, or tens, but these workmen know nothing about the yarn spun out of that flax. All flax of a certain sort is employed for certain numbers, and I do not see how a technical school can be of any service to a hackler at all.
6093. It is necessarily a rule-of-thumb trade?—Yes, and the way we make our overlookers is this. In a large room we have boys oiling machinery and working, in fact acting in the nature of attendants to the overlookers. Those boys as they grow up gradually come forward, and go from my place to a small department in York Street mill or some other large mill, and gradually grow up to be overlookers.
6094. And it is only for those boys that the technical school would be of any advantage?—Yes, only for those boys.
6095. You think those boys attending at their work during the day are necessarily restricted to the evening for attending classes?—Entirely restricted to the evening.
6096. But education could then be given of such a character as to be of service to them?—No doubt of it.
6097. Do you think they would take advantage of any instruction placed before them by such classes; they are boys who desire to improve themselves?—Yes; because also we want better boys for that work than ordinary mill boys. We would a great deal rather get a better class of boys to be with the overlookers, and this would be very useful to them.
6098. Then as to the distribution of these mills and factories in this neighbourhood, I presume they are spread to a considerable extent?

throughout the district?—The great majority of them are within a *Mr. W. Boyd.*
radius of two miles.

6099. And the boys could attend classes?—Yes, no doubt of it. I quite agree with Mr. Ewart and Mr. Beade as to the great importance of the weaving department of the technical school. I agree with both of them. I took a trip over to the United States last year, and when coming home a great many buyers were coming over for the season. When it became known that I belonged to Belfast, they all said, "Why is Belfast remaining so far behind-hand in its manufactures?" Some of the largest buyers from America were on board of the "Britannic" at the same time, and they all harped to me on the same string, namely, "Give us some variety."

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6100. Do you agree with the previous witnesses as to the stimulating effect that the establishment of a technical school would have on the trade?—Yes, and if we do not get it, our trade will go down; it is going down as it is.

6101. Is that the general feeling that it is not only desirable but absolutely necessary?—Yes. At the time of the American war there was very great prosperity in this trade, in consequence of the scarcity of cotton, and the majority of the old spinners sold their mills at a great profit, and they were carried on under limited liability companies. If you take up any of the local papers of to-day and look into it, you will find that out of 12 or 13 of the mills quoted, only two are above par; the York Street Company and Messrs. Gumming and Campbell's, and the rest, without exception, are below par, and if you add up the capital, the selling price of the shares now is about one-third. This just shows us that we must do something or else we will lose our trade. There are only two companies above par at the present time, and a great many of them are more than 50 per cent. below it.

6102. (*Mr. Slagg.*) I understood you to say that there was a very great want of technical education amongst the boys in the mills?—Yes.

6103. What is the nature of the instruction you would give those boys, as applicable to your trade?—I think that boys in the mill should mostly understand something about drawing, so as to be able to explain themselves when they wanted to do so, and should know something about mechanics.

6104. Drawing in special relation to design?—I am speaking now of mechanical drawing.

6105. You are of opinion that your trade is suffering from the want of this education?—No doubt of it.

6106. And that it underlies this question of competition?—Yes.

6107. How are you off in Belfast for Schools of Art?—There is one very good School of Art.

6108. Are there facilities already for teaching mechanical drawing?—I think there are some other gentlemen who will be able to give you fuller information on this question.

Mr. THOMAS NEILL called.

Mr. T. Neill.

6109. (*Chairman.*) What is your position?—Weaving manager for Mr. Boyd.

6110. Do you wish to make some observations as to technical instruction for weavers and persons employed in other industries?—Yes, I quite agree with the remarks that have just been made, and in the first place a technical school would take the place of the old hand-loom weaving. The old hand-loom weavers make the best men for the power

Mr. T. Neill. looms. Those hand-loom weavers are now wearing out, and at this school practice would be given at the hand-loom which would bring the men forward.
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6111. You mean that by degrees hand-loom weaving is disappearing, and that this causes a disappearance of the men you want to get?—Yes, as I have said already, the man who is a good hand at the power loom is the man who has been brought up at the hand-loom.

6112. (*Mr. Slagg.*) Are there more hand-loom weavers here than in other districts where there is flax?—In parts of County Down and round about Lurgan, and also in Ballymena, there are still a large number of hand-loom weavers, but they are gradually passing away.

6113. Is there any difficulty in absorbing the hand-loom weavers in the factories?—There is not; the hand-loom weaver is practically the best in the handling of the yarn, and all he has to do is to work the machinery.

6114. And you are afraid that when the hand-loom weavers die out there will not be men to replace them?—Yes, and this technical school would help to bring forward men for that work.

6115. In order to carry out what is apparently your idea of training young weavers, would you not require a very large establishment for such a purpose?—I do not mean to train the women at all, as they can be trained in the factories; it is only for the mands who are to be overlookers.

6116. Your remarks, then, apply to overlookers?—Yes, I mean in order to get in the hand-loom weavers and to bring them forward for that situation. I do not mean ordinary weavers.

Dr. J. L. PORTER, D.D., LL.D., called.

Dr. J. L. Porter, D.D., LL.D. 6117. (*Chairman.*) You are President of Queen's College, Belfast?—
 Yes.

6118. And you have devoted, of course, considerable attention to the higher branches of education; that is, to the application of the highest development of science to the industries of this district. We shall be glad to hear your general opinion as to the desirability of extending this system from the lowest to the highest areas?—For many years my attention has been devoted to the subject of education, and within the last few years, especially since I was appointed President of the Queen's College, my attention has been directed to the desirability of giving instruction in the principles of natural philosophy and mechanics, and in the great laws and discoveries of chemistry, with a view to educating young men for higher departments in the manufactures of this town and the north of Ireland. Some two years ago I had frequent interviews with the members of the Belfast Chamber of Commerce and of the Linen Merchants' Association, and I found that they all agreed with me in this, that for the sons of the millowners, and for the managers of the mills, it would be of the greatest importance to get the highest instruction that could be given in the principles of mechanics and also of chemistry. That instruction we are fully prepared to give in Queen's College, Belfast. So much were they impressed with this, that they appointed, at my suggestion, a deputation to wait upon Mr. Forster, then Chief Secretary for Ireland, to ask him to increase the accommodation, the very limited accommodation, I am sorry to say, which we have in Queen's College for the purpose of giving instruction in the principles of chemistry, in practical chemistry, and also in natural philosophy, applied mechanics, and engineering. We have a Professor of Engineering who unfortunately is at present in

London. We have a Professor of Chemistry who will give you full and correct information on everything connected with that department. As to the trades and manufactures which would derive advantage from superior scientific training, I may state that I have listened with great interest to what was stated by Mr. Ewart, and I believe if the principles of chemistry were taught as Professor Letts is capable of teaching those principles here, manufacturers and others would not be placed at a disadvantage as they are at present in regard to those peculiar dyes he spoke of. If our leading men were instructed in chemistry, I do not see why our manufacturers should not be able to compete in that respect with the best manufacturers on the continent of Europe or in America. Hence I made the application to the Government, and was aided by the Mayor of Belfast, the President of the Chamber of Commerce, and the Chairman of the Harbour Board in my endeavours to get the Queen's College enlarged. We want a larger department for practical chemistry. We had last year about 100 students in practical chemistry, and we have a laboratory capable of containing only 15. Our professor, who is most anxious to get more students, and who could have got more if he had had accommodation, was only able to accommodate 15 at a time, and had to instruct them in relays. We want a physical laboratory so that Dr. Everett might have an opportunity of teaching the students the principles of physics, and the application of those principles, testing, for example, the strength of metals, and in that way preparing young men for taking higher places in such great shipbuilding yards as Messrs. Harland and Wolff's, and also in Messrs. MacIlwaine and Lewis's, and other establishments in town, that are rapidly growing up. Then there are the various departments of machinery in the mills. I believe managers who got a knowledge of the principles of mechanics would be able to improve the machinery. They would be capable not only of doing that under more advantageous circumstances, but also of inventing new machinery.

6119. You have given us a clear account of what the Queen's College, Belfast, is capable of doing, and anybody acquainted with the history of that college must be aware of the important part it has played in the higher education of the North of Ireland. We hope to visit your College and to make further inquiries regarding it. I should now like to ask you with regard to your evening instruction. I think in the Queen's College you do not give evening classes?—No.

6120. Then the classes for instruction in science subjects, and the subject of applied art, to which reference has been made, would have to be given elsewhere?—Yes, as regards purely technical instruction.

6121. And I presume the establishment of the technical school would in no way interfere with the College, and with the work which you know it properly carries on?—On the contrary, I think it would be of great advantage to us, because we should be able to prepare teachers for those technical schools, as they could not be prepared elsewhere; and we should be prepared to give instruction of a higher class in the principles than the students could possibly get in those technical schools, so that the work of the College would in reality be that of a higher department of the technical school. Without the college the technical school could not be so efficient.

6122. (*Mr. Stagg.*) Possibly you are familiar with the work done by the schools on the continent?—With some of them; but I have not visited any of the foreign technical schools. I have, however, visited many in this country. I am aware, for instance, of what is done in the Owens College, Manchester, at Glasgow University, and

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I know that recently a Chemical and Physical Department has been added to the University of Edinburgh, to which I formerly belonged.

6123. And in those cases the provisions are superior to what exist here?—The teaching power is not superior to what we have here, but the facilities are far superior to ours. I think we have three professors here, who in this matter, are prepared to take their place anywhere.

6124. Of course I meant facilities?—Perhaps I might refer to one thing. My attention was called to it by our late Vice-President, the distinguished Dr. Andrews. Dr. Andrews brought it out in a pamphlet which he published a few years ago, and I recently brought out the same thing in a letter which I published in the "Irish Times" a short time ago, namely, that the establishment of the Great Chemical School in Glasgow, about 1822, and the continuance of it up to 1834 and onwards, actually revolutionised the whole manufactures, so far as dyeing and chemistry were concerned, in the West of Scotland and the North of England.

6124a. Under Dr. Thomson?—Yes.

6125. (*Mr. Slagg.*) I think you threw out the idea that there should be a training school for teachers?—There should be the means in Queen's College, Belfast, of giving scientific and practical instruction in a laboratory to teachers, and also of giving instruction to the managers of the manufactures connected with bleaching and dyeing.

6126. And how would you suggest that this should be done?—Only in one way. We have the teaching power here, but we want a laboratory to be built; in fact, we need an extension of the College.

6127. The extension of your present accommodation?—Well, when I state that we have a laboratory for only 15, while we have as many as 100 students in attendance, I think you will see that an extension is urgently required. Dr. Letts has more than he can accommodate in the present summer classes.

6128. Of course this would have to be done entirely by the Government?—Yes, by a Government grant; in fact, that grant has been partly promised by his Excellency Earl Spencer. Mr. Forster was in favour of it when Chief Secretary. I had many communications with him, and he said it was merely a question of time, and also that the present state of Ireland prevented the Government from taking it up.

6129. And you consider those defective arrangements stand in the way of the development of the higher branches of trade?—I do; if our facilities were extended in Queen's College it would have a very great effect on the progress of manufactures in the entire North of Ireland.

6130. And the absence of those facilities is one of the reasons, in your opinion, that the trade here does not occupy a higher place, and you consider that if they were supplied trade would be enabled to advance?—I argue in this way; we have natural intelligence in the North of Ireland equal to that in any other part of the world; we have industry and perseverance on the part of the people; we have energy on the part of the manufacturers, and all we want is facilities for giving a higher class of education, so that you may have properly trained men for the practical departments.

6131. (*Mr. Magnus.*) I think it is very important indeed that Dr. Porter should have brought before us this want of facilities in a manufacturing centre so important as Belfast, but I think Dr. Porter will readily admit that, in order that persons may avail themselves of higher instruction, their previous preparation should be fairly good.

I think I understood from Dr. Porter that he has had personal experience of the school system as it exists in Belfast and the North of Ireland, and, if so, we should be very glad indeed to have his views on that subject, whether the instruction given in the elementary schools at present is of a sufficiently practical character to train the most efficient workmen?—I think that, so far as the workmen are concerned, they have facilities in Belfast as great as in any other part of Ireland to obtain elementary instruction, and I would specially refer to this department in connection with the development of art. I would refer to three places where they obtain admirable instruction. One is the Sullivan School in Holywood. There they are trained admirably in the elementary principles of mechanics and chemistry and other things.

6132. (*Chairman.*) Are these national or intermediate schools?—The Sullivan School is partly intermediate, but it is also national. It has private endowments also.

6133. (*Mr. Magnus.*) Would you tell us as to the National Schools, the schools of the people?—They give the pupils sound and useful instruction, but I do not think it sufficiently tends to foster art and mechanical industry. The scholars are soundly taught, so far as I know, in reading, writing, arithmetic, and the ordinary elements of education, but I should like to see the introduction into this part of the country of some teaching of what might be called the elements of practical knowledge bearing on ordinary business or handicraft.

6134. (*Chairman.*) You would like to see them made handy?—Yes, and that I know is beginning to be taught in some of the schools.

6135. (*Mr. Magnus.*) You think that more attention should be devoted to drawing?—Yes.

6136. Do you mean ordinary freehand drawing, linear drawing, or drawing with mechanical instruments?—I think both should be taught.

6137. As to science, would you have the children educated by object lessons, or in the ordinary methodical way?—In both ways.

6138. Do you think practical instruction should be given?—As far as possible, I think it should be given, but the difficulty would be in getting the children to remain so long at school as to take advantage of it. I think it would be a matter of great importance that it should be made compulsory upon the child to attend some school from four or five years of age to, say, 15.

6139. (*Chairman.*) You are in favour of compulsory school attendance in the North of Ireland?—Entirely.

6140. And do you think that would be practicable, and would not meet with opposition?—Everything meets with opposition, but still, I think, it is practicable.

6141. But you think it is within the bounds of possibility?—I do.

6142. (*Mr. Magnus.*) Our attention has been devoted a good deal to compulsory education in Ireland, but there is another question with regard to elementary instruction, that is, as to the advisability of introducing into elementary schools rudimentary workshops, in which to give instruction in the use and handling of the commonest tools that enter into every trade and industry; do you think that this would be a valuable addition to the present elementary instruction?—It might be a valuable addition to it, but I do not think it would be well to introduce it at an early period. I think an elementary school education should first be given, and then, if you found an aptitude in children for some particular trade or business, you should have opportunities to give suitable instruction.

6143. You would not propose universally the addition of opportunities to give workshop instruction in connection with elementary schools?—

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I should be in favour of affording facilities in such a town as Belfast, and of having a number of schools for that instruction, but I do not think that it would be desirable to introduce it into every school.

6144. At what age do you think a child may begin to use its hands in the manner you have indicated?—I look upon age as not a test of the mind at all; there are some children more developed at the age of 10 than others are at 14, and I think it would depend altogether on the teacher to observe and determine the proper time for such training.

6145. Can you say this, at what class or standard should the child have arrived before he entered a school to receive instruction in the use of tools?—I think the child should have a fair knowledge of reading and writing, and also of the elements of arithmetic and geography, and should besides be acquainted with some of the principles of science before he should be permitted to enter into that special practical department.

Mr.
H. McCance.

Mr. HENRY McCANCE, Jennymount Mills, Belfast, called.

6146. (*Chairman.*) You are connected with the flax spinning industry in Belfast?—Yes.

6147. And you have heard the evidence which the other gentlemen have given?—Yes.

6148. Do you agree with what they have stated as a whole?—With the greater part of it. I am general manager of a spinning mill, and we have no weaving connected with it; I refer to the establishment of Messrs. Philip Johnston and Sons, Limited, but I may say that I have been connected with flax spinning all my days, and I certainly agree with Mr. Ewart in saying that neither France nor Belgium have, I think, gone much ahead of us yet in spinning. I was over in France last September, and went through a number of the mills there and saw what they were doing.

6149. What part of France?—At Lille.

6150. (*Mr. Slagg.*) Have you seen the flax mills of Ghent?—No, they would not allow me to visit and inspect them.

6151. And you consider your spinning industry here is quite on a par with that on the continent?—Yes, but there they have longer hours.

6152. (*Mr. Magnus.*) Did you see any of the flax spinning mills in France or Belgium?—I saw a good spinning mill in Lille.

6153. (*Mr. Slagg.*) And you say you can produce as good an article here as in France?—The mill I saw was a fine spinning concern, and made very good yarns, but can only go up to a certain standard, say from 30s to 100s. We supply them with the finer counts, 120s to 200s, which they cannot touch. In my opinion it is in what we call "doublings" that we surpass them; their doublings are from 600 to 1,000, we double from 100,000 to 200,000.

6154. Then the competition is in the lower qualities principally?—Yes.

6155. But in the higher qualities they cannot compete with you, and indeed do not make the article at all?—Twenty-five years ago they got some of the best managers, overlookers, and workers from Belfast, and went into the finer qualities, but, I believe, never succeeded, and it appears they have now gone back again to the coarser numbers. In my young days the spinning was far finer in France than now.

6156. And the attempt to spin fine numbers turned out a failure?—Yes, I believe so.

6157. But in the lower qualities they can compete with you?—
Yes.

6158. How do you account for that fact?—They have the flax at their own door. They get it at Courtrai, Ghent, and Bruges. It is better than our flax for that purpose, and they know how to manipulate it better. It costs us about 30s. per ton to bring it over here, and there is from 5d. to 9d. per bundle in the shape of duty and freight which we have to pay when sending back the yarn.

6159. They can compete with you in your own markets, I understand?—Yes, in the lower counts, because they have to pay no duty.

6160. But even in markets open to all alike, where there is no question of duty, how do you stand?—I should say that when we are getting about 4s. per bundle for our yarns, they generally have an advantage, having, as I said, the flax at their door, and they can send yarns over at that price. When the yarns come to 3s. 9d. they cannot hold their own, and when the price comes to 3s. 3d. or 3s. 1½d., which it is now, we can beat them out of our markets. They would stop their mills rather than lose money by working them in the way we do here. Our spinners here will go on losing money to keep the people employed, but in France they will not do that.

6161. In your opinion can the Lille spinner produce yarn at a lower price than you can in Belfast?—No, we can drive our spindles in Belfast at the rate of 5,000 or 6,000 revolutions per minute, and the revolutions there are only 3,500. The only point regarding which I disagree with Mr. Ewart, was when he said that we are no further advanced in spinning than we were something like 20 years ago. There is one point in which I would say there is, in my opinion, a material advance; that is in the length of the spindle. We used to order spindles as much as 18 to 21 inches long, and on the continent a great number are still of this length. Now if I were ordering spindles I would only go to 12 inches, and thus, while it was formerly difficult to drive the spindle 4,000 we can now drive them at 6,000 revolutions.

6162. Then you consider there is a great advance?—I consider there is a great advance.

6163. Both in speed and also in machinery?—Yes; in fine spinning, where we have fine spindles, we put in as strong a frame work as we previously did in the heavy coarse spindles, so that the drive may be steady, and that the spindles may run freely.

6164. In mechanical appliances, do you think your machinery is in a satisfactory position?—Yes, for the present time. The children under 14 years of age that we get in now have to pass a high standard in the National Schools before we may employ them on full time; and those children get on so well and are so enlightened, that they will soon supersede their overlookers and managers, unless the latter attend some technical classes.

6165. (*Chairman.*) You mean that primary education is becoming so good in Ireland that the children will soon be more educated than the overlookers?—Yes, we have overlookers who could scarcely write their own names, and yet they are intelligent men and able to look after the department, while they employ children of 15 years of age to write and keep the time for them.

6166. (*Mr. Slagg.*) Can you inform the Commission what, in your opinion, should be done in order to serve industrial education from a technical point of view?—I think if the employers would encourage overlookers to attend those technical classes, and give to such persons who have attended, the preference when they would want an overlooker or a foreman, it would be well. I think we should give the preference to the

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man who has received a technical education, and who is well posted up in drawing and such like. I think he would make a better overlooker or foreman than a man who had not attended technical classes.

6167. Have you thought how this instruction should be given?—I think it is only in the evening it could be given.

6168. Evening instruction?—Yes, evening instruction, so as to encourage overlookers. Last year I was one of the examiners for linen manufacture for the City and Guilds of London for the North of Ireland, and I do not think that out of 60 candidates we had one from Belfast. The reason of that was that the workmen here believed that they could not go in for examinations; that there was no use in studying unless they could attend some class or other. I find to-day from Mr. Barklie that they can. That is not generally known. I have known some overlookers who have studied hard and got well posted up in machinery and attended a night school, with a view to compete, but they did not get the chance, and now they are thrown back.

6169. (*Chairman.*) They did not get the chance; what do you mean?—They did not know where to go to get examined. Last year there was no class in Belfast for the examination at all.

6170. In what subject?—In spinning.

6171. You think a special examination in spinning would be an advantage to the overlookers who would get a certificate of having passed the examination and thereby increase their chance of getting a good situation?—Yes, I should say that, and I think the employers should aid any of the overlookers, and give them a further step in advance when they had gained a certificate of merit.

6172. If facilities were increased for this sort of instruction, you think they would generally avail themselves of it?—Yes, I do. I should like it to be fully known that the overlookers and mechanics and such like could be examined if they wished to compete.

6173. (*Mr. Magnus.*) In the cases you examined did you find the knowledge of the overlookers very deficient?—I do not think we had any overlookers as candidates at all. As to those examined, I may say that I thought their knowledge of flax spinning very trifling. I thought they knew very little indeed about machinery.

6174. And you think their knowledge might be considerably improved if they had the opportunity of having the processes of flax spinning and manufacture explained to them in evening classes?—Yes, I do. I think it would be a great benefit to the working classes, and to the overlookers also.

6175. And you think that that kind of instruction would be of benefit to the overlookers in making them more efficient, and also would be of benefit to workmen and other persons who are aiming at being overlookers or managers?—I do.

6176. Have you any suggestions to make as to the kind of instruction that should be given to those engaged in spinning or weaving?—Well, I think mechanical drawing is what they require, and I believe if they understood chemistry it would be of great benefit to them. If I were young again, I should like very much to attend Professor Letts' class. If I knew anything about chemistry, I could help our spinning very much.

6177. (*Mr. Slagg.*) What direct application would the science of chemistry have to spinning?—We spin in hot water, and one spinner will have say 100's lea yarn spun with cold water, another will have luke-warm water, and another boiling water; and yet each will say "I am right." We, who are not certain about it, cannot say which is

correct. There is a sort of gumminess in the fibre of flax, and we do not know how far we should go with this hot water in treating it.

6178. And the science that underlies the whole of that process seems to be imperfectly understood?—Yes, everyone does the best he can. In France they spin in cold water entirely, and whether they are better posted up in science than we are or not, I cannot say.

6179. Have you reason to believe that they are better informed scientifically in France?—Yes, I think they are, as they have had the advantages of the technical school for years, but as they cannot surpass us in spinning, they apparently do not apply their scientific knowledge. They have not the energy that our workpeople have.

6180. Are their overlookers and managers better educated on the whole?—No, I do not think it.

Mr. ROBT. McBRIDE, Glenalina Bleaching Co., Glenalina, Belfast, called.

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6181. (*Chairman.*) You are well acquainted with the bleaching of linen?—Yes.

6182. Would you kindly give us, in a very few words, the most improved method which is now adopted for the bleaching of linen?—With regard to the improvements in the bleaching of linen, we have tried many processes, and so far with very little effect.

6183. Then your process remains the old original one?—It remains much as it was many years ago. Lime was introduced in preparatory boiling and, in some instances, the ash more causticised about 25 years since, which quickened the process and improved the colour. The gentleman who built the place that I occupy was a man who wished to be the first in Ireland, and indeed first in the United Kingdom, Mr. John Patterson. He spent a great amount of money in introducing improvements; he had a very good place, and to improve this, he went to England and elsewhere and tried to introduce the same principle in the bleaching of linen that had been so effective in the case of cottons. He spent a large amount of money in the place, and remodelled it once and again, with the effect of losing money in the experiments.

6184. (*Mr. Stagg.*) It was bleaching by machinery?—Yes, bleaching by machinery. I tried the same on representations to me. I went into it most particularly, and found that I lost money over the improvements.

6185. (*Chairman.*) Then it did not prove successful?—No. I gradually receded step by step to the point where I found that machinery would be effective; and at this point, of course, I gradually arrived, but at a good deal of risk; and in this position I have been for the last 18 months or two years. It is fairly successful, but altogether, bleaching in Ireland is very unsatisfactory.

6186. Is it your opinion that it is for want of scientific knowledge—a knowledge of the principles of chemistry—or is it a difficulty which is inherent in the nature of the material employed?—Well, to look at the master bleachers, managers, and foremen, there is not anything like the practical and scientific knowledge that there should be. Very few master bleachers know enough about chemistry; there might be one or two in the trade who have some knowledge.

6187. Do you think those men, or their sons, or apprentices would take advantage of a science class, or are they too old and too much wedded to their old opinions to do so?—The foremen would be too much wedded to their own opinions to take advantage of such classes,

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but young men coming forward would be ready to do so. Such foremen as we have are not to the advantage of the trade; they generally work to the "rule of thumb." Still, even in this way, a careful man with good judgment is fairly successful. Everything in connection with bleaching is affected by many causes. There are changes in the material, and in the linen itself so many sets and so many different makes; and then there is such great difference in effect of the weather, between dry and wet, cold and hot seasons, when cloth is on the grass, that it takes the closest possible watching, independent of scientific knowledge altogether; but with a scientific knowledge I am sure there could be much greater success.

6188. You think for the master bleachers and the bleaching foremen in the neighbourhood it would be the best not only to endeavour to establish such a school and support it, but that they would assist the young men in taking advantage of the opportunities that such a school would afford?—They should do so. Their absence at this meeting of the Commission does not say very much for it. I am the only one connected with the bleaching trade here to-day. That may perhaps be accounted for by the distance at which bleachers live.

6189. They may wish to preserve the secrets of their trade?—They try to do so, but I do not think any of them have much that is worth keeping.

6190. Just so; that is generally the case?—Yes. For instance the best opinion that I have received on the subject of bleaching and printing in this neighbourhood within my acquaintance of it was from the late Mr. Joseph Fulton, who was a practical man in the matter of bleaching and printing. He was not at all of that secretive character. In fact he was my greatest friend when I came to this neighbourhood and found the difficulties which I had to encounter in the place which I carried on. Others could not give me an opinion of any use. There is a difference with regard to the position of the present schools and the advantages they present in respect to spinning, printing, and dyeing. Perhaps there would be a difference between the services it might render to the former and to bleaching in this way. Bleach-greens are scattered away over the country. Young men, the sons of owners of such places might, and I am sure will in future, attend more regularly and more fully to such classes as those established by Professor Letts and Dr. Everett. The young men who attend Mr. Barklie's classes in the evenings in the Working Men's Institute, are generally apprentices in chemists' shops and young men who take more or less interest in science, but bleachers are employed at a distance from Belfast.

6191. Living in the country, it would be difficult for them to attend?—It would be a disadvantage to walk in here after a hard day's work, even for the nearest of them.

6192. Still some arrangement might be made by which these difficulties might be met, but we need not enter into the details?—My idea with regard to that is this: The advantage gained by a technical school or by some addition to present elementary education would give lads who had the idea, an opportunity of turning their attention to something of the kind, and an opportunity of getting a good basis of chemistry before they would go out into the country and enter into bleaching establishments. When well grounded in the elements beforehand, then they could bring the knowledge into effect, and if they found it necessary afterwards, they might be able to make considerable improvements by studying works such as yours and others that have been popular. They would thus be able to use all their knowledge, and bring it into active operation in connection with bleaching.

6193. (*Mr. Slagg.*) How is your industry here, compared with continental bleach-greens?—We have an advantage in the humidity of the climate and in not having such changes in the temperature as they have on the Continent and in America. That is the principal advantage we have in this country.

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6194. On the other hand, you have the inferior influences of the sun?—Yes; but the influence of the sun even with ourselves is sometimes too great. In fine linens we must not force them; it is a matter of coaxing; we must bring them forward gradually. If we “hit them hard,” all the colouring matter remains in the centre of the thread. So soon as cloth is submitted to chlorine—particularly fine cloth—nothing more can ever be taken out of the centre of the thread again. It is not a matter that can be removed by washing, boiling, or anything of that kind. It must be removed from the heart of the thread, where it is like the pith of a rush, before it is submitted to the action of chlorine.

6195. As regards climate you stand in a superior position?—Yes, in a superior position. That can hardly be taken from us; but either we are losing to a large extent the art of making pure white colour or else the demand is becoming so great that we cannot come up to it. Certainly the demand for white colour has greatly increased in the last few years. My experience extends over 19 years, and the demand for fine colour is much greater than it was then. There is no such thing as disposing of inferior colour to any advantage in the fabrics referred to. These very fine fabrics are the only materials in the ordinary course of things that we can hold. In coarse materials, domestic goods, or that sort of thing, the continental people can bleach nearly as well as we can.

6196. But not better?—Not better.

6197. In these white colours you can compete successfully?—We can compete successfully, but we are not in a satisfactory position.

6198. As to the application of machinery to bleaching, how are your continental rivals? Do they push it further than you do?—The continental bleachers send their young men to such places in this country as they can get them into, but it is generally the same machinery to a large extent that is used. They have introduced more or less roller washing, but roller washing is very little used in this country in white bleaching. It was to this I referred before, as being unsatisfactory and attended with risk.

6199. Are they superior in the application of science to bleaching—your continental rivals?—I do not think that they are far ahead of us.

6200. In fact, where such an attempt has been made it has not been successful?—Except in finishing materials it has not been at all successful, though many new items have been introduced.

6201. Then you consider that your position is, on the whole, satisfactory?—We can compete successfully, but we cannot comply with the demands made upon us. At least, I do not consider, on looking over the country, that bleach-greens are doing at all well. I think the present season has been one of the worst for the bleach-greens that I have heard of. Those who have been pushing the fine linen to the whiteness of colour that is demanded by the merchants have been very unsuccessful.

6202. (*Mr. Magnus.*) Do you think there would be any disinclination on the part of bleachers to allow their apprentices or young workmen to attend classes on this subject?—No disinclination at all, quite the contrary; but from the position of bleachers scattered over an area of 20, or 30, or more miles, it would be difficult for them to attend during

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the three months course, or something of that kind, unless they lived here.

6203. (*Mr. Slagg.*) At the same time you consider the addition of scientific knowledge would be very useful?—Yes, scientific and chemical knowledge would be extremely necessary; none, as I said before, of the master bleachers know much of chemistry. The managers, very few of them, understand it, and the bleachers themselves have but a smattering of a few things.

6204. (*Mr. Magnus.*) You do not think that fear of their secrets being discovered would prevent the managers of bleachworks from giving permission to their employes to attend technical classes on such a subject?—I do not think it would at all; the difficulty as regards their attendance is the distance. I think young men coming forward would do better to get their education as much as possible before entering bleach-greens, and then they would be so far efficient in the business that they could bring science, especially chemistry, to bear on it.

6205. (*Chairman.*) Would you have them educated beforehand as much as possible?—Yes, and then if they saw anything in going through their business they could bring their scientific knowledge to bear on it; when we should certainly have the advantage.

Prof.
J. D. Everett,
D.C.L., Ph.D.

Professor J. D. EVERETT, D.C.L., Ph.D., Queen's College, Belfast,
called.

6206. (*Chairman.*) You are Professor of Natural Philosophy in the Queen's College, Belfast?—Yes.

6207. Would you kindly give the Commission any information you can with respect to your own special department of science?—Well, I have not prepared any special statement, but I can state what is being done at the Queen's College now, and what would be practicable. There is a professor of engineering, and there is a degree in engineering granted by the university, for which we send up our students. The course for the degree extends over three years, it is very complete, and gives young men a very excellent preparation as regards knowledge of engineering subjects. It includes three years attendance upon my classes. We have from 10 to 15 engineering students, as years go. There is a somewhat complicated arrangement of examinations under the university; it was so under the late Queen's University, which is now abolished by the Government; it is still more so under the Royal University that has taken its place. That necessitates a somewhat complicated arrangement of our college classes, and it would not be practicable with our present staff to establish evening classes, or to make any considerable addition to our work for technical education; that must be distinctly understood. I have always said, "I cannot put on any extra class for technical education unless considerable assistance is given to me." We have excellent facilities for the experimental illustration of lectures.

6208. You agree with Dr. Porter as to the College, especially as to its value for the teaching of teachers and for the higher class of instruction?—Certainly; we can give excellent training in science, except that we cannot train them to use their own hands. I have no facilities in my department for teaching young men to work themselves at apparatus, though I have very good facilities for letting them see what I am doing.

6209. That, however, is a very great want, and one which you desire to see remedied, I presume?—There is a very great want of a physical

laboratory, where students could be trained, and I should require an assistant to take charge of the training of the students under me.

6210. Quite so; we hope to see your class-room. Is there any other remark you wish to make?—I may just say that I have a very strong opinion on the general subject, that in every branch of manufacture those who are going to be managers ought to have a thorough training in branches of manufacture connected with their own business; for although in their regular apprenticeship, of course, they will be fully taught the particular processes which have been adopted by those who went before them, yet, in order to enable them to make improvements, they require to be taught, not only what has been done in their own line, but also what is being done by other people in kindred lines. For instance, weavers of one fabric should know what the weavers of another fabric have to do, and, whatever a man's branch of manufacture may be, he should have an intelligent knowledge of kindred branches of manufacture, that he may obtain further ideas when necessary, with a view to making new inventions.

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PROFESSOR LETTS, Queen's College, Belfast, called.

Prof. Letts.

6211. (*Chairman.*) You are Professor of Chemistry in the Queen's College. Can you make any suggestions to the Commissioners on the subject of their inquiry?—Yes; I have thought over one or two things which I desire to say.

6212. Kindly state, in the first place, whether you agree generally with the statements made by Professor Everett as to the College?—There are one or two points on which I differ slightly from Dr. Everett. There are none on which I differ from Dr. Porter. I am particularly interested in this movement, because, when I was Professor of Chemistry at Bristol, I was engaged on a scheme of technical education at Stroud. I have taught manufacturers and employés, chemistry as applied to the woollen industry, and I have had very many opportunities of seeing the effects of science, especially chemistry, in carrying out improvements in that industry. That is one reason why I am interested in the movement; and another reason is, as you know, that chemistry has done more for the improvement of manufactures than any other science; and the more I see of Belfast, the more I feel that technical education is very badly wanted here. You have heard several statements to-day which fully bear out that view. For instance, you have heard that the processes of bleaching have not been materially improved nor altered since they first came into use. There is still the grass bleaching and the chlorine bleaching, and you have heard also that it is very difficult to fix the colours upon linen, and I believe that is one of the great difficulties which the dyers have to encounter here. The chemistry of cotton fibre fabrics has been well investigated, whereas the chemistry of the flax fibre has not been so thoroughly investigated. I am quite convinced that if the employés in manufactories, sons of manufacturers, and their managers had a sound knowledge of chemistry, they would make very important improvements, not only in the preliminary processes through which flax is put before it is spun, but also in the dyeing of flax, the fixing of colours upon flax and in the bleaching of linen. Complaints of difficulties constantly reach me from manufacturers that they cannot get certain effects from certain colours. They may be easy enough to get with cotton, but not with linen. Scientific knowledge would, of course, remedy that to a large extent; and I have been sorry to observe since I have been in Belfast that the

Prof. Letts. sons of manufacturers, and those in a similar position of life, have not used the opportunities afforded them at the Queen's College for a scientific education, as I should have expected. In fact, I only know of one or two students who have worked at practical chemistry who have been drawn from the manufacturing class. I think that this is a very remarkable thing, because, as you know, in the large towns in England, and especially on the Continent, manufacturers' sons study science very carefully. Here it does not seem to be the fashion. I am quite sure that if they were to work in the laboratory they would gain very important information which would be of the greatest service to them afterwards. I may state that I knew one gentleman who worked in the laboratory, and was assistant, I believe, to my predecessor, Dr. Andrews. He is now engaged in the linen industry, and I heard from a friend of his that immediately on entering the manufactory he thought of improvements in the linen processes, which are now yielding a considerable revenue, entirely in consequence of his chemical knowledge, which he gained in the laboratory. At present there are very few of the manufacturer's sons, or those who intend to be managers, who are attending classes at the College where they would get the higher scientific education which is so necessary for them.

6213. Do you think the present movement in favour of technical education would bring home to the manufacturers the necessity of taking advantage of existing facilities?—I think that has been shown already. I believe that the question is beginning to be brought home to them; for, as the President of the College said a little while ago, a movement to obtain increased accommodation in the chemical department of the College was very warmly taken up by some of the manufacturers and chief men of the town.

6214. (*Mr. Magnus.*) Do you think that any large number of manufacturers send their sons to any other colleges for training?—No. I think not.

6215. Do you think many of the manufacturers send their sons to Germany in order to study at the advanced colleges there?—I presume you refer to the manufacturers of Belfast?

6216. Yes?—I think not. I know of only one case.

6217. You think that there is a want of appreciation amongst the employers of Belfast of the advantage which a knowledge of science would be to them and their sons?—Yes, I believe it is due to that, to some extent, that there is a want of improvement in the linen industry. I know of very few men getting a scientific education with the view afterwards of becoming manufacturers, and I think the want of scientific knowledge is very severely felt. I ought, perhaps, to state that there is very considerable excuse for their not going to the College, because of want of accommodation in its chemical department. It is quite probable that more would come if there were proper laboratories. The course of lectures is perfectly full, and though at present they could get the instruction, we have not the laboratories.

6218. (*Chairman.*) Have you lectures on technical chemistry as well as on general chemistry?—No, for the very reason I have mentioned.

6219. But such lectures could be given if the demand presented itself?—Yes.

6220. And they would be given if you had the facilities?—Yes, I believe you could not get a better class of students in the world. I have had a little experience of continental schools and Scotch schools as well as of English schools, and certainly I have not seen students anywhere so attentive or so able as the Belfast students are.

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6221. (*Mr. Magnus.*) Would you attach to your department a technical school for special instruction in dyeing?—I think that could be done better in connection with a technical school.

6222. Are you acquainted with the Dyeing School at Leeds?—I am not, I am sorry to say. I am familiar, of course, with its reputation, but I am not personally acquainted with the school itself.

6223. Have you any opinion, as a chemist, to offer to the Commission with regard to the advantage of such schools as the Dyeing School at Leeds in the practical teaching of dyeing?—I feel very strongly on that point, that with a school of the kind here immense improvements would be made in dyeing. It is simply because the dyers and printers in Belfast have no means of getting information that they are unable to reproduce colours and fail to obtain the effects which continental dyers get. A dyer here is unable to get any instruction, at all events in dyeing, and I am quite convinced that if a dyeing school were started here it would be of very great service to them.

6224. Do you not think that the instruction the student would get in the ordinary chemical laboratory, supplemented by such practical teaching as he would receive in the dyeworks themselves, would be sufficient?—No, I do not think it would be sufficient, unless he were under the superintendence of a teacher of dyeing.

6225. (*Mr. Slagg.*) Are you familiar with the facilities which exist in continental countries for providing education in the sciences which underlie the linen industry?—I think I may say that generally I am. I was myself for a year and a half at the Polytechnic at Vienna.

6226. And you consider they are very much superior to those found in this district?—There are none in this district.

6227. I understand you to say there is little systematic application of science in this district?—Very little.

6228. And for that reason you are at a disadvantage here as compared with other places?—Yes. If you take England you will find that science has been far more appreciated in the manufacturing towns than it is here. I do not think it has ever been brought home to the manufacturers here that improvements could be made if they had some scientific knowledge.

6229. Scientific knowledge "brought home" to the masters and managers?—Yes; to the masters and foremen.

6230. And to the working classes?—Yes.

6231. Can you tell us in what degree it can be afforded to operatives?—I had at Stroud a class of 50 or so. In this class there were a few operatives, and I do not think that they took so much advantage of it as I expected; but the masters and managers took a great deal of advantage of it, and before I left they were utilising the waste products, and recovering indigo, &c., and the utilization of waste products is a very important matter frequently solved by science.

The meeting was adjourned.

QUEEN'S COLLEGE, BELFAST.

Saturday, 9th June.

Conferences at
Queen's
College.
9 June 1883.

In the afternoon Dr. Roscoe, Mr. Magnus, and Mr. Slagg, M.P., visited the Queen's College, Belfast, where they were received in the council chamber by President Porter, Professor Purser (Registrar), and several of the other professors. The Commissioners inspected the various departments of the college. While in the chemical class rooms—

6232. *President Porter* stated :—In the higher department of practical chemistry it is impossible to get full instruction in Belfast, not because of the want of admirable teachers such as Dr. Andrews and Dr. Letts, but from the want of accommodation and of appliances. In fact the men who have desired to study chemistry thoroughly have been obliged to go away to the continent. For instance, Professor Hodges' son was obliged to go and procure his higher instruction in Switzerland. In such places as the great school at Bonn, they have far more appliances than we have, yet this is the centre of a wide district where applied science is absolutely necessary. Some of our students go to Berlin to get their higher instruction, and some to Vienna.

6232a. (*Mr. Magnus.*) How many students have you accommodation for in practical instruction?

(*President Porter.*) Fifteen.

6233. (*Mr. Magnus.*) How many students have you in the chemical department?

(*Professor Letts.*) I think, taking practical students, and including those attending lectures, there would be 200.

6234. (*Mr. Magnus.*) And have you only accommodation for 15 at a time to do practical work?

(*Professor Letts.*) Yes.

(*President Porter.*) The Board of Works have prepared plans for a new department in chemistry, histology, anatomy, and mechanical philosophy. The total expense would be about 8,500*l.*, and an application was made to the Government; they have not absolutely refused it, but they put us off from year to year, which is most injurious to the College.

6235. (*Mr. Magnus.*) What sum have you annually to expend on the library?

(*President Porter.*) We have about 600*l.* a year for the use of the library,—new books, binding, repairs, and other library purposes.

6236. (*Dr. Roscoe.*) And do you find that sum sufficient for keeping up the library?

(*President Porter.*) I think it is sufficient.

6237. (*Mr. Magnus.*) And that sum is annually spent?

(*President Porter.*) Yes, and we could spend a great deal more, and expend it profitably too.

6238. (*Mr. Magnus.*) What is the average amount of fees which your students pay in arts?

(*Mr. J. Wylie, bursar.*) About 8*l.* 10*s.*; and in the medical course it would average about the same.

6239. (*Mr. Magnus.*) That includes fees for attendance in all the classes in the prescribed course?

(*Mr. Wylie.*) Yes, it is somewhere about 10*l.* 10*s.* for the first year, and after that it amounts upon the average to about 8*l.* 10*s.*

6240. (*Mr. Magnus.*) What is the total amount of money you receive from the Government, exclusive of the fees? *Conference
at Queen's
College.*

(*Mr. Wylie.*) We have 7,000*l.* from the Consolidated Fund, and 1,600*l.* for the maintenance of departments. 9 June 1883.

6241. (*Mr. Magnus.*) Have you any scholarships leading up to this college?

(*President Porter.*) Nothing direct from schools except "The Sullivan Scholarships." There are three scholarships called "The Sullivan Scholarships," which are founded under the will of Dr. Sullivan, in Queen's College, Belfast, tenable for three years, and of the annual value of about 40*l.* each. Candidates for two of these scholarships must have acted as teachers or assistant teachers, during at least two years in Irish National Schools; and candidates for the other scholarship must have been pupils during at least three years in the schools of the Royal Belfast Academical Institution. Then there are the Porter Scholarships, value 50*l.*, and tenable for two years, which are awarded each year; two Dunville Studentships, each tenable for two years, and of the value of 45*l.* for the first year and 100*l.* for the second year; the two Pakenham Scholarships, which are of the annual value of about 25*l.* each and tenable for two years; and the Andrews Studentship, which is awarded every two years, worth about 150*l.*, taking the two years together.

6242. How do you distribute these?—By examination.

6243. Are those examinations held annually?—Yes, and are open to all classes and sects, and to students from every part of the kingdom.

6244. Do you know the total amount of funds you have distributed annually through the college from private endowments?

(*Mr. Wylie.*) We receive annually from private endowments about 500*l.*

(The visit to the college then terminated.)

TWENTY-FIFTH DAY.

Meeting at BELFAST.

Second Day.

Monday, 11th June 1883.

PRESENT :

PROFESSOR H. E. ROSCOE, LL.D., F.R.S., IN THE CHAIR.

Mr. MAGNUS.

Mr. JOHN SLAGO, M.P.

[The Commissioners resumed their sittings at 10 o'clock a.m. in the Chamber of Commerce.]

Mr. ROBERT BARKLIE, F.C.S. called.

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6246. (*Chairman.*) You are Science Master and general Superintendent of the Education Department of the Working Men's Institute in Belfast?—Yes.

6247. Will you kindly give the Commission, so far as you can, a concise statement respecting the foundation of, and the working of this institute?—I believe that it originated in this way:—There was a feeling in Belfast that there was no place where the working classes might meet, either for social conversation, the reading of newspapers, to hear lectures, or anything of that kind, outside the public-house; and this institute, when it originated, took the form of a kind of temperance movement. It was opened about 1872 for the admission of members. So far as temperance is concerned it does not directly advocate it or anything else of the kind. No intoxicating drink of any kind is allowed to be sold or consumed on the premises; no meetings of trade societies or of masters are permitted to take place in the building, or any meeting where any agitation either for the increase or decrease of wages could take place. The committee are elected annually. The members pay from 1s. to 1s. 6d. per quarter, or 6s. per annum for the use of the newsroom, library, and amusement room. That is apart from the teaching. So far as the science teaching is concerned, that may be said to have been introduced by myself. It was not directly stated as part of the original intention of the founders of the institute, but it was soon found that it would be desirable, and as one of the members of the committee first elected, I thought it would be advantageous. The committee then gave the use of the rooms free of rent, or gas, or anything of that kind, except a fee of 1s. per pupil per quarter, leaving me to manage matters pretty much as I thought best. That is the only aid the institute gives. The management of the classes up to

the present, the employment of the teachers, &c., rests with myself, subject to the approval of the Science Committee.

6248. Will you give us a list of the science classes held in your institute?—There are classes in all the Science and Art Department subjects, with the exception of mineralogy, metallurgy, navigation, and nautical astronomy, for which no demand exists. These are the only subjects on the lists, not included in our classes. The class which has the largest attendance is mathematics. Last year we had about 170 on the roll. Then machine construction and drawing, and as this class is so large and requires a great deal of accommodation, the large hall is utilized for that subject. I think there are 120 persons on the roll, and 85 presented themselves at the examinations of the Science and Art Department. The next largest class is chemistry. It includes inorganic chemistry, both theoretical and practical, and also organic chemistry theoretical and practical. The number on the rolls in chemistry last year was about 120. There are now 30 working benches in the laboratory, and owing to the altered arrangements, which I think a great advantage, we can have a greater number of students, working in relays, than formerly.

6249. Your arrangements for practical chemistry have, of course, been passed by the Department?—Yes, and it has also been recognised by the Pharmaceutical Society and the Committee of Council on Education. Our chemistry class has been in many ways remarkably successful, so far as can be judged by the success of the students who have gone elsewhere.

6250. Can you give us any idea of the class of persons who attend those various classes?—Three-fourths are purely of the artisan class; to a great extent they are the apprentices. With them there are the more intelligent of the clerks, who, by the way, are not altogether exactly clerks, but rather those engaged superintending the various departments of the warehouses, and so on. We have a large number in chemistry preparing for the examinations of the Pharmaceutical Society, my certificate being recognised by its Council. There are also some bleachers and others who come a great distance, and are not connected closely with the neighbourhood of Belfast. I have had some from Ballymony, and some from Banbridge and elsewhere.

6251. Can you give the Commission any reason why the sons of artisans connected with the dye works immediately around Belfast do not take advantage of this institute?—Well, there is really only one large dye works in the immediate neighbourhood of Belfast. One reason, I think, is that they are discouraged by the foremen in the different departments. The foremen, I am afraid, are beginning to think, in many instances, that many of those apprentices are getting to know a great deal too much. The foremen in the dye and bleach works about Belfast simply work mechanically, aided by old receipts which are in the hands of some, and supposed to be secrets to some extent, but I need hardly tell you that such is not the case. I am afraid also that manufacturers are not alive to the advantages that would be secured by encouraging these classes. It has been said to me by manufacturers in Belfast that all who are trained in the classes wish to be foremen or managers at once, and that is one of the drawbacks. Openings are not made for them, and they do not get openings to the extent to which they are entitled by their scientific training.

6252. I see that you have exhibitions from your classes to the local college of the Queen's University, and also to the Royal College of Science?—Yes.

6253. What can you tell us about the working of this system of instruction?—The merchants of Belfast are generally very willing to

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subscribe for prizes, or to the raising of funds for a local exhibition. Many of our students who have gained those exhibitions, have, in the competitions in the Belfast Queen's College, obtained the first prizes in chemistry. Our last exhibitors have gone to the Royal College of Science. Mr. Samuel Templeton is the present holder, and he obtained the highest position in chemistry at the Royal College of Science last year, gaining 94 per cent. of the total marks. That is on the authority of Professor Hartley. The marks were gained on both papers, the one by yourself, Dr. Roscoe, and the other by Professor Hartley.

6254. Do you think such a young man as that, having received a thoroughly scientific training, is likely to obtain employment in the general industries of the north of Ireland?—I am afraid not. His course will be finished at the end of next session and he is afraid he will have to look for employment in England, there being apparently no opening for him in the north of Ireland.

6255. (*Mr. Slagg.*) Why is it that there is no opening for him?—The merchants and manufacturers, on the whole, have not hitherto been prepared, or they have not had the openings, or they have not given the preference to local men. I do not know what cause to put it to, but here is a young man of 19 or 20 years of age, an artisan who, I believe, is about the best chemist of his age in Ireland at present, with the feeling that there is no opening to which he can turn his attention in Ireland.

6256. Is that because no openings exist, or because there is a prejudice in favour of somebody else?—The positions in which he would be of use, are at present occupied by other people, whether qualified or not. Some person employed by the firm is promoted to such positions, when vacancies do occur, though inferior to the person whom I have pointed out.

6257. And they are without scientific knowledge?—Without scientific knowledge. I believe scientific knowledge is the exception.

6258. (*Chairman.*) Do you believe from the working of these science classes in the institute, and the interest now taken in educational questions, that such a state of things is likely to be overcome, and that the value of instruction in science is now better appreciated than it was?—I believe that at present there is a strong feeling on the part of manufacturers and others that scientific training will be of benefit, and that the time is rapidly approaching, if it has not already come, when scientific teaching will be better appreciated than it has hitherto been.

6259. I suppose you would look upon the science classes at your institute as forming the foundation on which a thoroughly equipped technical school might be laid?—I believe the classes in the Working Men's Institute have laid the foundation of what has given rise in a great measure to the present feeling in favour of a technical school. Mr. Jaffe, here, who is a member of the committee, or any other gentleman on the committee, will, I believe, bear me out in that.

6260. You think your classes would form an introduction to the more advanced classes to be held in the technical school?—I think so.

6261. Besides the science classes to which you have alluded, I understand that you also carry on classes in the institute in connection with the City and Guilds of London Institute?—Yes, these have been recently introduced. They were stopped one year owing to my own illness, and they have not, on the whole, been altogether successful. We have a class in linen manufacture, which is not very largely attended; even this class is attended principally by people from a distance, not Belfast people, but people who come a considerable distance. There is a tolerably successful class in mechanical engineering taught by Mr. Florde.

Its advantages are confined exclusively to the apprentices from some of the foundries and machine works. This class of students will be found in the drawing classes in connection with the Science and Art Department.

6262. Do you think this laxity on the part of the community, where such classes exist, would apply to technical instruction?—There are several circumstances that appear to me to account for this laxity. There is first the want of publicity; they are not properly known to the public, and the advantages they offer are to a great extent unknown. Then there is, as is always the case with the introduction of any new system of examination, a considerable amount of uncertainty about the permanency of the examinations, and the arrangements of the subjects. Another thing is the want of teachers to give the necessary instruction, and another is the want of appliances. Here, I think, the technical school would be of the greatest possible advantage. We endeavour to train the students, by the aid of models and diagrams, or something of that kind, so as to supply this deficiency as far as possible. I try to apply the system of getting photographs of the machinery and making transparencies, but even with these, it is difficult to impart the instruction. That transparency (*produced*) is the photograph of one of the spinning frames as constructed by Messrs. Coombe, Barbour, and Coombe, and this I use in the magic lantern; but still it is a poor substitute for the machinery and other proper apparatus.

6263. In the technical school the actual machines would be at work?—Yes, and the teachers would have an opportunity of explaining the different departments as they go through. It is impossible for apprentices and others to get this kind of training in the works, as they are divided into different departments, and a man may spend many years in one department in order to become an expert, but his work is in some limited sphere.

6264. Has there been any difficulty to find teachers in these technical subjects?—Yes, that is one of the greatest difficulties. I was formerly an apprentice in the linen trade, in which I served my time. The introduction of power-loom machinery has necessarily produced some change. I tried this year to get a really good man to teach flax spinning, and a man was recommended to me, supposed to know his subject, but he had no facilities whatever for teaching. After meeting the class four or five times he voluntarily discontinued the work, feeling himself that he could not carry it on.

6265. Speaking generally, you believe that the young men and artisans of Belfast are anxious to obtain such technical instruction as may be offered to them by your institute and the proposed technical school, and also that they are capable of receiving such instruction from the fair groundwork of elementary education which they obtain in the National schools?—I believe so.

6266. And you are of opinion that this instruction will materially benefit the staple trades and industries of the district?—I believe it would do so very much, and I do not know any trade in which it is more required than the linen trade. I believe the linen merchants of Belfast are running the risk of driving their trade out of the country by the employment of men ignorant of the necessary scientific principles required in the various departments.

6267. (*Mr. Slagg.*) Does that apply to the workmen alone, or to the masters and foremen?—To all.

6268. To masters and foremen as well?—Yes; I believe you could hardly find in the Belfast linen trade, commencing with the master and coming down to the humblest working men, a man who possesses any-

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thing like an accurate knowledge of the scientific principles of the trade in which he is engaged.

6269. What is your opinion as to the scientific knowledge of the managers, and the training they have received in school adapting them to the business?—With one or two exceptions they are men who have received no such training, except what is general education, or such as has been acquired in the mere routine work of the office or the warehouse.

6270. And as to the scientific attainments of the masters?—In my opinion they are *nil*. I may be wrong to some extent. There are a few men in the trade who have received a university training, but that training is not applicable to their present employment.

6271. Do you think their sons are likely to get a better training than their predecessors?—I am afraid not. The best training of all, is being received by the apprentices.

6272. (*Chairman.*) Returning to the question of the extension of these technical classes, have you any suggestion to offer to the Commission by which the work of technical education, and of the classes connected with it, could be improved?—There was a plan adopted, and I believe is still carried out by the Science and Art Department, which would be of general advantage, I believe, if it were adopted in this district by the City and Guilds of London. Mr. Buckmaster was appointed organising master, and he visited various towns and districts, and explained the benefits of the system, and this led to the establishment of many science classes, some of which are still in operation. I believe if the City Guilds would appoint temporarily one or two organising masters, it would bring the matter home to our artisans and others, in a way in which it could not be done otherwise. This, I think, could be done very successfully. One or two of their own teachers, or of those connected with their schools, might be asked to visit outlying districts or provincial towns, and to explain the matter, and I think a considerable amount of benefit would flow from that course.

6273. (*Mr. Magnus.*) Can you say if the numbers of your students in the technical classes have increased during the past year?—The number attending has increased, and there has been a larger number present for examination. I think the number this year is 33. However, that is still a very small number compared with what there ought to be. Mechanical engineering gives the largest number.

6274. Have you any suggestion to make regarding the manner in which teachers for these technical classes might be trained?—Well, there is some difficulty also with regard to that. I believe some advantage, though not possibly all that might be expected, would flow from having a short course given, on the plan adopted by the Science and Art Department, in the new college you have established in London, where teachers could see the system adopted, and then use it as a kind of model on which they might work. I think that would do; otherwise I can hardly see at the present time how the teachers of technical classes are to be obtained, or how the blank is to be filled at present. I do not see how the training in the universities is at all likely to supply this want.

6275. You do not think that teachers of technical subjects might be trained at the Queen's College here?—The Queen's College arrangements might be so altered as to give some of this technical training, but as at present conducted, and with my experience of from 10 to 12 years of that College, I should say that no such thing as technical education can be given by the system as it at present exists there.

6276. I think you said the number of students who go in for the technological examinations, was small compared with the number who attended the technical classes, and hence the teachers received smaller fees?—Yes; and that is the case also with the classes of the Science and Art Department. There is a sort of feeling on the part of some of the foremen and others who occasionally put in an appearance at the classes, that they might fail at the examinations, and that they would be lowered when compared with their apprentices; further, they do not like to study in the same class with the apprentices.

6277. Can you suggest any means of inducing students to attend those examinations which have not yet been adopted?—I believe it would be better if the merchants and employers of labour would give the preference, all other things being equal, to those who have had the benefit of the classes connected with the Science and Art Department and the City Guilds. I think it a pity that there should be about 500 individual students on our class rolls as during the past session, and that only 267 presented themselves for examination. I think a suggestion of this kind made to the manufacturers would be attended with better results when made by any public department than if it came from any school or teachers. I do not know any way in which the Commission could assist in having this state of things remedied.

6278. Do you think that in this respect Belfast is worse situated than any other town in the United Kingdom?—Oh, I think not.

6279. The only assistance in this case must come, you think, from the manufacturers?—I think so; possibly in large towns, like Manchester, Birmingham, and Leeds, where these classes have been for a long time established, and where the certificates obtained at the examinations are better appreciated than in Belfast, there is not the same objection to coming forward to the examinations.

6280. You mean that the employers of these young men should in some way insist upon their examination?—I do not think it would be wise to insist upon that; but if they would encourage them, it would remedy this state of things very greatly.

6281. You do not think more prizes are required?—No; I should say the Belfast merchants have given liberally towards the prize fund, and also for local exhibitions. The money in most of those instances has been collected by myself, and during the last 10 years I have not received more than one or two refusals.

6282. How many exhibitions have you?—We have only one each year.

6283. Do the linen merchants give any prizes to the students who come out first in technological instruction?—No.

6284. Do you not think a prize of that kind would encourage the attendance of students at the classes and also at the examinations?—I think it would, and I once made the suggestion to the secretary of the Linen Merchants' Association; whether it was considered or not, I do not know, but I think that would be a very great advantage.

6285. (*Mr. Slagg.*) You mentioned the Queen's College as not capable of affording a nucleus for an educational establishment for technical teachers?—I believe the Queen's College could be so modified as to be of advantage, indeed of great use in that way, but as the teaching is at present I should not like to say it is valueless from a technical standpoint, but it is not suited to practical men, or for the training of teachers in technical subjects.

6286. You do not think it is adapted to the scientific requirements of the trade in any sense?—So far as the teaching of the science is concerned, I do not see that anything could be very much superior; that is

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science as applied to the different professions, but for trade purposes it is, in my opinion, almost worthless, except so far as the principles taught can be utilised for this purpose, and I say that as a student who was from 10 to 12 years in connection with the college.

6287. You see no difficulty why that training should not be adapted to the scientific requirements of the trade, for the training of both masters and students?—I believe it could be easily modified, and at even less expense than was mentioned by Dr. Porter.

6288. You have a practical acquaintance with the linen trade in all its branches?—I have; I served my time first, in a department of the spinning trade, and afterwards spent some time at bleaching, printing, and dyeing.

6289-90. You have alleged several reasons why the trade is not progressing, and does not occupy the position it should occupy, and have mentioned a lack of knowledge on the part of masters, foremen, and others connected with the trade; do you know of any other reasons which should militate against the success of the trade?—I cannot say that I do; I believe from the lack of the knowledge which I have referred to, manufacturers are running a great risk of driving the trade out of the country, and I can give you many reasons. I frequently have brought to me samples of cloth which have been returned from India and from other warm climates "tendered," in order that I may assign a cause. Even green linens are not free from this risk on account of the "dressings." Now, if the men employed in the works were acquainted with the simplest elements of chemistry, much of this risk would be prevented.

6291. You see no other reason?—No; of course I am not acquainted with the commercial aspects of the case.

6292. (*Chairman.*) Mr. Barklie, you can also, perhaps, give the Commission some information respecting the condition of primary education in this district; are you, from your own personal knowledge, able to do so?—I am well acquainted with primary education in all its departments. I was for 16 or 17 years connected with primary education and am familiar with the most of its details.

6293. Comparing the primary education of the country at that time with the condition of it at present, can you observe a distinct improvement?—A very decided improvement.

6294. We have had a good deal of evidence on the subject of compulsory education for Ireland, or portions of Ireland, would you give us your opinion on that subject with regard to this district?—I believe it is specially required in the manufactures of the district and the time is ripe for its introduction; we have to some extent a compulsory system already, so far as half-time workers are concerned, but the parents of the children would endeavour to evade this system, and would, in fact, send their children to the workshop at an age earlier than they should. They also take every plan of avoiding the application of the Factory Act. I believe the merchants and manufacturers are willing to carry out the Act faithfully, but the parents of the children endeavour to mislead the manufacturers, and try to get certificates of attendance at school from teachers and others.

6295. You think if an Act was passed to render attendance at school compulsory, it would be generally acceptable, and might practically be carried out at the present time?—I think so.

6296. Keeping to our own lines, can you inform the Commission whether in this part of Ireland there is any system attempted of giving instruction in natural science in the primary schools?—So far as

primary schools are concerned, the teaching of extra subjects is hedged round with conditions that are actually prohibitory.

6297. Can you give the Commission an explanation of what you mean by the statement "hedged round with conditions"?—The children are not allowed to be presented for examination until they have reached a certain grade, which I think is too high.

6298. Which grade is that?—The fifth and sixth standards. I believe that the percentage of the youth of the country that ever reaches these stages is less than 6.

6299. Then would you propose that the elements of science should be taught in the lowest stage at present?—No; I should not say in the lowest stages, but I think that when children reach the age of 14, or from 13 to 14, some instruction in the elements and principles of the sciences connected with the industry of the district should be attempted, and should be placed on the programme.

6300. Even if they could not pass the higher standards?—Even if they could not pass. And some of these higher standards might be so modified as to permit of such science or scientific education being given with advantage. For example, take geography; I never could see much advantage in teaching factory hands to name the branches of the Amazon on the right and left sides; I learned them myself when at school, and if asked at the present time I could give you a very imperfect idea of them.

6301. You think that a little instruction in the elements of chemistry, or mechanics, or botany, would be of greater service to persons who are employed in the flax trade?—Yes, I should say that in agricultural districts a good knowledge of botany might be obtained, and in those schools agriculture should be made compulsory. In town schools I think the elementary principles of the mechanical powers might be taught with great advantage.

6302. Agriculture might be compulsory as one subject?—I think it was compulsory a year or two ago in the rural schools, but I am not quite sure that it is compulsory at the present time. In the town schools it is not compulsory, but I think it is useless in town schools.

6303. You would substitute the elements of science as applied to the special industry of the district, in town in place of agriculture?—Yes.

6304. The position which agriculture holds in the country you would give to the elements of science in the town?—Yes. But with regard to agriculture, as connected with the Science and Art Department, I think there would be a difference; I believe that town schools do an immense deal of good, because a large number of the teachers in rural districts have, while acting as assistants in town schools, been trained in the science classes, for teaching agriculture, whilst others already employed as teachers of country schools come into these classes, and farmers' sons come sometimes a very considerable distance to attend them. I myself, for example, had one teacher who came all the way from Stewartstown to attend a class in agriculture.

6305. (*Mr. Magnus.*) Have you anything to say about the elementary education given in the girls' schools; do you think that sufficient attention is given in the girls' schools to such practical subjects as those of which a knowledge would be of use to them in their own homes?—In all the schools I should say the girls receive a very good and suitable general education. But with the exception of sewing and knitting and, in some cases, the use of the sewing machine, there is nothing taught but the ordinary subjects of the primary education programme; there is no attempt to give instruction in anything else.

R. Barkie,
F.C.S.

11 June 1888.

Mr.
R. Barklie,
F.C.S.
11 June 1888.

6306. Is there any attempt to give instruction in the elements of cookery, for instance, in girls' schools?—Well, I think, there is one school in Belfast which was built by Mr. Charters—the head of a family that has done a great deal to encourage education in the North of Ireland—where lessons in cookery are given, but with that single exception I do not know of any case.

6307. Do you think it would be advantageous if lessons in cookery were given to girls in elementary schools?—I think it certainly would.

6308. And you think that it would not interfere unnecessarily with the time that is and should be devoted to ordinary instruction?—Well, if it did, I think such a subject as geography—and I give it merely as one of the subjects that is required from the pupils of the schools—might be modified so as to admit of this, and in my opinion it would be much more valuable to them.

6309. (*Chairman.*) Passing, then, to the intermediate education in Ireland, I should like to hear whether you had any experience with regard to the working of the Board of Intermediate Education in this neighbourhood?—Well, I am acquainted with the working of it, having taught several of the classes in connection with it, and on the whole I do not think it is doing the amount of good that was expected from it.

6310. You mean that the system has failed to do what it was intended to do, that is, to fill up the gap between the universities and colleges and the primary schools?—In my opinion it has failed to a great extent, and for these reasons; it has not called into existence many (I know only of one or two) permanent new schools; it has not diminished the fees charged in the old established schools, and hence the middle classes, or the higher classes of artisans, are in no better position than they were in a few years ago. Then I think the system of payment by results which the Board have adopted is such a loose one that it amounts to a scandalous waste of public money.

6311. In what way? Can you suggest any improvement in this matter?—Well, I can only point out what the system is in respect to that which I object to, and, of course, it will be for somebody else to say what remedy ought to be applied to it. Payments are made on the results of the examinations to those who do not do the teaching, and on results of teaching which never has been done by anybody; for example, a boy who has not attended any class in botany, and knows only what he has taught himself, the school which presents him for examination receives result fees in botany, though no one even taught him botany. The students attending my class in chemistry,—the class that I am teaching and receiving payment from the Government for conducting (in connection with the Science and Art Department)—are presented at intermediate examinations from our other schools, and payments are made to those schools by the Intermediate Board, though they have not contributed to the knowledge.

6312. Does this apply solely to your neighbourhood, or is it an objection which holds good to the whole of Ireland?—It holds good to the whole of Ireland. In some cases it might not exactly be the same as in the individual instances that I have mentioned; but I believe it is the same everywhere, and I believe that the payments on the results should be on results of work done, and to the person who does the work.

6313. Then is not the payment on the results surrounded by the same restrictions as in the case of the Science and Art Department at South Kensington?—No, but I believe it should be so.

6314. You would reject the existing arrangements of the intermediate examinations and put them on the same footing as those of South Kensington?—Yes.

6315. (*Mr. Magnus.*) I suppose those schools which are not giving science instruction, and which send pupils to science teachers in order to receive science instruction, are deficient in the necessary appliances for such lessons?—They have neither appliances nor teachers in many cases.

6316. Do you know to what extent apparatus and appliances for science teaching exist in the intermediate schools?—I think in most instances the provision is very limited.

6317. Have you any knowledge from personal observation of the schools under the Intermediate Education Board in Belfast?—I have. I have in one or two instances taught some of the classes in those schools, and I have been asked to teach in others, but latterly I have declined such teaching; and in all those cases one of the conditions asked of me was, that I should provide my own apparatus, there being no appliances in those schools.

6318. You think that chemical laboratories exist to a very slight extent in any of the schools under the Intermediate Education Act?—I think with the exception of the laboratory in the Academical Institution there is not a laboratory in an Intermediate School in the North of Ireland.

6319. In consequence of the want of laboratories and the necessary appliances for science teaching, the masters send out the boys to other science teachers to obtain instruction, and they themselves receive payment from the Board on the results of the examination of those pupils; is that the case?—Yes, with one exception. I desire a word of explanation. I do not say—I am far from saying—that the *schools send* them, but the *boys and girls come*, and come frequently from great distances, and the Intermediate Education Board pays the result fees to the school.

6320. In consequence of the want of laboratory instruction and the necessary appliances, those boys and girls go to other schools where the appliances are found?—Yes. Permit me to correct myself, and make a slight alteration. Dr. Henry, President of St. Malachy's College, came and visited my laboratory, and I made some suggestions to him; they possess a laboratory, which is a very good one, and when finished will be very complete.

6321. Can you tell us to what extent these intermediate schools are rendered available for the children of the better classes of artisans and small tradespeople?—I do not think they are available at all.

6322. For what reason?—The fees charged in the old schools remain the same, and are therefore prohibitory, so far as the means of those people will admit. There is no family of artisans that I know of that would be able to pay the fees of, for example, the Belfast Academical Institution.

6323. What are the fees?—Well, as a general rule, they may be stated to be one guinea per class for each subject.

6324. Are there any schools of a higher class than the ordinary elementary schools, to which the children of superior artisans, or small shopkeepers, or the trading classes can go?—No. The intermediate schools in the Belfast district,—the Methodist College, the Ladies' Collegiate Institute (Mrs. Byers's), and St. Malachy's College,—are much of the same standing, or aim at being of the same standing, as the Academical Institution, and are charging much the same scale of fees.

*Mr.
R. Barthie,
F.C.S.*

11 June 1888.

*Mr.
R. Barkie,
F.C.S.*
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11 June 1882.

6325. There are no graded schools, or higher schools, into which pupils from the primary schools who show special aptitude might be drafted? —No. I believe the gap still remains unfilled notwithstanding the introduction of the intermediate system.

6326. Are there many scholarships attached to the primary schools which would take boys from those schools into the intermediate schools? —No. There are only one or two, these were established by the gentleman whose name I have already mentioned; they are called the Charters Exhibitions, and the pupil gaining one of these is entitled to pass from the Belfast Model School to the Academical Institution, and the scholarship money pays the fees.

6327. You think, then, that arrangements are wanting by which the more intelligent boys at the primary schools might be further educated in the schools of higher grade?—Yes.

6328. (*Mr. Magnus.*) Do you consider that the Science and Art Department's examinations in the subject of agriculture tend to improve the teaching of agriculture as applicable to the growth of flax in this district?—No. Flax is not mentioned even once in the programme of the Science and Art Department, and hence there is no instruction given in that department, apart from the general principles of the subject. I have no doubt that good agricultural teaching is being given in the country by men holding such classes, and I believe that there never was a time in Ireland when there were as many good opportunities for instruction in agriculture as at the present day, and that instruction is being given by teachers thoroughly qualified; I myself, as one of the teachers, commenced my course of study under Dr. Hodges. I am an honours man of the Science and Art Department, and several of my students have from time to time gained the highest honours. I know the subject practically, being a farmer's son, and brought up to farming pursuits.

6329. Can you give us your opinion respecting the value of the instruction at Glasnevin?—There are two kinds of instruction given, and two distinct classes of pupils; there are what are called the farm pupils living on the farm and receiving practical instruction in farming operations during the whole of their time. Then there are class lectures given to the teachers in training, that is, the teachers drawn from the different parts of the country. But those lectures are given only once a week. On the whole I do not believe that they are doing very much good. The present system of short summer courses to which a number of teachers are taken up, I have no experience of whatever.

6330. You do not think the teaching is sufficient?—I do not.

*Mr. J.
MacIlwaine.*
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MR. JOHN MACILWAINE called.

6331. (*Chairman.*) You are engaged in the shipbuilding trade in this town?—Yes, and marine engineering.

6332. It is a branch of industry which has been largely developed within the last few years in Belfast?—Very largely.

6333. Do you find that your apprentices and young men take advantage of the science classes of which we have just heard, at the Working Men's Institute?—Yes; in one department the apprentices have come forward very well—that is the marine engineering department. They have got certificates. Several of our apprentices have gone in and passed, and one young man got a first in mechanical engineering, and it was considered an honour.

6334. Do you consider that these classes are really of benefit to your apprentices?—I do.

6335. Have you any arrangements or have you thought of any arrangements, which might be made to assist those young men who bring certificates from these classes?—No, nothing further than that popular opinion might be changed a little. I think there is not sufficient encouragement given by employers or those looking for young men to fill important situations. They have to educate themselves to a certain extent. I think, however, there is a change setting in now; people are beginning to take notice of it, but there is room for great improvement in that direction.

6336. You yourself are in favour of giving an advantage to those who have passed a good examination?—Yes.

6337. You said that engineering had advanced?—It has advanced enormously in Belfast within the last 10 years. Ten years ago we had shipbuilding here, but very little marine engineering. About six years ago there was a very large establishment started, and since that others have taken up the manufacture; and now there are very large numbers of working men employed in the shipbuilding and engineering establishments. I should say there are perhaps 8,000 hands directly employed in shipbuilding and marine engineering in Belfast. Of course the position of this kingdom and of this town has been maintained. I think there is no appearance yet of any competition that is likely for some years to have any great effect upon it. Germany is already making great strides in ship building and engineering. And I believe a better education given to some of the engineers would have the effect of improving our manufactures. This, I think, is a very important point, and one that ought to receive the support of the employers and people who engage sea-going engineers.

6338. (*Mr. Slagg.*) And constructors as well?—Yes. My belief is that as far as shipbuilding proper is concerned, what are called strictly, technical schools could not be made available—that is to say, that men must learn the craft of the shipbuilder in the works, and in the works solely.

6339. (*Chairman.*) I presume that that is not peculiar to your industry. These technical schools are not intended to teach the trade as it can be taught in the workshops, but simply to give a preliminary training and such a general oversight of the operations of the trade as to qualify the young man to learn better and in a shorter time the details which can be learned only in the workshop or manufactory?—Yes. Well, from that point of view I think the technical school would be of immense advantage to all the trades. I think that teaching such subjects as arithmetic and elementary mathematics so as to improve the general intelligence of the workmen, would have a very good effect. Even the youths who are serving their time derive a great advantage from studies in the evening, and I have observed that young fellows who attend classes are more respectable and less liable to fall into intemperate habits, than youths who are idle and who do nothing in the evenings. So that in that way I think preparatory schools for improving the general intelligence of the young men attending them in the evening would be of great advantage. There is just one subject in connection with the shipbuilding trade where purely technical education would be of use, and I think of very great use, that is in the teaching of draughtsmen. A system has been started on the Clyde of teaching draughtsmen in classes, and there are classes in connection with the Science and Art Department where the subject is taken up. There is likely also to be a further development of that undertaking.

*Mr. J.
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Mr. J.
MacLennan.
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Mr. William Denny (of Dumbarton) has taken the subject up, and is very anxious to modify the examinations that are held now in connection with the Science and Art Department in the theory of shipbuilding, so as to make them suitable to modern practice. There has been an attempt made and small classes have been started in connection with that subject in this town, and I think that if the proposed technical school were to take that matter up,—as a purely technical subject,—and would engage a teacher, this teacher might get classes, and the instruction would be of great use to the shipbuilding industry.

6340. You think your views with regard to the advantages thus to be derived are shared by other shipbuilders of the neighbourhood?—Well, I could not say for certain. I think there may be some difference of opinion on the subject.

6341. You do not think that there is any great likelihood that the shipbuilders would themselves come forward and start classes for the benefit of their own industry?—I think not at present. I think that such a thing might be received at first coldly.

6342. Therefore it would be necessary that such classes should be established by the public at large, or by whom?—I understood that the Government were now thinking of extending the benefits of—something like the Science and Art Department system, giving examinations.

6343. Perhaps you refer to the City Guilds Institute?—Yes, I understood the Government were thinking of it.

6344. You think it is a matter of such importance that it is necessary to tax the community in order to raise the character of the workmen in this particular trade?—Well, I think as the community is taxed for National Education, there is no reason why the same benefits should not be extended to people a little further advanced in life—in the character of apprentices.

6345. The difficulty is, of course, that if we begin with that sort of instruction for one trade, where are we to end?—Yes.

6346. (*Mr. Slagg.*) You do not recommend special industrial teaching?—No. I do not think that special industrial teaching of handicrafts would be of any use.

6347. (*Chairman.*) You mean to say that the instruction you would like to give would be such as would be applicable to every large industry?—Yes. I have been so far speaking of shipbuilding proper and marine engineering, but I think that in the construction of marine engines and boilers and the various machines, now going on board ship, there is a larger field for the employment of young men, and I believe that the tendency is now for young men of rather better education, what one may call better social position to learn handicrafts; because there are a great many openings in marine engineering, such as being placed in charge of machinery afloat and on shore. It is necessary for young men to serve their time to this, and I think that the better classes of young men are now going into that branch of trade. Those young men are everywhere attending classes that are valuable to them,—such as applied mechanics, drawing, and that sort of thing. And anything that would give them increased opportunities of learning such subjects as arithmetic, elementary mathematics, and a little algebra, so as to enable them to work out formulæ when they came in contact with any text books, would be of very great use.

6348. (*Mr. Slagg.*) You spoke of Germany as being an expected competitor in the shipbuilding trade. Can you name any other country likely to be a serious competitor to us in the future?—From my own experience I do not know of any other country. We have not seen

any results of such competition yet; the reason I speak of Germany is that we had a steamer here the other day which was built and completely fitted out in Germany. I understand that the wages there are lower, and hours are longer there.

6349. You have no means of forming any estimate of the comparative cost of the construction of this vessel there and here?—I have not.

6350. Do you know anything of the methods of instruction there with regard to shipbuilding?—I do not.

6351. Then as to the position of the masters in this trade, do you find that they are scientifically or technically educated up to a high mark of fitness for the profession?—Some of them are very well educated; the elder men have never taken up the scientific or theoretical part, but I think that the rising men are being better educated.

6352. The coming generation of masters and heads of departments are in your opinion being well prepared?—Yes. But there is nothing pecially being done in Belfast, except the class I mentioned that has been started this winter.

6353. You are now speaking of the masters and heads of departments in the shipbuilding trade generally?—Yes.

6354. Where do they get this instruction as a rule?—Well, in Glasgow there are a great many classes for the apprentices and foremen, and there is a good system of teaching in connection with the Admiralty, and a good many private gentlemen send their sons to be educated there.

6355. Then in your opinion the higher scientific training which applies to your trade is well provided for at the present time?—In England, yes; and on the Clyde; the higher training with regard to masters, for men who can afford to send their young people over to England, is very well provided for. There is on the Clyde a great effort being made to teach the better classes of apprentices of the artisan class; those who are willing to take instructions. There is only one special class connected with the trade of shipbuilding here, and it has been succeeding pretty well.

6356. Where is that?—In connection with the Working Men's Institute.

6357. Do you think that anything more is desirable or could be done here in the direction of higher education in shipbuilding?—I think that more classes both in shipbuilding and in engineering ought to be established.

6358. Where?—In Belfast.

6359. In which institution?—Well, I hope that in the proposed technical school there will be provision for that instruction.

6360. Do you think that anything could be done in connection with Queen's College?—Hardly, I think, for the artisan classes.

6361. I am not speaking of the artisan classes?—Well, I really do not know; you see that the number in the highest branches would be so small that any person wanting to avail themselves of such instruction could go elsewhere.

Professor Hodges called.

Prof. Hodges.

6362. (*Chairman.*) Dr. Hodges, you are professor of agriculture in Queen's College?—I am professor of agriculture and of medical jurisprudence, at Queen's College. I am also chemist to the Chemico-Agricultural Society, an important provincial association. I was Professor of Chemistry in the Royal Belfast College, and am an honorary member

Prof. Hodges. of the Royal Academies of Stockholm and Turin, the Imperial and Central Society of France, the Imperial College of Gorygoretzk, and the Apothecaries' Association of North Germany.

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6363. You have had great experience with regard to the staple industry and with regard to the agriculture of the north of Ireland, the Commission would be glad to hear any opinions you may be able to give them on the application of technical instruction to those branches?—I have nothing specially to state beyond what is already known. In the north of Ireland agriculture has advanced considerably, compared with what it is in the other parts of the country. The advance is owing greatly to the general intelligence of the people, and to their industrious habits. There has always been a desire on the part of the Ulster farmer to keep pace with the improvements of modern times. The people are given to reading, and they have received much instruction through the instrumentality of societies of various kinds that have been established. In almost every part of the north of Ireland they have agricultural associations and the interest taken in the improvement of agriculture is much shown by the landed proprietors and the farmers, who associated themselves more than 30 years ago in a body called the Chémico-Agricultural Society of Ulster, which diffuses scientific knowledge by lectures and by means of monthly meetings at which agricultural questions are discussed, and information is given on improved methods of cultivation. In connection with the society, a journal has been established which is circulated free of cost among the farmers. I was the director from the establishment of the society, and superintendent of the laboratory, in which we conduct agricultural investigations. This laboratory has been found most useful to the farmers in protecting them against imposition in the purchase of manures. We have excited a great deal of agricultural activity, and the results are shown in the increased knowledge possessed by the Ulster farmer; and that the society has given satisfaction is shown by the fact that it has been supported by the voluntary subscriptions of farmers and proprietors for now 39 years. The friends of the society want to have the farmers taught the most economical methods of agriculture. I have placed in the hands of Mr. Magnus a circular on the subject.

6364. (*Mr. Magnus.*) You think something of that kind ought to be done?—Yes. We have experiments going on in various parts of the province, the expenses being paid by private individuals, and these, of course, are lessons to the farmers as to what manures are required in the various districts, and what could be dispensed with.

6365. (*Chairman.*) Having devoted so much attention to this subject, Dr. Hodges, may we ask you your opinion as to the agricultural education as now carried on under the National Board?—Agricultural education as carried on under the National Board at the present time, is not productive of much advantage.

6366. Will you state the reasons?—Well, the first reason is that the teachers are not qualified; they can give lessons out of class-books, but they have no means of judging as to the actual value of the answers given. In connection with the different schools of the Board, I think there ought to be small farm-stations.

6367. You are aware that in 1864 there were such farms attached?—Yes, but these have been given up.

6368. Are you aware that a number of National School masters are brought up to the Glasnevin model farm for practical instruction in the subject of agriculture?—Yes, I am aware of that; I was myself a lecturer at the Glasnevin farm when a great effort was made, principally through the instrumentality of Lord Clarendon, to have model farms

established in almost every part of Ireland. The results were unsatisfactory, and after some years the farms were given up. *Prof. Hodges*

6369. The plan which has been thus tried not having been successful, can you give us your opinion as to what now ought to be done, and as to whether the direction now taken by the National Board is or is not satisfactory?—I think that the farms established by the National Board in every province might be made to work more satisfactorily with properly trained teachers, and a system properly organised. Unfortunately the persons who conducted many of these establishments were not of that description likely to give much information to the pupils. I think small farms might be advantageously managed in connection with a number of the model schools throughout the country.

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6370. The model farms are given up?—Yes; I believe there are only two or three in Ireland.

6371. (*Mr. Slagg.*) Can you give the reasons of the failure in those schools?—I think they required properly trained teachers: the schoolmasters were anxious to get payment by results on the answering of the pupils and they taught them a good deal of a kind of "magpie" knowledge. I have not found that that system has ever succeeded.

6372. (*Chairman.*) I presume you consider that the present teaching in Glasnevin, both as to the instruction given to the young men, and the small number of teachers who go up, has but a very small effect on the whole of Ireland?—Yes, the effect must be very small. I know nothing of the present management of the Glasnevin school, but at the last meeting of the Chemico-Agricultural Society we had a paper read in which the system followed out in Glasnevin was condemned by a gentleman well acquainted with educational matters. I have not been on the farm for ten years.

6373. Did he point out the reasons for that condemnation?—He said it was the want of proper system and organisation. Manures were not analysed, and nothing was known of their composition, and he mentioned various matters of that kind showing a want of proper system in carrying out agricultural experiments. Farm yard manure, no matter its composition, was always being regarded as farm yard manure.

6374. Do you think that the present system of having gardens or small farms attached to a large number of the National schools, in which boys receive instruction, which must be of the very simplest kind, has worked well?—I am not able to say from personal observation. I have heard persons express dissatisfaction with them. I have not seen any of them, they have none in this part of the country.

6375. (*Mr. Slagg.*) I think you have expressed your general satisfaction with the condition of agricultural knowledge in the north of Ireland?—I consider that that knowledge is advancing, but I am not satisfied that it might not be advanced to considerably beyond its present point.

6376. To the point reached in these other countries which have been mentioned—Sweden?—I think the class of young men sent out in other agricultural countries are thoroughly qualified in the principles of agricultural science and are capable of conducting analyses and investigations as to the qualities of soils. I know that from Hohenheim and other stations in Germany, the class of young men sent out are well qualified to act as teachers or land-stewards or to conduct agricultural journals.

6377. There are no corresponding institutions in Ireland?—There are none in Ireland.

6378. (*Mr. Magnus.*) Can you give us any reason for the gradual falling off in the number of acres brought under flax cultivation in 18581.

Prof. Hodges. Ireland?—It is commercial. The farmer grows a large amount of flax one year and is successful, he is then encouraged probably to sow largely next year, and then there may be a failure in the crop. This and other circumstances discourage regularity, and become the great cause of the alternations which take place. Some years ago an attempt was made to extend flax cultivation beyond the limits of this province it being at that time confined to Ulster. A grant was given by Government to a society which then existed under the name of the "Flax Improvement Society," and instructors were sent to various districts. There was a great increase in the cultivation of flax, but the soils that were selected in many districts were totally unfit for cultivation. I was sent upon a Government commission at that time to report on Clausen's process. The proprietor of an extensive district at Kildinan, near Cork, caused a large quantity of flax to be sown. The lands were quite unsuited, and the flax was only about a third of the usual length. They could not get it well managed and they were obliged to try and scutch it without steeping. Ultimately, the fibre was sent to Cork prison, where it was made into clothes for the inmates of the prison, being unfitted for any other purpose.

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6379. (*Mr. Slagg.*) You think that flax cultivation in Ireland generally, does not enjoy the application of scientific knowledge?—Certainly not.

6380. And that it would be greatly benefited by it?—Greatly benefited by increased knowledge of the management of the plant and of the kind of soil suitable for its growth.

6381. (*Chairman.*) It is felt that probably instruction might be given in the Queen's College to those who desire to go there?—Unfortunately there is no encouragement to those who desire to obtain agricultural information in the colleges. Sir Robert Peel, when Chief Secretary, said that agriculture was out of place in a college.

6382. But many things have changed since that?—I have not since that time given any instruction in agriculture in the college, as the agricultural school ceased to exist in consequence of the arrangements made by Government.

6383. You are a professor without lectures?—Yes, a professor without lectures, as far as agriculture is concerned, but I lecture in the chair of Medical Jurisprudence.

6384. Then you think it would be a great advantage to this district that lectures should be resumed?—Well, as to that, I think lectures ought to be given in some shape or other through the country. The lectures that I gave were attended by young men from all parts of Ireland, many of whom now hold positions as land stewards.

6385. (*Mr. Magnus.*) Do you think the Queen's College might be made available for teaching advanced agriculture to those who are likely to become teachers in schools?—Certainly.

6386. Is there any reason why the teaching of agriculture in the Queen's Colleges should not be further developed?—I do not see any reason. The Government have had the idea that the instruction should be given in other institutions, as at the model farms of the Board of Education, and not in the Queen's Colleges.

6387. (*Chairman.*) You referred to a circular?—Yes. We are making an effort to get some assistance from the Government to establish stations throughout the country, where experiments can be made.

6388. These would not be places merely of original research but would be carried on also for the purposes of giving instruction in the higher branches of agriculture to those who have previously received

some agricultural training?—I am afraid we cannot at present aim so high. We are merely looking forward to stations where experiments could be made in order to test the qualities of the soils by growing crops upon them, and thus to obtain information to guide the farmer in the application of manures.

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6389. Similar to those carried on by Sir J. Lawes?—Yes, or those conducted by M. Ville in France.

6390. Then there would still remain the Queen's Colleges for higher instruction in agriculture?—Certainly. With regard to flax cultivation, I should be happy to give any information that may be desirable; I have paid special attention to it for a great number of years.

6391. I should like to ask one question before leaving the subject of agriculture. Do you think that the instruction obtained by children by means of the text books used in the National schools is of any practical value?—Yes, I think these books are of some practical value, one of them is my own.

6392. Passing on to the subject of flax cultivation, would you kindly give us a short statement of your opinion on the subject?—I think that the great want is proper instruction in the practical operations. Those who have been in Belgium are quite aware that from the very commencement the flax farmer attends to the condition of the soil; it is thoroughly pulverised and made like an onion bed before the flax is sown; the weeding is carried out at the proper time and the steeping is managed by persons who make steeping their business; I allude to the flax factors. One great improvement, if introduced here, would be the transference of the flax from the farmers to the factors, a different set of men who have skill in the steeping, management, and preparation for the manufactory. That is the great evil in this country, sometimes the flax is imperfectly steeped and sometimes it is oversteeped. The preparation practically depends on the skill of the farmers, and some may possess skill but others may not. No crop pays so well when it is of good quality and thoroughly managed. It is either the best or the worst crop that the farmer can grow. I do not know of any reason why the soil here should not produce flax as good as any in Belgium. I have examined both Irish and Belgian soils, and I know of nothing in the soil or climate of this country to prevent the profitable cultivation of flax.

6393. I should like to know in what degree under this bad system of flax culture, the price is affected as compared with the more scientifically conducted foreign production?—I do not know what the lowest prices are at the present moment. The price of flax in Ireland varies from 8s. 6d. to 9s. the stone, while the Belgian farmer can grow flax which yields a fibre which sells at from 80l. to 100l. per ton. One great cause of serious loss in this country is the total neglect to preserve the seed. It would astonish an English farmer to find that what he cultivates the crop for, namely, the seed, is here thrown into the "steep holes," instead of being removed before the steeping as is done in Belgium. It is here put into the flax pits, seed and all, and every year at a certain season one sees the sea margin fringed with enormous quantities of flax holes.

6394. Of course you will tell us that a bad method of farming operates injuriously on the possible production. If you can possibly tell us I should like to know in what degree the crop may be thus diminished in value?—There is, as I have said, an enormous difference in the prices obtained for flax, according to the quality.

6395. (*Chairman*). Does the quality depend on the steeping and management?—In the first place it depends on the soil and upon the proper preparation of the soil, and in the second place on the treatment and

Prof. Hodges. management of the plant until it is fit for scutching. The plant is pulled at the proper time and is then put into the steep hole where it is allowed to remain until the woody part is in a condition to allow of its easy separation from the fibre, that is until it is rendered brittle by fermentation; and it is then taken out. In this country the flax may be injured very much before it gets into the hands of the scutcher by carelessness and exposure. The Belgium farmer puts the flax up in a stack where it remains till it is fit for steeping. In this country it is often injured for want of proper care, and a serious deterioration of the quality of the fibre is caused. I have known 30*l.* an acre to be obtained for some flax, while other flax did not give more than 7*l.* or 8*l.*

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6396. (*Mr. Slagg.*) You have mentioned just now a subject upon which I want to get some evidence; that is, what the producer in this country is really losing in money value as compared with his continental rival merely through his bad unscientific management?—The difference is frequently enormous.

6397. That is what we should like to know?—I may mention that I obtained about two tons of straw from the acre, and that when scutched it gave a large yield both in fibre and seed.

6398. Can you show us, by information you actually have got, how much the district or the country is, in your opinion, losing through the neglect of this scientific education?—There is an enormous loss owing to the destruction of the seed. For instance, in 1881, no less than 330,525 bushels of flax seed were imported into Ireland.

6399. That being the case, what method would you propose in order to ameliorate this condition of things?—It would be very difficult at once to introduce a system that might be universally followed. But I have no doubt that good results could be obtained by something like the system introduced by Lord Clarendon, who sent instructors into the districts in order to introduce the Belgium management into this country, but for some reason the Government discontinued the payment of the sum allowed for instructors.

6400. Perhaps they thought that as the manufacturers did not see the necessity of sending out those instructors it was not the duty of the general Government of the country to do so. Do you think they were wise in that decision?—Perhaps they were right politically, but in certain districts it might be judicious to give this kind of instruction. In Ulster there has been a traditional knowledge of the rude methods of managing flax, but even that knowledge does not exist in the districts south and west. The district I have alluded to, where they grew flax in soil totally unsuitable, was in Cork; the consequence was, that instead of getting fine fibre useful for the ordinary purposes they were obliged to convert it into linen fit only for clothing the prisoners in the Cork gaol.

6401. Then it must be admitted that the agricultural teaching power has developed an improvement in the knowledge possessed by farmers?—The knowledge has improved in certain districts. When I began to exhibit experiments as illustrative of lectures in agricultural chemistry my statements were regarded somewhat like those of a conjuror. Such terms as phosphates, ammonia, &c., were totally unknown to the farmers, but at the present time the farmers are quite familiar with these terms; they have become household words, and the farmer can now talk about the actual value of phosphates and ammonia and other fertilizing matters and is able to take care that he gets good manure.

6401a. How do they get the knowledge?—By means of books, and agricultural periodicals of which a large number of copies are distributed.

6402. And they get information more from this sort of literature than

from any practical instruction?—Yes; almost every newspaper finds room for the discussion of agricultural matters as a means of giving information to farmers.

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6403. (*Chairman.*) Are there any other matters which you would desire to state?—My friend and colleague Professor Letts has made some statements from which I must differ with reference to the want of a desire for technical education among the manufacturing classes in this locality. Professor Letts is a stranger and is therefore not aware of what has been done here, but in an experience of forty years I am happy to be able to testify that scientific training in connection with our staple industry has not been overlooked. Nearly 40 years ago I was professor of chemistry in the Royal Belfast College, and chemist to an important association—the Chemico-Agricultural Society of Ulster. I had for several years a class of laboratory pupils engaged in the study of technical chemistry; and I believe I was the first to introduce into this country the system of laboratory training employed in Liebig's laboratory at Giessen. My classes were composed of young bleachers, weavers, and others connected with our local industries, and some of my old pupils are at present mill owners, like Mr. Greeves, and managers of important works. The fees of several of these pupils were paid by their employers—by Mr. Charley of Seymour Hill, whose appreciation of science is well known, and by the Richardsons, and others. There was, therefore, no ignorance of the value of scientific training among us. Professor Letts remarked that the fibre of flax had not been investigated as had been done with respect to the fibre of cotton. He is correct in saying that the printing on and giving colours to the linen fibre offer a wide field to further study, but I venture to say that a good deal of useful work has been done, though probably it has not come under Professor Letts's observation, both in this country and on the Continent by Wiesner, Vetillart, Kobb of Mulhouse, and others; the subject has not been overlooked. I should be sorry that this Commission should be induced to suppose that the Irish bleachers are inferior in their work to their competitors on the Continent; that such is the case I entirely deny, and my assertion is confirmed by the fact that every year young men are sent to Ireland by French, Russian, and German firms to study bleaching at Banbridge and other places, and that foreign governments are in the habit of sending agents to report on our bleaching processes. It is true that we have some things to learn in design, as Mr. Ewart has properly remarked, and in the matter of ornament, and many managers of greens are not qualified for their business. But employers are fully alive to the advantages to be derived from technical knowledge, and though the means for instruction at present afforded by Government are ridiculously deficient, still the continental bleacher has not yet been able to produce the pure white linen which is the pride of Ulster.

Mr. Wm. Gray, M.R.I.A., called.

Mr. W. Gray.

M.R.I.A.

6404. (*Chairman.*) You wish to make some communication to the Commission on the subject of establishing a free library in Belfast as tending to promote technical education. And as this is a subject a little removed from our inquiry I should be glad if you will make your remarks as brief as possible.

6405. (*Mr. Slagg.*) Perhaps you would be good enough to refer to the special provisions of the Act?—As an observer going through the country, I should like to give some evidence on the general question of technical education. I am endeavouring to make the Free Libraries' Act

Mr. W. Gray, a medium by which technical education in this country should be promoted.
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6406. (*Chairman.*) What is your position with regard to the free library?—I was the chief promoter of it.

6407. Are you in the town council?—No.

6408. In what way are you brought into contact with the working of the free public library?—I have taken an active interest in popular education, and I have advocated the adoption of the Free Libraries' Act with the view of promoting technical education in Belfast.

6409. Have you any official position with regard to it?—I am secretary of the promoters' committee, and in order to save your time I have selected a few printed papers showing what our object is.

6410. Mr. Gray handed in several documents containing a statement of certain views which he desired to lay before the Commission regarding the free library.

STATEMENT handed in by Witness.

SUGGESTIONS of the Free Library Deputation Committee, submitted for the consideration of the Belfast Town Council with reference to the establishment of a Public Library, Museum, and Art Gallery.

THE Public Libraries' Act (Ireland), 1855, was enacted for the purpose of giving "greater facilities for the establishment in Ireland of free public libraries and museums, or schools of science and art," and its provisions are framed upon the principle of encouraging and co-operating with local voluntary effort, and are not intended to supersede such effort.

The ratepayers having adopted the Act in Belfast, the nature and extent of the scheme to be carried out under its provisions will be determined.

1st. By the character of our requirements.

2nd. By the amount to be obtained from the special rate of a penny in the pound.

3rd. By the measure of external aid we may reasonably expect towards the promotion of the scheme.

Subject to those conditions the projected scheme should, in our opinion, be as broad, comprehensive, and complete as possible. It should be framed with the view of making the proposed institution educational in character, utilising the experience of other towns, and avoiding all unnecessary expense and all temporary experiments. What is to be the permanent municipal institution should be commenced at once, and all expenditure from the beginning should be devoted towards the ultimate realisation of a central educational establishment that will be really worthy of the wealth, intelligence, and commercial importance of the capital of Ulster. The time for the completion of this scheme will necessarily be dependent upon the amount of external aid that will be forthcoming.

Having carefully considered the above, we recommend—

1st. That, under the XII. section of the Act, the town council of Belfast should elect a composite managing committee, including at least ten members (not connected with the town council), selected from the committees or governing bodies of such local societies as are devoted

to the cultivation of art, literature, science, or general education, and who will consent to act upon such a composite managing committee. *Mr. W. Gray.
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2nd. That, in order to assist the town council in discharging their new functions, such managing committee should have full powers to devise the scheme to be carried out under the Act, and the required building should include provision for at least a newsroom, a lending library, a reference library, a museum, an art gallery, each being of ample dimensions. Space should be reserved for a public hall or exhibition room capable of accommodating about 1,000 people, and a suitable lecture room to seat 500, to be added as funds will permit.

3rd. That, under the IX. section of the Act, the town council should erect a substantial building, including the above accommodation, or such portion of the building as can be provided at a cost of 15,000*l.*, and that the building be erected upon an open, convenient site, that will admit of future extension.

4th. That a sum of 5,000*l.* be expended in the first instance upon a stock of books, art objects, &c., which sum should, as far as possible, be obtained by local voluntary subscriptions.

5th. That, if necessary, a sum not exceeding 20,000*l.* be borrowed from the Crown upon the security of the rates, five per cent. covering principal and interest in thirty-five years, or by a direct application to the Treasury this sum may be obtained on easier terms.

6th. That an effort be made to acquire the collection of books in the present Linen Hall library, and also the collection of natural history and other objects in the present Belfast Museum.

7th. That steps be taken to secure for the town all the advantages that the Department of Science and Art, South Kensington, offer to the provinces, either by loans of select objects for exhibition or by purchasing, at reduced cost, reproductions of works of art, &c.

8th. That the managing committee should make an appeal to the citizens of Belfast for funds to enable the committee to complete their scheme at an earlier date than the limited income from the town rate will admit. It is possible that a considerable sum might be procured in the first instance by means of a national industrial exhibition and subsequently by means of annual exhibitions of art, and industrial loan collections.

Mr. JOHN KENTON called.

Mr. J. Kenyon.

6411. (*Chairman.*) You have had much experience in the printing and dyeing of linen goods?—Yes.

6412. Can you give the Commission any information respecting the knowledge which the workmen, foremen, and managers have on this subject?—Yes. At the present time it is practical knowledge.

6413. Is the printing trade in linen goods an extensive branch of industry here?—I do not think it is very extensive.

6414. Have you directed attention at all to the question of technical instruction or to the advisability of increasing the means of technical instruction given to your workpeople and managers?—In order to compete with France and Germany I think technical schools ought to be established, especially for the arts which depend on chemistry and organic chemistry, but sufficient instruction can be gained from books and periodicals.

6415. Are you aware that in many cases the buyers of linen yarns have not been able in this district to get the tints which have been

Mr. J. Kenyon. required and desired by customers, and that the consequence is that yarns have to be sent to Belgium to be dyed?—I am not aware of that.

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6416. You would be astonished to learn that such was the case frequently?—I should not be astonished.

6417. Then you think there is room for improvement whether through study in books or in the education given in schools or colleges. There is room for improvement in the dyeing trade in this district?—There is no doubt about that.

6418. When you say that instruction can be given through books, is that opinion founded upon your experience, or what is the reason for your telling us that a sufficient amount of scientific practical instruction can be given or obtained by reading books?—Well, if you are acquainted with the subject at all, you can get a great amount of information from those books.

6419. Do you refer to books on chemistry?—Yes, books of chemistry.

6420. And practical dyeing books?—Both.

6421. Do you think you do not require any instruction in a chemical laboratory to enable you to learn the subject of chemistry?—I think you do not.

6422. Nor in dyeing?—No.

6423. (*Mr. Slagg.*) You understand the printing trade. Where do printers in linen in this district get their instruction?—Chiefly from England and Scotland. Many a time new colours come out; it is chiefly in Germany that the new colours are manufactured at the present time, we get them first in England, and after working them successfully in England we get them over here.

6424. Of course design comes into operation?—We get a great number of designs from Paris—a very large number indeed.

6425. You get designs from Paris?—Well, we get some new designs from Paris; our designs are something similar and the local designers work them up.

6426. And adapt them for the trade?—Yes.

6427. Then you are not well off for original designs?—We are pretty well off, but it is well to get some outside ideas occasionally.

6428. Beyond what you learn from books?—No. You could not learn designing from books.

6429. In that case you advise that schools should be established?—Certainly.

6430. Is there any special art taught here in its application to industry?—No; I do not think it.

6431. In the School of Art?—I do not think it has much to do with printing. There is no school in Belfast that gives training adapted to the printing of linen.

6432. Are you acquainted with the School of Art?—No.

Sir J. Preston.

Sir JOHN PRESTON called.

6433. (*Mr. Slagg.*) Sir John we are very much interested, of course, to find out everything that relates to those causes which are alleged to produce the disadvantages in the trade here, which we understand is not in as flourishing a condition as those engaged in it would like to see; and amongst other causes we hear that you suffer from competition from Belgium and France, and possibly some other countries, in your yarns, I should be obliged if you would be good enough to tell the

Commission what are the causes of the competition and why it is possible that foreign countries can compete successfully with your industry in Belfast?—I think the chief cause is the difference in hours; we formerly had 69 hours, then they were reduced to 58, afterwards it was thought that that was too little and it was raised to 63; now the hours are 56. That, we consider, puts us at a very serious disadvantage, and we have found the effects of it ever since those short hours were established in Ireland, and I should say Great Britain; of course I know more of the condition of the trade in Ireland than elsewhere. It so happens that I was one of a deputation to the Government at the time this bill was spoken of, to endeavour to persuade Mr. Mundella and others that it would be a serious injury to the trade if it were enacted; but Mr. Mundella, in the lobby of the House, then said to me, "England can whip the world," and my reply was, that that was a very fine figure of speech but that I knew to the contrary. I said that I recollected the time when she could "whip the world"; when she had a clear stage and no favour, but since she had been so heavily handicapped; countries that we supplied with yarns are now supplying us; formerly France and Germany were amongst our best customers, they took largely from us of yarns, and houses in Leeds and Bradford that did business in worsted yarns, bought linen yarns from us and sent them to customers there. On the Continent they have a very frugal, industrious, ingenious, sober people as their workers; and they can get our English machinery over at the same price at which we buy it and they can get—as in many instances they have done—some of our best workmen who apply themselves to their work there. And those countries having the advantage of a 72 hours' system, we here felt ourselves too heavily handicapped. That is, I think, the chief cause—there are others—by which we have been losing ground and losing it very materially.

6434. You say they get machinery at the same price as you get it?—
Yes.

6435. But they cannot import machinery from England and set it down as cheaply as you can, established as you are here, having the machinery on the spot. I have been told that in France it is an addition of 30 per cent. to the cost of the machinery to put up the things that go to construct the mill?—I should be curious to know how 30 per cent. could be put on; it is not put on in the way of duty.

6436. In packing, which is very expensive, and transit?—Packing. In Leeds the freight to France is exactly the same as to Belfast, and the carriage is lower to Belgium than it is to Belfast. The rate of freight from Belgium to Belfast is lower than from Hull to Belfast, or from Leeds to Belfast; so that if any person makes such a statement I should be very curious to see his figures. Because I can tell you as a fact, that Lawsons, whom I have known for over 30 years, supply machinery to Belfast, and they have supplied it all over the Continent, and also to other places; and they would require to pack that machinery just as much for Belfast, and just as expensively as they would have to do for France or for Belgium. I have little doubt, indeed I have no doubt, that those parties abroad pay the same price for it as we do; they could not pay better; they pay their engagements, and they make as hard a bargain no doubt. Therefore they have their machinery as cheaply as we do. And the workers that we have had here for the last half century, and all the information we have obtained through these workers and applied to our own work, the countries I have mentioned have also. They got the best of those workers over to them; they have taken our foremen, they have taken our hacklers, our spinners, our

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Sir J. Preston. preparing masters, and we have to compete with them with 58 hours against their 72. So that we are heavily handicapped, and that is the great cause of our present position.

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6437. Then you consider that your continental rival can establish his mill on as favourable terms as the Belfast manufacturer using English machinery?—I do.

6438. Then this competition that you speak of, does it show itself in the Belfast market?—Very materially; in no place more so.

6439. Are yarns from Belgium and France offered in the open market in competition with your own?—Yes, and so much so, that they have beaten our spinning here in many cases by more than 10 per cent. I wish to say incidentally, I do not care to make any boast of it, that I suppose we have imported more than any other house, perhaps, in Great Britain; in the course of three or four months, we paid upwards of 58,000*l.*, and in 12 months upwards of 96,000*l.* Mr. Mundella thought the sum might be 3,000*l.* or 5,000*l.*, he did not think there was any such business carried on to such an extent.

6440. You have paid that in three or four months for foreign yarns?—Yes. That is a statement that no other person could make, for I believe we have done more than perhaps any other houses. Whether rightly or wrongly that has sometimes been a profit and sometimes a loss. At the present time or last year we did more than 30,000*l.* with one house.

6441. Where?—In Belgium.

6442. And in France too?—Not so much with France.

6443. What class of yarns?—Well chiefly from eight-lea, ten-lea, twelve-lea; at fourteen-lea they begin to increase, in tow-yarns (line-yarns)? Tow-yarns, that is what is backled off the flax; the tow that comes off the flax, they are produced from ten-lea up to forty-lea. But from Belgium we only import those numbers. And you may think that strange; the lower numbers having, as you imagined, a much larger carriage to pay than finer numbers at our own door. We use them largely, ordering many thousands of bundles at a time of 14s, 16s, and up to 25s. As you have asked the difference between the coarse and the fine; in the coarse numbers I say they can beat us in many cases 10 per cent. Then as to the line-yarns from fourteen-lea to 25, above that they cannot beat us so much, although we import very largely up to 40, and sometimes 50, and above that up to 60, the finer numbers coming from Austria. I wish to mention when I speak of Belgium, that it is chiefly yarns from 20 up to 35 that we import so largely, and regarding which they have so much advantage over us, at least we can buy them so much cheaper there than at our own doors.

6444. Well then it is a common thing and one well recognised in your trade to meet with these yarns that you have enumerated which are offered by foreign houses in the Belfast market?—Yes, and not only in Belfast, but all over the country, and also in England and Scotland. We have also business in England,—at Manchester and Leeds,—and in different manufacturing districts in Scotland, and we meet with them there, and the foreigners are amongst the keenest competitors we meet.

6445. And do you find that besides offering these goods to you, who have a regular trade for them, they compete with you in the neutral markets?—They do, and beat us in our markets. They can beat the Leeds spinners and they send very large quantities of those tow-yarns. I now speak of Leeds, Barnsley, and the places in that neighbourhood.

6446. But in foreign markets?—Yes, in Spain and Italy in some numbers, but we can beat them in the finer numbers of yarns, at least

it so happens up to the present. Why that should be so I do not know. They could hardly be expected to get into the trade all at once. They have the finest flax and we are spinning those numbers from it here and sending it back to the continent. We can beat them so far in those, but how long it may remain so I cannot tell.

6447. How is it that the hours of labour do not operate in regard to these numbers as well as to the others?—I am quite sure that the hours of labour do operate in those numbers as well; but they have not yet got into the way of spinning those yarns; the hands have to be educated. At first it was difficult for them to spin 20 lea or 30 lea, and they came to spin up to 50 or 60, and 100 lea. Some of them spin 100. But I am now speaking of yarns from 100 to 200, such as are used for cambrics.

6448. Is there any superiority in their methods of manufacture or in the manner in which they conduct their trade that accounts for their success, in addition to the labour question?—No, I should be slow to say that there are any parties in the world who could beat our own manufacturers, or our own mechanics. I do not think they possess any knowledge beyond what we have.

6449. (*Chairman.*) Do you think that in the treatment of the flax there is any superiority; we have heard from Dr. Hodges of a great want of knowledge and skill on the part of the persons engaged in the steeping of the flax in Ireland for instance; do you think that that goes to explain the matter at all?—That is going rather beside the question; that is the preparation of the flax in the rough state before it comes to the hacklers.

6450. I am aware of that; but if a large percentage of the flax is lost, or if the flax grown in this district is not as good as that grown in Belgium, would not that effect the question, if it is cheaper; for example, a good quality of flax may be cheaper in Belgium than here, owing to want of preparation on our part?—There is a great deal of truth in that. I am sorry to say our Irish flax has not been manipulated properly nor prepared properly, and the flax on the Continent is prepared in a much better manner. But then when it comes to the dressing, I think they do what is called "preparing," the next process after "hackling." I think perhaps they pay more attention generally to it than we do, and "prepare" better.

6451. (*Mr. Slagg.*) Then you attribute the whole of the superiority to the labour question—to the advantage in the hours of labour?—I think it is to be traced mainly to that cause.

6452. How are you situated generally speaking as to wages compared with the Continent?—I am not prepared at this moment to give you that.

6453. Do you find an improvement in the general social and material condition of the working people, which of course would have a reflex action on their industrial capability, since the short hours system was introduced?—No, I am sorry to say I do not. I have heard many others who are large employers of labour, say that their workers do not do their work better than they did when they had the longer hours; they have more leisure and they spend more money.

6454. Do you think they employ their leisure in a profitable way?—Some of them do, but I am afraid it is a small percentage of the whole, I regret to say that.

6455. Do not you think it is desirable that the working people should have leisure to some extent for improvement if it is possible to apply the term to them?—Unquestionably. I should grieve to see anything like the hours established here that they have on the Continent; but I think if we had 60 hours here they would have ample time to improve

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6456. Then it is really a question with you of four extra hours in the week?—I believe that if we had that, it would be infinitely better for the workers, and I think it would put the employers in a better position to meet the competition on the Continent.

6457. Can you suggest any other means by which you could advance the position and efficiency of your trade, educationally speaking?—No, I think that that has been exhausted. I think that the flax spinners have tried every possible means through the keen competition that they have had for many years passed. I believe they tried everything that the mind of man could conceive.

6458. Can you indicate any matter of an educational nature in which the continental working people are superior or possess greater advantages to our own?—I am not aware that they are better educated. I have said already that they are industrious, sober, and frugal, and attentive to their work; they do what they are told. And there are no strikes, and I think that that is of vast advantage to them.

6459. You consider that the natural aptitude of the people in this country, is quite equal to that of the Continent?—I should be sorry to say otherwise.

6460. (*Chairman.*) I wish to ask one question with regard to the comparison between the masters here and the masters abroad, and the managers here and the managers abroad; are they equally alive in this district to the necessity of high cultivation or education to further their trade?—Well, it would be difficult for me to answer as regards the masters on the Continent or the employers there; but, as I have already said, I think that anything that could be conceived by any ordinary mind I believe has been put to the test here; and I believe that they have been most desirous to do everything they could to make their workers as comfortable as possible, and to give them very good wages, in fact more than they can afford.

6461. (*Mr. Slagg.*) Are there any other reasons besides those you allege. Does the foreign competition account for the falling off in recent years in the demand for linen and the adoption in preference of such substitutes as cotton and woollen goods?—Yes. I think that is one very great cause certainly, for I see there are many parties wearing the garment called a shirt made from cotton or woollen material, which I think is a very great mistake, and I wonder that any gentleman does it. But so it is. And I think that your question does apply there, because a great many are using this cotton and finer mixture of fabrics which I think has a good deal interfered with our trade. And the fashions have changed a good deal; the ladies at one time wore the cuffs and collars of linen, and nothing looked better I think on a lady.

6462. Then have you, Sir John, any recommendation to make to the Commission in regard to their special functions and for their guidance in subserving the interest of the trade educationally or otherwise?—At the moment I do not think of anything more than I have already stated; but I do think that it is a question which the employers have exhausted. Finding that they cannot hold their own with the parties on the Continent, it is quite a question for the workers themselves to

consider whether they should not apply to the Government for 60 hours, so that the trade of this country may not be taken away from it.

6463. (*Mr. Magnus.*) You think, as far as I can gather from your evidence, that it is mainly owing to the shorter hours of labour in Belfast, that there has been this considerable falling off in the yarn trade of recent years?—I do; but if you take in connection with that the quantities of foreign yarns that our markets have been flooded with, you will see my answer would not be complete without my telling you the cause and the effect, that is to say, the shorter hours here, and then the large quantities of yarns that have been sent here from the Continent.

6464. Can you tell us if there was any corresponding falling off in the yarn trade of Belfast prior to the passing of the Act limiting the number of hours for the employment of women in flax mills?—I never heard of such a thing; there have been periods when the trade would be dull for perhaps three or six months, but it seldom lasted longer than that, and we considered that we might have expected at the close of each ten years what was called a panic in the trade, but that was soon got over; it was got over in the course of six months.

6465. (*Mr. Slagg.*) Have you reason to suppose that this trade which competes with yours is of a profitable nature, or is it attempted for the purpose of sacrificing goods?—That is a question I can scarcely perhaps answer with complete accuracy. But my impression is that many of the mills do make money, and the reason I say so is, that being limited concerns they show a goodly balance; and further, in reply to your question, I think that in many instances or at many times when the trade of their country is dull, they sell large quantities of yarns here, lower than they ever sell them at home; at least I have been led to believe so.

6466. But the trade is an organised one and you can give orders at certain prices which are lower than you can produce for yourselves?—That is true; and the difference on certain yarns is from 5 to 10 per cent., and in many cases below what the yarns can be produced at here, or below the prices that spinners will take for their production.

6467. (*Mr. Magnus.*) I was given to understand that there was just as much decrease in the exports of linen yarns during the five or six years prior to the passing of this Act, and just as much increase in the imports of linen yarn as there has been in the five or six years subsequent to the passing of this Act. If so, we should like to know what is the cause of that increase during these six years?—My ideas are embodied here ("Nineteenth Century," June 1883). I shall give you the exports and imports:—

Years.	Exports.	Imports.
	£	£
1869	34,670,316	2,018,363
1870	37,239,314	3,081,597
1871	36,235,625	4,913,697
1872	31,187,051	3,723,260
1873	28,784,212	1,603,286
1874	27,154,906	1,375,640
1875	27,837,681	3,336,374
1876	22,278,259	3,414,205
1877	19,216,001	5,308,395
1878	18,473,800	5,969,484
1879	17,428,800	6,384,798
1880	16,437,200	6,958,731

Sir J. Preston

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Sir J. Preston. 6468. Is it not the case that from 1869 to 1875 there was a decrease in the exports of nearly ten millions; that was prior to the passing of this Act?—Yes.

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6469. While you were running long hours?—Yes.

6470. Does not that decrease require some further explanation than the fact to which you refer?—Yes.

6471. We should be glad to know the cause of the decrease before the passing of these Acts?—The exports for the six years before the Factory Acts came into operation averaged 32,527,237*l.*, and for the six years after the Acts were passed, the exports averaged only 20,000,000*l.*

6472. Can you give us any reason for the decrease before the passing of the Acts limiting the number of hours of labour?—The exports before 1874 averaged for six years 32,000,000*l.* and for the six years after 1874 they averaged 20,000,000*l.*

6473. (*Chairman.*) The rate of decrease before is very much the same as the rate of decrease after the passing of the Acts, and we wish you to explain—if the decrease is caused by the reduction in the number of hours—how it is that the decrease in imports is very much the same for the six years before the Acts as for the six years since the Acts were passed. We want to know what you ascribe the gradual diminution before the Acts to. You ascribe the diminution since the Acts passed to shorter hours, but how do you explain a similar decrease taking place prior to the Acts?—Some considerable time before the Acts were passed the American War inflated business to such an extent that we had extreme dulness for many years after that war. The large production that existed before the American war was still going on when the American war ceased; then the stocks were left there and that was the chief cause of it.

6474. (*Mr. Magnus.*) I do not wish to press that point further. I should like now to ask if you have ever considered the extent to which foreigners are handicapped in contrast with England in consequence of the system of compulsory military service?—I do not think that that can materially interfere with them; they so regulate the military arrangements as to take one portion from a certain district at one time, and another portion from another district at another time. I have never heard of their manufactories being interfered with. It might have been so, no doubt, during the French war, but I am speaking of ordinary times.

6475. Do you not think that it must affect the increase of production that the labour of the producers is absorbed on the Continent for a very considerable time during the period at which that labour would be very profitably employed?—Yes, but still I think they have abundance of hands for it. It is not so here I am sorry to say. Now at the present time, although business is so unremunerative for flax spinning, the hands are scarce and a good deal of machinery is standing for want of hands.

Mr. H. Matier.

Mr. HENRY MATIER examined.

6476. (*Chairman.*) You are in the handkerchief trade?—I am a manufacturer in that trade, and have been so for a considerable time.

6477. It is an important trade?—Very important.

6478. Technical knowledge and knowledge of design and of colour are of more importance to you than to those manufacturers who make plain goods?—Of much more importance.

6479. Can you give the Commission your views respecting your trade, so far as the question of technical instruction is concerned?—I am not altogether prepared to go fully into it. What we require most is a better knowledge of design for one thing; designing the patterns and getting them up for both printing and embroidery. Then colour comes in. We require to make improvements in printing, and also in the dyeing of the yarns. We are not able to compete in some colours with the French; they are, in some respects ahead of us, and that is where the benefits of a technical school would come in, where colour would be improved.

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6480. Take the application of art to your industry, do you practically make use of the School of Art, do your young men go there to learn designing?—No, they do not. We could get them to go if there was a class in the school that would apply to our business.

6481. Does not the School of Art give such instruction as you require?—I am afraid not; it may to a certain degree apply to us, but not so as to be useful to us until after the students have received special training from ourselves.

6482. I suppose it is only a question of expressing the want to the authorities of that school, and the students would obtain the necessary instruction?—They could not have the designs without coming in contact with the trade. You cannot teach boys or girls, to supply designs for handkerchiefs in the school. The work must be applied practically to designs.

6483. You mean they should have a further practical application than they have in the School of Art at present?—Yes.

6484. And you think the technical school about to be established would be of service?—I think it would be of very great service in causing improvements in designs for handkerchiefs and damasks. We have to keep a designer ourselves, and all the printers here keep designers. We get designs sometimes from France, and we often get something out of them by showing them to our designer, who works them out.

6485. I suppose your system of designing is something like that in the calico trade?—Very much the same.

6486. Do you get your designs from Paris?—Not altogether; very often we do; our designers have much improved of late.

6487. (*Mr. Magnus.*) Do you not ascribe that very much to the influence of the art school?—I cannot say that I do.

6488-9. Where do you get your designers?—One of them came from Manchester. I know some of them that have learned to be designer in the print works.

6490. Would you be willing to give your young men facilities to attend such a school as you have mentioned?—Certainly.

6491. And you think they would themselves willingly give their time and attention to the subject?—I am sure they would, especially in the evenings.

6492. (*Mr. Slagg.*) At present there is little or no teaching of designs in the School of Art as applied to your business?—No, I am afraid not.

6493. You alluded just now to the superiority of the French, both in design and in dyeing?—Yes.

6494. Can you tell us how it is that they are ahead of you both in design and colour?—I cannot tell you that, but it is only lately we could get fast blues—only about 10 years ago. Formerly the French had it more to themselves.

Mr. H. Matier. 6495. They have a sort you cannot make at all?—Yes; I am speaking of very fine handkerchiefs—hand-spun.

11 June 1888.] 6496. Some of the goods which you buy for consignment you have to buy in France, because you cannot get them here?—Not in the trade I am concerned in, in handkerchiefs, but there are other things that the buyers have to get from the Continent.

6497. You consider the scientific and artistic knowledge of the masters, foremen, and others connected with the trade is not as good as that on the Continent?—I believe it is not; we want more technical education in weaving, and especially in damasks, towels, and household linen. Then we want better designing and better colouring, both in the dyeing of yarns and of printed goods.

6498. And the absence of that technical education seriously affects your trade?—Certainly it does.

6499. (*Chairman.*) Are you aware that, to many of the continental schools, museums are attached, containing a collection of manufactures of different kinds connected with the trade of the district; is there anything of that kind here?—Nothing of that kind whatever.

6500. And do you think that a museum of that kind would be an assistance?—I think it would be. I understand that in Lyons they have a collection of specimens of the better class of silks manufactured for a number of years.

6501. How is it that the manufacturers here never thought of establishing such a museum at their own cost, which would be very slight, either in connection with the Flax Supply Association or the Linen Merchants' Association, or in your Linen Hall?—One reason I might assign is that there might probably be some little jealousy the one with the other.

6502. Quite so, but might there not be the same jealousy on the Continent. We find at Mulhouse, on the Continent, the calico printers have joined together and have obtained a collection of specimens of all the printed goods sent out for years. Would such a museum not be advantageous here?—I think it would be a capital thing.

6503. And do you think it would be possible to induce the Irish manufacturers to do that every year?—I do.

6504. And you look upon the establishment of a technical school here as important for the good of the trade?—Yes.

6305. (*Mr. Stagg.*) Where and how is the embroidery done?—It is worked out in the country, by girls. We have first to get the patterns, and print them by block, lithographic plate, or otherwise, on the handkerchiefs in a colour which will wash out, we then send those patterns to girls at their own homes. You could not do the work by machinery, and you could not collect the girls all in one place to do it, besides it could not be done so cheaply.

6506. It is done in the cottages and farm-homes of the girls?—Yes.

6507. There is no special application of labour to this work; the girls may be otherwise occupied?—They may be occupied otherwise. This work has, of course, to be learned.

6508. But no special training is required for it?—No, little girls can commence at eight or 10 years of age and go on through the various classes of it.

6509. Can this embroidery be taught in the school?—I do not think it would suit in the school, it has been taught in some schools, but when it gets into a neighbourhood one girl teaches the other.

6510. You have an ample supply of that class of work, and you get as much labour as you want?—Yes. Formerly there was a great quantity of sewed muslin work done here. It is now done by machinery in St. Gallen in Switzerland. 11 June 1883.

6511. How is it that you cannot do the same thing by machinery here?—I really cannot answer that question. They have got hold of the business there and are likely to keep it for some time. They do the work by special machinery invented there.

6512. Did you ever endeavour to transplant it?—Well, I never was engaged in that class of business myself. It is embroidery on cotton for children and ladies wear. The Messrs. McDonald were in the trade here and in Glasgow, and they could not transplant it. When a manufacture is once started in a particular place it is difficult to take it away, especially if labour is cheap and the people industrious and clever.

6513. And do you in Ireland now get that embroidery from Switzerland?—We do; it is sold in all the shops here.

[*Witness here produced a quantity of fancy goods of handsome design and in great variety of colour. They were all of foreign manufacture, principally Austrian, and consisted of table-cloths, towels, toilet covers, &c. Mr. Matier said he had bought some of them in a wholesale house in London, and the remainder he purchased in America.*]

6514. (Chairman.) Can you make these colours here?—No, not so good.

6515. Would it not be advantageous to have such goods as these exhibited in a museum?—It would, certainly. What we want chiefly is that local manufacturers should take up this class of fancy goods and make them here.

6516. Are these goods, Mr. Matier, all Austrian?—All Austrian. These goods ought to be exhibited, so that people might see them, and that manufacturers here might be led to make them.

REV. HAROLD RYLETT, Moneyrea, County Down, examined.

Rev. H. Rylett.

6517. (Chairman.) You appear here in what capacity?—I am a manager of a National school.

6518. And you desire to give us evidence as to the importance of teaching science in those schools?—Yes.

6519. Kindly do so in as few words as possible?—I think I shall be able to point out some facts which will lead you to see the deficiency of the National system in this respect. I think that, unfortunately, there does exist in the country a considerable prejudice against science.

6520. What evidence have you that such a disposition prevails?—The Moderator of the General Assembly only the other day spoke of science as—

6521. We cannot go into that. Some lessons in science are given in connection with the National school system of training?—Not that I am aware of.

6522. Do not the reading books contain extracts respecting the industries of Ireland and ordinary matters which are fit to be brought before the children at an early age?—Suited only for a very early age.

6523. And is there any indisposition on the part of the National Board to introduce, as time goes on, even practical science into the schools?—I cannot say that I am aware of an indisposition in that respect on the part of the Board.

Rev. H. Rylett. 6524. It is only recently that elementary science has come to be taught in the National schools?—Yes. The books here (*produced*) are the books used in our schools, and I will venture to say that if you look through them you will see that the science taught is of a very poor and unsatisfactory character.

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6525. And what suggestion would you make regarding the teaching of science in those schools?—I have here a list of what is taught in the ordinary hours, spelling, reading, writing, arithmetic, agriculture, and book-keeping for boys, and needlework for girls. This is all that is taught in the ordinary work of the school, and is really all that is taught in National schools.

6526. (*Mr. Slagg.*) Is needlework universally taught in the National schools?—As far as my experience goes, it is.

6527. (*Chairman.*) What then do you suggest?—That some extra subjects should be introduced.

6528. But that can only be done after a certain preliminary training has been passed through, and in the whole of Ireland the number of children who now pass into the sixth class is only four per cent of the whole?—It is extremely limited.

6529. Then your teaching of experimental science would be limited to that proportion?—I do not think that. The teaching, for instance, of agriculture begins with the fourth class, and one of the difficulties and obstacles in the way of education in that respect is, I think, that the book which is used is defective. That (*produced*) is the book. ("Introduction to Practical Farming, specially written for use in Irish National Schools." By Thomas Baldwin, M.B.L.A.)

6530. Have you any practical experience of agriculture, because Professor Baldwin has devoted his life to the subject?—I regard Prof. Baldwin as the highest authority in Ireland on practical agriculture, yet although I am not a practical farmer, I think I can show you that this particular book is not a proper one to teach children with. The fourth book for children consists of simple stories, while the portion of Professor Baldwin's book used with the same class is highly technical and very difficult, either for the teacher to explain or for the child to understand. I may add as a general complaint against the system of education here, that the books used in the schools are certain prescribed books which are not in all cases particularly well adapted to the work. I should like to see the system introduced here that obtains in England, of a teacher being permitted to select his own books.

6531. I am not aware that under the rules of the National Schools the choice of books is forbidden?—In practice such is not the case.

6532. But what is to prevent the teacher from taking, instead of Mr. Baldwin's book, Mr. Somebody else's book?—Because the Board does not approve of his doing that.

6533. But the Board cannot refuse you liberty to use another book unless there be some reasonable and apparent disadvantage or objection?—That may be so, but you will find if you try it that the Board will say, "We have already got a most excellent book on this subject."

6534. Who decides the books?—The people in Dublin; one or two professors elected by the Board. This is the sort of obstacle you meet with.

6535. (*Mr. Slagg.*) In what respect is the selection of books optional?—Well, it is extremely limited; in fact the regulations are very stringent.

6536. (*Chairman.*) Would you throw the whole of these books open *Rev. H. Rylett* to free trade, as in the English system?—I would.

6537. Do you consider it desirable that the schoolmasters of this country should select their own books on history?—Yes. 11 June 1883.

6538. There are some subjects of an historical nature necessarily connected with political matters that are discussed now; do you think it would be desirable to throw the whole supply of those books into the hands of the teachers of Ireland?—Certainly; I have no hesitation whatever in saying that the system which obtains in England of large publishing houses competing with each other in the production of school books is a much better one than that which is adopted in this country, and results in better success.

6539. Are you bearing in mind the very great difference of opinion in the South and West of Ireland as compared with the condition of things in the North?—Yes.

6540. You are bearing that in mind?—Yes; presuming at the same time, that the principle of education which prevails in Ireland should be maintained.

6541. And who is to maintain it if the books are to be chosen by the masters?—The results fees should only be paid on such subjects as the Board approves.

6542. (*Mr. Magnus.*) You would consider it indispensable that the National Education Board should have a veto upon any book, in any particular school?—Yes, I suppose I should.

6543. (*Chairman.*) You are not certain upon that point?—Well, I should like to see the Education Board reformed before I gave it absolute power of veto.

6544. Can you tell us how long it is since these books of the Education Board have undergone revision?—No.

6545. How long have they been in use?—Oh, for many years.

6546. What do you mean by for many years?—Well, as long as the people about me can remember.

6547. Do you know, Mr. Barklie?

(*Mr. Robert Barklie, F.C.S.*) I agree with Mr. Rylett as to the prohibition of the books. What Mr. Rylett has stated is I believe within the truth. I have known teachers in Belfast, whose names I can give, who have been reprimanded and threatened with dismissal for merely using an exercise book which contained nothing but what the title page and arithmetical cards contained; nothing but the exercise to be worked by the pupils. The text-book which the teachers are obliged to use in Natural Philosophy is a text-book published so far back as 1841 or 1842, and it has undergone no revision since that. Dr. Roscoe can understand what that means in a text-book on chemistry.

Witness (Mr. Rylett). I urge that the text-books do not provide the children with anything like a proper basis of scientific research; that they do not incite the children to seek further into scientific matters, and I also lay it down as a terrible defect that no history is taught, no biography, and no drawing except as a special subject. As a consequence of the latter defect, when the children migrate from the country into the town they have no disposition whatever to follow up any advantages which the School of Art might have to offer.

6548. (*Chairman.*) Would you wish to see Elementary Science introduced in the Fourth Class?—The Fourth or Fifth.

Rev. H. Rylett. 6549. And drawing made an ordinary subject?—Yes; and in addition to that I should like to see a better teaching of farming. That is a point the importance of which I should like to urge very strongly. Let me show you a portion of Professor Baldwin's book which a child of nine or ten years is supposed to read. "The crops to grow, and how to grow them." The general style of the book is not adapted to the requirements of the children, and no other books, except such as are even more objectionable than this, have received the sanction of the Board. I complain that the National Board having sanctioned this book will not sanction any other book on the same subject. They practically insist upon this as the text book since they examine upon this and no other. I think that any intelligent schoolmaster in this country could take that book in hand, and reduce it to the capacity of the children he has to teach. From page 21 to page 67 is for the Fourth Class; from page 68 to page 125 is for the Fifth Class; and then from page 126 to the close of the book is for the Sixth Class. The book is too technical even for the last-mentioned class. What I should like to see is this:—the matter in the book greatly simplified and adapted to the capacity of the several classes. I should also like to see one or two extra subjects introduced into the ordinary course in the school. I consider it a great defect in the present state of things that the attendance of scholars is so bad.

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6550. Would you like to see compulsory attendance?—I should, but before I vote for it I should like to see a better condition of things in the country.

6551. We cannot go into the question of the condition of the country—Perhaps, but I should like to say that the children at present are unable to attend school as regularly as they should, because they are taken away to farm work at the earliest age possible. I have respectable people in my own congregation who have to take their children from school at an early age and put them to work on the farm. I should like to say a word about remedying this state of things. The deficiency in the education of the children when they leave school follows them as they grow older, and consequently they have no desire for that technical education or scientific instruction which they might obtain if such institutions existed here. Now, as to how this state of things is to be remedied. I should establish under the Education Board general lectures with the view of spreading a general interest in science and scientific culture. I think this could be arranged without very much difficulty in some districts.

6552. Are you not aware that lecturers are sent around by the Science and Art Department at South Kensington to carry out the very objects you have in view?—I was not aware of that, and we have no evidence of that. I wish that that system could be still further promoted, as I believe it would have a very salutary effect. I am certainly in favour of compulsory education, but the principle would have to be applied with very great care in Ireland for some time to come.

6553. Do you think public opinion in large towns is ripe for its application?—I would rather not pronounce an opinion about that, but in some districts of the country that I am familiar with public opinion is ripe for it.

6554. Do you say it would be almost impossible to take children from their farm work?—I should think that the manner in which the children could be taken from their work would have to be very carefully considered, and I would suggest in this regard that a certain minimum of attendances might be insisted on; so many attendances in one half-year and so many in the other.

Statement handed in by Witness.

Rev. H. Rylett.

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6554a. One of the greatest defects of the system of education in Ireland is that, so far as the national schools are concerned, there is such a serious laxity in regard to the attendance, and, speaking as one who is anxious to promote technical instruction, I am bound to say that until something can be done to lay a better foundation than is now being laid, we need hope for very little in respect to technical instruction in Ireland. Speaking from several years' experience as manager of a national school, I am bound to say that the system of national education, while it is in my judgment seriously defective in some important particulars, does not get fair play. The children might obtain much more in the way of education than they do obtain, if only the attendance was as good as it might be. If the attendance was as good as, even in the present condition of the country, it might be, then the removal of certain obstacles or difficulties in the system of education would result in still greater improvement in the education of the children, and thus a broader and better foundation would be laid for technical instruction and higher education generally.

I. The Question of Attendance.

In my evidence I stated that I was in favour of compulsory education, though I should not like to see the principle of compulsion rigorously applied in the present condition of the country. Upon maturer consideration I am of opinion that the principle of compulsion might even now be judiciously applied. Experience teaches me, that while the great majority of parents, particularly of the better class, exert themselves to the utmost to send their children to school with all possible regularity, there are others so indifferent that often times they endanger a school by causing the average to fall below that fixed by the Education Department as necessary to secure grants for a master and mistress. This has been my own experience. I have occasionally suffered the gravest anxiety lest the average attendance at my school should fall to such a figure as would lead the Education Commission to deprive me of one of my teachers. And having made careful inquiry into the matter, I have come to the conclusion that this is to be accounted for in the following way. Parents in many instances have to keep their elder children at home on market and fair days. Indifferent parents, those I mean who are not so anxious for the education of their children as they ought to be, seldom send their children to school at all in the weeks that are broken by the occurrence of two such days, and one other wet or stormy day. That is to say, suppose the children have been prevented by any reasonable cause from attending school on Monday,—say by stress of weather,—and Wednesday and Friday in the same week should be a fair day and market day, which happens at least twice a month in this district; careless parents are indifferent about the children going to school at all in such a broken week. Now, we require to hit upon some scheme of compulsion which will make the odd days in a broken week of this kind valuable in the eyes of parents of this character. And it appears to me that the end in view might be attained in this way. I would insist upon a minimum of attendances in each half-year, counting the half-years from November to May, and from May to November. Omitting holidays, &c., there are two hundred available school days. I would insist upon a minimum attendance of one hundred and twenty-five; fifty-five in the half-year

Rev. H. Rylett. from May to November and seventy in the half-year from November to May. At present no child can be presented for examination except at least one hundred attendances have been made. I would make no change in that rule, because I would allow the margin of twenty-five days for absence on reasonable excuse. The judge of what is or is not a reasonable excuse should, in my judgment, be the district inspector, who should at the same time be invested with the necessary authority for putting the law in motion against any offender. Of course this would involve an increase in the number of district inspectors, and I think that would be a desirable thing, for in my opinion there are already too few of such officials. I am satisfied from my own intercourse with the people of this part of the country, that the great body of the intelligent farmers of Ireland would heartily approve of some such scheme as that sketched above.

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II.—*The question of the improvement of the system of education, with a view to its being made a better basis for technical instruction and higher education.*

I know that many excellent authorities are of opinion that no "extra subjects" can advantageously be included in the ordinary curriculum. But I am satisfied that if my suggestion on the subject of compulsion were adopted, and if the principle of free trade in the supply of school books, to which I refer in my evidence, were also admitted, it would be possible to include one or two extra subjects. Supposing we had compulsory attendance and free trade in the supply of school books, I would proceed as follows. I would recognise the fact that some of the children must become farmers, while others must drift away into the towns and become artisans, or go into business of some kind. The general subjects already taught would require to be supplemented, at all events in one important particular, before we could specialise. I would add history to the ordinary curriculum. I know the teaching of the history of Ireland is a difficult matter to deal with, but that is no reason for the exclusion of general history from the national schools, nor even for the exclusion of Irish history. I have thought much about this matter, and I know nothing more disastrous than this exclusion of history from the National system of education. The study of history broadens the mind, and contributes to peace and goodwill among men. Narrowness is the penalty of isolation. If general history were taught in Ireland's national schools we should lose in intension and gain in extension. The reading books of the higher classes might contain carefully written essays on the leading events in ancient and modern history, including biographies of eminent men in politics, literature, science, and art. Particularly, however, I think an earnest effort should be made to obtain some impartial digest of Irish history. There are some unpleasant items in Irish history, no doubt, but the people are not kept in ignorance of them by reason of the exclusion of Irish history from the national schools. On the whole, I think history had better be taught in the schools. It is a mental discipline of the highest order, and I regard its neglect as a disaster.

I pass from this point to deal with what I may call special or extra subjects. And having regard first to those children who in the ordinary course must become farmers or farm labourers, I would urge that steps should be taken to improve the quality of the instruction in agriculture. In urging the simplification of the text-book on agriculture, I by no means wish to be understood as reflecting upon Professor Baldwin.

I wish to see a book on agriculture adapted for the fourth class, *Rev. H. Rylett*, another for the fifth, and another for the sixth; or lessons on agriculture adapted for each of these classes included in the 4th, 5th, and 6th Class Books respectively. The best way of arriving at good results in the teaching of agriculture, however, is, in my judgment, to leave the choice of the book to the teacher and pay only for such and such results. In that case I believe a series of class books of the kind so urgently needed would be immediately forthcoming. Indeed, I have now lying before me a very excellent series of such books. They are most strongly recommended by very high authorities. Professor Baldwin, writing to the author of this series, says: "I have read your catechism. I would be glad to see it encouraged. Up to the present I have been almost single-handed. I gladly welcome you as a coadjutor." And M. Brogan, Esq., Inspector of Agricultural Schools, says of the same series: "I think it very ably and successfully realises the idea you have in view. You have certainly supplied a deficiency that I myself have long felt. I shall feel great pleasure in recommending your book." Now the Commissioners seemed much astonished when I told them how rigidly the National Board insisted upon their rule in the matter of class books; but here is an instance of the arbitrariness of the Board. This series was in actual use for some time, and is most highly spoken of by seven or eight inspectors, and the Board has been more than once appealed to by the Teacher's Associations, but, as I am informed, in consequence of superior "influence," the series is placed under the ban of the Board. I do not say the books are perfect, but they are an attempt in the right direction, and the Board's rule against them is, in my opinion, a rule in the wrong direction. This is the more to be regretted, because nowhere in the world perhaps is the rule of thumb in farming observed more rigidly than in Ireland. The weekly newspapers have their "agricultural columns," and the editors are probably under the amazing delusion that the farmers appreciate the learned dissertations that appear therein. It is quite a mistake. The Irish farmer, as a rule, knows nothing of the elements of scientific agriculture; dissertations of a scientific character, therefore, in the columns of a weekly newspaper might just as well be printed in Greek letter. All the Irish farmer knows about agriculture is what his father, grandfather, uncle, or granduncle knew; and he does to-day what they did in their day. To put the next generation of Irish farmers into a better position we must take greater pains to have the children taught more effectively than hitherto; and as one book will not suit all children, or even all teachers, I would allow a teacher to use that book which in his judgment would be likely to lead to the best results in the particular case before him.

One other subject I should like to see included in the ordinary curriculum, viz., drawing, particularly for the benefit of such children as are most likely, as they grow up, to make their way into the large towns. Elementary drawing would at least have the advantage, that it would interest the children sufficiently to induce a good percentage of them to connect themselves with the schools of art which are to be found in connection with most of our large towns. With regard to scientific instruction, having thought a good deal upon the subject, I have come to the conclusion that, by means of judiciously edited reading books much more might be accomplished than is now the case. By way of making my meaning perfectly clear, perhaps I may be permitted to say that the Introductory Primer by Prof. Huxley, published in Macmillan's Science Primers, about covers the ground which I should like to see covered by,

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Rev. H. Rylett. at all events, the fifth and sixth classes in Irish national schools; and it appears to me that the subject matter of this little book might very readily be incorporated in any carefully compiled series of reading books adapted for the classes I have mentioned. By this means I do not expect to make the children into anything approaching scientific authorities, but I think I should have reasonable ground for expecting that a large percentage of those who received such instruction, would, upon their migration to large towns, manifest an inclination to attend classes in connection with technical schools.

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Now, so far, I have confined my remarks to subjects that might be taught in ordinary school hours, simply because I know from experience that it is extremely difficult, and in nine cases out of ten simply impossible to give such instruction in any other way. I may be met with the objection that it is equally impossible to do what I propose in the way I suggest. But I reply that the improvement in the attendance which would be secured by the application of the principle of compulsion would go far to minimise any difficulty now standing in the way, and an improvement in the teaching staff would remove all remaining difficulty. I think the Board's regulations in this respect are too stringent. I venture to say that, so far as the discharge of my duty as manager of a national school is concerned, I am as diligent as most managers. I say it in no egotistical spirit, but I will say that I do my level best to secure that the attendance at the school under my management shall be as good as possible, and the teaching the best that can be got. But for all that, my efforts are neutralised by the fact that the teaching staff is not equal to the proper instruction of the children who attend the school. Very often we have upwards of 60 and sometimes upwards of 70 children in attendance, but we are limited to one principal male teacher and one assistant female teacher. Our average attendance, however, ranges between 50 and 60, and the teaching staff is calculated upon that basis. Now, in country schools the average is most seriously affected by the distance the children have to come, by the weather, and by the indifference of parents, as well as by causes already referred to; and accordingly our teaching staff, while quite equal to the proper instruction of from 40 to 50 children, is quite inadequate to properly teach from 50 to 70. In all country schools, therefore, where the attendance upon ordinary occasions is upwards of 50, I would allow of the appointment of pupil teachers or junior assistants.

In fact we want in Ireland better attendance on the part of the scholars, a great improvement in the quality of the class books, and, so far as the 5th and 6th classes at all events are concerned, an enlargement of the curriculum, and finally a more effective teaching staff. Having all this I believe we should be able to lay a foundation for technical instruction and higher education generally which could not fail of producing most satisfactory results.

I have only to add that, with regard to extra subjects taught out of school hours, certain of the existing regulations might with great propriety be revised. For example, the fee charged in some cases might be considerably reduced with great advantage. According to existing regulations an extra school fee of 2s. per quarter must be paid to the teachers by each pupil for instruction in each of the extra branches, classics, French, trigonometry, navigation, mechanics, or any of the physical sciences except physical geography. This is practically a prohibitory tariff. Then there is a regulation to the effect that no result fees shall be paid for more than two extra subjects (besides music, drawing, algebra, and geometry) in the same school without the sanction of the Commissioners.

There is another regulation which prohibits the teaching of geometry *Rev. H. Rylett.* and mensuration, algebra, trigonometry, magnetism, and electricity, light and sound, chemistry and geology to girls. The combined result of these two regulations is that classes can only be formed with extreme difficulty, even where there is a willingness on the part of the parents to pay the extra fees for each subject demanded by the regulations. 11 June 1883.

I have only indicated one or two of the principal obstacles which the regulations present to technical or scientific instruction. The regulations generally are in my judgment too numerous. One wonders what colossal mind conceived them all. They are much too stringent also in some particulars, and one wonders what pedant devised them.

I should like to add that, having met Mr. Barklie since giving my evidence, I find that gentleman misunderstood my recommendation that the Education Board or the Science and Art Department should arrange to provide lecturers, whose business it should be to proceed to any part of Ireland and give a popular science lecture on payment by the district of the lecturer's travelling expenses. It appears that there is really no provision of this kind, and I strongly urge that the Government should do for Ireland what private energy has done for Manchester, Glasgow, and other places, in providing popular science lectures, and thus create a taste for scientific or technical instruction. I am sure my own case is a typical one. I am very anxious to have two or three such lectures this winter. But I cannot obtain lecturers; and I could not pay them anything beyond travelling expenses. If the Government would provide the lecturer, I would find an audience and pay all local expenses. We want a scientific "mission" in Ireland.

HAROLD RYLETT.

The witness withdrew.

TWENTY-SIXTH DAY.

Meeting at BELFAST.

Third Day.

Tuesday, 12th June 1883.

[The Commissioners visited the Belfast School of Art, and after inspecting the various departments of that institution, had a conference with the members of the Committee.]

PRESENT :

MR. JOHN SLAGG, M.P., IN THE CHAIR.
MR. PHILIP MAGNUS.

Conference at School of Art. 6555. (*Chairman.*) We have visited your School of Art, and should now be glad to hear any suggestions you may have to make as to improvements of the national system, especially in its relation to art teaching as applied to industry. Our mission has direct relation to that question, and we have received a large amount of evidence on that subject all over the country. Any hints from you would be valuable to us, and we should be glad to receive them for our guidance in any improvements we might eventually have to suggest regarding the Science and Art Department. We find wherever we go, that people depend much on foreign countries for their artistic designs, and it would be an object of this Commission to aid Belfast in developing design as much as possible in the country. If you can tell us what you are at present doing in that particular department, we shall be glad to hear you, and to receive any suggestions you may have to make.

Mr. William Gray, M.R.I.A. (one of the vice-chairmen of the Board of Management of the School of Art).—There is one thing I would strongly urge, namely, that we ought to have more frequent inspection from South Kensington. Unfortunately we, in this province, are isolated from the work done in South Kensington, and we have not the same advantages as if inspectors were sent more frequently. I may say that, as a rule, we find that manufacturers in this locality do not sympathise with the work done in this school as they might do, and there seems to be a tendency on the part of local manufacturers to encourage foreign artists or strangers, rather than to employ those artists who have been educated among themselves, and who are familiar with local industries.

6556. Perhaps your secretary would name a few cases where manufacturers have applied to this institution for a student, and have actually employed him to meet the requirements of their business.

Mr. Hugh Robinson (Secretary to the Belfast School of Art).—The system of education which has been adopted here deals with the general principles of design as applied to manufactures, but, owing to the variety of fabrics in the linen trade, the application of this knowledge must be developed in the factory and the designers' office. We have had a

number of instances of pupils who obtained national scholarships when at this school, and who, on their return from South Kensington, secured permanent situations as designers in various trades. One of them is employed in an ornamental ironworks establishment, some are damask designers, and some are designing in various other departments of the linen trade. We frequently have applications from employers for boys with some knowledge of design to enter their designers' offices. One of our national scholars has been employed as an assistant under Sir F. Leighton, P.R.A., and another obtained employment in London as a designer for a linoleum company.

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6557. In the instruction of artisans it would be interesting to the Commission to know what you are doing.

(*Mr. Gray.*) This institution endeavours to assist those pupils who are apprentices, and who cannot afford to pay even the nominal fee, which is in itself as low as it possibly can be; in fact, it would be demoralising to make it too low, but those who cannot afford to pay can be nominated to a free studentship by any subscriber who has paid a subscription amounting to 5*l*.

6558. How many of those nominations have you?—I do not think all our nominations are used; in fact, we find that our manufacturers do not take the hearty interest in the institution that they should take.

(*Mr. John Brown.*) I think the South Kensington Department should encourage a greater variety of style in design than they now do. The designs are universally in the conventional style.

6559. Can any other gentleman present speak concerning the value of the instruction?

Mr. F. D. Ward, J.P. (of the firm of Messrs. Marcus Ward & Co., Belfast).—We, in our particular business, have found great advantage from this school. There are from six to eight persons in our artistic department who are attending the school. Of course in our own establishment they have to work out the details of our own particular business, but the ground work which they obtained in the school we have found to be of great advantage. I have no doubt, if this school were made to work in connection with the technical school, about to be established, the two might be made to dovetail into each other, so that they might assist each other very materially. Of course I know nothing of the manufacturing of damask, but I should be delighted to see a technical school established, and I believe that it would be of great advantage.

6560. Have you proceeded so far with your technical school as to have decided what kind of art instruction will be given there?

(*Mr. Ward.*) It is not intended to have art instruction there at all. All we mean to do at present is to have a school for teaching the weaving, dyeing, and printing of the different fabrics manufactured in Belfast. I should like to see other manufactures introduced here as well as that of linen. I do not see why we should not have woollen, silk, worsted, and jute manufactures here also.

Dr. James Moore, Hon. R.H.A.—We have lots of bloom here, but we want to be fructified.

6561. (*Mr. Magnus.*) Do you take full advantage of the loans from the South Kensington Museum? They are anxious there to extend the facilities for sending out loans in order to help local art.

(*Mr. Gray.*) Unfortunately we cannot avail ourselves of them to anything like the extent that would be desirable. A short time ago South Kensington offered us a loan of textile fabrics, and we asked to have them supplemented by certain things. They said they would do so,

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provided we gave the exhibits proper accommodation, and we were obliged to say that we had no such place as was required. We had to take the textile fabrics, and did not go to the expense of hanging the other exhibits around the walls of a place which was not suitable. We afterwards asked the loan of the specimens of the national competition prizes. We had no place in the town to exhibit them, and had to fit up one here, and the members of the Committee themselves had to bear the expenses. It would be most desirable that we should more frequently have loans from South Kensington, and we hope, before long, to have premises for them. At present an effort is being made, under the Free Libraries Act, and the town council have not included in the prospectus a museum. If we had that, we should have a place to show objects which might be sent forward from South Kensington, and also objects connected with our various manufactures. Our struggle for existence in Belfast is severe, but still we maintain our place, and the central institution we are now getting up will be an incentive to the public, and we have no doubt it will succeed. We have got through the most difficult part of our way, and we think it will be a success. We want this museum and art gallery just to the same extent as museums and art galleries are required in other towns.

6562. (*Chairman.*) How much will the penny in the pound rate yield?—2,200*l.*

6563. (*Mr. Magnus.*) And do you propose to devote the whole of that amount to the library?—The Town Council propose to expend 16,000*l.* on the building, which will consist of a library and two picture galleries. We hope to utilise that as an art gallery, to a certain extent, but we want also to have a technical museum. The Town Council have issued advertisements for designs, but they include a library and picture gallery only. We hope to be able to change their intention, and an expression of your opinion in favour of a museum would go a long way to direct public opinion in Belfast.

(*Dr. Moore.*) We should have a circulating museum from South Kensington for, say, six months or so.

Mr. John Jaffe (President of the Belfast Chamber of Commerce.) We thought of establishing only a technical school; we did not think for a moment of including drawing and art, because we hope to be able to arrange with this institution to give the instruction in art here.

(*Professor Letts.*) As a member of the committee of the technical school, I may say that we have specially borne in mind the necessity of looking out for a building easily accessible from this one.

6564. (*Chairman.*) Then the technical school will be placed in this neighbourhood, if possible?—Yes.

6565. (*Mr. Magnus.*) Have you considered it possible to connect it in any way with the Working Men's Institute?—(*Mr. Ward.*) We thought it might be arranged so that the working men's classes and all might be brought together under one head, and that all departments of this education might be made to fit in, so as to work the one with the other.

(*Mr. Gray.*) The movement as to technical education in Belfast is up to the present independent entirely of the School of Art or the Working Men's Institute. As a matter of fact, we have had no overtures whatever from the promoters of the technical school with reference to the co-operation of the School of Art, which I think is rather unfortunate.

6566. (*Chairman.*) What is the nature of the building you propose to erect for the art gallery?

(*Mr. Ward.*) With regard to the free library and art gallery, we have asked the Town Council what kind of a building they propose to erect. I think the council were astonished when it came to the vote, and when they found that by such a majority the ratepayers voted as they did. The Town Council then talked of only a free library, but Mr. Gray, Dr. Moore, myself, and others, attended as a deputation at the council, and I believe we have induced them to agree that there shall also be a picture gallery and probably a museum. If we could get a beginning made, we might get people to leave us some money, but we shall be glad to receive what Government aid we can get.

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6566a. It would seem then that you are in any case either going to have a museum at the expense of the Corporation, or a gallery of some sort, and the question is whether it is going to be devoted to trade purposes. In such cases the Town Council have always the direction of the buying of the pictures, and they are not always very good pictures. Pictures are very expensive things, and, of course, have to be bought with very special knowledge, which it is impossible always to obtain, whereas you can always have a good industrial museum with exhibits that will improve the taste of the community and be of very great service to trade.

(*Mr. John Brown.*) I think we should take steps to secure the loan of some of those excellent pictures by eminent artists, so as to get them into these new galleries.

(*Mr. Gray.*) If there is a place in the United Kingdom in which it is possible to have a successful museum established it is in Belfast.

Mr. Trowbridge (Head Master, School of Art). Many students go up to South Kensington to study design. A good many of them become designers, but about one half of them develop into painters. When students here are engaged in designing for manufactures, I encourage them to pursue their studies in that direction, for there is a great tendency on the part of students to get out of designing as soon as possible. The idea has occurred to me that the work of the schools of art might be much extended in the direction of technical art. As to foreigners cutting us out in Belfast, I think the alarm is unnecessary. Most of the leading designers in the town are natives of the place. This school has produced a number of good designers, and some are holding good situations in the best firms. I could name half-a-dozen, and Mr. Robinson has mentioned several. I must admit that foreigners do come to the town and sell their designs for a less sum than Irish designers could work for.

(*Mr. Jaffe.*) The teaching of art in such a school as this must be attended with good effects in a manufacturing town like Belfast, and there can be no doubt that much good has been done by the Belfast School of Art, which has made itself felt in the town.

(*Mr. Gray.*) We as a Board take special care to encourage all classes of design, and also to induce the offering of special prizes by local manufacturers, to be competed for under the manufacturers' own conditions.

TWENTY-SEVENTH DAY.

Meeting at CORK.

First Day.

Monday, 11th June 1883.

PRESENT:

MR. BERNHARD SAMUELSON, M.P., F.R.S. IN THE CHAIR.

MR. WILLIAM WOODALL, M.P.

MR. GILBERT E. REDGRAVE, Secretary.

*Dr. W. K.
Sullivan,
D.Sc., Ph.D.*

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Dr. Wm. K. SULLIVAN, D.Sc., Ph.D., President Queen's College, Cork, examined.

6567. (*Chairman.*) You were formerly professor of chemistry to the Museum of Irish Industry?—Yes.

6568. That is now called the Royal College of Science in Dublin?—Yes.

6569. And you have also been lecturer on agriculture, chemistry, and geology at the Glasnevin model farm, and have lectured in various provincial towns on various scientific subjects, more especially on chemistry?—Yes.

6570. In the latter capacity were you employed by the Government? Yes, under the Science and Art Department, or rather under the Board of Trade at that time.

6571. And you took part also in the formation of the technological collections of the Museum of Irish Industry and of the Industrial Museum in Scotland?—I did.

6572. And you have studied the system of technical education in several continental countries?—I have.

6573. And you have written on the subject?—I have, and I may add that at the time I was engaged therein I also started a Technological Journal in Dublin.

6574. At any rate you have paid great attention to the subject, and it is not new to you by any means?—I have; it is not new to me.

6575. Nor, I believe, is it new to Ireland? No.

6576. Can you state very briefly what has been the history of technical instruction in Ireland?—The history of the Dublin Society and of the Irish Linnen Board represents the history of it in the last century. Every one knows of the system of premiums established by the Linnen Board. The money premiums given by the Dublin Society went so far as to obtain for one of the most active members of the society at that time the name of "Premium Madden." It was the principle of premiums given for the encouragement of manufactures in different parts of the country. To refer to it will be quite enough.

6577. The encouragement then consisted in offering premiums?—In offering premiums and bounties upon the production; and I should like to say that the success was very great, for many of the towns that you will now see, almost without an artisan of any kind, were then very busy industrial centres, as, for instance, Blarney and Bandon.

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6578. To what do you attribute the retrogression of those towns?—To two causes. In the first instance, at that time no artisan who was a Roman Catholic was admitted into a trade society—in fact he could not be a tradesman; and the whole thing was therefore artificial, so that when a crash came after the conclusion of the war of 1815, and between that and 1826 when a still greater crash took place, all these little artificial centres went to the wall. They had no roots among the population of the country themselves. At that time in this city no man who did not belong to the dominant party could be a tradesman, even of the lowest class.

6579. But in spite of that certain trades had arisen?—They had.

6580. How do you reconcile that?—They have all risen since.

6581. No; they had arisen before?—Oh, those were fostered by the dominant class, but they were artificial. You will see therefore that the greater part of the Roman Catholics at the beginning of this century and for forty years afterwards were confined to rural industries, like paper, the manufacture of which was at one time altogether in the hands of two or three families; the same, too, may be said of the provision trade—that they were carried on outside the boroughs, and that will account for the peculiar position of those trades in the country. The woollen manufacture was another that was carried on outside the boundaries of towns for the same reason.

6582. Are you of opinion that if a similar system of bounties or premiums were now to be created anew that the effect would be beneficial to manufactures?—I would hardly say in the form of premiums, but some such system of encouragement would, I think, do good.

6583. Can you define a little more what you mean?—I think I could not point to a better example than the foundation of the whole system of the technical education of the continent as shown in the earlier stage in Belgium in the *ateliers d'apprentissage*.

6584. You are speaking now of the workshops set up in Flanders at the time when machinery was introduced for the linen manufactures? Yes.

6585. You are aware, of course, that that was a temporary expedient?—Yes.

6586. And that although it nominally continues to exist, it is only vegetating now?—And quite right; that would be my notion now. That is to say it should be only a temporary remedy in Ireland, merely to raise us to the same position as other countries around us, and then let it drop and die out, as it ought to do.

6587. But the trades which were taught there are not actually living trades; they existed only for a very short time; they were superseded very rapidly by the introduction of machinery into those very trades which were temporarily established?—Quite so; but in the meantime it gave them skill of hand.

6588. Have you at all considered how improved workshops of this kind might be established in Ireland?—I think all efforts of this kind should be locally done, and managed entirely by local people, but that there should be some State assistance, for the simple reason that the burden of starting these things falls upon a comparatively limited number of people.

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6589. In which way do you think that the State could assist local efforts?—I should think it could be done, as we were anxious it should be done at the dairy school, where a local committee finds a considerable portion of the funds, and the State supplies the remainder, and the inspection, which I look upon as the most important part. You will hear from Sir George Colthurst the whole history of that enterprise.

6590. You are aware, doctor, that there is this difference between anything regarding agriculture and anything that concerns itself with manufactures that, in the former case, it may be said that there is no competition, whereas in the latter, you must necessarily compete with some private industry?—Yes.

6591. It would follow from that, that if Government were to give assistance to the establishment of workshops of any kind, complaints, and just complaints, would arise from those engaged in competing pursuits, who had no such assistance? Is it not the case, therefore, that the mode of encouragement in regard to manufactures should be different from that which might be given to agricultural and dairying operations?—If I were asked that question in England, I should certainly entirely agree with the spirit of your question, because there I think it would not be desirable to have the State interfering in any kind of industry of that form, but the circumstances of Ireland are perfectly distinct, and if you are to train the people at all to industry, you must make an exception and use exceptional means.

6592. Would it not be enough, if upon such industries being established by voluntary support—I do not say purely from local sources, because perhaps Cork might feel disposed to do something for its neighbourhood, and perhaps also some central national society might do something for the poorest districts of Ireland—but would it not be sufficient if after the establishment of workshops for domestic industries, more especially by private effort, the Government were then to give assistance by way of payments on results?—Well, perhaps I differ from most people with regard to that system of payment by results. It may be very good elsewhere, but I look upon the whole system of payment by results on examination, and the introduction of it, as a true curse to the country, and the effects of it will not be felt until the next ten or fifteen years. What the people want is to be taught, not to be examined.

6593. Does one exclude the other?—I think to a large extent it does, as we have it developed in Ireland; fortunately you have not felt it in England. We have what I may call payment by results in the form of examinations beginning with the primary school and ending with the university, and though I do not like to appear as a prophet in the matter, I believe you will see, probably in the next twenty years, a movement to get rid of the whole thing. It is not the same as in England, where it is an examination upon good sound teaching in schools; and I do not exclude it in that form, but when it is, as it is here, the sole substitute for education, then it becomes a mischief.

6594. In manufactures, the results would speak for themselves?—It is difficult to judge of that. In manufactures, however, it is different; where there is a mere good sound inspection, and where good work was done, as proved by that inspection, a sum of money might be given to aid them.

6595. That was exactly what I meant when I spoke of payment by results?—Well, I accept it in that form.

6596. What you mean, is that you would exclude the element of competition?—I would.

6597. And you would insist that the examination should take a more serious form?—Yes; and that it should not be by a number of printed questions on subjects which are of no practical value whatever.

6598. But if a locality were able to show that, in consequence of voluntary effort, new trades had been established, and those more particularly in remote poor districts; if they were able to show this to the satisfaction of the Government, you think that then the Government might repay a portion of the expense which had been incurred?—I think so; that is the view I take of it.

6599. In point of fact, we may take it that you do not object to the payment by results, if you could be certain that they really have been obtained?—Quite so, and that they are not put forward as a substitute for real work; that there is no sham appearance of work being done where there is no work at all done.

6600. Then may I take it that we substantially agree in this, that the best mode, in your opinion, of encouraging domestic industries in Ireland, would be their establishment by voluntary effort, the Government coming in only when some proof had been given of these efforts having been serious and successful?—Yes, that is my view of the matter.

6601. It is your opinion that technical teaching in Ireland should be of a different character from what it would be in a more advanced country?—Certainly.

6602. Inasmuch as it should include education of the hand as well as of the brain?—Certainly; that is exactly what ought to be the difference between the system that would be adopted for Great Britain and that which should be adopted for Ireland. We should begin lower down, in fact.

6603. In point of fact, you would attach more importance to what may be called primary technical instruction, including instruction in trades, than you would to higher technical education?—At the moment I would, but I think the foundations of the whole system ought to be laid so that it would gradually develop.

6604. Is it not the case that the foundation of intermediate or higher technical instruction has already been laid?—Of the higher it has, but as was expressed by a former colleague of mine, Dr. McCosh, with respect to the intermediate schools, "there are no stairs between the bottom and the top."

6605. Is it not the case that the encouragement offered by the Science and Art Department to the towns to establish science and art classes, forms that intermediate step?—I do not think so.

6606. Why not?—Because it is mere examination; facilities for teaching are wanted. That we are trying to provide in Cork by the 1*d.* rate. We are trying to establish a good and genuine school of art and science. A school for that express purpose. Then there will be some link.

6607. Will the 1*d.* rate be sufficient?—It is all we have got. We were obliged to pledge part of the rate to the Board of Works under the Act to raise money for the building; we expect to raise the rest by subscription. We have the plans prepared for the building, and there is to be a sum of 16,000*l.* expended upon it.

6608. How long is it since you first applied the Libraries' Act?—As far back as 1855, I think.

6609. How much do you raise?—A penny rate on the whole valuation of Cork at present, produces between 500*l.* and 600*l.* It is not a very large sum.

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6610. But this is the only city in Ireland, in fact, where the Libraries' Act has been applied?—Yes; Belfast, I believe, is about to do so; in fact, I believe, has done so this year.

6611. Have you both science and art classes?—Yes. There are other science classes also in the town, but it is our attempt at starting science classes that leads me to think that the work done by the South Kensington examinations has not been done perfectly, because the classes started elsewhere are not technical in the proper sense of the word. The questions are very well suited for attracting the attention of boys in a school to scientific subjects, but the ordinary papers that are given out are not exactly such as would suit our locality. We want inculcated above all, the study of mathematics and mechanics, and we find it almost impossible to get a pupil to attend to these, in consequence of the facility he has for earning more money at the more popular subjects; in fact, it will not pay a good mathematician to form a class at all.

6612. You would like, then, that your teacher should receive a salary in addition to payment by results?—I think so.

6613. And that, I suppose, could be done either by subscriptions on the spot, or out of the rate, if it provided a sufficient sum?—Yes.

6614. Then you would be in favour of an Act of Parliament which should enable municipalities to give greater assistance than that which can be got by a 1d. rate?—I would; and when about to get up a dairy school here, I proposed a plan, which I am, in fact, about to publish completely, of having a Permissive Act passed, to enable the county to found and support an agricultural school and a veterinary school, at a sum not exceeding one halfpenny in the pound in the rating.

6615. You said there was a defect, and you pointed out its nature, in the scheme of the Science and Art Department as applied to Ireland, and that that defect made itself felt in the want of encouragement to the more severe portion of a science curriculum?—Quite so.

6616. Are you of opinion that a good knowledge of science lies at the root of technical instruction?—Oh, certainly.

6617. Are you acquainted with the scheme of the City and Guilds of London Institute?—To some extent, but not to a very great extent. I have not had an opportunity yet of inspecting their work.

6618. You are aware, perhaps, that they offer prizes to students and payments to teachers for technical subjects?—Yes; I think they have, in fact, followed on the lines of the Society of Arts. Some young fellows of our schools have succeeded on one or two occasions in obtaining silver medals in those examinations.

6619. Do you consider that examinations of that kind are useful?—Well, I cannot say that. In a particular instance I know it was useful, because the student was able to pursue a whole course of mathematics and mathematical physics to his great advantage, by the money obtained. Of course you will always understand me as looking at it from the point of view of Ireland, and I would not by any means say that my observations apply under other circumstances, but, as a rule, these examination papers appear to me to be sterile, to have no direct connection with the work that we require.

6620. But do you think that an examination may be devised that would be useful?—Certainly.

6621. You would, however, wish that the technological examination should be of a nature which would render previous instruction in science an absolute *sine quâ non*?—I would. I may say what I should wish to avoid is the danger of mere cram. Such examinations, I think,

should be made as practical as possible, and no subject capable of being practically tested should be examined by means of mere papers.

6622. Would it be possible to hold those examinations locally?—I think so.

6623. Seeing that payments and honours depend upon them, would it not require that considerable confidence should be placed in the local examiners?—I think so; but at all such examinations the body granting or paying money should be represented, and should take care that the thing was well done.

6624. But that would be very expensive?—I think not more expensive than the present system. Of course there is always a representative of the Department of Science and Art at the examination; at least, he visits the examination hall during the night.

6625. You speak of the officers of Engineers who go round?—I do.

6626. Do you consider that that is serious inspection?—I do not consider it very serious, but still, it is an inspection, to some extent. I do not say that it would guard against every chance of collusion between local parties. I know, of course, that a great many curious things have occurred in that way, and that is one of the great difficulties of the system of examinations.

6627. You are aware, no doubt, that one of our colleagues is the director of the City and Guilds Institute?—Yes.

6628. And I think I may say on his behalf that he would be very grateful for any advice you could give as to the adaptation of their examinations to the circumstances of Ireland. Might I take it that you would be willing to let him have your views on the subject somewhat in detail?—I shall be very glad to place them before him.

6629. You think that sufficient allowance is not made in England for the peculiar conditions of Ireland?—I do; I look upon most of the legislation for Ireland as being entirely from an English standpoint without taking into account the exact position of the country.

6630. Do you think there is some improvement in that respect now?—Decidedly, there is a very good intention, but sometimes it does not produce practical results.

6631. You would guard against our taking the Irish gentry as the exponents of the opinion of Ireland on all educational subjects, more particularly on account of their having been educated in England?—Yes, and because they view these matters altogether from an English standpoint, but I am glad to say they are improving very much in that respect.

6632. Then what should be the guide that the Government should accept in regard to education, including technical education, in regard to Ireland?—The local management of things and the way in which they are conducted; Government assisting each place when it has shown that it is able to do good work; not endeavouring to carry out a hard and fast line with regard to assistance of any kind, but aiding everybody that is capable of doing some sound, good work.

6633. We have been told elsewhere that, in consequence of the peculiar conditions of Ireland, everything ought to emanate from the Government; that is an opinion in which you do not at all concur?—Certainly not; but when the Government, by any policy, have succeeded in reaching a certain point, and when the country is beginning to accept it, I think they ought to persevere in the good work they have begun, and not pull it up by the roots immediately, because somebody has said that it ought to be changed.

6634. In saying that, have you at all in your mind the model farm schools that were formerly established in Ireland?—I have; but upon

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that point a good deal might be said. I did not look upon the model farms, as they were formerly conducted, as a great success, but they were beginning to work out of their difficulties just at the moment when they were abolished.

6635. Was the change taking place in the condition of those farms themselves, which would have adapted them better to the circumstances of the country, or was it that the conditions of the country were being changed, so as to make the farms, as they were, of greater use?—It was the country itself that was changing; circumstances were changing, and no doubt, if time had been given, the system of the national education would also have suited itself to the new circumstances. I may add, if you will allow me, that it was the centralised mode of governing those agricultural schools that ruined them. Thus, they had one system of farming for a dairy country and for a mountain farm, and were trying to till a farm near Belfast, out of the clay of which good bricks might be made. A great many were placed in the midst of the best farms of the country, where the people were already able to till pretty well, and none in the mountain districts, where they ought to have been taught the planting of trees, the reclamation of waste land, and so on.

6636. May we take it that the state of things it was gradually bringing about, of approximation between the needs of the country and these schools, has developed itself still further by this time?—I think so. I think you will get evidence with regard to our dairy school epitomised, which will show the whole thing.

6637. Then you would be of opinion that that whole question ought now to be reconsidered?—I should.

6638. And that, with respect to any school that might be established, particular regard should be paid to the actual needs and circumstances of the district in which it is established?—I am strongly of that opinion.

6639. And that is the only way in which they can be made successful?—Yes; that there should be uniformity of inspection, but not uniformity of practice. I know that Mr. Thomas Carroll, Inspector of Agriculture under the Board of National Education, agrees thoroughly with my criticism as to the character of the teaching and as to what should now be done.

6640. I take it that you consider the State aid which is given to Reformatory and Industrial schools as a type of the aid which you would propose should be given to the most elementary technical education?—I do. There is a special portion of which I would claim for Ireland in addition to the ordinary scientific technical education.

6641. That is to say, you would introduce into your primary schools instruction in the use of tools, at any rate, if not in actual handicrafts, and that the State should partly pay for that instruction?—Yes; that is to say, that they should do for technical instruction what is done for the literary.

6642. That they should do for the honest population what they are doing for the waifs and strays, and the criminal population?—Yes; I have opportunities every day of seeing the contrast between children of the unthrifty and the waifs and strays of the town, who are well clad and better taught than the poor; and at the same time the children of the honest working man without boots or shoes, with thread-bare clothes, while the others are well clothed and covered; and there is a hatred growing up between the classes that is every day becoming more and more marked.

6643. You say that the honest poor resent the advantages which are given to the dishonest?—Yes; and then the drunken fathers, when they

ar remonstrated with for being drunk and not attending to their children, say, that is much the better way for them. A shoemaker of that class in my neighbourhood, with whom I remonstrated, told me "Oh, I will still find a place for the children above there," referring to the Greenmount Industrial Schools. It was unanswerable; I could say no more.

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6644. I suppose that is felt more in Ireland because there is more immediate contact between the classes?—Not merely that.

6645. I mean that the juxtaposition of the school for the waifs and strays, and those for the industrial population is closer?—Yes; and because in most of the towns I know in England, those in Lancashire, for instance, the proportion of the population that is not as well off as those classes is very small indeed. They do not at all come in contact.

6646. (*Mr. Woodall.*) Is it the practice in the industrial schools, to which you have already made reference, to receive children of the ordinary population as externs or day scholars?—Not that I know of.

6647. (*The Chairman.*) Amongst the items of manual instruction you would include domestic economy for girls?—Yes; we tried to do that at the dairy school.

6648. You understand, of course, that I am now speaking of primary schools; of course that is a branch of technical instruction?—Yes; at the time when I paid considerable attention to the question—many years ago—a great effort was made to introduce domestic economy into the national schools through the country. The late Resident Commissioner, Sir Alexander Mac Donnell, was very much in favour of it.

6649. But we have been told that the sewing of girls in the national schools was too much of an ornamental nature. Can you say anything on that?—Oh yes, it was always too ornamental.

6650. But did the teaching of ornamental needlework exclude the teaching of ordinary sewing and cutting-out?—Well there was something to be earned by the ornamental work.

6651. And you think the other branches have been too much neglected?—Too much altogether; the Commissioners at all times endeavoured to foster rather the plain work, but it is impossible for a central Commission to be everywhere, and unfortunately, in Ireland, there is a great want throughout the country of any local authority or local committee to exercise any superintendance, so that teachers are very much left to their own will in the matter.

6652. Do you think it would be possible to put the school under the charge of an attendance committee or some local board?—While the religious question continues in its present aspect, I think it scarcely possible that that could be done to any large extent, but there might, I think, be a visiting committee appointed as a beginning. In some parts of the country it would be effective, in others it would not, but it is the beginning of what ought to be the end some day or other.

6653. What interest have the teachers in encouraging ornamental work, rather than plain sewing?—I should explain what I meant by ornamental work; it means crotchet work, lace making, and so on. It is not that the teacher has a direct interest in it, but the children have; there is some money to be made by it, and the children will not attend to mere lessons on plain sewing if they can earn money by any other form of work.

6654. That is an object which you would wish to encourage?—Yes, certainly.

6655. And in that sense it is not objectionable?—Not objectionable, certainly; it is better than that they should be idle. I would be in

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favour of giving encouragement to such work as would conduce to comfort at home.

6656. But if they could sell their fancy work for more than they could buy the materials of the plain work for, you would not object to the fancy work?—I would not. I might qualify my answer to this extent, that I should like that they should be kept to doing the plain work, but I think the tendency everywhere is to suit the market for their industry, and that they must obey it.

6657. Then it is not mere vanity that causes plain work to be neglected?—No.

6658. We have had some evidence in reference to workhouse schools; we have been told that more might be done there in the way of industrial training; does that apply to the south of Ireland, as well as to Dublin?—It applies perfectly to the south; I am not aware, in fact, of any effort made in that way in the country. There was at one time a great effort made to attach farms to the workhouses, and some very good results were obtained. I remember one of the farms especially where good work was done, it was in Wexford. At that time I paid some attention to the chemistry of agriculture, and that farm gave a test of the work it had done by supplying me with materials for analysis in the way of various kinds of roots. All these were given up. Objections were raised to Boards of Guardians having farms. The objections were not raised by the ratepayers generally; I think they came from the then Poor Law Board.

6659. What was their objection?—Their objection was, I suppose, that there was a good deal of jobbery done in the workhouses; that the system was not, in fact, adapted for working out in its then condition.

6660. The condition of what?—The condition of workhouse administration; the whole government of the poor house; it was in a transition state. The time, in fact, had not come for the workhouse system to be burdened with an industrial system of that kind.

6661. I believe there still are farms attached to some workhouses?—There are very few.

6662. Does the Poor Law Board at present encourage or discourage the attachment of farms to workhouses?—I could not say; the thing has really dropped into abeyance, there is no action being taken about it, and yet it is one of the most important questions that could be dealt with in Ireland; that is teaching pauper children in workhouses as well as in industrial schools. I believe that at the Cork workhouse they have a tract of land, and the guardians are very anxious that the children should be taught garden work and agricultural work.

6663. What would be your general scheme of a complete system of technical education for Ireland?—Well I think it ought to include everything that you would require in England, namely, something corresponding to the Polytechnic of Germany which we have in the College of Science in Dublin, and it is practically existing in the Queen's College.

6664. With regard to the Royal College of Science in Dublin, might I ask whether you consider it is doing as much work as it might do?—I think it is doing a good deal of work, but the public do not appreciate the amount, and, therefore, the attendance is very small; but I think it also might be somewhat modified in any new scheme, and made to do more work. Brought more into harmony with the wants of the people.

6665. Are you aware that many of the students, perhaps one-half of them, are young men from England?—Yes.

6666. Is it not a fact, also, that the instruction given there is to a great extent a duplication of that which is given in Trinity College?
—No.

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6667. What is the difference?—The difference is most marked, at least it was when I was there. The difference was so complete that the Trinity College students came there. Every man who competed for higher honours in Trinity College, for physical or chemical honours, for several years came there. It is more distinctly practical. It has a considerable technological museum, upon which, however, I shall say a word or two afterwards, and, altogether its teaching is more directly practical. No doubt Trinity College has improved its system of practical teaching very much since, but it has fulfilled a very different function, and I attribute to the institution of the College of Science more of the good teaching, due to its example, in and about Dublin, than to any other institution in this country. Little as its direct effect may have been, it is the source of all the changes that have been carried out in Dublin.

6668. You are not acquainted with what is now being done in Trinity College?—Oh, yes, I am aware that they have modified their system very much indeed; but Trinity College could not possibly meet wants that could be supplied by the College of Science, if the College of Science were known to the people of Dublin, I mean the people who want technical education, if they were led up to the College of Science by having information supplied to them at various stages as they came onward. They are now unable to take advantage of it, they know nothing about it, and do not appreciate it.

6669. I think I may conclude from that answer, that even if the instruction in Trinity College were identical with that in the Royal College of Science, that there would be reasons connected with the social, political, and religious condition of Ireland, which would prevent students taking a technical course in Trinity College who might take it in the Royal College?—Well, Trinity College is a University, and has a matriculation examination, which imposes a knowledge of Greek and Latin, and other things quite necessary as elements of general education, but which would not exactly suit the son of a soap boiler or of a machinist who wants to get that kind of knowledge which would aid him directly in his business. I look upon the College of Science as the head of the technical system in a general education.

6670. But I believe students are admitted to the laboratories of Trinity College for a short period without examination?—They are; but they are chiefly medical students, whereas, in the other, they are chiefly technological, and have been, essentially so. With regard to the College of Science, I may say that it has undergone several transformations; first, it was the museum of economic geology, then the museum of Irish industry, and then the Royal College of Science. We established there a technological museum, or rather the beginning of one, and I visited the greater part of England and Scotland, gathering together materials for that museum. Among other places, I visited the potteries. The collection in this department is a very complete thing, including models made at Stoke-upon-Trent. I only instance that as an example of what might be done. A similar collection was made at the same time for the Industrial Museum of Scotland, and it is there now in a prominent position undisturbed, whereas, bit by bit, our museum is disappearing. Many of the things collected cannot be had now, and many of them of great value in the history of Irish development, are thrown into corners. I believe the newest arrangement is to get rid of another portion of them. That is what

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I complain of in Ireland ; that when an institution of the kind is gradually developing ; an institution which, if it had not done much work, or been very useful at the time, was certain to be so hereafter, it is suddenly transformed and pulled about, and valuable materials are thrown away, because a change of view has taken place.

6671. That ought to make us rather cautious in making any recommendations with regard to Ireland?—Well, if you like to take it as such, it is a kind of caution, but it is rather to the pulling down I object. To the building up I have no objection at all ; it is to the transformation, without consideration of institutions which exist, that I object.

6672. That is a very important caution, with reference to the Royal College of Science, because the question arises with regard to that institution whether it could be in some way made available for more systematic evening instruction, and your advice would make us very seriously reflect, whether, by any recommendation of that kind, we did not incur the risk of disturbing the day instruction which is now given there. Could you assist us in regard to that?—I think it is possible to join the two. I may say, it was I who instituted the evening teaching there. My then colleague, Professor Jukes, since head of the Irish Geological Survey, and myself, opened courses of evening lectures, which were attended with the best possible results, both as to the numbers that availed themselves of the teaching, and the effects afterwards on the working classes of Dublin.

6673. How is it that the system has not been continued to anything like the extent that you would expect?—Well, other things have intervened ; political movements have distracted the people from matters of that kind ; and there was a transformation of the place itself from the form in which it had existed, as a museum of Irish industry, into the Royal College of Science ; it was modified by Government. But as far as I am aware there are evening lectures now going on there.

6674. There are evening lectures, but they depend on the goodwill of the professors, who have no remuneration for those lectures ; they are not practical, and they are attended by only a limited number ; is not that so?—They have always been voluntary lectures. When we started them first, they were voluntary on our part, and there was a consideration always uppermost in the minds of the professors, and I think very justly, that voluntary work of the kind, that was not paid for, might be made compulsory by use, and that there should have been some arrangement made by which either the voluntary character would be thoroughly established or that the professors should be paid for the work.

6675. Do you think it desirable that they should be in some way remunerated?—I do ; I think the work would be more effectively done ; to begin with, it would give them a greater interest in the work, and on the evening classes themselves it would be productive of the greatest good. That is the result of my experience for some thirteen or fourteen years.

6676. Was there never any practical instruction given there?—Oh, yes, in the laboratories.

6677. That, you are aware, has now entirely fallen away?—I am aware of that.

6678. Then, in point of fact, you see no incompatibility between that school being a high technical school and at the same time a good secondary school for the instruction of artizans?—No, I think it quite possible to utilize the important collections that are there, and the laboratories, &c., without disturbing the day instruction. It may be

that a little more room might be required to carry it out, but the materials are there, and I think they should be used for the double purpose.

6679. It is simply a question of arrangement?—Yes, and a question of arrangement about which, I think, there should be very little difficulty.

6680. As regards evening classes, you consider that they should aim at a higher standard than an ordinary science school?—I think so; they should go, in fact, in the evening classes as they go in the day classes—as far as the people who attend them are capable of going. I think one of the great evils in Ireland is the mixing up of one grade with another, such as making a primary school do the work of an intermediate school, and even of a university, and not doing its own work effectively. If you want systematic science classes in the evening, you should take care that the teaching be really high. That is what Professor Jukes and I endeavoured to do, to make the systematic teaching in the evening quite up to the level of a university course.

6681. And though that might not be possible, you desire it should approach that standard as nearly as possible?—As far as is practicable.

6682. So that it would not be substituted for that of an ordinary science class?—Quite so.

6683. Now you admit, I believe, that the technological courses of Trinity College, though they may not suit everybody, are of importance?—They are of importance, certainly.

6684. Then with regard to the Queen's College is there any true technological teaching in these colleges—in Cork, for instance?—In Cork, certainly; we have a distinct faculty of engineering—we call it a school of engineering, but it is really a faculty, which terminated formerly in a degree of the Queen's University. It has been one of the departments most satisfactory in its working and has done much good; and I take it that as far as the scientific course is concerned, it is thoroughly technological. The professor of engineering, who is now present, will be able to give you full information on the subject and show you what the result has been. A little more development—and we have in fact tried to give it that development—would make it a high technological school.

6685. Does that apply to the other Queen's Colleges?—So far as I know, yes. There is only one want, and one that we have long contemplated to satisfy whenever we get the building completed and that is to convert the existing small laboratory into a museum of technology. And we purpose taking advantage of the present exhibition to get the beginning made of the technological museum we require; this museum will not, of course, interfere with other technological museums in the city.

6686. Have you also a department of manufactures?—No, the laboratory, of course, is open to students for that purpose; and it is taken advantage of for that: the men work in it. At present it has become too small, like every other part of the college. It was built as if it was never intended to supply the wants of the future, and there is not a single department that we have not had to increase.

6687. You have no special technological course?—No, but we had once a chair of agriculture, and when an application was made to the Government to increase the salaries of the professors, which were fixed at a very low rate, because it was supposed that the professors would have been paid by fees, (large fees will be paid some day or another I suppose, when we are a rich nation, but in the meantime the professors are very ill paid), they did not get any increase, but, if I may so

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express it, were treated to a joint off their own tail. The Government abolished the chair of agriculture, and another chair, and amalgamated two or three more, and but for the resistance, three or four years ago, by the professors in the three colleges, they would have gone on further with the process of amalgamation. Whenever we asked for an increased remuneration for any chair the Government proposed to give it by amalgamating two of the chairs.

6688. Do you think technology could be advantageously taught with regard to chemical manufactures?—I do, certainly.

6689. Are you aware that this teaching has been more and more abandoned on the continent?—I am quite sure it is, because they have attained their results without it. It was a great assistance while it lasted, and they can now do without it. When I was a German student, all the laboratories of the continent were filled with technological students, who have transformed the industry of Germany, and a good deal affected the industry of Great Britain. Men who were contemporaries with me at Giessen I afterwards met in many factories in England. That was when I was collecting specimens for the Irish Industrial Museum. I am quite satisfied, of course, that they are able to give it up now, because the whole system is organised. They have thoroughly organised a system which, so to speak, they can take up from below.

6690. Still, you know, the old men die out and the young men succeed?—Yes, but the thing now begins with their ordinary schools; the course is complete, they do not want that which they did in the beginning. Just as I said before, we want manual teaching in Ireland, you don't want that in England.

6691. What you mean is they learn pure chemistry in the laboratory and technical chemistry in the workshop?—Yes.

6692. And by the same rule you would say technological teaching is wanted least in countries where factories are most advanced?—Quite so, except in that intermediate condition I should be opposed to mere technological teaching anywhere. If you want to teach science, you must teach pure science. I plead for technological teaching however in the case of agriculture; there it would, of course, come under the head of applied science, just as in the teaching of medicine you have such chairs as those of medical jurisprudence and of materia medica, which latter is an unscientific chair, being a combination of three sciences; still it is found convenient to have in each school or university some chair that will group a large number of facts having a direct practical application which will bring them before the students' mind in one group or relation. I should say the same with regard to the chair of agriculture; though dependent on chemistry, physics, botany, and geology, it was desirable to have one man who would bring all the facts together to one point. It is not an absolute necessity, but it is a great convenience.

6693. Then the agriculture, you point to, was the same as other technical subjects?—Yes.

6694. And as there is no necessity for a model workshop in countries advanced in chemical and mechanical manufactures, so a model farm is least required in districts where agriculture is in an advanced state?—Yes. I may add that a want which was not felt when the chair was established has been felt since, and that the city and county grand jury, and the agricultural society two or three years ago memorialized the Government to re-establish what they had abolished, because in the meantime the farmers have begun to learn its utility.

6695. What has been the response to the memorial?—That we could do it ourselves, I dare say; no other result, that I am aware of.

6696. We may take it that Ireland is pretty well provided with the means of higher technical instruction?—Yes, with slight modifications.

6697. Would you kindly proceed with your sketch of what you would like to see established?—We should have representatives of the German Real Schule and of the *Gewerbe Schule*. I think our dairy school in Cork may be taken as a representative of the one and the *Glassevin Institution* of the other. These are schools that require either to be entirely created or else to arise in the form of additions to the existing schools.

6698. With respect to the Real Schule you are aware that it has no relation to what is described as technical education?—Oh, perfectly; they represent the lowest grade of the scientific teaching.

6699. The elements of science are taught?—Yes; at that stage of education I allow the mere workshop to disappear.

6700. These schools are for children who remain up to the age of fifteen or sixteen?—Yes, and longer.

6701. But would you have any hope of keeping the children of the lower middle classes at school until that age in Ireland?—I think in Ireland the children of the lower middle class are at school until sixteen or seventeen; only they are at school doing unprofitable work. But as to the school time there is abundant room for it here.

6702. Do the intermediate schools, as they exist, supply that want in any way?—No; in no way.

6703. Is it that the curriculum is not of the nature of that of the Real Schule during the day classes?—Well, the Real Schule and the Gymnasium are fused into one. The ordinary intermediate school here teaches Greek and Latin very often to every one who is intended for industry or the professions, but there are what are called commercial classes in most intermediate schools, where they teach reading, writing, a foreign language, and the elements of science, pretty well after the fashion of a magic lantern exhibition.

6704. If science were thoroughly well taught in these schools, would they supply the want?—They would.

6705. There would be no social difficulty?—There would be no social difficulty, I fancy, because we would have to go to the root of the matter; with regard to intermediate schools, there is no hope of changing their condition, so you must take the thing as it is.

6706. Are they sufficiently numerous?—No; for instance, in the south of Ireland there are scarcely any intermediate schools, properly so-called. They have been broken up nearly entirely by the religious orders who have taken up the teaching of the intermediate classes or by the diocesan schools of the secular clergy, who are, of course, obliged to have such schools for their own purpose of training young men who are to enter the church; and they also use that school for the general purposes of the community.

6707. Then the schools of the religious orders now contain children of the class to whom you would wish to give instruction in elementary science?—Yes; they supply the only intermediate schools among the Roman Catholics. There are a few Protestant intermediate schools; one only lately established in Cork; but there is a great deficiency of them in the south of Ireland; and in this city of Cork, which could boast of having sent at one time eleven junior fellows out of eighteen, into Trinity College, there is not a single intermediate school which could be described as being of a high class.

6708. Where do people desirous of giving their children a high class intermediate education send them?—Some to schools in England others to schools in the neighbourhood of Dublin.

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6709. Were they all private adventure schools; those that were so successful?—They were. The system of sending children to boarding schools, which has grown up gradually, and to the national schools, has broken up those schools almost altogether. The national schools took away the lower classes, and the higher classes were taken away by these boarding schools.

6710. Are you aware that a company has recently been formed in England for establishing secondary boys' schools similar to the Girls' Day School Company, which has now been in operation for some time?—I know of it only by the simple statement about it that I saw in the newspapers. I know nothing of the details of it.

6711. Well, the plan is to establish schools in those localities the inhabitants of which are prepared to take up a considerable portion of the shares; so that if the city of Cork, for instance, were prepared to take, say 5,000*l.* worth of shares in a secondary school, the company would take shares to about a similar amount. That has been very successful in establishing girls' schools in various parts of England, and I should like to know if you see any reason why something of the kind might not be done, either by a separate company, or by correspondence, with the one which is established in London?—Well, one difficulty we have with regard to our schools here is that the boarding school system is an expensive one compared to the mean income of the middle class here.

6712. Precisely; but these are day schools?—Yes, but these are the only ones that can help us in technical education, and these we have not.

6713. Is there anything to prevent the schools of the religious orders from giving elementary education in science?—In one school here, which would come under what I should call the third class or the elementary primary school, it is actually given. I refer to the school of the Christian Brothers which would represent the third grade.

6714. Are the schools of the religious orders not recognised as schools which may compete for the payments on results of the Intermediate School Board?—Oh yes; and many of them have classes in connection with South Kensington.

6715. As a matter of fact do they compete?—Oh, certainly, in the intermediate examinations, and most successfully.

6716. Then, I suppose, the fact is that sufficient encouragement is not given by the examination board to science in the intermediate schools?—It is given as far as encouragement of that kind can be given, but you see it will be mere cram, it will not be teaching.

6717. Have you visited any of the intermediate schools since the establishment of the Board?—I have.

6718. Have there been any improvements in the teaching apparatus?—Yes. The intermediate system has done at least this much good, it has superseded all the old books that were of very little use, and substituted newer and better ones, and I may say that this was a great benefit. There has been a great improvement in the diagrams, apparatus, and books. It has also attracted the attention of pupils to subjects that were not looked on with any favour before, and shown the wants of the country as measured by the programme itself. And there, I take it, the benefit has ceased.

6719. Have you visited any intermediate school where there is a good chemical laboratory, adapted to the needs of elementary instruction in chemistry?—No, I have not.

6720. Do you believe there is such a thing?—I do not.

6721. Do you believe there ever will be such a thing, unless a practical examination is included in the programme of the board?—Never. We have been trying to do that in the Royal University, but so far it has not succeeded. We desired to bring it into the ordinary pass examination for the B.A., and in fact into every examination in any branch of science in which a practical examination could be held. In the honours B.A., it has however been introduced.

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6722. Can you suggest any means by which influence could be brought to bear on the Intermediate Education Board to induce them to make a practical examination in science a portion of their programme?—Well, I think they will do so of necessity when the facilities are afforded them. There was no place in Dublin in which they could hold a practical examination. The Royal University will be provided with a chemical laboratory, a geological museum, and a physical laboratory for examination purposes, so that we shall have all our range of physical science practically examined there. And there seems no doubt that the Intermediate Schools will gradually be provided with laboratories; this they will now have to do, because they try to do university work as well as intermediate work. They will, therefore, endeavour to get these laboratories, when a practical examination is aided by the boards.

6723. Then in that way you think that a university examination will be a sufficient stimulus?—I think it will be a great stimulus; it will compel those schools sending students up for university examination, if they wish to get honours, to provide laboratories and apparatus for properly teaching them. And I know that some little movement is taking place among the better class of schools.

6724. Well, now as to primary schools?—In that you have an example of what can be done by the Christian Brothers schools here, which are on the list of those you are asked to visit. You will see that there a great deal has been done in the way of technical instruction; but they are, perhaps, on a larger and more extensive scale than might possibly be attempted in other primary schools. A good deal has been furnished by friends of the institution in Cork, and therefore you will not take the amount of apparatus you will find there as a real measure of what would be actually necessary.

6725. I suppose we may take it that in the remote districts something very much more humble should be attempted?—Yes.

6726. And even that could scarcely be attained without considerable expense?—It would be impossible without it, and it should be in harmony with the wants of the district itself. Too much should not be attempted at once.

6727. Are you of opinion with Mr. Carroll and others from whom we have received evidence that in rural districts a plot of ground should be attached to all primary schools?—I am strongly of that opinion. I was of that opinion as commissioner of primary education, and, with my colleague, the late James Arthur Dease, reported in that very spirit in 1868.

6728. That is the case now, I believe, only with regard to a very small portion of those schools?—A very small portion.

6729. Do you think that the method at present adopted, namely, that of leaving the entire pecuniary responsibility of the model farm, as we may call it, to the managers and the teachers, is the proper one?—I do, only that I think greater encouragement should be given to those who manage them properly.

6730. And that there should also be local inspection?—I think there should be an inspecting committee in every district to aid and help the

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inspector of the board, who can never possibly carry out such a gigantic work unless the localities aid him.

6731. Do you think that the staff of inspectors of the National Board generally are competent to give an opinion on these small model farms?

—No, I do not think so, because, in point of fact, it has been no part of their duty at any time.

6732. Is there a staff of competent inspectors of any kind sufficient to inspect those farms if they were to be multiplied?—There is only one inspector at present, Mr. Carroll, and no one could give better evidence on that point than he could. Mr. Carroll himself placed one point of very great importance before me the other day, and that is the teaching to all the teachers and inspectors themselves something of agriculture. If you are ever to raise these agricultural schools to do any good in the country, you must convert Glasnevin into a normal school for teaching the inspectors and the teachers who are to go out of it. That is the true function which that institution ought to perform. I do not think much more could be done for the existing teachers, but I wish that those entering on the career of a teacher should be regularly trained at Glasnevin for a certain period.

6733. And I suppose that instruction might be given at the model schools which you propose to re-establish?—Well, I have not thought upon the re-establishment of any of the other schools on the old lines, but rather on the development of the small ones, or that of the central one which I would make the great normal school for the whole teaching staff.

6734. It appears that some instruction of the kind is now actually given to the teachers in training at the Marlborough street institution?—Yes; that has been always the case, and it is to that I allude when I say the period of training is too short. In each year a number of teachers come to Marlborough street for training, and these teachers attend for an hour on two days of the week at the Glasnevin farm, where they receive lectures on practical agriculture and horticulture.

6735. Do you consider a six-weeks' course more advantageous than the instruction given for two hours per week?—Most certainly; a man could then devote his whole attention to the subject.

6736. Do you consider that if the ordinary inspectors of primary schools received a short course of instruction at Glasnevin, or some similar institution, that then the inspection of agricultural work might be left to them, or would you still consider it necessary that there should be special inspectors?—I think a good deal might be done by them, but I do not think it would supersede the necessity for a small staff of thoroughly practical agriculturalists also engaged in inspecting, to see, as it were, that the thing was kept properly at work.

6737. Of course you would desire that the competency of the ordinary district inspectors to examine in agriculture should be ascertained by some examination or other method before they are appointed?—Yes, if it is to be a part of their duty to examine in agriculture. And they should be encouraged to make it a substantive part of their studies by getting credit for it on their examination papers.

6738. Have you any definite information to give respecting schools of apprenticeship?—I hold those apprenticeship schools to be models of what is required to supply our wants, because, knowing the condition of the country in Belgium at the time of the establishment of these schools, and having devoted a good deal of time to the study of them, and to the state of Ireland at the time, I thought them then, and they still appear to be so now, models of what we should aim at in teaching

what I may call handicraft to the people, making up by this means for their past neglected condition in this respect.

6739. And that, you think, in the first instance, should be done by voluntary effort?—I think it should be done by voluntary effort, aided, of course, as must be from the very nature of the case, by some help from the State.

6740. But only on condition of showing some good work done?—Well, I think all State aid should be based on that condition.

6741. (*Mr. Woodall.*) You told us that you think special technological instruction should only be regarded as temporary, and to meet the particular purpose of fostering industry?—As I understood the question put by the chairman, that would apply to the higher schools.

6742. I am applying myself more particularly to the primary schools; how would the case stand with regard to them?—In the primary schools I think there will always be some necessity for having technological instruction continuous there.

6743. I should like you to give us some information in regard to the history of this question; the need for this practical instruction seems to have been felt very early in the history of the national board?—Yes.

6744. As early indeed as 1837?—Yes.

6745. But in 1847 practical experiments appear to have been made rather extensively about the country?—Yes.

6746. And the National Board pledged itself to encourage all experiments which might be made in the nature of increased grants to schools of industry with a laboratory attached?—Yes.

6747. Will you tell the Commission some instances of such instruction given in a boys' school within your own knowledge?—With regard to boys it was given scarcely anywhere except in the agricultural schools; it was altogether confined to girls. The only case I know of, and that is a striking one, to the contrary was the piscatory school at Galway, which was rather successful for a time. There they taught the boys the manufacture of lines, the weaving of nets, and, in fact, the making of a good deal of the fishing gear. They had some navigation schools also, but they could scarcely come under this class, as the teaching was only theoretical. And I may mention that the want of system in a thing of that kind was strikingly illustrated in their having put one of their navigation schools at a little village called Kinseely on the coast of Dublin where there were not a dozen fishermen, while we had not one in the port of Cork.

6748. When you say "they," may I ask who put it there?—I could hardly put it down to anyone; I suppose the Commissioners were theoretically responsible, but that the local people encouraged the getting up of the school.

6749. Can you tell us what has become of the school so established at the Claddagh?—It has gone down with the population itself; the Claddagh is almost depopulated. No one who cannot remember the state of the people of Galway and the west of Ireland from the year 1847 to 1853, can have any idea of the condition of the people there, or how any institution could outlive it. I was then a medical student, and in that part of the country, I have gone into a house on all-fours where there were three dead bodies inside and two dying of fever. There was, of course, no trace left of any industry among those people after that.

6750. Will you be good enough to state the experiments in the training of girls?—There were many good results in connection with that. For instance, one was the Kinsale convent, which I knew practically at that time. It taught girls a great many things, and the whole remnant of the lace industry that exists in Ireland is a survival of

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their work at that time. It has survived in some places as a result of that instruction.

6751. Was the school at Kinsale a convent school?—Yes.

6752. And now, in the matter of the training of girls, speaking of your experience of that lace-making, would you say that in that particular instance the more useful needlework was neglected?—I think not; not at Kinsale; there they went further, and taught the girls household industry, and there were cooking classes. It was very well managed, and every branch of domestic industry was encouraged there, at least for some time.

6753. In a well conducted school of that kind, is not good needlework regarded as an essential preliminary to skill in lace-making?—Yes, it ought to be, and in that particular school, and in some others with which I have incidentally become acquainted, it was regarded as essential, and the making of lace was regarded as a promotion for proficiency shown in plain needlework.

6754. But at this Kinsale school to which you have referred, instruction was given in other useful arts?—Yes.

6755. Muslin embroidery, for instance?—A considerable trade at that time grew up in muslin embroidery, and it was taken up by persons outside, owing to the support given to those schools.

6756. Kinsale is a fishing place?—Yes.

6757. And fish net making was also carried out there?—It was.

6758. Was that profitably encouraged by the teaching of the school?—I think it was, at least for a time; but then afterwards came a period of backwardness.

6759. On account of the competition from outside?—Well, it was not taken up by the local parties as a trade.

6760. But the school had sufficiently encouraged a local trade?—It had.

6761. Then with regard to the trade of dressmaking and staymaking and netting?—Everyone of these departments more or less succeeded, and many of the girls that were educated there have continued to earn money in different places, but I am sorry to say a large number of them emigrated.

6762. What became of that school?—That school exists still.

6763. Is the work still carried on there of the same character?—The school is still there, but I cannot answer for its condition.

Sir
G. Colthurst.

SIR GEORGE COLTHURST examined *en parenthèse*.

6764. You will, at the Cork exhibition, have a large exhibit of the work done in primary industrial schools by girls?—Yes.

6765. I wish to ask you whether the work you are about to exhibit is work from schools in which that instruction in industrial occupations has been carried on fairly for some time?—A great deal of it; most of the best industrial schools are represented. I will forward you a list of the collection with the prices of the articles.

Dr. Sullivan.

DR. SULLIVAN'S examination resumed.

6766. Kinsale may be taken as a typical convent school?—It may.

6767. And as such it is recognised as a non-vested school under the rules and regulations of the National Board?—Yes.

6768. And in that sense receives aid in public grants?—It does; but there is a special regulation that applies to what are called convent schools.

6769. Having given that as a typical convent school, I should like you to give a school of the more ordinary kind. A specimen of the national school with an industrial department attached?—I could scarcely give you one of that class at present.

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6770. Can you tell us whether teaching of this kind in sewing and other useful industries has been given in the ordinary schools under the National Board?—Yes, and in some of them I believe it is good. I had a case recently of a young girl who wished to become a teacher under the National Board, I had an opportunity of examining her, and found she was as well up in literary work, as I knew she was in knowledge of ordinary domestic matters.

6771. Do you think such teaching is sufficiently encouraged by the present regulations of the National Board?—I do not think so; I think it is a matter of great necessity to the country at the present moment, and that such teaching should be more encouraged than it is.

6772. Would you say further encouraged by grants; or in what way particularly would you suggest that the greater encouragement should be given?—I think it should form part of the general scheme of technical education, and that the Board of Education ought to take this matter up and work it up in the schools, and encourage it in every way, both by giving advantage to the teachers for teaching it, and to the pupils in learning it. They should make it a distinct and formal part of the education.

6773. Can you tell us how far drawing is taught in the primary schools which have come under your observation?—A good deal; and a good deal of benefit has been derived from the production of small drawing books by Vere Foster; and in many schools they have been rather successful in teaching elementary drawing. But it is not as much developed as it ought to be; it should be as much part of the system of teaching as writing.

6774. Under the regulations to which I have referred, there is some recognition of evening schools; can you tell me to what extent night classes are established in Ireland?—There are night schools in this city in the schools belonging to the monks of the Presentation Order; they have night schools at what are called the Lancasterian schools, which I believe are very fairly conducted. In Dublin they have had it in some of their model schools, but as a rule, I think there is not much done in the way of night schools.

6775. You think more might be done in that direction?—Yes, I believe so.

6776. Can you state any way in which a desire for such instruction by those whose education has been comparatively neglected might be encouraged?—I think the encouragement should be given to the teachers to undertake the work. If you appeal to the men to come in and be instructed they will not come, but if you make it the interest of the teachers to get them they will always be able to find them.

6777. Should instruction in the primary schools in Ireland be made compulsory?—Well, I was not of that opinion when on a Commission in 1868, because I saw the difficulties in the way of such a measure. Not that I objected to the principle, but that I did not see that the time had come for it. I think circumstances have changed since then, and now I am in favour of it. You have only to take the statistics of the National Board to see what a very large proportion of the children attending the national schools never get beyond the first or second book.

6778. Will you state the changed circumstances since 1868 which would make compulsory attendance practicable now?—I think the public have come to recognise its necessity since then; they were not

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prepared for it at that time at all. There were some changes then contemplated by the Commission, such as bringing the intermediate and the national schools under one system, and that will be absolutely necessary before you can have compulsory education. That is to say, you cannot carry out compulsory education in the national schools alone; it must embrace all the religious organisations for teaching as well. If the child be compelled to attend school the parents must be left at liberty to send it to any school they please.

6779. Provided it be an efficient school?—Always assuming that.

6780. How would you ascertain that?—By inspection. I say that all schools to which children would be sent under a compulsory Act should be open to inspection, no matter what schools they were.

6781. Do you think the religious orders, male and female, would submit to inspection?—I believe all of them would, except the Christian Brothers. I examined them on that point in 1868, and they refused it. But the other religious orders, I am sure, would do so, and many of the bishops were in favour of that kind of inspection.

6782. What proportion of schools would that exclude?—The Christian Brothers have an average of 25,000 children on their rolls, that is about one-fortieth part of the whole.

6783. Have you reason to believe some change has taken place in the sentiments of even the Christian Brothers in regard to that?—Oh! I am sure that such is the case.

6784. Then there is some hope that by conciliatory approaches on the part of the National Board the whole of the Irish Schools of any importance might be brought under inspection—I think they might be. The schools under the Church Education Society have practically accepted the whole thing since. They were equally strong as against State interference, but since then the majority of those schools have dropped into and been placed under the National Board.

6785. Of course, in any scheme of compulsory attendance, allowance would have to be made for remote places, and the difficulties of particular populations?—Certainly.

6786. But you think, as far as town populations are concerned, the country is quite ready for it?—Decidedly, that is my belief.

6787. And without it there is no hope of bringing people under general instruction?—No hope. Look at that simple fact shown by the statistics of the National Board—the proportion of children in the first book who never pass beyond it; that is the best proof of it.

6788. You have already spoken of the importance of drawing—Are you aware of any special industries utilising locally some natural materials in Ireland?—The one that occurs to me now is that of the bog-oak ornament trade, which has grown up in Ireland within the last thirty years. That, certainly, would be a large trade if design had been introduced into it. It was deficient, and remains deficient in design. With very few exceptions the articles exhibited lack all ideas of true design; they are vulgar in style and appearance, of the mere conventional type such as “Paddy and his Fig,” and things like that, and are for the most part, productions that are really degrading to art.

6789. Have you considered the manufacture of small articles in arbutus, such as tables, work-boxes, and so on?—The same objection applies to them; there is a lack of design in every way in them. Once in the great Dublin Exhibition—the one before the last—I was the judge in the bog-oak ornament series of exhibits, and I marked my disapprobation of the whole class in regard to design, by giving the prize to a trader from Belfast who had for the first time introduced art into it. He had produced a really excellent series of ornaments and cheap

jewellery in which real design was introduced. It had some effect for a short time by the disappearance of "Paddy and his Pig," and other things from the windows, but they have, I am sorry to say, come back again.

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6790. Do you consider the traditional cabinet work in the arbutus trade is fairly well done?—Its work is well fitted and finished, but where it is deficient is in design.

6791. And you think aid might be applied which would give this instruction in design which is wanted?—I do. I think trades of that kind which embrace design ought to have it brought, as it were, to their very doors; in fact it might be done by the ordinary art schools.

6792. Do you think that such instruction could be given in a primary school or would you require a special school?—I think it might be given in a primary school; every primary school, I think, should teach drawing, as it teaches writing, irrespective of any future application of the art to any special purpose.

6793. Would you suggest any special kind of instruction adapted to the peculiar wants of these districts?—I would rather give general instruction how to use the hand.

6794. General instruction might be given in a private school which might be applicable in the way of design?—Quite so.

6795. Do you think that with such aid these industries might become capable of providing employment for an important number of people?—Yes, I think a moderate trade might grow out of it. It did to some extent in Dublin in the bog-oak manufacture; and I am sure in many towns in the country local employment might be afforded to a considerable extent.

6796. Has this industry been pursued in many parts of Ireland?—I doubt it very much, in consequence of want of designing power, and the disappearance of skilled workers.

6797. And the experience you have stated, in the case of bog-oak and arbutus wood might be regarded as applying also to other industries of a like nature?—It applies perfectly to the cabinet trade of Cork, which at one time was very large indeed, but which has been injured not only by want of design, but by something outside; the objection to work by piece work.

6798. Have you any knowledge of the industry in marble which is found in many parts of Ireland?—I, at one time took great interest in it, when I tried to get help to aid in forming the collection which you will have seen in the Royal College of Science. The result of that collection was to get two or three marbles brought into considerable use, as, for instance, the red marble found near Churchtown in this county, and the green serpentine found in Galway, but the same objection I have urged as to want of design in bog-oak work, and other things, applies there in a very strong degree; there is total want of design in most of the articles I have seen, such as chimney pieces, and so on. There is a revival now, however, and the effect of some of the schools of design is beginning to tell.

6799. Is there an increase in the trade?—Yes. Two or three manufacturers have very large works indeed, and I hoped that larger numbers of them would exhibit here. One of the largest manufacturers however, wrote a short time ago stating that their hands were too full of work to find time for exhibiting. Still, I take it, that there is a want of art in our whole industry in marble.

6800. Can you account for the failure of nearly all the mining industries?—That is easily accounted for. Our mines are extremely poor, and the same fate that has happened to ours has happened to

Dr. Wm. K. Sullivan, D.Sc., Ph.D. richer mines in Cornwall. We have been beaten by foreigners. Our mines are extremely small and poor, and require a great deal of knowledge and skill even to keep them open at all.

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Mr. J. Fox.

Mr. JOHN FOX of the firm of Booth and Fox, Lavitt's Quay, Cork, examined.

6801. (*Chairman.*) Your firm are manufacturers?—Yes, of eider down quilts, bed feathers, and curled horse-hair; and our firm is an old one, of fifty years' standing.

6802. You are a member of the Town Council, the Cork Harbour Board, and the Municipal Committee of Science and Art?—Yes.

6803. You wish to give some information to the Commission on the difficulties with respect to technical education in the city of Cork?—That is my intention. In the first place, I think there is a great lack of skilled labour in Cork, particularly of mechanical engineers; and in anything at all pertaining to chemistry the people seem to be totally devoid of knowledge. That is one of the principal drawbacks, and if it could be remedied in any way by this movement it would be for the good of the trade and the business of the country generally. Then there are certain other obstacles, for instance, the objection to piece-work, though I scarcely know whether such would come under the subjects before the Commission. It is one of the matters with which we have to deal, and it is a great hindrance to trade. Another thing is, limiting the amount of work to be done in a day, which causes bad workmen to be paid as much as good ones. I have studied the question here, as well as in England. We have warehouses in Liverpool, Glasgow, and Manchester, and we employ 300 hands here.

6804. Where do you export your products to?—To England, Australia, and elsewhere; we sell more of our goods in the colonies than in Ireland.

6805. But they are manufactured here?—They are all manufactured in Cork.

6806. What are the peculiar facilities Ireland offers for your trade?—Our trade here has grown to what it is from a very small beginning; fifty years ago my father and uncle had the business. The raw materials being mainly feathers, and the labour for manipulating them being cheap, are the chief reasons why the trade here has grown to the extent that it has. We employ a large number of females, and much unskilled labour; if it could be applied in any way, there is any amount of such labour to be had. There is skilled labour in Cork that could, with teaching and training, compete with anything that England or Scotland could produce. There is plenty of ability among the working classes of this country. The labouring portion of the community, the unskilled untrained portion of the community, are at a great disadvantage, I think, in not being allowed by the skilled artisans to take up any branch of work they were capable of.

6807. You mean to say it would be useful if they could be taught trades outside of the workshop?—That is it, or if a portion of the workshop could be used as a day technical school.

6808. What obstacle is there to that?—Well, for instance, in sewing-machine work, which is a large branch of the business. We have some thirty or forty machines at work, and they are also used for army clothing, the clothing trade generally, and for boot uppers. Machine sewing is one of the things that I think should be taught as an adjunct to a school of art and science, a technical school training here. That could be done without much expense.

6809. Why is it not done?—Well, for instance, we would prefer paying higher wages to a person who was trained than allow a work-hand to go into the place to be trained; because while she was in that preparatory stage she would damage more goods than her work would be worth. *Mr. J. Fox,*
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6810. Then in point of fact this is an economical question, and you are anxious that something should be done for you rather than that you should do it for yourselves?—Well, I came here at the request of the President of the Queen's College, being a large employer of labour; but, individually, it does not very much matter to me if we train work-hands or not.

6811. You are speaking of other trades, and when I say "you" I mean manufacturers here generally?—Yes. If any teaching or training could be given in any school, or if there were lectures to show work-people the futility of opposition to mechanical appliances and machinery generally, and to help them to come out of that slipshod way of doing their work, it would be one of the greatest benefits we could have in any country.

6812. Do not you think it would be possible for manufacturers in Cork to combine to establish places of that kind?—Yes, if there were a sufficient number of them of any one trade; but that is one of the evils of this country—there are not many people in the same branch of business. They are compelled to import skilled labour, and if the few hands they have think proper to dictate their own terms to them they can do so. Such has been the case recently with myself.

6813. At any rate, you would consider it very desirable that, in a primary school, children should be taught the use of ordinary tools?—Yes, hand-work in the use of ordinary tools; and I would have workshops, such as carpentry workshops, which would bring children into the habit of doing something besides unskilled labour, something beyond mere fetching and carrying.

6814. You would not, of course, contemplate the teaching of a particular trade, because trades are so numerous it would be impossible to teach all?—I would begin at one trade; I would practice on the woollen trade, which seems to be thriving here. I would make people skilled in the art of weaving,—some one branch if it could be applied.

6815. Then you would like to see in any technical school weaving taught?—Yes, or any other special branch of the business peculiar to the neighbourhood.

6816. Is there a sufficient number of woollen cloth manufacturers in the neighbourhood to enable them to combine and form a weaving school?—I think there are.

6817. You think that would be useful?—I think it would be a step in the right direction. In mechanical engineering we are as much at a discount here as in anything else. If any teaching could be given to the youth of the present day here to give them a desire to become mechanics, and to suit them for mechanical engineering, it would tend very much to develop manufactures. Here, for instance, mechanical engineers have 25 per cent. more wages than in England, and the amount of work they do is from 25 to 30 per cent. less.

6818. You have two engineering establishments here now; that of the Cork Steamship Company and the Messrs. Perrotts?—The Cork Steamship Company do not do much in that way now; those who have ships to build find it cheaper to get them built elsewhere.

6819. But they do their repairs in Cork?—Not so much as formerly.

6820. Do they make their own boilers?—I do not think so; I am sure not. Recently Sir John Arnott had two steamships building at

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Passage Docks, and there probably were half a dozen strikes while they were being built, principally among the engineers. A dispute arose between the carpenters and the binders about the former doing some rivetting work, and the latter would not work with them. The result was that if a balance sheet were made out on those two ships I think there would be a loss instead of a gain found on them. That is one of the drawbacks to business here. If we could instil a knowledge of chemistry and mechanical engineering into the youth of the present day, and those subjects point in the direction of that trade, my idea is such occurrences would not take place. Just now there is a great demand in Cork for painters and paperhangers in consequence of the Exhibition. I had engaged one of the principal men in the business to do some work for me. When I met him last I asked him why he was not getting it done? He said, "I have forty men now, and they will not do anything for me because they know there is plenty of work to be had, and they are not disposed to do it." I have had to bring workmen over here from England to start a curled hair manufactory. When I put on other men to work with them they immediately walked out. The result was that I had to send away the men before the others would come back. I speak from experience of both England and Ireland, having workmen employed in both countries, and there is no question but that there is as much intelligence and as much ability amongst the lower classes of Irish labourers as you will find in England or Scotland, and if you give them an opportunity they are equally intelligent and as smart as English or Scotch people.

6821. And as persevering?—Yes; persevering until they see they have got the law in their own hands, when they are strong enough to strike; and they often ruin themselves and the trade they are engaged in when they are able to get what they demand.

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Mr. ALEXANDER JACK, M.A., Q.U., Professor of Civil Engineering, Queen's College, Cork, examined.

6822. (*Chairman.*) You have occupied the chair of Civil Engineering in the Queen's College for a considerable time?—Yes, for 28 years.

6823. What object have you proposed to yourself by the course of instruction you give?—I took up the idea when it was imported into the place by the late Christopher Bagot Lane, an engineer of considerable eminence, and the first occupant of the chair, who started the idea of a scientific preparation to be given there which would make a pupil useful in an engineer's office as a pupil, and enable him to profit to the utmost by the practical instruction he would receive there. I adopted that idea, and have worked it out ever since. We have always worked with the intention that our men should go through a short pupilage afterwards; our work has been preparatory.

6824. What has become of your students generally?—The great bulk of them have become civil engineers, some of them have become practical mechanical engineers, some mining engineers in America, and some have gone into various manufacturing businesses. One student from our school was chemist at a brewery in England. That shows what an exceedingly varied number of openings the men have found afterwards.

6825. Have many of them been employed in Ireland?—Few. The harbour engineer in Cork is an old pupil of the school, so are two or

three of the local architects, so is the harbour engineer of Limerick, and I might mention some of the subordinates of the Board of Works.

6826. And many of them have gone abroad, and to England?—The surveyor of the Marylebone district and the recently appointed assistant surveyor of Birkenhead are old pupils of ours. But the great bulk of our pupils are abroad. For the last ten or fifteen years most of our men have gone to America, where they have thriven very well.

6827. They have generally passed through a pupilage afterwards?—Almost invariably; a shortened pupilage.

6828. With civil or mechanical engineers in this country or in England?—In England principally.

6829. And you are satisfied that this plan of preparing them for pupilage is a sound one?—Undoubtedly; and I will refer to the opinions expressed by Mr. Conybeare in a volume of opinions collected by the Institute of Civil Engineers a few years ago upon this subject. Several of our men had gone into Mr. Conybeare's office, and he referred to it specially. I mean the engineer who presided over the Bombay Waterworks.

6830. And from your success you consider yourself (and very properly) entitled to express an opinion in reference to what should be done in regard to technical education in Cork?—With regard to one branch of it, not the question of teaching handicrafts, but the question of imparting a certain class of scientific knowledge to artizans with the object of improving them and of improving their work.

6831. I may ask, in reference to that, whether the professors of the Queen's College, Cork, are giving any instruction to artizans, and whether they have any evening classes?—Neither; it was formerly discussed amongst us, and besides other difficulties that lay in the way of it, one was that the building itself is unfortunately a little too far away from the town—not such a distance as elsewhere would be thought much of, but it is apparently out of the town. For many years the way to it was rather a roundabout one, and it was at that time thought to be still farther away from Cork than it really was.

6832. Is there a tramway to it?—No; it is only a question of fourteen minutes' walk from the centre of the city; formerly it would take about twenty minutes to get there.

6833. Then the question might now be fairly re-considered?—Certainly.

6834. Will you now tell us what you propose in regard to the technical instruction of artizans?—Well, the great question, I cannot help thinking in improving a workman and in improving his work is the possibility of inducing him to think about it; to think of his work when he is doing it. And in order to do that, I believe that if you train him—the great object is to teach him the elementary principles of science, particularly of those more immediately connected with his trade; and to train him into the habit of making deductions from these in connection with his work. And I attach very much more importance to that than I do to teaching the simple results perfectly independent of any reasons to be put forward for them. Your most intelligent artizan is very often always reading; he is reading descriptions, and he is going about receiving instruction in the ways of doing work, and yet he will not make use of these facts. He will really and truly use only the systems that he is taught in his work, and those he is made to employ in the workshop where he is engaged. Therefore teaching of that kind practically amounts to very little. I long had those ideas in my head, and I was greatly struck by the forcible way in which they were put in the "Scientific American," in an article towards the end of April,

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concerning the advantage which might arise from teaching and from reading. I think then that the question of scientific teaching of the artisan is the main point that should be maintained in view and not the teaching of mere practical applications without the scientific principles on which they are based.

6835. Well, that is precisely what the Science and Art Department encourages?—No doubt that was the idea put forward, but I am afraid that there is a tendency at the present time to hasten on to the end without working from the beginning. I see books published; it would be invidious to mention names, but I see books published in which really the most advanced class of instruction is put forward under the name of practical teaching in a peculiar manner, dissociated altogether from the principles on which they are founded; and of a class such as to be entirely outside the requirements of the artisan or of the workman, and which would be doing him no good whatever. I will just give you an illustration. What is the use of putting forward "Gordon's formula for the strength of pillars," and of teaching that to an artisan. It is a thing that he will never be called upon to use; that he will never be able to understand, and ten to one that if he tries to apply it he will misapply it. His time is wasted by the way the thing is done now. On the other hand, if you take him to the elementary notions of science and get him to think on those matters you will do him good; give him something to throw light on his daily work and to benefit him in every way; that is the chief point. Now, I cannot help thinking there are of course very few subjects that come into this—mechanical science, physical science, chemical science; perhaps some branches of natural history in its widest sense might come in, and of these the two that most commonly present themselves in connection with a good many handicrafts will be mechanical science, and physical science, and the difficulty that generally crops up is the question of the want of a certain knowledge of mathematics as a basis for the teaching of these. It is the difficulty of obtaining that knowledge of mathematics that generally induces teachers to abandon deductive teaching and to hasten on to the teaching of results.

6836. What do you mean by elementary mathematical science?—Mathematics, you will find very commonly taught in schools for two purposes—first of all as a means of mental training; secondly as a large and varied subject in itself. But mathematics may be used simply as a tool, in order to enable the person learning it to proceed to the other sciences. Now I think that more effort should be made to provide a knowledge of mathematics in this sense, as a tool, than is at present done.

6837. What you would like, I suppose, would be that a mechanic should have some elementary knowledge of trigonometry?—Precisely.

6838. And be able to understand formulae?—Exactly; you cannot go into the subject of mechanics at all without at least asking a student to have a knowledge of how to solve a simple equation: but it is quite unnecessary to waste his time in working out puzzles. He does not want these, and a much more simple knowledge of the subject will enable him to go on. As to trigonometry, the ordinary functions of trigonometry are very easily understood and applied, and there is no use in wasting the student's time over the more intricate portions of the subject—properly enough taught in other schools.

6839. These, the more difficult formulae, you consider he would take on trust, but at the same time with a sort of reasoning trust?—Quite so; but he really does not want them at all—for instance you may teach a student the scientific use of logarithms and how to apply the

logarithmic tables, though he does not need to study the formulæ upon which that table is made out. Pupils coming from national schools have, I find, received precisely the mathematical knowledge I speak of, and those students have afterwards, from the assistance of that elementary mathematical knowledge, gone a great deal further ultimately. I have seen the son of an ordinary farmer, living within five miles from this place, who came bringing with him nothing beyond the simple mathematical teaching he got at a national school; but this enabled him to proceed afterwards in a systematic way to further instruction, and became to a certain extent the foundation of his future progress.

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6840. That would be instruction in advance of the ordinary sixth class instruction?—Oh, no; it would be far below it: it would be what might fairly be acquired by any boy of fourteen years of age.

6841. Would it be included in the sixth class instruction of national schools?—I cannot say that. I am not sufficiently acquainted with that.

6842. But at all events it is instruction which you know as a fact to be given in a good national school?—Yes.

6843. And it is your opinion that, apart altogether from the question of a man rising in the social scale, he would be a better and a more intelligent workman if he possessed this instruction?—Most unquestionably. I believe there is nothing in the world that would tend so much to improve a man's work as that.

6844. And he would take a greater interest in his work too?—A much greater interest, and he would understand his work better.

6845. And you object to the teaching of results unless a young man has a competent knowledge of the scientific basis of these results?—Certainly. I think it quite useless. Take a house painter for instance: it is quite useless to endeavour to teach him mere rules about the constituents of his paints unless he has previously learned some of the elements of chemistry. I think it useless to try and teach a smith or an engineer in a foundry the results of dynamometers and matters of that kind unless he has previously gone through a systematic course of mechanical science. He may get knowledge to the extent of fancying that they are something very wonderful, but really he does not acquire the least notion of using them.

6846. Then what would you specially urge on this Commission in regard to the instruction of artisans?—That in any steps to be taken for conveying instruction in the mechanical applications of science the teaching should always be based on a sufficient previous instruction in what may—using the word in its best sense—be called theoretical knowledge of those sciences themselves.

6847. And, with regard to any scheme of theoretical examination on the subject of processes of manufacture, you think that that should be combined with or subsequent to an examination of the candidate in the principles of science?—That is the application of science—to practice, and that should come of course only subsequent to examination in the sciences themselves, but it may lead to examination in the excellence of handicraft; but that is another matter altogether.

6848. That could be only tested by actual demonstration?—Quite so: you may take an engineer in a workshop and ask him to file down a cube for you. In any application of mechanical power to any forged substance you may examine him on the advantages to be derived from forging down an axle at a gentle curve, or by a sharp cut across the shoulder—a point very much insisted on. That is a point in the illustration of mechanical principles.

Mr. A. Jack, 6849. Take, as an illustration, the manufacture of gas; you expect
M.A. that a man should have a competent knowledge of the chemistry of the
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 exactly the point that I wish to press strongly.

Mr. D. Lane, Mr. DENNY LANE, M.A., Barrister-at-Law, Secretary to the Cork Gas
M.A. Company, Starch Manufacturer, and Member of the Harbour Board,
 South Mall, Cork, examined.

6850. (*Chairman.*) You are the secretary of the Cork Gas Consumers
 Company?—Yes, I am.

6851. And a starch manufacturer?—Yes. I manufacture starch in the
 neighbourhood of Cork. I have been connected more or less directly
 with several other industries, and a director of two railways and a steam-
 boat company. I have also been connected with the brewing trade, the
 distilling trade, and have a knowledge of a good many branches of
 trade in Cork.

6852. And you are consequently acquainted with the wants and needs
 of those trades?—Yes, I am.

6853. And one of those needs is technical teaching?—Yes, technical
 teaching; and with reference to that there is a point which has often
 struck me as of very great importance; and it is that, in addition to any
 actual technical teaching, it would be very desirable that men connected
 with trades should acquire some idea of the general principles of trade.
 Because I attribute a great deal of their backwardness in many respects
 to the mistaken views they have taken up with regard to these general
 principles. Now, one thing that has kept back manufactures very much
 in this city, I think, has been frequently an objection to the use of
 machinery. Well, I think a portion of the instruction that ought to be
 given to them would be something of the nature of that which was con-
 veyed in a book which appeared a great many years ago, called "Results
 of Machinery," and which was then attributed to Lord Brougham,
 pointing out that the greater the amount of machinery employed in a
 country the higher became the wages, and the more employment there
 was for the people. There are two or three cases within my recollection
 when a knowledge of that principle would have proved very useful.
 The latest case was that of the strike amongst the tailors in Cork; those
 men struck because some employers here proposed to use sewing-
 machines. Those men made no objection whatever to ready-made
 clothes being imported from England or other places which were actually
 made with the sewing machine. They objected to the manufacturer
 in Cork using exactly the same tools as those employed by his rival in
 England, thereby putting the manufacturer here in Cork and their own
 trade to a very great disadvantage.

6854. I suppose they would have objected to the introduction of
 machine-made clothes if they could have done so effectually?—Oh, cer-
 tainly they would. Not only that, but they were on strike for a con-
 siderable time. One of the master tailors told me that when discussing
 the question with those men, he said to one of them, "Are these Cork
 "made boots you have on?" Oh, no, they were not, they were machine-
 made "boots;" and it was the same with every one of them. They had
 no objection to machinery in other trades, but had this narrow-minded
 view, thinking that they could cause more work to be done in the city
 and have more demand for their labour. In doing that they were
 exactly doing what would prevent a demand for their labour. I think it
 would be very desirable in any system of technical education that a few

of those things should be conveyed, if possible, to the minds of the workmen, so as to prevent them from doing damage to themselves, and from preventing the progress of manufactures in the city. Another point, which is, I think, of very great importance, and which is overlooked by them, is this, that all goods are manufactured for the consumer and not for the producer. They should be made acquainted with this and with other things pointed out in De Bastiat's *Sophismes Economiques*; such, for instance, as that it is better that a good thing should be abundant rather than scarce. A common notion among tradesmen is that articles are produced in order to give employment to them. There are a number of other things of that kind which are really forms, in their limited view, of protection by which they are in fact injuring themselves, their trade, and their neighbours. Another result of the kind of combination that I think has been promoted, and that might be removed by a proper system of technical education, is the system upon which they limit the amount of work that a man should do, or is allowed to do, in the course of the day. For instance, a bad cooper may be able to make three casks in a day; the best cooper, who can make six casks, is not allowed to make more than the three which a bad cooper can make. They believe they are serving themselves by that; but the effect of that, I believe, would be, more or less, to drive away trade from the place or to enable other markets to compete with greater advantage against Cork, and probably in this way to deprive themselves of employment. Another trade I may instance in which the same thing occurs is the printers' trade in Cork. In that trade there is a rule that no work shall be undertaken by men on contract. There shall be no contract prices for work; everything shall be paid by daily wages, and I believe that in a newspaper office printers are restricted from "setting up," as they call it, in the technical language of printers, more than a certain number of "ems," that is, more than a certain length of matter in a day. There is another point of very great importance, as I think, and one that I have had occasion several times to speak about before, I believe that the greatest obstacle to progress here in Cork is the great objection of workmen to undertaking piecework; they all wish to be paid by the day. For instance, in the matter of agricultural implements, for which there is a very large demand in this country, I have been told by the manufacturers that they cannot manufacture them as cheaply as they are manufactured in England; not on account of the prices of iron or coal, but on account of the impossibility of getting men here to make the different portions of the machines at a certain rate per thousand or per hundred. The consequence is, that in England men earn considerably more wages than here, and at the same time the employer will have his work done at a considerably lower rate. I may give you one example of this from what I learned at the piano factories of Messrs. Broadwood, Alison, and some others. I wish to lay particular stress upon this, because the common objection made to piecework is that it may be cheaply done, but that it is badly done. I believe, as far as I know, that there is no product of industry which, as compared with similar products of foreign industry, is better manufactured than a good English piano, made by Broadwood, or by one of the great English houses in that business. I discovered that there every portion of the work, from the beginning to the end, was made on the system of piecework, and the wages were in some instances extraordinarily high. I saw one man myself employed at a portion of a piano which was the roughest of a cabinet maker's work, that is, making the structure of the piano, driving tenons into mortices, really putting the skeleton of the piano together; and I was told that that man ordinarily earned on piecework from 6*l.* to 6*l.* 10*s.*

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a week. I point that out as a remarkable instance, showing, firstly, that work can be done cheaply for the manufacturer; secondly, that it can be done in the very best manner for the purchasers; and, thirdly, that it was done in such a way as to yield very large wages to the man who was employed.

6855. You are aware that the scope of our inquiry scarcely includes questions of political economy, except so far as it can be shown that they should form part of a technical education?—That is what I was pointing out; that I believe it should be a portion of the technical education so far as this country is concerned. I think it would be a very important thing that a few of those simple principles, recognised by all men who have studied anything of political economy, should be included in the teaching; and I attribute most of the errors that have arisen among the workmen themselves to this cause—that they have not really considered these questions properly, and have not been instructed properly, concerning them.

6856. I suppose you do not consider that such defective knowledge is peculiar to workmen?—No, I do not; but I believe that workmen have the power of acting more on it; I think they have been the agents who have produced most injury from that kind of ignorance. I do not by any means suppose that it is confined to workmen.

6857. Have you any suggestions to make as regards the question of technical education proper?—Yes. I think it is, in the first place, extremely desirable that it should be commenced on what I would call a lower grade of technical education; and, I believe, the education of the eye and hand, independently of the study of principles, ought to form a very early portion of that. After that training of the hand and the eye, it would be of course absolutely necessary to explain the principles on which those manipulations of the hand, guided by the eye, were carried out. I could give you some examples of the remarkable ignorance that occurs among workmen and the evils that it might lead to. I just give one example. A friend of mine, a trained engineer, who had served his time to one of the first mechanical engineers in England, went, a short time ago, to visit the waterworks of the city of Cork, and there were several steam engines there; amongst the rest a very large Cornish engine of the old form. It had a very large cylinder, and my friend happened to ask the man who was in charge there at the time, a good class of stoker, at what pressure they were then working, and the man said 90 lbs. on the inch. My friend started back with alarm when he heard this; for, being a practical man, he thought it would not be a very safe thing to stand near such a large cylinder with such a pressure on. A short time afterwards he was taken to see the boilers of the establishment. He saw three boilers all communicating with the same steam-pipe, but each having a pressure-gauge. "Oh," said my friend, "I knew you were wrong about the pressure, for there was only 30 lbs. pressure indicated." "Oh, but," said the man, "there are three boilers, and if three times thirty do not make ninety, I do not know what arithmetic is."

6858. But the engine did not work any the worse for the man's ignorance?—No; but if you take the same kind of ignorance under other circumstances it might produce a very fatal accident. For instance, if one of the boilers were shut off, he might want to make up the pressure with the other two, or, if two were shut off, he might try to put the pressure on the remaining one up to 90 lbs. Therefore, this ignorance might be calamitous in its results.

6859. Fortunately, he would hardly be able to get the steam up to 90 lbs.?—Possibly not; but he might burst the boiler nevertheless.

Another instance I knew of where a gentleman in a mill required a shaft to be measured. He wanted to have a wrought-iron shaft made and brought over from England, which was to fit exactly between two points of the already existing shaft, and he sent three men to measure the shaft. Each brought a different measurement of the length. He then measured it carefully himself, and found that all three were wrong. That would go to show, I think, the necessity for technical instruction by which men would be taught the need for accuracy, and a portion of the technical education, I think, would be practical instruction in really practical, accurate measurement. In the trades here in Cork, in the building trades especially, there are among the carpenters and masons many fairly educated and many very good workmen in their respective branches; and they are the people who have most frequently attended here at the school of design. There is a very important body, the mechanical engineers, and as far as I can ascertain, and so far as I know from my own experience, they are very much below par as compared with what a similar set of men would be either in England or in Scotland. Of course they are practically conversant with questions connected with heat, the pressure and volume of steam, and some of those things which, of course, should be taught to them in an upper class of any technical school, but what they are most deficient in, I think, is in the mechanical manipulations. I know that within the last week, for instance, a gentleman connected with a foundry told me that some of the men there objected to the use of the twist drill, one of the most modern and most extensively employed tools.

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6860. (*Chairman.*) You may be aware there is considerable difference of opinion as to the utility of the twist drill?—That may be, but the workmen are of the opinion that they are not at all as good as the old drills. There is a general want of accuracy in work; for instance, I am sorry to say that nearly all the iron castings in Cork are not nearly as well executed as they might be. People who are ready to pay higher prices in Cork for castings are not satisfied with them, and are forced to go to England and Scotland to get them. I think there is a very great want of skill in trades connected with machinery.

6861. You are aware, of course, that it is scarcely possible to find an iron moulder in England or Scotland who has received any technical instruction, except the instruction he got in the actual course of his work?—Yes. Of course technical instruction must be followed by employment in the workshop, but I think it would be well if reading and instruction were provided for apprentices, or men more advanced, so that they might learn to do the work more efficiently, to do it better, and with less cost of labour and of time.

6862. If they were better instructed, and that increased instruction were the result of technical training or training in principles, which underlie those handicrafts, they would at any rate take more interest in the work that they are doing?—Oh, very much more interest, I think.

6863. Is there anything you would like to add to that?—No except my expression of the general opinion that any sound system of technical education, being of a very practical character, would do immense service to the men here. They are very quick at learning. People here when taught any new thing learn it very quickly. They want perseverance, and, I am sorry to say, most of our young men here want ambition as well. I suppose if they had ambition it would produce perseverance, but they want that. There is great blindness also to their own interests, too much asking, "What is the good of it?" And unless

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they can immediately reap the benefit from their instruction, in money, they have not, I believe, a desire to improve themselves in that respect, in the same way as in other countries, and as is the case in Scotland, more than anywhere else, I believe, and in some parts of England. Some time ago there was an attempt made to establish Mechanics' Institutes in Cork. Fifty or sixty years ago one was formed, which got on very well for some time. Some time ago I was connected with a movement to re-establish this Institute, but we got so little help from the trades that it had to be abandoned. In the same way schools of science were opened, but had to be practically abandoned.

6864. Do you not think that young men who had no ambition or experience would not be easily induced to attend technical classes?—I think there would be some difficulty about their attendance in the beginning, but it would be a thing that would grow up gradually. At the time we were in difficulty in trying to establish, and when we did not succeed properly in establishing, a Mechanics' Institute in Cork, I saw that there were at that same time 160 Mechanics' Institutes in Yorkshire; many of these containing numerous members, and giving valuable aid to the working men. The city of Cork could not maintain one, while there were 160 in Yorkshire.

6865. You think that if you had good teachers in the city of Cork some young men would attend, and their example would perhaps induce others?—Decidedly; and others, finding their friends were making progress, might avail themselves of the instruction. If some encouragement were given by the employers, such as has been done in some places, and if some small additional amount of wages were given to any of their younger hands that attended these schools and passed examinations in them, I believe it would be of great benefit to the people who paid the money, to the consumers of goods in Cork, and a still greater benefit to the men themselves. I may mention one matter as an instance of the want of technical education in Ireland. One industry that I am connected with is the manufacture of gas. Until lately nearly all the managers of the smaller gasworks, and of some of the larger ones, were Scotchmen. Latterly that has not been the case; a good many managers now are Irishmen; but some time ago, for want of technical education, things were in the hands of imported men that we ought to have been able to train men enough here to do.

6866. What becomes of the bye products of the gas manfactories in Cork?—None of the gas companies in the county of Cork work out any of their bye products. In our own gas manufactory, whatever ammoniacal liquor there is is worked into sulphate of ammonia on the works. The Cork Gas Company sells its tar to tar distillers, and so also does the Dublin company. In Dublin they sell the ammoniacal liquor as well as the tar.

6867. What becomes of the sulphate of ammonia?—It is always sold to manure manufacturers. For the last three or four years the product of the gas company has been sold to Messrs. Goulding, and to Mr. Scott, of Millfield. They are the principal purchasers.

6868. What are the quantities of sulphate of ammonia produced at the Cork gasworks?—Not so much as I would wish, and that is attributable to the particular kind of coal used, about 16 lbs. per ton of coal carbonised. It is Hebburn coal we have been using. From inquiries I have made from English gasworks, Ipswich, for instance, I learn that there, too, they have been complaining of not getting a greater yield. In Waterford, where they use other Newcastle coal, they get 20 lbs. of sulphate per ton of coal.

6869. What is the total quantity of sulphate of ammonia you produce in the year?—About 150 tons. *Mr. D. Lane, M.A.*

6870. And the whole of that is consumed by Messrs. Goulding?—Yes, and by Mr. Scott, of Millfield. And at present sulphuric acid is supplied, and has been supplied for some years, by Cork manufacturers, Messrs. Scott and Goulding. I forgot one other product of gas residuals, that is, oxide of iron, that which has become saturated with sulphur. That has been sold here, and has been used by Messrs. Scott to some extent for the production of sulphuric acid. An objection to the employment of it in that way is that we employ hydrated oxide, being the only one useful in gas manufacture, and the residue of the spent oxide, after the sulphur is burnt out, is dehydrated oxide, and can no longer be used for the same purposes. 11 June 1883.

6871. (*Mr. Woodall.*) Further, upon this question of gas I wish to ask whether of recent years there have not been many improved methods introduced which have rendered scientific knowledge more necessary than before?—Oh, certainly; particularly in the more complete elimination of ammonia from the gas, which improves the quality of the gas, and gives a very valuable residual product. I have tested gas which has been bubbled through distilled water, by a very delicate test, and found afterwards in the water so used less indication of ammonia in the water impregnated with our gas than in the drinking water supply of the town.

6872. I suppose you can remove the ammonia a great deal better by the new processes than you could before?—Oh, yes. I have been connected with gas companies about twenty-two years. We were never without the means of using up sulphate of ammonia, but at that time we used nothing but lime in purification, so our residual was mere waste. We use lime still, of course, to take out the carbonic acid, but oxide of iron was not formerly used if I remember aright.

6873. But the public requirements now, I suppose, necessitate a much more subtle testing of gas?—Very much more.

6874. And the attention of gas makers is given to the conditions and laws of heat, and so on?—Oh, yes, very much so. The use of fuel and the appliances and the conditions of purification are carefully studied. In point of fact, I do not know any profession or any branch of engineering in which more progress has been made than in that of gas engineering within the last twenty years. The men connected with it have themselves risen to a higher status than before; they are better educated men, paying more attention to the scientific aspects of gas making with the utmost economy, and with great advantage to the shareholders and to the consumers.

6875. And that progress has been with regard to the conditions of combustion as well as of manufacture?—I do not see that in the ordinary gas work there has been very much progress with regard to combustion; the improvements we have made are directed to turning all the fuel into gas first, using gas furnaces for heating the retorts, and we have now in our works erected furnaces on the plan of Mr. Alfred Wilson, of Birmingham, generator furnaces, and then on the outlet from the retort we are erecting iron regenerators to take up heat that would otherwise be lost.

6876. I put these questions with a view to taking your opinion whether this more scientific character of the business does not entail a necessity not felt before for technical teaching for those employed in it?—Most decidedly.

Mr. D. Lane, 6877. Do you think that need would be felt in the various branches
M.A. of a subordinate character?—Yes, I do. I think it is felt all through
the work.

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industries as brewing and distilling?—Well, I do not see that very much
progress has been made in these trades. I think some of those organic
changes that take place in fermentation seem to be very little more
understood now than when I first knew anything about them, which is
a great many years ago. I have understood fermentation practically
since I was a boy, and I do not see that there have been any practical
improvements made at all.

6879. But would a knowledge of chemistry conduce to that?—I think
it would; but I think it would especially conduce to preventing men
from falling into fatal errors, and from adopting new systems that
were recommended to them, and which they might, perhaps, adopt,
which might be a very dangerous experiment if they had not previous
practical training. As I have referred to the gas industry, in which
very great progress has been made, I might say in regard to brewing
and distilling that there has been very little improvement. There has
been some in regard to refrigeration, but I do not know of any other
since I was a boy. There is a great deal of mystery in all those organic
changes which chemists have not yet penetrated. I might give one
instance of the advantage of some technical education. Some time ago,
on that very subject of ammonia, I was very much dissatisfied with the
quantity of ammonia produced in proportion to the coals consumed at
the gasworks, and I sent to the Christian Brothers' schools here in
Cork to ask the Superior, Mr. Burke, to recommend some boy who
would have some elementary knowledge of chemistry. The boy came,
and in consequence of the technical education he had received he was
quite able to carry out everything I directed him to do efficiently, so as
to test the quantity of ammonia in the ammoniacal liquors, waste liquors,
and everything of the kind, and after a few days' instruction he was
able practically to test them as well as anyone need do. I regretted to
have to part with him some time since; he passed a Civil Service exami-
nation, and took so high a place that I did not feel warranted in asking
him to remain. He was only about seventeen years of age, and the son
of a man in the very humblest class in society, a labouring man of the
humblest kind. In consequence of the education he received at the
Christian Brothers' schools he has got an excellent position. When he
left I sent again to Mr. Burke, and he sent another boy, who, after a few
days' instruction, was able to take the place of the former boy.

6880. And he learned chemistry there?—Yes; and he understood
manipulation so well that after staying with me a portion of three days
he did everything I required him to do, as well as I could do it myself.

6881. He had acquired the faculty of handiness?—Yes. It is a great
thing for a boy to know even the very names of the tools. At that
school of the Christian Brothers they are very much in the habit of
making the pupils perform experiments themselves. In that way they
acquire a certain amount of handiness and a great amount of intelligence,
which saves a considerable amount of trouble afterwards. In point of
fact, so far as it goes at present, and for the class they teach, the
Christian Brothers' schools are really excellent technical schools. One
Superior of the Order, Mr. Duggan, died some time ago, and on his
death subscriptions came in for a testimonial. It was then a question
what form the memorial should take; and, I believe at my suggestion,
the committee unanimously resolved that, besides some commemorative
bust and tablet to Mr. Duggan, there should be created a school of a

more technical character than had existed before. We are now in progress with that, and have already part of the apparatus there. I was lately entrusted with a portion of the funds, and we are now getting some things we had not before, dynamo-electric machinery, to show the production of the electric light, and to show the conversion of force into electricity and of electricity into force, and we are also in treaty for a gas engine. We have got some excellent models of steam engines, and they have asked me to select for them whatever lathe or lathes I thought would be most suitable for teaching boys the principles of turning. The school is not regularly organised yet, but we are rapidly getting together the necessary apparatus, and I hope by the time the schools will recommence work in the autumn we shall have a very fair representative collection of tools there. We are getting such things as models of rooves, gearing for machines, models of wheels, &c., and all the different portions of the steam engine, bevelled wheels, line shafts, &c., so that the boys when they afterwards go into a workshop may know something of the work that is going on there.

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6882. This is intended, practically, as a department of the already existing school?—Yes; the existing school is what I may call a school of physics so far as it deals with any of these subjects. What we proposed to do was, after the boys had learned the elementary principles of physics, heat, chemistry, electricity, &c., they should then have an opportunity of seeing there how these facts were practically employed and actually used, illustrating such things as the strength of materials.

6883. You have already said that the industrial instruction now being given in connection with the literary instruction turns out the boys handier and more generally intelligent?—Yes; it is mere education in physics, not technical education.

6883a. Do you know whether the instruction is given by the Brothers themselves, or not?—Altogether by the Brothers up to this time, and for a very sufficient reason; they had no funds at their disposal from which they could employ anyone else. And there is some little difficulty in the system, I think, in the brotherhood of employing anyone else to teach besides a member of the brotherhood. But that difficulty, I think, will be removed; and I have been already in communication with a very good workman, now employed at the college, who was at one time employed at the gasworks, a most excellent turner in wood and metal, and he has arranged with me, at any price I may settle for his time, to give lessons at this school in turning and similar mechanical manipulations.

Mr. HUGH POLLOCK, junior, Flax Mills, Douglas, examined.

Mr. H. Pollock,
jun.

6884. (*Chairman.*) You were a student of the Glasgow Technical School, which is a weaving school?—Yes; and designing is taught there as well. We were starting the woollen manufactory, and I took great interest in all the theoretical parts, such as designing and dyeing. We could not get the advantages here we get over there.

6885. What advantages are these?—The advantage is that you get theoretical education in designing and weaving better in a college, than in a mill. The theoretical portion of dyeing is also taught in the college, as well as the practical.

6886. Are you of opinion that instruction of this kind is valuable to overlookers and foremen as well as to the managers and owners of mills?—Most decidedly, because that sort of knowledge enables them to understand better what they are doing when they have the theoretical

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 knowledge as well as the practical. For instance, in dyeing there are several new things coming out in the products of dye wares; and if you understand the chemistry of these dye wares you are able to tell at once without any expense whether they are suitable to the industry you are engaged in.

6887. Then instruction of this kind is particularly useful in new districts?—Certainly.

6888. You have had also a course of instruction at the Andersonian College?—Yes, in dyeing.

6889. Was it the Young laboratory you attended?—Yes.

6890. Did you go through a course of theoretical chemistry before you attended the dyeing class?—Yes. I attended the course at the college here in Cork in connection with engineering.

6891. Are you of opinion that the dyeing course would have been of much service to you if you had not some knowledge of theoretical chemistry?—That is just one main point. If I had not attended the chemistry course here I should not have understood the theoretical portion of the course there, but the practical course I could. Supposing such a course of lectures were brought about here and given, the majority of the people could not take advantage of them because they have not had the education necessary, that is the theoretical portion; but the practical portion, the same as there, would be very useful. As for that it does not matter much to the student whether he knows the law of the chemical formulæ he is using, and the chemical combinations that are taking place, if he knows how to bring out the shade he requires, and to make that shade a fast one. Of course it is of great advantage to him if he does know it.

6892. But the more practical part one would imagine would be learned as well in the dye-house as in the school?—It would, but when you have a school you can bring forward difficulties which are met with occasionally, but which, if they occurred in the dye-house, you would not know how to meet them without previous technical knowledge.

6893. Could the student do that even if he had no theoretical knowledge?—Yes, if there is an instructor to whom he could submit the difficulty. If he is dyeing, for instance, with a certain water, he can bring this water into the school and show the effects of it on the dye wares. Then, if he should meet this in his practice, he will know what to do. But if he met it in his practice without knowing of it before, he might lay the fault to the dye being bad, or he might attribute it to some cause not at all affecting it.

6894. So that to a certain extent the practical teaching of this subject, even when not preceded by some theoretical instruction is of use to working men and foremen?—Most decidedly. Another thing about dyers is that they are most conservative people, and do not like telling their receipts. If an apprentice to a dyer, goes to a school of dyeing at the same time, he will get on very much quicker than he otherwise would.

6895. Does not that militate this way against the school, that the school is always liable to be behind the best practice of the day in consequence of the practical men being unwilling to communicate what their processes are?—In a certain sense, but in the schools that have been started they have found no difficulty in getting practical men to combine with the theoretical men of the period.

6896. But that practical man knows what was done only up to the time he left the practice?—Yes, but he is making experiments all the time.

6897. Of course that is fostered by the society of chemical industry; and chemists are no longer so jealous in communicating information to each other as they were before?—On the contrary, there are Messrs. Crose and Bevan making some experiments in bleaching, and instead of keeping these to themselves, as would have been the case some years ago, they publish them as they go along, and every chemist reading the paper knows as much about their experiments as they do themselves.

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6898. They have come to understand that they can learn more from the world than they can teach the world?—Something like that.

6899. Then what would you recommend should be done in Cork in those trades that you know best?—The technical schools that are started in England and Scotland are not of the class that would be suitable here, because I believe the people have not the education that would enable them to take advantage of the same class of school—that is, the majority of the people.

6900. What kind of school would you think should be established here?—A school that would commence, without any literary instruction going on, with the teaching by the eye and the hand. The pupils should not have recourse to books, or take notes at lectures, or anything of that kind.

6901. We have been frequently told this by persons representing the working men; but we have never yet been shown how to set about it. It is a question not at all peculiar to Ireland. Could you give us any hints as to what should be taught in a school of this kind—in connection with your own particular industry for instance?—Well, the thing that would benefit us would be that we should not have to train our own hands when we get them, as we have to do at present. If there were any school which would train those hands and enable us to get them in that condition they would not be such a loss to the employer. If you have to train an entirely new set of hands there is a great deal of expenso before there is any good work done.

6902. But the number of manufactures even in Ireland is very great. Would you establish a school for each trade?—If a school were established for each trade it would have to be begun in those places where those trades were.

6903. What is to prevent the woollen manufacturers of the south of Ireland from establishing a school of that kind?—Because they are scattered about too much to establish a school in any one district.

6904. Would it not be possible to do what has been done in some continental countries, viz., that the manufacturers of a certain district should combine and establish a school at a central point?—That would be the most practical plan.

6905. Do you think the manufacturers of the south of Ireland feel the want of such a school sufficiently to subscribe to it?—The want of such a school is greatly felt, and I am sure all the woollen manufacturers would support it very willingly.

6906. Would you think that the Exhibition which is going to be held in this city during the next few months will afford a good opportunity for discussing the matter?—Most decidedly; it brings it more prominently before the public.

6907. Then, perhaps, if a school of the kind were established you might not think it beyond the scope of the Government to give you some assistance?—Certainly not: it would get on a great deal better if assisted in some way by the Government.

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11 June 1883. 6908. But you would not expect the Government to start a school of that kind?—No; not unless there was co-operation by the manufacturers it was intended to benefit.

6909. You are aware, I suppose, that the Government does contribute to the cost of the erection of schools of science and art?—Yes.

6910. And you think a school of this kind might very properly put in a claim for a contribution to the building fund?—Certainly; but I think those schools of science and art are too entirely managed by a society; a council, outside the district, altogether. What I mean is that the manufacturers, the people of the district where a technical school is situated, know more about it than gentlemen in London.

6911. You think that the regulations ought to be relaxed?—Yes, with regard to a technical school in Cork.

6912. You are aware that the great London Corporations have contributed to establish schools of this kind—the cloth-workers more especially?—Yes.

6913. And you would have some hope of obtaining a contribution from them?—I think so. I think we should have as great a claim as any other schools would have.

Mr. J. W. Pollock.

Mr. J. W. POLLOCK, Flax Mills, Douglas, examined.

6914. (*Chairman.*) Do you agree generally with the evidence given by your son?—Yes.

6915. You are a very extensive manufacturer, I believe?—Yes.

6916. You have built extensive flax spinning mills near Douglas?—Yes.

6917. And also mills for scutching flax?—Yes.

6918. And you have lately embarked in the woollen industry?—Yes.

6919. Which is very large and still increasing?—Yes.

6920. You employ between 500 and 600 hands?—I do.

6921. Do you think any large proportion of these would avail themselves of technical instruction similar to that given elsewhere?—Yes; from five to seven per cent.

6922. How do you manage to obtain the hands you require for your industry?—When we commenced seventeen years ago we found great difficulty, because all the hands we had to deal with were never taught any industrial work before, and we had to train them ourselves. We built some sixty houses, brought the people from the country districts, brought teachers to our mills, and after a considerable loss of time and much discouragement had them taught. But it took three or four years to do it, requiring a very large outlay of money; and this evil constitutes a very great obstruction to the extension of manufactures in this country. In fact, it required the greatest perseverance and personal attention to surmount it.

6923. And you have in your mind some kind of technical school which would obviate this trouble and expense?—Quite so. I would prepare the people by having them taught manual labour, such as weaving in its different branches, and I would have schools established in various places where there were a large number of people.

6924. Do you agree with your son that the manufacturers might unite in establishing schools of this kind?—Well, you know, we hope to receive Government aid. There would be large local expenditure. We want to encourage manufactures here, and to find employment for the people; the want of trained hands is the great difficulty to be con-

tended against. Consider the starting of a place like ours with a vast sum of money to be expended, and further, of having to commence to teach the people. It is a matter of great labour and a very responsible position to take up.

6925. But you do think that a school of that kind should be initiated by the manufacturers?—By all working together, I should think so. I should not say exactly “initiated by the manufacturers,” but I think a great deal of support would be derived from them in reference to the matter, provided it was managed by a proper local committee; if there were proper local supervision over the business.

6926. (*Mr. Woodall.*) From the experience you have had, would you indicate the kind of training which you think would best conduce to the development of the class of workmen required; in regard to the elementary schools for instance, do you think that the instruction now given is the best adapted for that purpose?—What I would do would be to educate the people with their hands to make them all work. Commence, for instance, with the weavers. I would begin with the industry most likely to succeed in a district. I would go into populous places where there are any number of people in want of employment, and I would have them taught those elementary things, such as the different matters connected with the woollen trade, which is, I think, that most likely to extend itself here.

6927. Do you think that that kind of teaching could be incorporated with the ordinary literary instruction at school?—No. I would have special technical schools open at night as well as in the day, so that those who could not attend in the day might be able to go in the evening.

6928. (*Chairman.*) At what age might you expect young people to begin?—Somewhere from eleven to twelve years of age, and they would spend an hour or two at it every day.

6929. But would so young a child be able to manage a hand-loom?—Oh, there would be no difficulty in having a power-loom; there would be no difficulty in teaching by means of that.

6930. That is by the employment of a gas engine?—Yes.

6931. Then you want a separate establishment entirely, and the children from the various schools might attend there?—Quite so. I would go to the best centres and have them established there.

6932. (*Mr. Woodall.*) Would you make any suggestion as to the training that should follow on that teaching?—Oh, yes; you should have, growing out of that, a regular scientific technical training.

6933. What would that be?—Such as chemistry; and the overlookers would require instruction in the higher branches of textiles.

6934. Then you think it necessary for the proper development of these industries that there should be different kinds of schools, adapted to the different classes of people to be employed?—Yes.

6935. The instruction required for the workman would not be the same as that required for the overlooker?—Oh, no, not at all.

6936. And then you would like to see established here a higher class of people's school as described by your son?—Quite so; but what we want here is to educate the people to industrious habits. There is most difficulty about that, and there will be great difficulty in manufactures until that is done. Unless great enterprise were displayed about the matter in the first instance, there would be very little chance for the manufactures at all. A few isolated men took up this business of teaching their workpeople, and it required an immense amount of labour. You can have no idea of what the labour was. It would be a great aid if we could give this education when the people were young.

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6937. (*Chairman.*) Your manufacture, I suppose, is very like that carried on at Galashiels?—Yes; so far as the woollen branch is concerned.

6938. And also at Chipping Norton?—Something similar.

6939. How do your wages compare with those in Scotland and in Yorkshire?—Weaving wages are at much the same standard, but there is not very much difference in the others; our managers and overlookers are paid higher, because we have had to bring them from a distance.

6940. Do you consume wool grown in the district, or do you purchase at the London wool sales?—We use the wool grown in the district and buy it in London and elsewhere.

6941. Is the wool grown here long wool?—Yes, principally.

6942. Do the manufacturers here use Belgian yarns at all?—No, I think not.

6943. (*Mr. Woodall.*) Have you felt the need of any museum, or collection of manufactures?—My people have felt it very much; there is nothing for the people to see here.

6944. You are aware of the existence of collections at textile centres on the Continent?—Yes.

6945. And you think a collection of that kind would be of service to trade here?—Yes, I do. I think that is one of the reasons that the continental people are doing so well; they have great advantages.

6946. Are you aware that the industrial museum at Edinburgh claims to have rendered important service to the tweed districts?—Yes, I have heard that statement; there cannot be a doubt in anyone's mind as to the advantage of it.

Mr. TIMOTHY MAHONY, J.P., Blarney.

Mr. T.
Mahony, J.P.

6947. (*Chairman.*) You are a woollen manufacturer at Cork and at Blarney, and one of the Vice-Presidents of the Cork Exhibition?—Yes.

6948. Have you paid any attention to this question of technical instruction?—I have not paid much attention to it; but there is one great want, which was put before you by young Mr. Pollock, that is technical instruction for dyers. The dyeing is about the most important branch that a tweed manufacturer can have to attend to, and it is one in which we are most deficient. We are entirely at the mercy of our dyer; if he chooses to go away our concern is stopped at once.

6949. Are you aware that practical dyers on the Continent are men with no technical instruction whatever?—I believe they are so here also.

6950. But I asked you with respect to the Continent?—I am not aware of how they are there.

6950a. And where there is any chemical knowledge in the factory that it is generally possessed, in fact is always possessed, by the manager or owner of the factory, and not by the foremen or workmen?—I was not aware of that; but it is a very difficult thing to arrive at that point of general excellence at which a manager could be obtained who would be capable of directing every branch of the work. As it is, you will find that a thoroughly practical knowledge of the qualities of the wool to be purchased, and the purposes for which it is adapted, is of more importance and of more consequence in the carrying on of the manufactures than a knowledge of any single or particular branch. For instance, we are quite content to pay for a good foreman weaver or dyer. We can also get a man to buy, but we cannot so easily get a man thoroughly acquainted with all the qualities of wool, and what such wool will produce in the manufactured state.

6951. If our friend, Professor Sullivan, would undertake to teach the chemistry of dyeing in the Queen's College, would it not pay you to send some one of your staff there to learn it?—It would, undoubtedly; but it ought to be more generally placed within the reach of the public than to exist merely for the satisfaction of, say, one out of such a staff as we have in our dye-house. I suppose we have 25 men under one dyer, and I do not think there is any one of these men who knows anything at all about the subject except the dyer.

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6952. But is the dyeing under the control of these men?—No, there is but one foreman dyer; the rest are manipulators.

6953. And I suppose they have only to carry out the instructions he has given them?—Yes.

6954. And the foreman is responsible for the result?—He is the only person who knows anything about it. If there were a dyeing school within reach of these men by which they could learn the peculiar properties of the various dyes and materials used, and how, if they had put in too much of one thing, such as logwood, they could remedy the mistake by the addition of another dye, it would be much more interesting to them. Even a boy who was never in a dye-house before, if he had this knowledge, would pursue the business with more avidity, because he would be possessed of real knowledge.

6955. You think they would be more accurate in carrying out the instructions of the foreman if they knew what the reasons for these instructions were?—They certainly would, because at present, although the dyer may give his instructions, still the parties to whom he gives them, not knowing the great importance of $\frac{1}{4}$ lb. or even a $\frac{1}{8}$ lb. in weight, frequently lose colours and shades and spoil the work; whereas, if a man had some technical education he would be less likely to make mistakes, and would therefore be more useful, and would earn larger wages.

6956. Do you think if you had a dyeing school the ordinary workmen would attend such a school?—They would attend a night school, or a day school on one day in the week, and I am quite sure there would not be a manufacturer within a reasonable distance of the school who would not supplement a man's wages in order to enable him to attend a certain portion of the instruction.

6957. I think we ought to say we have not been in any district of the country in which the ordinary dyer, the mere manipulator, has received instruction of that kind; but you think your people are sufficiently inquisitive to spend a portion of their spare time in acquiring instruction of that nature?—I have not a doubt but that they would go to any place that would give them an opportunity of taking a better station in life. I have always found it so. Our people are very ambitious to get any advantage they can, because they know they can get into a higher position in our works according as they qualify themselves for it.

6958. I would ask you then is there any reason why the woollen manufacturers of the south of Ireland should not combine to establish such a school?—The difficulty is that they are so very few in number; you could count them on your fingers.

6959. The cost of a school of that kind would not be very great?—Well, possibly not; but we are so far away from each other that we should hardly see the good of paying for such a thing unless it was supplemented by the Government, or by some public body who would make an addition to our contributions. Moreover, the time that would be lost to the establishment by a man's attending a class of that kind, together with some little money added to his pay, would, in the opinion

Mr. T. Mahony, J.P. of the owners of the establishment, probably be quite a sufficient contribution from them.

1) June 1883. 6960. But if the works are scattered about the country it would be impossible to have a school of this kind at each works?—Yes, it would; there should be a day, or half a day in the week, set apart on which instruction should be given, and all the men in the factories should be allowed to attend. There would be no other way of doing it.

6961. Then that would be a very proper subject for combined action among the factories?—Yes, certainly.

6962. Would it not be proper that the manufacturers themselves should lay down some scheme for the establishment of such a school?—I do not think they are numerous enough here to give sufficient stability to such a movement, at the start, at any rate. We are not above four or five in number altogether.

6963. Seeing it is for their individual advantage?—Yes, but it is also for the collective advantage of the district.

6964. Just so, but the collective advantage of the district being composed of the advantage of individuals in the district?—Certainly.

6965. (*Mr. Woodall.*) You heard it stated by young Mr. Pollock that elementary instruction in the theory of chemistry was essential to him for the studies he afterwards went through?—Yes.

6966. And you are aware that such instruction is largely aided by the grants of the Science and Art Department?—I believe that is so.

6967. Would it not be expedient for you to encourage, in the first instance, the formation of a class on that system?—I think that what Mr. Pollock said was very practical as regards the advantage that might be gained by uniting with, and having a school attached to, the Science and Art Department.

6968. (*Chairman.*) Are you acquainted with the scheme of the City Guilds?—No, I have only heard remarks about it.

6969. But the institution at Glasgow to which reference was made was largely aided by these Guilds?—I have heard so.

6970. So that if you know you can get instruction in theory by aid from the Science and Art Department, and in practical application of that theory by aid from the City Guilds, would it not be of very considerable help to you?—Well, but you see where these things have been brought into force there was a large number of manufacturers in the district, and they were able to give the scheme a united push, which would be hopeless here, I must say; we want to get the push from the other side of the channel.

6971. But I think you have said any scheme of this kind might be initiated and largely managed by the district itself?—No, it might be largely managed but not initiated; I did not say that.

6972. Do you think that such a scheme should be initiated or introduced altogether from outside?—I think it should come to us, and we would then assist it as far as could practically be done. You see we are so very few in number at present.

6973. You have already said there are four or five manufacturers?—Yes.

6974. They are within a short radius of the city of Cork?—Yes; we are the farthest away, I think. The school should be in Cork certainly.

6975. (*Mr. Woodall.*) Have you anything to add to what Mr. Pollock has said with regard to the difficulty of training work-people?—There is the utmost difficulty. All our foremen and managers have come to us from Scotland, from the tweed district. And unfortunately, latterly, when we got some of our people sufficiently educated, we only served as a starting point between this and America.

We train the best hands we get, and then, when they are trained, they leave us and go away to America. *Mr. T. Mahony, J.P.*

6976. You agree with Mr. Pollock in what he has said with regard to the additional training which children should receive in the primary schools?—Yes, undoubtedly; and also in what Mr. Lane has said respecting the great advantage to be gained by boys by attending the technical school about to be attached to their ordinary elementary school by the Christian Brothers, because the lads could get the two kinds of instruction almost simultaneously; and boys coming from that school are much more easily taught than others. *11 June 1888.*

Mr. THOMAS MULLINS and Mr. MATHEW MULLINS, of the firm of Mullins and Sons, Coachbuilders, Warren's Place, Cork, were next examined conjointly, the former gentleman answering for the two. *Mr. T. Mullins and Mr. M. Mullins.*

6977. (*Chairman.*) You are extensive coachbuilders?—We are.
6978. And one of you has taken important awards for technology?—Yes.

6979. The Commissioners will be glad to receive from you any suggestions in reference to technical instruction, as applied to the trades of the city of Cork, more especially to your own business?—I think there should be better means of learning the various science subjects, such as mechanics, mathematics, and elementary chemistry, if such could be provided.

6980. What obstacle is there to such provision being made?—As respects chemistry, I do not know of any place in Cork where it is taught, so that people working during the day can learn it in the evening.

6981. You would like to see evening classes established?—That is what is wanted.

6982. If the authorities at the Queen's College could be induced to start an evening class in chemistry, do you think some of your work-people would attend it?—I do not think they would. I think schools more in keeping with their general surroundings, on the plan of the Mechanics' Institute as in England would alone be successful.

6983. Do you suppose that the character of the building deters the men from going?—There would be no good in having the instruction given if none are got to listen to and derive benefit from it; and workmen, I feel certain, will not be induced to go.

6984. Have you any chemical class at all here?—Not that I am aware of.

(*Dr. Sullivan, President of the Queen's College, here stated that there was a class going on this session conducted by Mr. Farrington.*)

6985. Then your workmen were not aware of the existence of this class?—They were not.

6986. Is it a fact that the elementary instruction received in the primary school, is sufficient to enable them to understand the instruction given in the Queen's College class?—They would be able to understand it.

6987. With regard to chemistry, what seems to be sought is, that knowledge of the existence of classes of this kind should be extended to them?—That is what is wanted, I suppose.

6988. With respect to practical mechanics, are you aware whether there is any class?—I am not aware of any class they could attend in the evening.

(*Dr. Sullivan.*) There is none this year, because we found it impossible to get any of the workmen to come. We tried for three years to get

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a class to attend in mechanics, but it was a complete failure. If we had a magic lantern we could get some few; but not having a magic lantern for the purpose we failed to get them to attend any subject like mechanics or elementary mathematics. We sent printed notices out from the school to all the workshops, but the class amounted altogether to only eight persons. It was taught by a man who has now taken the position of Inspector of National Schools; and who, in that particular subject, had scored the highest marks on record, so that he was quite competent to undertake the work. I may mention that Mr. R. U. Penrose-Fitzgerald proposed the appointment of a sub-committee, which has not yet met, selected from the executive committee of the Exhibition; a sort of watch committee, which will hereafter take the whole of this matter into consideration, and as you have expressed the hope that something in this direction may come of this Exhibition I may say I believe it will; and I believe it will be the work of Mr. Fitzgerald's committee to give effect to that.

6989. (*Chairman to Messrs. Mullins.*) Are you of opinion that the working men of Cork will have their attention directed to this subject of technical instruction by the holding of the Industrial Exhibition?—It ought to tend in that direction.

6990. Can you suggest any other means than those which have been employed hitherto in order to attract or engage the interest of workmen in technical education?—I could not.

6991. But of its value you have no doubt whatever?—There is no question about it.

6992. (*Mr. Woodall.*) You have read reports of what has been done by the carriage builders of Paris?—I have read a good deal about the work of the carriage builders of London.

6993. And you know what has been done by Mr. Hooper and the gentlemen who work with him in London?—I do quite well.

6994. Do you think there is any possibility in Cork of a teaching combination of a like kind?—Oh, Cork is a small place.

6995. How many workpeople are there employed here in your trade?—We have fifty, young and old; there is another establishment of about the same size, and two others, not quite so large. So far as carriage building in Cork is concerned, I do not think that anything of that kind could be done here. It would require a larger place to do it in.

6996. Do you think drawing would be serviceable?—It would be absolutely necessary.

6997. Do you think it expedient that drawing should be taught to children in the elementary national schools?—It would be well to teach children when young, but I think that lads of fifteen or sixteen, or up to twenty, could be taught better.

6998. (*Chairman.*) Do you not think that they would make very much better progress in a special class if they had been accustomed at school to the use of drawing instruments, and trained also to observe accurately the shapes and sizes of objects?—If they commenced young they ought to attain more excellence in each subject, of course.

6999. And in that way it would be of more advantage if linear drawing with instruments were taught in schools?—I think as regards workmen it would be very well if they were taught when they first went to their business.

7000. (*Mr. Woodall.*) Have you done anything to encourage the attendance of your boys at the drawing schools?—We have brought the schools under their notice.

7001. And as far as drawing goes you consider further facilities are required?—There are other facilities; there is a fairly good school, as

far as drawing goes. The only thing, I think, would be to extend the amount of the instruction there, and to teach mechanics and an elementary knowledge of chemistry. *Mr. T. Mullins, and Mr. M. Mullins.*

7002. And you think that these subjects would be better taught in a public school than in the Queen's College?—Very much better. Not better taught, perhaps, but workpeople would be more likely to avail themselves of the teaching. I am certain they would not go to the Queen's College at all; the objection they would raise is, that it would be too "loud" a matter for them to undertake; plain popular schools would be very much better. *11 June 1888.*

REV. CANON BAGOT, Kildare, examined.

Rev. Canon Bagot.

7003. (*Chairman.*) What is the subject on which you wish more especially to give evidence?—On the promotion of dairy education; that really, I suppose, comes within the scope of the Commission.

7004. You have already given some information on the subject to our sub-commissioner, Mr. Jenkins?—Yes; but that was more in the form of what had been done by the travelling dairy. I did not know at that time that the Commissioners were coming to Ireland.

7005. Would you wish to supplement the information you have given on that particular subject?—I should; I do not think, then, that I gave any scheme at all that I thought we ought to adopt in this country; my statement was merely an account of what had been done.

7006. You would now like to give some evidence as to dairy schools in Ireland?—Yes, certainly. With reference to the one dairy school which has been established in Ireland, I do not think it fulfils all the functions that it ought. I do not think it goes far enough. Of course, such a school is of paramount advantage to the country, but we want something better than that; we want to have a college to which pupils educated, as I may say, at the primary school—taking the Cork school as a primary school—could go up and get further education so as to qualify themselves to become themselves teachers. That plan has, I think, been carried out with success in Denmark and in Sweden. The point I desire to impress upon the Commission is this: that, if there is such a college, a dairymaid who goes up there for three months (or say for six months, as in Sweden), and after that time passes an examination, obtains a diploma of the college. That dairymaid is eagerly sought for by the farmers for this reason: that as she has a diploma of the college she is herself entitled to receive pupils upon whatever farm she happens to be located. I was on two or three of the farms where these dairymaids, holding diplomas, have the actual working of the dairy, and I found the dairymaid received a very small payment from the owner of the farm, because she received fees with the pupils, and these pupils themselves did most of the work of the dairy, so that the farmer obtained a double advantage by having a certificated dairymaid; he first of all had the advantage that he got a first-class dairymaid at a very reasonable price, and then he had the second advantage of getting the labour on his dairy performed for merely the board of the pupils. These pupils, after spending their one or two years at the dairy—ono year I think it is—received their certificates. They were not then entitled to take pupils where they went; they were merely certificated as dairymaids, but they could after that go up to the college and have their education perfected, and then they gained a diploma; and in that way they could themselves subsequently go to another dairy as teachers. Passing through the country one may find numbers of those dairymaids holding diplomas and certi-

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ificates, and each farm in itself becomes a little dairy school, without any expense to the Government of the country.

7007. You do not mean a small farm?—No, but at a farm having, say, about a hundred cows, there were generally some four or five pupils receiving education. I was going to point out that a system of that sort might work very well in a country where dairies were large, but there would be some difficulty in establishing an exact counterpart of it where dairies are as small as they are in Ireland.

7008. Dairies as a rule in a large part of Munster have from fifty to sixty and even seventy cows; they are surely sufficiently large to employ several dairymaids?—I think so. I think that most of the dairies of Munster employ six or seven hands in the dairy, especially for milking.

7009. How would you differentiate between the teaching that should qualify the dairymaid for the simple certificate, and the kind of teaching that should entitle her to become herself a teacher?—I should say that the one who simply desires the certificate must have spent a certain period of time under a dairymaid holding a diploma, either at a school, or wherever she might be located. If she wished then to go further and receive a diploma herself, she must go up to the college.

7010. Yes; but the dairymaids now go up to the college?—They have no college to go to in Ireland.

7011. Then you do not call this dairy institution in Cork a college?—No, I call it a dairy school.

7012. What would be the nature of the instruction you would give in such a college as you would like to see established?—I think the scientific part of dairying should go very much farther in the college I speak of, than I believe it does in Cork. However, I do not exactly know the curriculum in Cork; I may be wrong in saying it is not a college; it may fulfil all the conditions of a college, but what I should like would be to see the dairy schools extended.

7013. Do you think that whether the curriculum of the school at Cork be sufficient to train teachers or not, that it is not sufficient to have only one dairy school for all Ireland?—Yes; that is what I want to convey.

7014. Have you at all considered what are the places at which other dairy schools might with advantage be established?—I think that that would be a thing which would determine itself. If we have some kind of system, such as I have sketched out, many dairy proprietors and large dairymen would be glad to get a dairymaid holding a regular diploma. I want to distinguish between a certificate, which shows that she herself is a qualified dairymaid, and a diploma qualifying such a person to teach dairying. One person may make an admirable dairymaid, but she may be very much unfitted for teaching dairying. That is one of the criterions, I think, where the utility of the time spent in a college becomes manifest.

7015. Have you considered whether the mode of living and the accommodation to be obtained in an Irish farmhouse, and various other conditions of that kind, would admit of the boarding of dairymaids in numbers in this way?—I think that that is already in effect carried out at most of the dairies in Munster. They have a number of dairymaids. I do not know what the arrangements are for boarding them, but last week a gentleman told me he had seven dairy assistants, with a dairymaid over them.

7016. You mentioned that those apprentices obtained only very small wages?—That is in Denmark and Sweden.

7017. Do you think the assistants in a dairy farm in this country, in consideration of the instruction they receive from the dairymaid who has a diploma, would be satisfied to serve in that way?—I think they would serve for much smaller wages along with board. At this moment I have made arrangements for a gentleman who is going to emigrate; his two daughters are now at Hamburg, on a dairy farm, to be educated. They were going to the Government college at Antwerp, and one of the Swedish colleges at Maalmund agreed to take those two young ladies in at 15s. a week, including everything; but the reason that that arrangement was not carried out was that they could receive no instruction by lectures, because none of the teachers speak English. I then recommended them to go to a dairy farm, not far from Hamburg, where there was a teacher regularly certificated from this very college, and there they are paying 25s. a week for the two of them. They are to be there three months.

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7018. Were they aware of the existence of the dairy school at Cork?—I think so; but they were going to emigrate to America, and they thought it might be a great advantage to them to have received a foreign dairy education, so they went there. But what I want to point out to you was that the Swedish college was quite willing to take them.

7019. Would it have been possible for them to obtain equally good instruction at the Cork school?—I do not know whether the Cork school would have taken them in or not. I could not answer the question.

(*Sir George Colthurst.*) Oh, they would be taken in; they have to come in, and do the same work as the other dairymaids. We have had two instances of ladies coming there to be instructed.

7020. (*To Canon Bagot.*) They might have received instruction at the dairy school in Cork, but I suppose the German and Danish and Swedish institutions are more extensive?—I think they are larger; and these ladies particularly wanted to learn the ice system thoroughly; that system you must learn abroad. They were going to a country where, of course, ice was cheap.

7021. Is it the case that ice is cheaper on the continent than imported ice would be here?—Oh, it costs nothing. In several places we went to we were told that the system would not pay if the ice cost anything. It is merely the cost of the labour which they have on the farm, and which, during the winter, they could not apply to any other purpose. One of the largest dairymen there told me that the ice system would not pay if he had to buy the ice.

7022. Do you think that this plan of boarding pupils under a dairymaid holding a diploma would be a sufficient training in the case of Ireland, or would you recommend the establishment of other dairy schools like the Cork school?—Oh, but I think the Cork school is carrying out the boarding system as I have been describing it.

7023. Well, in the case you describe of boarding on a farm under a dairymaid holding a diploma?—I think a certificated teacher on a large farm will be the means of teaching practically the dairymaids under her.

7024. Then would that dispense with the necessity of establishing other schools like the Cork school in other parts of Ireland?—Certainly not; I should like the Cork school to be developed into a dairy college. I distinguish between the dairy college and the dairy school. I should like these schools to be a great deal more numerous, and then I would have a great deal more of the scientific part of dairy education imparted in the college; matters, in fact, which cannot be taught in the working schools. I do not think you can put a professor in every school, but you can teach the real agricultural portion of dairying in a school, and

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then the best pupils could go forward for a session to the college, and acquire a good deal of the more theoretical part.

7025. Describe what you would like the schools to be and to do?— I would have the school to do merely the purely agricultural part of dairying, milking, setting the milk, making the butter, and the whole dairy manipulation from the beginning to the end. But I think there is a great deal of a more advanced character than that which could be taught, which may not be capable of being taught at the school; the reasons why you do certain things in the making of butter; and all the science involved in this, may be taught, as it is taught abroad, in the dairy colleges.

7026. Are the teachers in the foreign colleges men or women?— Well, at Antwerp the professors in the college are men. In one of the German colleges they are all men; they will not allow women near the place, and say a woman is not fit to make butter. That is a college subsidised by the Government.

7027. Do you think there are many farmers in Munster who would be willing to pay for the instruction of their daughters at a dairy school, say for three or for six months?— I could not answer that question. I should hope so. I know so little of Munster.

7028. Can you answer the question with regard to Leinster?— I think there are. I hope there are; but really the question has never been raised, and I may be wrong in my opinion.

7029. If you want to establish a dairy school in the east of Ireland, in Leinster, what would be the best centre?— Dublin.

7030. Which, I suppose, means Glasnevin?— Yes, Glasnevin, I think.

7031. (*Chairman to Mr. Thomas Carroll, Agricultural Inspector.*) Is there any intention of establishing a school of this kind for dairymaids at Glasnevin?— I have been asked to make a report upon the subject, and I am disposed to recommend it.

(*Canon Bagot.*) There is one point I wish to mention. I think a great impetus might be given to elementary dairying in Ireland if the Commissioners of Education would give results fees. Suppose I get up a dairy school in my own neighbourhood, and conduct it properly, what I should like to see would be that it should be open to me to ask the Commissioners of Education to send down their examiners to that school, and to examine the pupils, and if they were up to the standard, as in any other department of education, that they should receive results fees. The reason I mention this is because I have just established an educational dairy in Dublin, and we are receiving about 1*l.* a day in fees from ladies who come there for education. We have several applications from dairymaids who are willing to pay 1*l.* a week for their board in connection with the instruction in the dairy. I have applied to the Commissioners of National Education to know whether I can send up a dairymaid, when I see she is sufficiently educated in practice, to be examined by the Commissioners of Education, and if found to be up to the standard that she should get the results fees. The answer is that there is no money available for the purpose. I think it is a great pity that there is not; more especially as I believe there are results fees given for cooking, and dairying is just as important as cooking. At all events, I think it would give a great impetus to dairy education if such fees were paid, for I believe the results fees system is the best of all. I should be quite satisfied with it. I do not know whether you are aware that Bishop Nulty at Navan has to all intents and purposes established a school for dairying, laundry work, and cooking, which he

has conducted there for some years. I believe it has been of great use in the country. *Rev. Canon Bayot.*

7032. Would you consider Navan to be a good centre for a school of that kind?—Not for dairying. I do not think it is a dairy country at all. 11 June 1883.

7033. Have you thought of what may be good positions for dairy schools in Connaught or Ulster?—There are two or three counties in Ulster which make splendid butter—Tyrone, Monaghan, and Derry. Dairy produce is one of the staple commodities of the country, and Omagh, I should say, would be a very central place for a school for the north of Ireland. I know the northern markets very well, such as Strabane. A very large quantity of butter is sent into the markets in 28 lb. and 56 lb. packages. They are not very large dairy farmers.

7034. Is instruction required, or is the butter so good that the farmers do not require to be taught there?—I think there is very little really good butter there; there is some. I just mention one fact in connection with that question. I was in the Strabane market, and after market was over I went into the establishment of one of the large dealers, and saw some very beautiful butter there, along with some very bad butter. Turning to the first, he said to me, "What do you think of that butter?" I said, "That butter is as good as ever I tasted in my life; what did you pay for it?" He said he paid 10d. per lb. for it. I then saw a very bad piece of butter, and asked what price he paid for that, and he said he paid 10d. per lb. also. I said, "There is the real rub with regard to the education in Ireland; you pay the same price for the bad butter as you do for the good." I telegraphed to London to know the price of first-class Irish butter on that particular day and found it was 1s. 3d. per lb., so that the dealer was buying one butter for a great deal more than it was worth, and another for a great deal less than its value.

7035. As regards Connaught; do you know about any centre there?—I do not know of one. Lord Lucan, who is the largest dairy farmer in Ireland, as well as in England, lives in Connaught.

7036. (*Mr. Woodall.*) I should fancy that dairy produce is not a staple commodity at all in Connaught?—I do not know that it is.

7037. Have you anything to say about cheese-making?—No, I do not believe cheese-making will ever pay in Ireland.

7038. Why not?—Well, my idea is that the whole world can compete with Ireland for cheese, but cannot compete with her for butter. Cheese will carry well, and will, in fact, improve by being kept a length of time; but this is not the case with butter. Of course there is some effort being made to make skimmed-milk cheese, but I am afraid it will not pay.

7039. Have you anything to say on the subject of rearing poultry?—Nothing. I do not know whether I might mention one fact which will, I think, turn out to be very important with regard to dairying, that is, the use of the separator. In Dublin we now have, at the Educational Dairy, an unlimited demand for this separated milk, and we are selling it at the price we pay for the new milk. We are at present sending out about 200 gallons a day, and I think it will succeed to an unlimited extent, for the Dublin people all like it, and say it is equal to the whole milk.

7040. Are you using a centrifugal machine?—Yes. I have always thought that the large towns ought to get their supply of separated milk, and Dr. Cameron stated publicly the other day that this separated milk from Laval's separator was as nearly as possible of the same composition as human milk, and if that be so, there may be a great

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future for the Irish dairying business ; it may yet be possible to supply the large towns in England with separated milk.

7041. Is there any difficulty in the use of Laval's separator?—Well, I have been associated with a company that has been getting cream regularly for the last thirteen months from a gentleman in Limerick, who has but one separator, and in the whole thirteen months we never were disappointed in receiving the milk but on one day, and that was in consequence, I believe, of the want of a driving band. A machine that goes like that, working every day for thirteen months without breaking, cannot be difficult to use. That is my experience of it.

7042. You are aware, of course, of the encouragement given by the National Board to teaching agriculture in the ordinary national schools?—Oh, yes.

7043. Have you anything to suggest in regard to instruction in this subject of girls attending these schools?—I should like to see poultry management and bee-keeping form part of the teaching in the schools, and there should be payment for results.

7044. Do you suppose that that instruction could be given without detriment to the literary instruction in the schools?—I do.

7045. And girls attending school would have an avidity for such instruction?—I think so. There is a great deal of instruction given to girls in national schools at present which I think is misdirected. A short time ago a girl came to me to ask me to get her a place as a nursery governess. I asked her a few questions, and by her answers I perceived what kind of education she had got. I said, "You ought to be a lady's maid." "A lady's maid?" said she. "Yes," said I. "Oh, sir!" said she, "I have either too much education or too little." That was true ; too much for one and too little for the other ; she could play a little on the piano and do a little drawing. She had been taken out of her proper sphere in my opinion.

7046. What was her father?—Almost what I should call a labouring man.

7047. Was she instructed in an ordinary national school?—In a convent school. I spoke to her parish priest, and said, "I wonder that you should allow this girl to get this high class education ; she will never be contented to settle down in her own rank in life." He said, "I did my very best to keep her from the convent school and to keep her at our own school." But the parents will insist on sending them to the convent schools, where they learn a little drawing and a little of the piano.

7048. Was this convent school a school under the National Board?—I think it was ; it was the Athy convent school.

7049. But would that kind of criticism apply to instruction generally given under the regulations of the National Board?—Well, I should like the education of women, more especially as given in the convent schools, to be turned to the more practical part of a girl's work—to laundry-work, dairying, and cooking. They would be equally successful.

7050. Then you think it practicable as well as expedient that instruction in these subjects, especially dairying, should be included in the scheme of the National Board?—Yes.

7051. Perhaps you will say what facilities for practical instruction would be required to make that teaching or instruction intelligible?—Well, the convent school has a number of people living in the place, and therefore they want so much milk, butter, cooking, and laundry-work done ; therefore they have all the facilities on the spot for teaching those kinds of work.

7052. Then it could only be partially taught in connection with the ordinary schools, and more efficiently in a school where there were interns?—Yes; and there are convent schools scattered over the country now, nearly within reach of everybody.

7053. (*Chairman.*) And, with the exception that you think too much attention is paid to accomplishments, you are glad to see the children of Catholic parents going to convent schools?—I am, and I think they are a wonderful credit to the country. The education, too, is very good, except that it is rather restricted from the point of view of making a woman a good helpmate. . .

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Mr. PATRICK CAHILL, Tin, Sheet Iron, and Zinc Warehouse,
8, Coal Quay, Cork, examined.

Mr. P. Cahill.

7054. (*Chairman.*) You are a wholesale manufacturer of tin, sheet iron, and zinc ware?—Yes.

7055. Have you worked at the trade yourself?—Yes, and I am working at it still.

7056. You have considered the question of the advantage of technical education to the workmen in your trade?—Yes, and, in fact, in all trades. I have given it great consideration.

7057. Would you state in what way technical education would be of advantage to persons employed in your trade?—In this way: they would much more readily take to using extensive machinery, and thereby they would be put into a position of competing with foreigners by taking up an otherwise unprofitable article and making it profitable by a quick and ready out-put.

7058. In what way do you think machinery would be more agreeable to them if they had received technical instruction than otherwise?—I find among working men generally there exists a great fear of using machinery. They seem to have a mistaken idea that by using machinery the work will be done too quickly, and that this will put them out of employment; while I fancy it would create a great deal more employment if they used machinery, as it would enable them to take up a lot of work they could not take up by hand labour.

7059. Is not the reason of that because they think that by the use of machinery there would be no occasion for skilled labour; that you would be able to employ unskilled men in place of those who learn the trade?—Well, one skilled labourer and two or three others could, of course, by the aid of machinery, produce a lot of work that they could not otherwise produce.

7060. Do you think that in your trade there would be as much employment for skilled labour, if machinery were used, as at present?—I think there would be a great deal more employment for both skilled and unskilled workpeople.

7061. And you think, they would appreciate that better if they received technical instruction?—Yes.

7062. What is the kind of technical instruction that you think would enable them to appreciate that?—I think instruction in all sorts of machinery, and examples of models showing what they could produce. I also suggested, in a paper I sent them in connection with those schools, that prizes should be given; the prizes to be in this shape, that a deserving pupil should be enabled to visit other cities, and see articles in process of manufacture. I make it a rule to go every year to London, Manchester, or Paris, and when I came back I have always added at least one article to what I had previously been manufacturing.

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7053. Are you aware that at Liège, in Belgium, that plan of rewarding successful students is carried out by the Corporation; by the municipality?—No, I am not aware of it.

7064. Well, if you take it from me that it is so, do you think, if the Corporation of Cork had the means of doing it, they might with great advantage encourage young men to become students in that way?—I think, sir, in fact I know, that, as far as the Corporation of Cork are concerned, their hands are pretty full already without undertaking that. It will have to come from some other corporation than the Corporation of Cork.

7065. The city of Cork is, I believe, the only one in Ireland that has adopted the Libraries' Act?—I am not aware of the facts.

7066. Yes, that is so; and the funds at their disposal are limited by the amount of money which they are able to raise by way of rates?—The rates are tremendously high at present, and I believe there is no likelihood of their being reduced.

7067. Then you think the citizens would not like to see the education rate increased?—I think not.

7068. Have you made up your mind as to the source from which you would get funds to encourage students by way of travelling studentships?—Well, I think if the school were established in the first instance by Government grant, the resident gentry would probably be got to move early in the matter, and the Corporation might supplement that by a yearly grant. I presume the Government, too, would supplement it. If the school were once established there would be no difficulty in working it.

7069. What sort of a school do you think this should be?—What would you teach in that school?—Arithmetic, algebra, mensuration; a thorough English education. In addition, for young men having a taste for building, I would have models; and for young men likely to become engineers, mechanical engineers, or to work in foundries, I would have suitable mechanical appliances there—to develop their intellect, and to educate them as to the principles of the business they would be likely to follow.

7070. Do you think this instruction should be given in the daytime, or in the evening?—In the evening. I may say I have not very much hope of reforming the present tradesmen; their minds are too prejudiced. But commence with the youth; get youths—especially when they are apprentices—have them well trained in the principles of the work they are doing practically at the bench, and in that way they will every day be adding to their information.

7071. Have you ever thought whether it would be desirable to give instruction of this kind on a Sunday?—I should have no objection to giving instruction on any day; Sunday might be spent a great deal worse.

7072. Do you think public feeling would go with you in that direction?—In Cork I do not believe we have any feeling like that against it. I believe clergymen of all denominations would desire to see young men engaged in educational pursuits rather than any other; of course after religious worship.

7073. One would not interfere with the other in any way?—No.

7074. You desire also to say something in connection with the development of Irish fisheries?—A gentleman was speaking to me on the subject, and asked me if I could think of any new industry that could be developed, and the thought just struck my mind that a very large thing could be made by preserving fish that cannot be sent away in its ordinary state; preserving it in hermetically sealed tins. I was

employed at that business myself with Mr. Gamble, who kept an office at the Royal Exchange, London, up to 1864, and learnt the art of doing this business. Those fish, when preserved in hermetically sealed tins, are preserved for a practically unlimited period. Now, in Kinsale, for instance, there is a tremendous take of mackerel at this time of the year. It is sold remarkably cheap; it could be tinned at a cost of about one penny per pound, and it would command a great sale in another market.

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7075. (*Mr. Woodall.*) Are you aware of experiments now going on at Skibberen in that matter?—I believe that those experiments are to preserve them by smoking or salting.

7076. (*Chairman.*) And you think that that trade would have a fair chance of success?—I think success would be almost certain, because the cost would be very trifling, and one could lay in stock without fear of its depreciating.

7077. Is there much capital required to carry it on?—I think about 2,000*l.* would be a very good thing for plant and material, and would start it very successfully.

7078. In addition to that there would be the working capital?—Yes. Some four years ago a gentleman called on me; I think he was a Scotchman, and he was going to Youghal, where they catch an immense quantity of sprats—in such quantities indeed that they frequently have to use them for manure. There are also people there who boil them down and make oil of them. This gentleman told me he was anxious to make them up in the same way as the sardines of Brittany, and he told me he was anxious to give an order for a thousand timber cases containing each one hundred tin boxes of sardines, and he would repeat that order probably three or four times a year.

7079. And he did not find anyone to go into that?—No, he did not. Since then, I believe, there has been a rumour that the sardine fisheries of Brittany are getting exhausted, and there is, to my mind, a great field for this new industry here.

7080. (*Mr. Woodall.*) You have not heard of any place in Ireland where they have been doing that business?—There is one man in Youghal doing it with, I believe, very little capital, but he managed to make a living out of it.

7081. You have said it would be very useful to have a collection of models and machines accessible to the working men?—Yes.

7082. You are aware they are going to erect in Cork a building under the Public Libraries' Act, to be called the New School of Art?—Yes.

7083. And that there will be a museum attached to the place?—Yes; but I fear that that will be for ladies and people of a higher sphere. Working lads would feel abashed at going there.

(*Mr. Woodall.*) That is very unfortunate, because Government aid is exclusively given for the instruction of the working class.

(*Chairman.*) They give no grants except to students who are either workmen themselves or whose parents have an income of less than 200*l.* a year.

7084. (*Mr. Woodall.*) I was speaking more particularly of the museum, and one of the essential conditions of Government aid being granted is that admission shall be free. May the Commissioners take it that such a museum, if it contains a good collection of models of such machines as you have described, would meet your views?—It would be very useful indeed; there is no better way of educating youth in such matters than to be able to show them, on a miniature scale, what has been, and what could be, done.

Mr. Mr. CHARLES G. DORAN, Architect and Builder, Chairman of the
C. G. Doran. Town Commissioners, Queenstown, and Member of the Cork
 Harbour Board, examined.

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7085. (*Chairman.*) I believe you have heard much of the evidence given here to-day?—Yes. I have attended at other Technical Commissions, but not to give evidence myself. I may say that I have visited all the towns on the continent and in the United States, of over 60,000 inhabitants, in connection with trades of this sort. Although I agree in a great measure with the gentlemen examined, yet I must say that in my opinion the great defect is in the want of technical appreciation rather than of technical education. I have been accustomed myself for many years to employ large numbers of men. I constructed one of the largest buildings erected in Ireland, at which I educated men taken almost from under the very shadow of the building, and made them first-class artizans and artists, but, owing to want of proper appreciation and proper payment, the men who have acquired such talents and such skill have, or at least 80 per cent. of them have, taken themselves to the United States of America.

7086. What you would then like is to see the great public educated?—I should like to see the classes which have patronage in their hands in this country thoroughly educated at their own schools. There is scarcely any building or museum you could go into, where you would suppose that everything would be perfect to attract people there, that you will not see the blunders that have been committed, and which no intelligent or respectable community would tolerate.

7087. How are you going to remedy that?—By appreciation; by simply employing the best artists, properly training and properly paying them.

7088. But the difficulty here seems to be that the public do not know the true artists?—Oh! they know them very well, but they do not pay them. I heard a gentleman say to-day that it was almost impossible to get engineers to take charge of his boilers. I know as a certainty that nearly seven out of every ten engineers on the Irish railways are men who have been educated from the fires; not men who have been educated from the institute, such as Professor Sullivan and Professor Jack had trained, but men who have been first firemen, who have graduated from that to being engine-drivers and engineers, and, as a matter of fact and for economy, are then given the preference over thoroughly educated people who know their business. Now, as a contrast, 70 per cent. of these men in England and Scotland are men trained exactly for the position, as is done in Glasgow, Sheffield, and other places I have gone through.

7089. You mean that the artizans have been trained?—In the building trades to a certain extent in this country they are as well educated as in any other country you go into. The only trades that would be benefited to a certain extent would be trades that require greater scope of mechanical knowledge, such as engineering and mechanical gentlemen can give in the various establishments under their control and charge. The great difficulty to be contended with in this country is that we group into one school classes of people who in a few years are to separate as from a common centre. That is a great mistake. My idea of technical schools would be, that if scholars are brought into a school there would be a common training for them up to a certain stage; and that from that stage each class should develop into the training suitable to the business it was afterwards to be attached to. For instance, we would

say that in training up masons, carpenters, plumbers, plasterers, and men of that character you have to give them a specific technical training, that the training for the one may be of advantage to the other, and may be of common benefit to all; but at the same time there is a special kind of knowledge that must be sought to be inculcated into the minds of those intended for a special business. A portion of the roof of York Cathedral was burnt off some years ago, and that portion of the roof was renewed. There had been a leaden roof on the old cathedral, and the new portion erected in place of what was burnt was covered, as the mechanics supposed, similarly to the older portion. As a matter of fact, eight tons of lead that had been laid on the new portion decomposed, while the lead on all the old portion remained perfect. On investigation it was discovered that the modern lead was so impoverished by the extraction of the silver that it was acted upon by the acid of the oak on which it was laid, whereas the acid could not affect the old lead in which there was silver, or at least not to any appreciable extent. Therefore, I say that if a plumber got any technical education he would, to a certain extent, know the enemies of his trade that he would have to avoid. You will not find tradesmen properly educated fastening zinc coverings with iron nails; they would know at once that such a combination would be destructive. These examples show how a few distinct principles, if thoroughly impressed on the minds of the working men, would bring very material advantage afterwards.

7090. What you mean is, for instance, you might tell a zinc worker that he must not put zinc and copper into juxtaposition—without going over the entire field of electricity?—Yes, that is what I mean. I heard Professor Sullivan stating here what, I think, was a very great matter, that is, that you should get the working classes to think as well as to work. At the present time, in this country and in other countries as well—for we are not behind by any means in that respect—the working men are mere mechanical appliances, to use the expression; they have got nothing to think of, but merely work in a certain groove, as directed by those above them. Those above them are supposed to know everything, and certainly mistakes are liable to be made where the working man's mind is not employed on his work, just as well as the mind of the man above him. I am sorry you could not come to Queenstown during your visit, as I think I could give you a treat there in showing you what Irish workmen could do. I have in that cathedral got every figure worked out of the rough block by men educated there at the works. To show you the want of technical education: there is a very large building in Cork, and it is an extraordinary fact, and a lamentable one, that the stone for the sculptures in that building was excavated here in Ireland, taken to London, and carved in London by men who could not do the work a bit better than it was done in Queenstown.

7091. But were not the Cork people aware of what was being done in Queenstown?—I believe they were, because I had at the time the honour of pointing out to the gentlemen on the committee of that building the great injury they were doing to Irish workmen.

7092. And what was the reason they did this, if they were aware of what could be done in Queenstown?—No reason whatever. I myself offered to have the works executed equal to anything that could be done for them in England, and to undertake all risks myself.

7093. In what way did you teach the workmen employed at Queenstown on this cathedral?—By educating them: by training them up from the figures to the sculptures.

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Mr. C. G. Doran. 7094. Did you teach them drawing?—To a certain extent—only detailed drawing.

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7096. And in some instances you taught them drawing also?—Just detailed drawing; only ordinary drawing required for working out models and sections of mouldings.

7097. Did you teach them how to set out curves?—Yes.

7098. In what way did you teach them that?—I took a platform, as large as this room we are assembled in, and brought the men I had engaged for the purpose on it. I went with them and assisted them in laying down all the curves necessary from the commencement to the end of the work. I found them a most tractable and susceptible class for learning. It is the only building in Ireland that has been wholly executed on the ground without any importation whatever.

7099. (*Mr. Woodall.*) Are you including the human figures?—Yes.

7100. But you are aware that a sculptor executing works like that usually has a mould in clay first?—Yes.

7101. And you are aware also that he has a human model standing by his work?—Not necessarily.

7102. What size figures are those on the cathedral?—Some are colossal figures.

7103. And the men trained during the progress of the work under your direction, getting the whole of their training during the progress of this particular work, have executed round life-sized figures merely with the aid of the flat diagram?—Quite so, sir. I have twenty-three or twenty-four of those figures already. There was one man employed there, Mr. O'Reilly here in Cork, a man left unemployed by the citizens of Cork, while they go to London, and other places, for figures far inferior to what he could execute.

7104. Does not it occur to you that what you have stated rather goes to show that there is no necessity for technical instruction?—It shows there is a necessity for technical appreciation. I myself, if I were dependent on my own profession for a maintenance, would be unable to live in Ireland, and in my profession I may say there are few men whom I would admit as my superior.

7105. We are speaking of what you yourself have been able to accomplish by merely instructing a workman during the progress of the work; you state that he is able to execute those very important works merely with your directions and supervision?—Mr. O'Reilly has always worked from my flat diagrams in the same shed with these men. I have had only one trained man in doing all this work.

7106. What Mr. O'Reilly was able to do, you have been able to get other workmen to do?—Yes, quite as well.

7107. Are we to understand that those others did the rough hewing and Mr. O'Reilly finished the figures?—That was so in the commencement; they did the rough part of the figures and Mr. O'Reilly finished them off. Another thing is that there is great want of knowledge on the part of gentlemen who ought to be the patrons of art—in this respect. I know a cathedral where the figure of Pope Celestine is painted life-size, with tiara and symbols that did not come into existence for close on 700 years after that Pope lived, and I know that painting on that

ceiling to be admired by very high officials, ecclesiastic and otherwise. I know another case in the same county where the abbess of a convent, supposed to be the patroness of it, is represented with a crozier, as if indicating that she was a secular bishop. I only instance these facts to show the want of knowledge in a class that ought to be our instructors, in case the working class made errors in that respect.

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Mr. MICHAEL A. O'LEARY examined.

Mr. M. A.
O'Leary.

7108. (*Chairman.*) You are a cork manufacturer?—I am, sir.

7109. And you are anxious to make some suggestions to the Commission on the subject of education in art?—Yes.

7110. Kindly state what it is you wish to say generally in reference to art education?—I feel, sir, in the first place, that our art workmen in Cork who are decorators, carvers, either in stone or wood, engravers, plain or coloured, and all others of that class connected with art or who may have a living by art, are very backward in art education. It may appear strange for me, a cork cutter, to be making these observations; but since I was a child I was fonder of art than of cork cutting. I have spent a good many years connected with art. I have got a certificate from the Science and Art Department, and have won a medal. I have been appointed pupil teacher from the department, and have had one of my studies hung in the corridor of the South Kensington Museum. I have been a student of the British Museum and National Gallery, and Mr. Clarkson Stanfield himself, when he saw a drawing of mine, promised Mr. Herbert and Mr. Maclise to get me into the Royal Academy.

7111. The Commissioners are quite satisfied you would not present yourself for examination in a subject in which you were not quite competent. What is it you would wish to say?—I came here with an impulse that if I could do any good in aiding or assisting my fellow citizens or countrymen in any way, and to get more people employed than are at present—

7112. What would you suggest?—I suggest that there should be a complete change made in our school of art. That is one of the reasons why I did come.

7113. Well, now, please, come to the main question?—Well, I feel that since our free cast gallery was brought in connection, or under the rules and regulations of the Department of Art (now over 34 years) an injury has been done to art knowledge in Cork. I was a student of both, and I know that a class of art students belonged to the old gallery that was never equalled by any class of the Government school for the following reasons: The old gallery was *free* and *open to all*, every day and all day, so that students who could not attend regularly could attend at any time as opportunity offered. There were no masters to prevent them from assisting each other. They had no fees to pay, and consequently there could be no exclusive class to occupy the gallery, to the injury of those who could not pay. They were not subjected to a course of study for which they had no taste, and the students in advance kindly assisted the others. The rules and regulations of the Department of Science and Art changed all that, the school was closed three days in the week, and, part of the other three days. Then with vacations, or holidays, our beautiful collection of casts has been shut against those anxious to study from them for at least (if time were counted) twenty years out of the thirty-four. Those who could not

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pay had to stand aside the whole time, and, there are many of our labouring class who could not pay the lowest fee of 10s. per term. The masters appointed from time to time seemed to me unable to make a good classical drawing or study from the antique either in colour, shaded or outline, whatever they may do in bric-a-brac, vertu, or sprigs of old ivy; and consequently were not proper teachers for the Cork Cast Gallery. This is partly the reason why art in Cork is in such distress, going from bad to worse every year for at least the last 20 years, when at their last exhibition a collection was shown that would not, I believe, be exhibited by the poorest town on the Continent, but would be swept from the walls and cast into the fire, yet our people have the ability if they had the opportunity of others.

7114. What are the opportunities which you wish should be given them?—In the first place our cast gallery should be open to the citizens free every day and all day, and those wishing to study from the casts allowed to do so, as of old. Next, I would have adjoining apartments for mechanical drawing, modelling, carving, painting from natural objects, or studies in colour, &c., also such technical education in manufactures as could be fairly managed. For all this, I, for one, ask for no Government grant, because from my experience I find that with a little grant, masters, rules, and regulations are sent that do ten times more injury than good. No! let us be free, to manage our own affairs, and I firmly believe we would soon regain our place in the race of nations in science, art, manufacture, &c.

7115. Is there any life school in Cork?—No, sir, there is not.

7116. Then you think it would be desirable to re-model the school, make it free, and give greater advantages for study?—I do.

(Adjourned.)

TWENTY-EIGHTH DAY.

Meeting at CORK.

Second Day.

Tuesday, 12th June 1883.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., IN THE CHAIR.

MR. WILLIAM WOODALL, M.P.

MR. GILBERT R. REDGRAVE, *Secretary.*

(The Commissioners sat first at the Munster Dairy Farm, and afterwards in the Council Chamber.)

SIR GEORGE ST. JOHN COLTHURST, Bart., D.L., Blarney Castle, *Sir G. St. John Colthurst, Bart., D.L., and Mr. W.H. Barry, J.P.*
 Chairman of the Committee of the Munster Dairy School, and Mr. W. H. BARRY, J.P., Carrigtohill, Middleton, Member of the Committee of the Munster Dairy School, were examined together, Sir George Colthurst answering in the first instance.

7117. (*Chairman.*) This school, I understand, is held in buildings which formerly were part of the Munster Model Farm?—Yes.

7118. That had ceased, I believe, to be carried on for some time before the dairy school was established?—It had been carried on in a sort of way, but it had lapsed; it was used by the Commissioners of Education as a place to lodge their pupil teachers at the model school. It was proposed at the time when they got rid of the other agricultural schools in Ireland to abolish this one, but the Committee of the Agricultural Society of the County Cork raised a protest in the matter; the Duke of Devonshire, who had given a lease of the land for the purpose of a model farm, helping them. The Commissioners threw out a suggestion that they would consent to the Government establishing it on a new basis; the Government paying a certain amount, provided a local subscription was got up in the district. A meeting was held, the matter was taken up warmly and at the very inception, being a dairy country, our attention was called to the great deterioration that was taking place in the quality of Irish butter, and the manner in which our butter was being superseded by the Danish. We found, on going into the matter, that 10 years ago Danish butter did not command anything like the price ours did, and we believed from inquiries made, that it was in consequence of technical education in dairy husbandry that they had beaten us. In fact they beat us in Rio de Janeiro and such markets abroad as Cork used generally to supply. It was rather an important fact that Rio, a city of 300,000 inhabitants, which had formerly

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Sir G. St. John Colthurst, Bort., D.L., and Mr. W. H. Barry, J.P. been supplied entirely with Cork butter, was now supplied with other butter instead. I give you that as an instance of the condition of things. The committee thought it would be absolutely necessary, in order to make the school successful, to teach what would most probably produce an immediate effect on the agriculture of the district, and we therefore suggested that an experiment should be tried, to devote part of the time of the school to the instruction of girls in dairy husbandry. This suggestion was at first opposed very strongly by the Commissioners, on the ground that they had taken—which they had no right to do—possession of the buildings to lodge their pupil teachers in. Though the school for teaching them was in Cork, they had taken possession of this place to lodge the young men who attended there; and they objected that as those young men stopped there all the year round, it would be perfectly impossible that we could have young women in the same building.

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7119. When you speak of pupil teachers, you mean pupil teachers in connection with the ordinary elementary school?—The training school.

7120. Not being specially an agricultural school?—Having nothing whatever to do with it. They took possession of buildings devoted to agriculture, and strongly objected to giving them up.

7121. You were successful in rescuing the buildings for the purpose to which they are now devoted?—Yes, with some difficulty. The local committee had to pay the rent of a house in Cork to get rid of those pupil teachers. We then started the principle of introducing dairy instruction, and what I wish to point out to the Commissioners is, that for the first time I think in agricultural education in Ireland a local government was introduced. That is to say, instead of the school being managed by a central office in Dublin, it was virtually managed—not entirely managed but principally—under the supervision of a local committee who also provided the funds, and I think that this made them feel themselves responsible for the success of the experiment, and imparted a vitality to the school which the other institutions, hitherto established in Ireland, in connection with agricultural education, did not succeed in getting.

7122. Except at Glasnevin?—Yes; except at Glasnevin.

7123. Will you now have the kindness to state what the school consists of; how the expenses of the first establishment were met, and how it is now supported?—It is supported by a grant from Government. We supply about 500*l.* a year, roughly speaking. I hand in a copy of an abstract of receipts and expenditure.

7124. How is the expenditure on the school divided between the local committee and the Government?—The local committee provides funds to pay prizes to dairy-maids, to pay prizes to agricultural students, and supplements the superintendent's salary as well as the payments to secretaries and lecturers.

7125. Is that for the dairy school exclusively, or for the entire school?—The entire school.

7126. How much does that amount to altogether?—When the thing is running smoothly, it would be about 400*l.* a year; this old return gives the subscriptions as amounting to 52*l.*

7127. And the Government pays all the other expenses of the establishment?—Yes.

7128. Including the necessary loss on the farming in consequence of your having to provide a special course of farming for a dairy school, different from that which you would adopt if you intended to make it a paying farm?—Quite so; and because of experiments necessary for the establishment.

7129. Are you able to state the total amount of Government expenditure; what portion of it is applicable to the establishment as a school, and what portion of it consists of loss on the farm?—For the year ending the 31st March 1883, the amount paid for the maintenance of the agricultural students, salaries, &c. was 409*l.* 17*s.* 10*d.*; the loss on working expenses generally for the year is 242*l.* 1*l.* 10*d.*, and pupils' fees amount to about 250*l.*

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7130. Then the figures would work out in about this way. The total cost being 1,400*l.* five-fourteenths are covered by subscriptions; between six and seven-fourteenths are received from the Government, and about two-and-a-half fourteenths are paid by the students?—Yes, I suppose that would be it.

7131. But are the subscriptions to be depended upon?—The subscriptions have fallen off to a considerable extent, but I think they have reached their lowest point, and I have no hesitation in saying that the subscriptions can be kept up. One of the reasons that the subscriptions fell off was this. Of course it was principally supported by the landed gentry; well some of them unfortunately, owing to changes, are not in a position to contribute the same subscriptions as they used to give. But although it has fallen off to a certain extent, it has not fallen to such an extent that we have to make an appeal, and I think I am justified in saying that we have only to appeal to the public spirit to make it up to what it was. The work of the school was regarded with great doubt at first by the butter merchants in Cork, but the result has been to show a marked improvement in the last year, in the quality and cleanliness of the butter that has come into the market; and though at one time they were more or less hostile to this institution, they now certainly support it, and their inspector Mr. Forrest came here during the last term and gave most admirable and interesting lectures to the girls, and in fact assisted us in every way. I do not think we need in the least fear as to the failure of our subscriptions; I do think certainly in every case of this sort, that if the locality has not sufficient public spirit to produce an adequate amount for such a desirable object, they do not deserve to get Government assistance. I only want to insist on the principle that Government assistance should be given only to those who, to a certain extent, help themselves. I do not think it right or just that the Government should pay the whole of the expenses, because if they did, they would assume the whole charge and manage it from some central office, which would rob the institution of its vitality. Therefore it is absolutely necessary that the people should themselves subscribe to the support of the institution. I hope to see schools of a similar character established in every dairy district in Ireland. And, I may say, I think that the industry for whose benefit this school was established should contribute towards its support, and should be allowed to take the management of the institution, subject to the rigid supervision of the Government officials.

7132. That is to say, the Government officials should see that a result has been obtained, and should leave the local committee, under whatever name that body may pass, to carry out the necessary steps towards that result in the manner which may appear to them to be most expedient?—Certainly. Perhaps I may be allowed to give you an instance, in the very establishment of this school, of what I mean. One of the great difficulties in the model farms in Ireland was, I may say, that the co-operation of the Roman Catholic Episcopate in Ireland was not sought in any way; and when this school was first started, Mr. Barry, and another gentleman and I waited on his Lordship, the Roman Catholic bishop, and also on the Protestant bishop, and asked them to give us their assistance—in fact we recognized that we could not get on

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without their approval and assistance. Dr. Delany, the Roman Catholic bishop, asked us, that any books to be used in the school should be sent to his chaplain for approval. He said it was merely a formal matter, as there was nothing of a heterodox character likely to be introduced into butter-making, but still it was a point he should insist on, otherwise he could not send his chaplain to see after the religious duties of the girls. We could not but agree to this, as for the success of the movement, we are largely dependent on the parish priests, who in a good many cases advocated the advantages of the institution. We introduced into the prospectus that we issued, a short note stating that the educational arrangements had the cordial approval of the clergymen of all denominations, and sent a copy of the prospectus to the Commissioners in Dublin. The Commissioners sent it down with that note struck out of it. We sent it back stating that it was a *sine qua non*, without which the school could not work. They sent it back again insisting that the note should be struck out before they would approve of the prospectus. In reply we said we should resign, and at last they yielded. Now that was a matter which any one interested in it locally, could see was a necessity, but I can quite understand how, in a central office in Dublin, they did not see it in that light.

7133. I can quite understand that the supervision of persons locally interested must be very valuable in all cases, but you have laid down another very broad general principle, namely, that nothing should be done for a locality unless the locality were prepared to give considerable assistance also?—I should say not.

7134. Now if you had stated that with respect to the city or county of Cork, I think no one would have hesitated to accept it; but have you borne in mind that there are many parts of Ireland which are so poor that they are scarcely able to do anything for themselves, and if so, would you modify the general principle which you have laid down, in regard to these localities, and if so, in what way?—I still hold to the opinion very strongly, that there must be some local effort; that people must help themselves in some way, otherwise the result of giving instruction gratuitously in what is, after all, a branch of industry, will merely tend to demoralization. You must, in some way, make them pay something themselves, for an Irishman, as a rule, does not care for what he is given. If you carry out the principle in such a matter as giving seed potatoes to poor tenants, if you give them these gratuitously they will not think anything of them. Charge them something, however little, make them pay something, and they think a great deal more of it, and take a great deal more care of the potatoes. You will have to make the locality in some way assist the funds, or otherwise they will not think so much of it.

7135. Then you consider that even subscriptions from, say Dublin or Cork, for the distressed districts of Ireland would not be the equivalent of some local effort to serve as the foundation of a Government grant?—No.

7136. And you think that that is a principle which can be carried out in every part of Ireland?—I do. But as far as distressed districts are concerned, I believe that more good could be done in places, where there are very small farms, by continuing the efforts which were made immediately after the famine. Then, there were travelling instructors who went into certain parts of the country and introduced the growth of turnips to a very large extent. Of course I do not know of that personally, but from what my father told me. Those practical instructors did a great deal of good, but it was nothing whatever compared to what was done by

people when they did it in the locality, of themselves; the good was abiding in the latter instance.

7137. You would not have the Government pay the travelling instructors in your case?—No; of course we are in a different position here; there is money in the country, but we are a great deal too fond, in Ireland, of asking the Government to do everything for us, and never doing anything ourselves. If that principle is encouraged in Ireland, it would simply end in demoralization and pauperism.

7138. Now I believe you are of opinion that agricultural schools should take a different form, that they should have a different object in different localities?—Certainly; for instance, in the north you have a flax district. The object of the school here is, of course, to give agricultural education principally with regard to dairy husbandry, but where you had a flax district I should say the attention of the school should be turned to encouraging the industry succeeding in the locality, and for which the locality is best suited.

7139. Now will you kindly say what is the present condition of this school, and what have been its results?—Well, I believe the number of girls who have passed through it since August 1880, is 134. It was in May 1880 that we got possession of the school, and the first term began in August. For girls, you must remember, we have only two terms in the year, one in the summer, and one in winter. We now propose to change this, giving six months of the year to dairy instruction, and making each term two months. We commenced first by making the term a month, then we made it six weeks, and we now are anxious to increase it to two months. The school could only take in 23 or 24 girls at a time, to do them justice.

7140. How many students are there in the school now?—Six. It is the agricultural students' time now. We have passed only 36 of these, and that, it seems to me, is to be explained on these grounds. Every one recognizes the immediate advantage a farmer gets by the instruction of his dairymaid or his daughter in the improved methods of butter-making; he at once gets a better price for his butter; it is quite another thing to recognize the advantage he will get by the instruction of his son in the principles of agriculture. That conviction must take time to grow. I would ask the Commissioners to remember that the success of the school does not depend absolutely on the number of people attending. The result in the teaching of boys cannot make itself apparent until after five or six years. To a certain extent also this fact may have had an effect; it was started at a time of great public excitement, and the representatives of the school were looked upon, to a certain extent, as a class hostile to the people, but I trust, indeed I am certain, that those feelings will ultimately die out, and the prejudice that existed against it has died away to a great extent. Of course I am speaking under the correction of my friend Mr. Byrne (who is present), who represents, I believe, to a certain extent the feelings of the tenant farmers. The disturbed state of the country indisposed men's minds for a time to send their sons to the college.

7141. I wish to ask you whether the number of the students of agriculture is, or is not on the increase?—I think it stands on about a dead level, more in one term, less in another.

7142. How many at this moment?—Only five; I am sorry to say it has decreased; but this is the worst period.

(*Mr. Barry.*) The small number of pupils that we have in the school has been owing, in a measure, but not entirely, to the disturbed state of the country, and I anticipate now, from the manner in which the country is settling down, that the attendance will improve.

Sir G. St. John Colthurst, Bart., D.L., and Mr. W. H. Barry, J.P.

12 June 1883.

Sir G. St. John Colthurst, Bart, D.L., and Mr. W. H. Barry, J.P. 7143. (*Chairman to Sir G. Colthurst.*) You were about to observe that you were going to make some change in the arrangements which you thought would be beneficial?—There is a change in this way; the year is divided into two terms of six months, one for girls, and the other for boys, and I think it will be far more easy to get the boys to attend in the autumn, than it is at this season.

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7144. After the principal agricultural work is finished?—Yes.

7145. We have not yet been told what are the fees?—The fees are 7*l.* 10*s.* for four months for the boys, and 3*l.* 3*s.* for six weeks for the girls; that includes everything. I may add that we have passed a resolution to reduce the latter fee, from three to two guineas; we have asked the Commissioners of Education to sanction this, but even if they do not, we have decided to bear the risk ourselves. The instruction of girls was an experiment made by the Local Committee, I will not say against the wishes of the Commissioners, but at all events they said "It is an experiment, and you must make it at your own cost."

7146. And the Government would have been prepared to devote a larger sum to this school if they had been satisfied, at the time when you started the experiment of teaching dairy work, that that was as useful, and would be as successful as you believed it to be?—I fancy what they would have done would have been to supplement the boys' fees. We really brought in the dairy pupils ourselves, and it was an experiment made at our own risk.

7147. But you do not believe Government would hesitate to afford as much encouragement to the teaching of girls, as to that of the boys, if they were convinced of its being as beneficial to the country?—I am certain they would not; I think they are satisfied of it now.

7148. I suppose we may take it that the value of the labour of girls to their parents is less than that of boys?—On the contrary, I should say that in this country it was greater, because the country is almost entirely a dairy country, and wherever the small farmers are, it entirely depends on the man's wife, as to whether he is well off or not, because his whole profit is made out of the cows; and it is therefore of even more vital importance that the girls should be taught than that the boys should.

7149. But my question was, whether the farmer could better afford to spare his girls than his boys to come to this school?—Well for a small farmer I think it would be a greater inconvenience to spare his daughter, but he would get such an immediate result from her teaching that he would do so. We are arranging sessions which will be more suitable for the boys and the girls than they are at present.

7150. Then if the farmers could only be convinced that the advantage to be gained by sending their sons to an agricultural school is as great as that to be derived from sending their daughters to a dairy school, you think that there is no obstacle in the way of the value of the labour of the boys as compared with that of girls to prevent boys from being sent as well as girls?—No, I do not, but what you want to do is to convince them; the girls show an immediate result, the boys necessarily cannot.

7151. And all the arrangements which you are making tend in the direction of bringing up the students of both sexes at the time when they can most conveniently come?—Yes, that is our intention; it is with that object that we have made the change. The most gratifying matter in connection with the school is that whilst at first pupils were forced on the school, and were not paid for by the farmers themselves, this has been diminishing every year, until I believe at the last term there was not more than one pupil who was paid for by the landlord or by any outside person. A number of applications had to be refused. The last term we had 28 in, and had to refuse numbers of applications;

the first term we had 9 dairy pupils, the second term 6, the third 17, the fourth 18, the fifth 21, the sixth 16; that last was because July is a very bad month for girls to be spared. Of those 16 in July, I think, if my recollection serves me right, they were all paid for by the parents themselves.

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7152. Have you ever contemplated the granting of bursaries by somebody to children who have distinguished themselves by passing a good examination in agricultural subjects, including dairy subjects, in an elementary school? I should think that nothing would tend so much to spread the value of the school, and to make it useful, as to give the advantage of free places to a certain number of children from the national schools. I do not think anything would tend more to popularise it, or spread its good effects so much, as to bring us into communication as much as possible with the primary schools.

7153. Do you think that that would be a proper object, in which the locality and the Government might join?—Certainly; some of the girls have come here and with the amount of the prizes they have won have paid for another session, and some have actually given their prizes in order to pay for their brothers to come here. I could give you a practical instance of the success which girls have achieved after having received education at this school. The daughter of a small farmer, living close by me, came here to this school; she was not by any means known as a good butter maker in her own district when she came here; and yet, after attending two terms here, she was offered a place of 25*l.* a year and all found, as dairy-maid. That was solely in consequence of the instruction she got at this school. There was also another girl in my own district, whose brother was a small farmer, paying only 11*l.* a year or so as rent; this girl—and it is solely owing to the instruction that she received here—is now engaged at 1*l.* a week to carry on the experimental dairy at the Exhibition; and she was offered a place by one of the leading agriculturists of Ireland, Mr. Crosbie of Ardfert, at 34*l.* a year.

7154. Have you had any expression of opinion from the small farmers themselves as to the value which they attach to the education which their daughters have received here?—Yes, I have had several. In one district with which I am connected, it is their constant effort to get their daughters in here. In fact, at the present moment I have two or three of them asking me if I could give them any help towards paying the fees; they are determined to send in the girls whatever happens.

7155. You will easily understand this, that it is of more importance, in a national point of view, that you should train girls for employment on small farms, than that you should provide dairy-maids for large farmers or landed proprietors?—Certainly, but then you must remember that the future in life of those girls is to enter into the marriage state, and on the wife, as I said before, depends the success of the small farmer.

7156. They might go into service, and become farmers' wives later on?—Certainly, and the education that would suit them for one position would suit them for the other.

(*Mr. Barry.*) I took a great interest in the establishment of this school, being an ex-officio member of a board of guardians. I found great difficulty in getting farmers to send their daughters to be educated as dairy-maids; and I took the opportunity of pointing out to them that the desire we had was, not that we might educate them as dairy-maids to go out for hiring, but to educate them in the art of manipulating butter and in other domestic matters, so as to be an advantage to their families.

7157. And you believe that you succeeded in convincing them that such was your object?—If it be not out of place, I will give you

Sir G. St. John Colthurst, Bart., D.L., and Mr. W. H. Barry, J.P.
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(*Sir George Colthurst.*) I should like to bring before you one part of the arrangements which has done a great deal of good and has tended to make the school exceedingly popular, and that is the Ladies' Association, which was formed for giving instruction in the elementary principles of cookery and needlework. It was found that the girls had time at their disposal, and a course of instruction was arranged by ladies who had been struck by the total ignorance of elementary cookery there is in the country. As a rule, if you gave an ordinary girl in the country a piece of meat to cook, she would not know what to do with it. All she knows of cookery is, how to boil a potato—and that not well sometimes. I think what Mr. Barry has stated applies largely to the cookery classes.

(*Mr. Barry.*) Allow me to make a few observations on this head. We found that the girls had some idle time on their hands, between and after the hours of instruction, and we wanted to give them some occupation for that idle time. Lady Colthurst, the mother of Sir George, with other ladies, established this course of instruction in cookery and needlework, in order to occupy these leisure hours. The result of that instruction has been of the greatest possible benefit to the people of this country. Living amongst the people as I do, knowing their habits, and being continually in and out of their houses, I have always observed that great want. The food of the family, from one end of the week to the other, is boiled potatoes; there are no other vegetables used, and grain is not utilised for food. If they get meat, they do not know how to cook it; they would not know what to do with it in fact. The art of cookery which they have learned here is brought into their domestic establishments, and with it a great amount of comfort that they knew nothing of before. In the case I mentioned to you, this was one of the great questions that influenced the mind of the father of the girl; he had received real comforts, not only in the working of the butter, but also in the domestic arrangements of his house. The rewards that we give for proficiency in the arts of cookery are cooking utensils; these are taken home by the pupils and they become useful to them in their establishments. The whole of this matter has been managed by Lady Colthurst and a committee of ladies working with her. It is now being carried on by the present Lady Colthurst, as Sir George's mother is living in London; but the present Lady Colthurst is carrying it on with equal success, and I hope that at the exhibition here you may have an opportunity of witnessing work that has been done by the girls under her directions.

7158. (*Chairman.*) Are we to understand that this instruction is given entirely at the expense of this association of ladies?

(*Sir George Colthurst.*) Yes, entirely.

7159. I suppose that the apparatus is furnished by the institution?—

Yes, that is, the use of the kitchen; of course I do not know the practical details of how it is carried out.

7160. By whom is the instruction given?—By the cook or rather by the matron of the institution.

(*Mr. Barry.*) The system adopted at the examination is this; a list is given of certain articles—portions of meat, vegetables, and so on, and each girl must cook a dish, the price of which is fixed.

(*Sir George Colthurst.*) Each girl is allowed only 15*d.* to produce her dish, and the idea is that the prices should be stated to show who could produce the greatest amount of satisfactory food for the least amount of money. Here is the bill of fare (*document handed in*) with the prices put down; every one of these has been cooked by the girls of the school. They buy their own materials.

(*Mr. Barry.*) The prizes are awarded in this way. The committee of ladies sit round and partake of the luncheon, and put a mark opposite what they consider the best dish, and whoever has the most marks gets the prize.

7161. (*To Sir George Colthurst.*) Is there anything else you would wish to say as to the school?—Yes. Though I do not, as a rule, attach paramount importance to the prizes won by the pupils, still I would wish to draw attention to the prizes won by the school for dairy work done. In the year 1881 the school, then under the direction of Mr. Carroll, carried off at Birmingham first, second, and third prizes, against about eighty competitors from all England.

7162. Was the butter *bonâ fide* the work of the students?—That was the butter made by the dairy-maid of the school. That same year, they won two first prizes in the Dairy Association, or Cattle Show of London, two pupils took two silver medals, two were “highly commended,” and the Lord Mayor’s Champion Cup was won. This year the dairy school did not compete at all, but pupils have won in London two first prizes, a medal, and a third, and a fourth prize. In Dublin they won all the champion prizes, four first prizes, three second prizes, three third prizes, five highly commended, and seven commended. These were all won by pupils who had passed from the school, and were working in their own homes. I may give you one fact in my own experience, of a girl whose mother was previously taught by one of the best butter makers in the country, and whose father sends his butter to a certain broker in Smithfield. This same girl took first prize last year for mild cured butter at the London Dairy Show. I was excessively anxious last year, being in London, to go to the broker and to ask him if he had observed any change in the butter. I went and asked him the question, and he told me that after a certain time (corresponding with the time the girl had been at this school) he remarked an increased uniformity in the making up, colouring, and packing of the butter. He wrote to the man congratulating him on this, and telling him he considered the value of his butter increased by 1*d.* in the lb., and the man answered that that was owing to his daughter having been taught the use of the thermometer in this school, which she had never known before. That shows what could be done by teaching these people the principles of heat and cold, &c.; by applying the principles of science to manual labour.

7163. What is the nature of the instruction given to them?—Oral and written. They receive lectures on the science and practice of making butter. In fact, to use the words of the report, the object of the school is not to teach the girls how to make butter—as a rule, those who come here know how to do so—but to teach them the principles on which the process is founded. They receive lectures in the elementary sciences applicable to dairy farming; elementary chemistry, a small amount of

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physics applied to the work of the dairy, and the feeding of dairy stock. They also receive practical demonstrations and lectures on the manipulation of dairy products. I have already handed in the answers given by the girls at an examination in the school. They are taught, too, to distinguish between the ordinary simple diseases of the dairy cows. Dr. Sullivan assures me that, after a long experience of examination papers, he was never more delighted than with those filled by the dairy-pupils of this school.

7164. What is the curriculum of the farm students?—They are taught the science and practice of agriculture. There are two science lecturers at present, a chemist and a veterinary surgeon; the chemist lectures on chemistry and on geology as applied to agriculture; the veterinary surgeon lectures on the principles of the diseases, and on the diseases of animals. The superintendent gives lectures on scientific and practical agriculture and the pupils are employed, a portion of their time, at working on the farm of 126 acres, where they are taught the use of improved machinery and implements. I should like to add that if anything is to be done in the way of technical education in Ireland, I would venture to suggest that a school must be established on the same lines as this has been—a subvention from Government in aid of local effort, supervision by Government, by means of rigid inspection, but the management to be in the hands of a local committee. Here we took up an industry that exists, but had deteriorated, and we tried to apply the principles of science and technical education to a handicraft that had deteriorated, and I believe there is another industry in this country, the woollen industry, which could be improved in a similar manner. It is the only other industry that I know of that employs any large number of people, and that is steadily increasing; and surely if in England, at the great centres like Bradford, they find it absolutely necessary to have their institute and their technical school, it is impossible to think that we can, without them, ever establish woollen manufactures, for which I believe Ireland is admirably suited; this country at one time undoubtedly shipped a large quantity of goods to England. These manufactures seem to have more or less localised themselves in the south of Ireland. I believe that it is for the advantage of the country, and for the advantage of everyone connected with it, that some technical school, applicable to the woollen industry, should be established on the same basis as this is. I mean that the same principle should be carried out; it must, of course, depend on the local effort, and, to have any vitality in it, the management of it must be left in the hands of local individuals.

7165. And, just as you thought it proper and expedient that you should decide what should be the nature of the instruction to be given in the dairy school, so you think that the more intelligent and the more advanced of the woollen manufacturers, on being informed of what has been done elsewhere, should decide what should be the nature of the instruction to be given as bearing on the woollen industry?—Certainly.

7166. (*Mr. Woodall.*) Would you make any suggestion as to the way in which instruction of an elementary character could be given to girls, in connection with the remote national schools, where it would be impossible to form a dairy school, which would be useful to girls employed in agriculture and dairy work?—Well, one of the great faults of the teaching of girls in the national schools, is undoubtedly that needlework is neglected. Thus, for instance, at the school at Dunmanday, which I was at only last week—I believe needlework is only taught for one hour in the week, and the girls, there, passed a very creditable examination in navigation. They were able to navigate a ship thoroughly

from Queenstown to New York, but what use it could be to them afterwards I do not know.

7167. Was this a mixed school?—No, it was simply a girl's school under the National Board.

7168. I wish to know from your experience, do you think that instruction in agriculture, being now obligatory in rural schools for boys, any corresponding instruction could be given to girls, without the use of a farm?—I do not think it would be of the slightest use to teach them theory without having practice alongside. Of course you might teach them so, that what they would learn at school they would practice at home; that of course would be an advantage, but not of the same advantage as practical work in the school.

7169. Well, but I have to assume that in a large number of cases, they cannot have a farm or school garden to aid in agricultural instruction, and it is assumed that the children are able to apply at home the theoretical instruction which they get in the school. I wish to know whether theoretical instruction might not desirably be given to girls corresponding to that given to boys?—Certainly, it would be a great advantage.

(*Mr. Barry.*) I think it most desirable that into the schools of Ireland there should be introduced works on agriculture, that is on certain branches of agriculture with which the women of the country have to deal, such as the manufacture of butter, the growing and the use of vegetables, and those matters particularly appertaining to their domestic life, and also the subjects they need for the assistance of the farmers in the produce of the farms,—such as with regard to fowls and all those things.

7170. (*Chairman.*) We have been told by many witnesses that they do not set any great value on the agricultural instruction given in the primary schools, unless there be a plot of land of sufficient size, and it need only be a small plot—to admit of that instruction being illustrated by practical demonstration?—That is very true; as a rule theoretical instruction in practical pursuits must be assisted by practical work in the field or the garden.

7171. And that, you think, could not be conveniently given on the farms but should be given on a plot of ground contiguous to, and connected with, the schools?—No, I do not think so. I think it should be carried out on their own farms; and I have suggested in the observations I have made to the pupils here, the necessity, when they go home, of carrying out in practice what they have learned at this institution—by taking half or a quarter of an acre and putting what they have learned into practice in a small way. I know the great prejudices the people of this country have against following out any such instructions: if you point out to a farmer, that so and so is the proper thing to do, it will not have much effect on him; but if once he sees the thing actually done before by another person he will immediately follow it. And the difficulty we have in dealing with the farmers of the country is not to offend their prejudices and at the same time to instruct them.

7172. Are we to understand that you do not think it of importance that this should be learned on the school farm before being practised at home?—I think it most important that they should be learned at an educational establishment like this practically; theoretical knowledge must of course be brought from an establishment like this.

7173. Therefore you think the primary schools in the country districts should have a plot of ground in connection with them?—I think it is most essential that they should have; otherwise I do not think the instruction would be of any use whatever.

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Sir G. St. John Colthurst, Bart., D.L., and Mr. W. H. Barry, J.P. 7174. You think that theoretical instruction in agriculture in the primary schools will be of little value unless there be also practical illustration on a plot of ground near the school?—Quite so; you must take the pupil from the lecture room to the field, and show him how what he has been learning is practically carried out.

12 June 1893. 7175. (*Mr. Woodall.*) Do you think it would be practicable in those remote places where schools are small, and the children come from a distance, to have farms where instruction could be given in dairy work?—If you have a competent person to give agricultural instruction; the ordinary schoolmaster is not a competent man for the purpose.

7176. (*To Sir G. Colthurst.*) You told us that you regarded it as very important, that in establishing this school you should be able to state that it was so established with the approval of the clergy of all denominations?—Yes.

7177. Do you think it would be equally important to secure that approval and to advertise it, in the event of establishing technical schools for ordinary industries?—Certainly; I think in approaching this question, you must deal with Ireland by itself and recognise the fact that the greater part of the population of the country—in fact I may say nine tenths or more, is Catholic; and you may calculate that the people whom you wish to attract to these schools are almost entirely Catholic: and it would be only through the influence of the priests being exercised in your favour that you can hope to do so. And it is not what they wish or what they do not wish, so his Lordship told me, but he is obliged by virtue of his office, to exercise some supervision over the books to be used in educational establishments.

7178. (*Chairman.*) You would not apply that to schools in which mechanical drawing is taught at night?—Oh no, but still you must get their active co-operation before you can succeed. There is a sentimental side to it, as well as a practical one, and if you do not get the co-operation of the clergy you will not make the schools a success.

(*Mr. Barry.*) That is of course more applicable to cases where pupils reside in the house.

(*Sir George Colthurst.*) But whatever you do I maintain you will not be able to make it a success unless you can work in harmony with the priesthood.

7179. (*Chairman.*) And more than that, I suppose it would have a greater chance of being successful if the various political parties into which the country is divided were all willing to act harmoniously in the matter?—It is a question from which you must divorce politics altogether; it is a practical question, outside politics, and if you cannot succeed in treating it as a non-political one entirely, you never can succeed in it. I believe that a spirit has sprung up in Ireland,—an anxious desire to try and develop the industrial resources of the country, in which all parties can join.

7180. Of which you have an example in the Cork Exhibition?—Yes. I believe there is that spirit, and unless it is carried on in that spirit, everything must be a failure. I do not believe any school would succeed which is taken up by one party or by the other.

(STATEMENT by SIR GEORGE COLTHURST.)

I am anxious to bring under the notice of the Commissioners that the principle which I advocated has been thoroughly recognised by the Government in the Tramways Act, the leading feature of which is, that wherever a district in Ireland is ready to tax itself, to develop its resources, the Treasury is willing to bear half the burden, provided the

scheme is a feasible one, but that the initiation and the management of the project is left entirely in the hands of the people themselves, as I believe that in no way could the resources of the country be better developed than by giving the artisan the advantage of technical education. I trust that the same wise and statesmanlike liberality which framed the provision of the Tramways Act will be found not indisposed to accord similar advantages to those localities when the necessity of technical education is thoroughly recognised.

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Mr. W. H. BARRY, Ballyadam, Carrigtohill, examined.

Mr. W. H. Barry.

7181. (*Chairman.*) As a landed proprietor and a practical farmer, and therefore as one who has great experience of the needs of those engaged in agriculture in Ireland, are you of opinion that an absence of agricultural knowledge on the part of the farmers, as well as on the part of the landlords and agents, has been one of the principal elements in the recent sufferings of this country?—Yes.

7182. And are you able to point out to the Commission how technical education can remedy this?—Yes.

7183. Have the kindness to state how you think it could be done?—I will first endeavour to point out to you why I have arrived at that opinion. I find that the absence of agricultural knowledge on the part of the farmer, together with the competition and the scarcity of other avocations, have led him to bid for land considerably over what it is worth, and to compete for land with no knowledge whatever of what net profit he can have, after paying rent and taxes on the expenditure of his money. I have also arrived at the opinion that the landlord, in letting his land, is governed by the act of the tenant in competing and over-bidding for it; that he has, as a rule, no practical knowledge of the productive capabilities of the article in which he is dealing. A farmer will go to a landlord, say, and make him an offer of 26s. an acre for land. The landlord says, "I have been getting 27s. an acre for it." "Well," replies the other, "I will not give you more than 26s. I cannot make more out of it, that is the value." Another man offers the landlord 27s. an acre, and he lets the land at that. He is asked why he has let it at 27s., and he says, "Well, I have been always getting that rent, and I think it is the value." The word "value" in my opinion has a very vague meaning. If you send a man out to look at land and ask him what rent he would put on it, he will perhaps say the rent should be 26s., and that was the value. If you read the decisions of the Sub-Commissioners, they say, "We have put what we consider to be the fair value on the land." The meaning of that word is a difficult thing to define as regards land, and I wish the farmer to be educated sufficiently in agricultural knowledge, so as to be able to give in his own mind an approximate idea of what a farm is worth, without being governed by Griffith's valuation, or by anything else as a basis; that he should have such a knowledge of agriculture that he could say what his net profit on a certain number of acres of land will be, after he has expended his money, paid his rent, and everything else; to be able to say, for instance, with reasonable certainty, "that 40 acres of land will leave me a net profit of 75l." To arrive at that, he must be in a position to take many elements into consideration: the lie of the land, whether it is hilly, undulating, or flat; the working expenses of the land, which are governed by the position in which it is; the productive capabilities of the land; how much they are assisted by water power; the disposal of these productive capabilities by reason of being near or remote from the market. These are all considerations which the farmer should be acquainted with before he embarks in agricultural pursuits.

Mr. W. H. Barry. 7184. And if that be important in determining him in making an offer of rent, you would say it is still more important when he goes to purchase the goodwill of the farm?—Certainly; he must have all those things before his mind. Now I want to point out how you are to educate his mind into that condition. Well, take the working of the farm. There is no more important instrument in agriculture than the mowing machine, but when in the hands of an unskilled man it is about the worst implement you could have on a tillage farm. In order to work the mowing machine, you must have eight men. Well, an unskilled man gets on, and after going a short distance the connecting rod or some other part gets out of order. The eight men are standing by idle, and time goes on; he fails to repair the machine; there is loss of time, and you must look for employment for the eight men. The system I adopt with regard to machinery is this: whenever I introduce a new agricultural implement on my farm, the first thing I do is to get it taken to pieces and have it cleaned and oiled by the men who are likely to be using it. By adopting that plan, I avoid delays which are certain to occur when you put agricultural implements into unskilled hands. The result of which is that agricultural implements are not used as much as they ought to be. It is absolutely necessary that people should be educated more in their use, for emigration is going on and labour is becoming scarce, and we shall require the aid of instruments which hitherto we have been able to get on without. That is one point of technical instruction in which youths in this country should be educated, in establishments of this kind, and that rule applies to all agricultural implements used. There are various other matters connected with the farm which of course it is unnecessary for me to point out to you; such as the laying out of grounds, the growing of cereals, &c., which they have no means of learning themselves, and there is scarcely a farmer that I know of in the country who is in a position to state what I have mentioned to you now, namely, what the value is of a farm of forty acres, simply because he has not acquired the habit, which he would learn in an establishment of this kind, of keeping accounts. No farmer ever keeps an account of his receipts or disbursements. The same rule applies to landlords, and my desire is that the educational facilities in Ireland should be such that the younger sons of landlords might be educated concerning the nature of the properties of their fathers, so that they might be employed as agents afterwards, instead of employing, as now, men who know nothing about the business, mere receivers of rent, who take money like a bank clerk over a counter, and who, when a farmer goes to complain of the overletting of his land, are not in a position to say, "here is what the cost of this 100 acres ought to be; here is about what the disbursements should be," and so on. This is information which the landlord and the farmer essentially need in this country. Now technical education in small matters must lead to furnishing men with the knowledge they require, and it is only by establishments of this kind that this knowledge can be acquired. The united support of the locality, supplemented by Government aid, should be, I consider, the great motive power in an establishment of this kind. The fact of my being a member of the local committee has imposed on me the duty of pointing out to the people the advantages to be gained from sending their children to the Munster Agricultural and Dairy College. By that means we have been able to send recruits both to the dairy department and to the men's department here. There has been a strong prejudice among the people against an establishment that has been under the control of a certain class. First of all, if you ask them to send their children to such a school as this, they will say, "Oh, there's

so and so in it." We have to get over these prejudices. It is only men in my position who live among the people, who know their habits, and who can go quietly to their homes and talk to them, who can get rid of these prejudices. Therefore I think it essential, in recommending any establishment like this, that you should bring the local gentry and farmers to take part in the management. Of course Government should have supervision over the expenditure of their funds. Another point I wish to notice in the evidence of Sir George Colthurst. I do not take so cheerful a view as he does, as to the facility of collecting subscriptions for an establishment like this; but I fully agree with him that it ought to be done, and that we should not be dependent on Government for everything we want. I am entirely, and always have been, opposed to the common habit of going to the Government for the remedy whenever anything gets wrong in Ireland. We have sufficient intelligence and sufficient means among ourselves to right ourselves, and we should be put upon our own resources in a measure, but the Government should watch and see whether it is necessary to supplement any good desire on the part of the people to be educated.

7185. Would you say that agricultural schools are more necessary for Ireland than for England, on account of the fact, to which I think exception can scarcely be taken, that you have in England farms which are themselves, by their example, technical schools for agriculturalists, whereas in Ireland farms of that description are comparatively rare?—In England, as I take it, you have a high state of cultivation, and if there are any improvements to make on the land, they are there made for you. In Ireland you are a hundred years behind England in that respect. It is only necessary to go through the country, to see how the country is sub-divided by large ditches or fences which occupy twice the ground that they ought, and the neglected headlands growing weeds instead of vegetables. These are things you do not see in England. In England, if a man has any agricultural knowledge at all, he can tell, knowing the locality and the lie of the land, whether he can make 100*l.* or 150*l.* out of a farm in a given year.

7186. Do you think it necessary that there should be technical education in order to induce the people not to make hedges twice the size they ought to be, and not to allow weeds to grow on the headlands?—Well, sir, I am carrying the thing out in practice on a farm of 300 acres which some time ago was growing weeds. I think the gross receipts of the farm forty years ago were not 2*l.* 10*s.* an acre, and now they average 5*l.* an acre.

7187. But the question is whether technical education is necessary to convince people of such self-evident things as that it is a waste of resources to allow headlands to grow nothing but weeds?—Well, it is essential to take them out on the farm, and to show them what can be done where there are no weeds. They must see these things in Ireland. Last year I grow, on the headlands of my own farm, ten thousand cabbages, producing 13*l.*; that is utilising the headlands. Farmers can only be taught to utilize those headlands in establishments like this.

7188. (*Mr. Woodall.*) You have spoken of some misgiving with regard to the reliableness of subscriptions in aid of these schools?—Yes.

7189. At the same time you think it undesirable that the charge should be borne altogether by the Government?—Certainly.

7190. Can you suggest any other way in which the expenses of the school could be met?—I should say that the Government should be prepared to take into consideration representations, made by a committee

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such as we are, with respect to a diminution of subscriptions, and ought to be prepared not to let the school go down.

7191. But have you calculated the effect of such action on the part of the Government in discouraging subscriptions?—I do not think it would be discouraging them, because the general public would not enter into the question. This is a growing establishment, and we should require considerably more, besides the Government grant.

7192. Can you say whether the value of these institutions to the community is sufficiently appreciated to make it probable that rates in aid would be contributed either by the cities or counties?—It is not at all sufficiently understood or appreciated; we are only like infants growing up, we have been in existence only three years.

7193. Do you think that the good done by institutions of this kind to the community generally would justify a claim upon the cess or the rates of the county or locality?—I do believe that the instruction given in agricultural knowledge is so necessary, in what I consider to be at present an essentially agricultural country, that the funds must be provided wherever they come from. I believe the future of this country depends on educating the people in agricultural pursuits.

7194. You think that this would constitute a just claim on the local rates?—It justifies a claim, I will not say on the local rates, but wherever they can be got.

7195. What is the objection to putting it on the local rates?—I believe it would be justifiable to put it on the rates provided the rates were spread over the whole country. We get pupils from the north of Ireland, and every other part of it, and how are you to limit the area of the rates? One objection I would offer in regard to this, and which may in some measure enlighten you as to the difficulty of collecting funds by way of rates is this: at present the Government are offering a certain amount of money by way of results fees to schoolmasters, provided the boards of guardians will supplement it by another portion, and that system has been a failure. I voted for the proposition when it came before the board of guardians, of which I am a member, as I would do for anything to educate the people, in 1881. The local guardians have a prejudice against taxing themselves in any way. I was out-voted, and the result was that the schoolmasters in my district got nothing to pay the results fees. That is a case in point, and may give you some idea of the probability of taxation, if the voting of that taxation were left in the hands of the people themselves.

7196. Then your answer is that you think there is an equitable claim on the rates, but that there is so much reluctance on the part of the guardians to increase their burdens that you think you would not be able to get the assistance from them?—Yes, I do say that.

7197. But some boards of guardians would be more advanced than others, and there could be no harm in giving them authority to vote money for the purpose?—From my experience of the administrative ability of boards of guardians within the last two years, I would rather that the funds were provided through some other channel.

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Mr. JAMES BYRNE, J.P., Wallstown Castle, Shanballymore, Mallow, examined.

7198. (*Chairman.*) You were educated at the Albert Agricultural Institute from 1852 to 1854?—Yes.

7199. And I believe you are favourable to the extension of technical agricultural instruction?—Yes. I have seen a great many young men derive very substantial benefit from the training at Glasnevin.

7200 You attribute your own success, perhaps, in a great measure to the training you received there?—Yes.

7201. You consider that the present time is favourable to the extension of such instruction?—I do, and for this reason, that the land question, which stood very much in the way of agricultural improvement, is, in a measure, settled. I know that some time ago, whenever I spoke to a man about improving his place, I was met by the answer, "If I lay out so much money, the first thing that the landlord will do is to increase the rent on me." That cannot be the case in future.

7202. You think the time has now come when the farmers would be willing to be taught to lay out their money with intelligence?—Yes.

7203. Do you think that anything could be done to increase the attendance of farmers' sons at the Munster school?—I think so; very much. I know that an effort was made at first to induce young women to attend here; in fact, a great many of the landlords I believe paid their fees for coming here. Nothing like that has been done for boys. Furthermore, I am not aware that the advantages of the school are sufficiently known throughout the country. What I would suggest is that a copy of the syllabus of instruction should be sent to the clergy, gentry, and leading farmers of the country, and that a premium should be given to the most deserving boys, that after spending a certain time here they would be admitted to the Glasnevin Institute to complete their studies as a premium for their success here.

7204. That is to say, the best scholars here should receive exhibitions either from the Government or from the school to enable them to continue their studies?—Yes.

7205. You would say that for various reasons this is a favourable time for drawing the attention of the farmers to the advantages which are offered by this school?—Yes.

7206. And that the fact of such attention being drawn to the school at this time would give different results from those which followed any circulars or advertisements which may have been sent out some two or three years ago?—Yes. Another advantage, I should say, derived from agricultural education was that formerly, if a gentleman wanted to carry out farming on an extensive scale, he was sure to send to England or Scotland for a land steward. After the young men were trained at Glasnevin I found a great many Irishmen taking the places of Scotch and English stewards.

7207. Are you of opinion that, in addition to instruction in agriculture proper which is given at this school, instruction in veterinary science and in forestry also should be given here?—I think so; inasmuch as Ireland is chiefly dependent on its stock, there is no country in proportion to its size more dependent on the veterinary surgeon. I think we are very favourably circumstanced here to get up a veterinary college for a very small sum of money. I understand that one of the Royal Veterinary Colleges in Scotland is entirely composed of young Irishmen. It would be a great advantage if we had these men educated at home. We have the advantage of the Queen's College and of the veterinary and chemical lectures now being delivered here.

7208. Is there absolutely no veterinary school in Ireland?—There is not.

7209. I believe you also attach some importance to the establishment of a school of forestry, and you would instance the German and French schools of forestry and the efforts made by England for afforesting India. But is there the same scope here for the exercise of any knowledge that might be acquired here in forestry? There is an attempt being made at present by Dr. Lyons, the member for the city of Dublin, to

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re-afforest Ireland. Ireland has been denuded of her timber, and it is considered that her climate has been very much injured thereby. A great deal of the soil of Ireland could be profitably employed for growing timber.

7210. Although there is no veterinary college in Ireland, I believe it is a fact that instruction in veterinary science is given at Glasnevin and here?—Yes.

7211. And that probably would be sufficient for the ordinary farmer, although it certainly is not sufficient for the education of veterinary practitioners?—Yes.

7212. (*Mr. Woodall.*) Have you seen anything of the instruction given in national schools to children in agricultural subjects?—Yes.

7213. Will you instance the case of any particular school that has come under your notice?—I know that at nearly all the national schools agriculture has been taught.

7214. In some cases where no farm or garden is attached to the school?—There is no garden attached to any school in my neighbourhood at all.

7215. And you consider that the instruction given to boys on those subjects there is useful?—I think so; if a boy was instructed in the theory of agriculture at a national school, and he came here to complete his education, he could complete his education twice as quickly as another who had not got that instruction previously.

7216. But in the case of a boy who does not come here, is he able to apply at home the theoretical instruction he gets at the national school?—I think so; to a certain extent.

7217. Do you think that similar instruction given to girls would be useful to them?—I think so; in some of the girls' reading books there are chapters devoted to cookery, but there is nothing about butter-making that I know of.

7218. Girls are employed at the farm work, I suppose?—Some time ago, when they were more plentiful, they were employed at thinning turnips and work like that; but latterly I do not see them employed so much at field work as at house work, I see a great many more women employed in the fields in Scotland than in Ireland.

7219. Do you think that any instruction suited to them might be given to the girls in the national schools, similar to the instruction now given to the boys?—Decidedly so.

7220. (*Chairman.*) Do you think there would be any difficulty in getting land attached to the primary schools for the purpose of giving instruction practically to the children?—I think a certain form of agreement should be drawn up.

7220a. Suppose a schoolmaster took a small farm and he was removed from the school, how would the land be managed then?—I think the land should be vested in trustees in some way.

7221. The difficulty appears to be this: that, if the schoolmaster takes a farm and he should be dismissed, which he could be at a very short notice, the farm would no longer be available for the use of the school?—Just so.

7222. But if the land were rented or owned by the managers of the school, the same difficulty would not arise?—No.

7223. Is there any difficulty which would present itself in regard to managers taking farms to be used in connection with the schools?—I cannot see any difficulty, provided the teacher be trained to agriculture himself.

7224. Setting aside the qualification of the teacher, is there any material difficulty arising out of the customs of the country, or from

legislation, which would stand in the way of a plot of land being readily obtained for that purpose?—I think it could readily be obtained.

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7225. (*Mr. Woodall.*) You have spoken of the value of the instruction given in cookery?—Yes.

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7226. Is any such instruction given now?—Yes, it is taught in the ordinary reading books for the fifth and sixth class of girls, and it is taught with great advantage.

7227. There are some national schools, also, where needlework and embroidery are taught?—Yes.

7228. And the girls, you think, are better for that teaching?—Oh, certainly.

7229. Have you any suggestion to offer as to the extension of that kind of work?—Not with regard to needlework; in the schools with which I am acquainted they teach the girls ordinary sewing, darning, and knitting.

7230. (*Chairman.*) If we have been told that in country schools too much attention is paid to ornamental embroidery and so on, would that be somewhat of an exaggeration?—It is plain work in my districts principally.

7231. (*Mr. Woodall.*) Are any industrial occupations taught to the boys in those schools?—None whatsoever.

7232. Do you think that any such instruction might with advantage be given to them?—I think so.

7233. If it were practicable, would it be useful?—The only thing I am acquainted with in that way is agriculture, because we have a farm attached to a great many of the workhouses.

7234. (*Chairman.*) I would wish to know, are you acquainted with the remote parts of Ireland, say of Cork or Kerry, or the north-west of Ireland?—I have been through Kerry, and of course through Cork.

7235. Do you think that, in those remote parts, where portions of unreclaimed land could be easily obtained, there would be any use in teaching boys the reclamation of land?—I think there would.

7236. Do you think that species of tuition could be given to boys in national or primary schools?—I think so. I was reading Dr. Sullivan's Report on Lough Ashe Agricultural School, and I saw in it, that a teacher reclaimed a great deal of waste land there, and reclaimed it very profitably.

(*Mr. W. H. Barry.*) I wish to say that I differ from Mr. Byrne as to the employment of girls. In my part of the country, when a farmer is hiring a labourer, he prefers to hire one having a large family of girls, because they are so useful on the farm.

(*Mr. Byrne.*) Well, that is contrary to my experience.

The witnesses withdrew.

Mr. F. F. DUNNE, Harbour Commissioner, Watercourse Road,
Cork, examined.

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7237. (*Chairman.*) You have had seventeen years experience of the trade of a tanner?—Yes.

7238. Do you follow any particular branch of that trade?—Yes; altogether sole leather. Tanning is a branch of industry that has not been altogether prosperous in these Kingdoms—a remark which applies to England as well as to Ireland.

7239. What is the cause of that industry not being prosperous?—The importation of American leather. I think it is in no way caused by want of technical knowledge on the part of English tanners; on the

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contrary, I think they are very much in advance of American tanners. It is simply owing to the fact that American tanners make their tanneries in the midst of huge hemlock forests, and it is cheaper to carry the hide to the tanning material than to bring the tanning material to the hide.

7240. Do not you use valonia in tanning?—We do use valonia, and as far as that is concerned, for making the very best water resisting leather, no other tanning material is nearly as good—it is the cup of the prickly-cupped oak that grows in Greece and Asia Minor; in England and Ireland we are able to obtain that cheaper than in America. I think in the three Kingdoms the state of trade is in no degree to be attributed to want of technical education. I think English tanners are the best in the world.

7241. Have you introduced much machinery into your trade?—I have machinery for everything that I could possibly apply it to, and I have never found any difficulty with the men about it. I believe, in different trades, employers have had a great deal of difficulty with their men, but in mine the men have never objected to the introduction of machinery.

7242. Are your men what are called tradesmen, or are they mere labourers?—They are all labourers.

7243. That is to say they have little or no special training?—The men that get the most important training are three or four men that we have for what is called "fleshing"; that approaches very nearly to the character of a trade, but it is not a trade. The man who cuts flesh off the hides with a very sharp knife has to do it in a very careful way; but it is not a trade.

7244. Is that done by a machine?—No, it is done altogether by hand; it very nearly approaches to currying, which is a trade.

7245. You are not carriers?—No, we are not.

7246. You have found no prejudice among working men against machinery?—Yes; I have heard of it in the building trades—an objection to all labour-saving machinery; but there is none in my trade.

7247. Do you not attribute that in part to your men not being tradesmen?—I attribute it very much to the fact that there is no organization amongst them.

7248. And you have had no difficulty in introducing piece-work?—At first the men struck, but I got over my difficulties in that respect in a few days. I think if I abolished piece-work now, I should have a strike amongst some of the men.

7249. Is the amount of actual work that you have got from your men very much greater than what it was?—The men do just about double the amount that we were able to get from them before. I judge not by my own experience alone, but by that of others, who said to me that they could never get more than a certain amount of work out of the men.

7250. So that, weight for weight, the work is cheaper, and the men earn more wages?—Yes.

7251. Are there many machine-made boots imported into Ireland, from England?—A vast number of machine-made boots.

7252. What has been the effect of that?—It has had a most disastrous effect on the local trade.

7253. Is there any reason why boots should not be made by machinery in Ireland?—I think, on the contrary, there is a splendid opening for the establishment of that industry in Ireland; there is no industry that could be better developed.

7254. Are there any obstacles in the way of it?—Well, as far as knowledge of it is concerned the country is a complete blank; you

would have to commence by educating persons from the very beginning. There is a factory that has been started in the city of Waterford by an English firm. It is a branch of a firm in Leicester, and it appears to be getting on very well; labour is cheap, and the whole thing altogether appears to have an air of success about it.

7255. Would there be any possibility of some of the tanners of the city and neighbourhood of Cork combining to establish a boot factory?—That attempt has been made, and there is a boot factory going on at present; but I am not at all as hopeful of the success of it as of this one in Waterford.

7256. Why not?—I think that a concern under the charge of a manager has not nearly the same chance of success as one managed by the principals, and of the gentlemen who are proprietors of this factory in Cork, not one knows anything about the trade himself; that is the reason I am not so sanguine about the success of the concern.

7257. Are the gentlemen concerned in it tanners?—No; they have no connection with the leather trade at all; they are very respectable men in their own businesses, but have no knowledge of the leather trade.

7258. Have you considered the question of technical instruction as applied to your trade, or the trade of bootmaking?—I think mine is a trade for which science has done less than any other. I do not know how science could do much for the young tanner; but I should imagine that a technical school for currying, and for the manufacture of boots and shoes, could be established as well as could one for any other purpose.

7259. But it would be difficult, would it not, to establish technical schools for every species of industry?—Of course, I suppose it would; it might cost too much to establish technical schools in each particular place; but the boot manufacture, it strikes me, is a very large industry in any country.

7260. What do you think the boot manufacturers of Leicester and Northampton would say if the Government were to establish a boot-making institution in Cork, partly at the expense of the Leicester and Northampton cess payers?—It is a question that I have not considered.

7261. If such a school were to be established, say in Cork, do you think it should be a school resembling one that might exist, or that might be established at Leicester or Northampton?—Oh, no; certainly not; because anything done in Cork should be done from the very commencement. Of course there is a factory in existence, but it is on a small scale.

7262. Are there any waste products from the tanning?—There are two waste products; these are principally the glue pieces, or roundings, which are used by paper manufacturers for sizing their paper, and the fleshings, which are used by makers of common glue. At one time there were two or three glue manufacturers in Cork, and I very much think that that industry went out through ignorance of the subject. I was very much struck with a conversation I once heard between the son of one of those manufacturers and a principal of a very successful firm of glue manufacturers in Dublin. The son of the Cork manufacturer said to my friend in Dublin, "Do you make very much out of the grease which you extract from the flesh in boiling?" and the other said it was a very important part of their production. "Oh!" said the other, "when my father was in business he used to throw it all away." Since then I have been struck with the fact that a man in that position did not know the value of it.

7263. But at the time that his father threw the grease away, was the grease being used elsewhere?—I have not had time to follow up that

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inquiry ; but I was rather inclined to think that this was a very ignorant man ; I am very certain of it in fact.

7264. The manufacture of glue would be one in which a knowledge of chemistry would be very useful?—Most important, of course.

7265. Is there anything to prevent the owner of a glue manufactory of some importance, sending his son to the Queen's College here to learn chemistry?—Certainly not ; but there is no man who has an anxiety to start a glue manufactory at present in Cork. It would not be a very large one ; it would depend on the amount of flesh to be obtained ; but still there would be an amount of flesh to keep 10 or 12 hands going.

7266. You would have the whole south of Ireland I dare say?—Yes ; there are tanneries in Limerick, Macroom, Killarney, Bandon, Bantry, and, of course, in Cork.

7267. And in Cork they are very considerable?—Yes ; there are some large establishments in Cork, Messrs. Hegarty Brothers and mine. The average number of men employed by Messrs. Hegarty, in proportion to the amount of capital invested in the business, is very much larger than mine. I tan a very much greater weight of leather, but he bestows on it a vast deal more labour, and his leather is, pound for pound, worth three or four times as much as mine. He has about 200 hands employed at tanning and currying, and my own firm about 40 or 50 at tanning.

7268. Leeds, I believe, is a great centre of the currying trade?—Yes ; one of the most important manufacturers anywhere in the business is Mr. W. T. Jackson, M.P. for Leeds.

7269. Would instruction in chemistry be useful in currying?—I should say, much more useful than in tanning. Alderman Hegarty is far and away the most advanced man in Ireland with regard to upper leather.

7270. You have had some experience as a Poor Law guardian in reference to industrial training in workhouse schools?—Well, very little ; but I see that a great many who leave the house come back again, and I think that practically very few people learn anything in the workhouse.

7271. Is it your opinion that if they were better instructed they would find employment out of doors, and not be so liable to relapse?—A far better way I think is to extend the system of boarding out children ; it is infinitely better, for they get absorbed into the ordinary working population. They are brought up among a class among whom they are likely to live afterwards, and they are educated as well as any of that class in the national schools of the country. The workhouse does a great deal of good by the boarding-out system.

7272. Have the rules of the Local Government Board prevented adult females in the workhouse from learning industries that they might learn with advantage?—Yes. About 18 months ago there was a match factory started in Cork ; all match factories depend very much, of course, on the amount of female labour they are able to obtain in pasting the match boxes together. One of the proprietors came before the board of guardians and offered to give a certain amount to each girl per thousand match boxes that she put together. The guardians entered into a regular bargain with this firm, and when we were arranging to have these girls taught match-box making, and that they should have a certain sum put by for them to take away when they would be leaving the workhouse, the Local Government Board interfered, and put a stop to it.

7273. The rules precluded the guardians from doing this?—Yes, the rules of the Local Government Board precluded the guardians from putting any money to the credit of pauper inmates. Mr.
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7274. They had no objection to the industry being carried on?—Oh, no objection at all, but I need not tell you that the inmates would not work without getting something for it, so the effort collapsed. 12 June 1883.

7275. Did they assign any reason for that rule at all?—I forget now the exact reason of it.

7276. There would be no objection if the money were going to the credit of the guardians?—Oh, certainly not. The guardians attempt to make some money in that way at present, by breaking stones.

7277. (*Mr. Woodall.*) Do you think it would have been right for the community to have borne the charge of maintaining paupers, and, at the same time to have allowed them to earn money?—That is the reason, no doubt, of the rule originally; but I think it might have been as well to allow them to learn some industry for a short time; the rule might have been modified in that particular case. They might very soon have been got rid of permanently. I think it would be very much better to empower boards of guardians to spend some money that way, better than in emigrating paupers, as they are empowered to do.

7278. Suppose there was a proposal that these women should be employed gratuitously, and that the contractor had said, "I propose to put a trade into those womens' hands, so that they shall afterwards be able to go out and earn money," do you think the Local Government Board would have raised any objection?—Oh, no doubt, I think they would not.

7279. The objection was to a practice, which anyone of us might easily see, would grow into an abuse; that those girls, being maintained by the guardians, were to earn money at the same time which was to go to their own credit?—I think it would have been very great economy to allow them to do it for a very short time; because you must remember that the able-bodied women in the house are not a very good lot; if they were they would not be there.

7280. Generally speaking, you think the guardians should have power to teach handicrafts to the inmates?—Certainly; especially to the young.

Lady EDITH COLTHURST, Blarney Castle, examined.

7281. (*Chairman.*) Will you, Lady Colthurst, when the exhibition is opened in Cork, be kind enough to furnish us with some information as to female work exhibited there?—Yes.

(STATEMENT handed in by LADY COLTHURST.)

Herewith I beg to hand in a short report on the needlework shown in the Cork Exhibition, 1883. I enclose with it a copy of the circular issued by the Committee to which I had the honour to act as secretary. (*Papers and Catalogue of Exhibition produced.*)

There were over a thousand articles exhibited, and the work was divided into different classes, namely,—1. Plain work. 2. White embroidery. 3. Lace. 4. Art needlework. 5. Knitting. 6. Crochet tatting.

In the first class we received some excellent specimens of work from National and Industrial Schools, but in the case of the former we found, on inquiry, that in almost every instance of good work, an active interest had been taken by the residents in the locality, who by

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E. Colthurst.*

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their own efforts supplemented the instruction given in needlework by the official teacher of the school.

The white embroidery was very good; most beautiful specimens were exhibited from the private schools under the care of Countess Dunraven and the Countess de Vesce; both design and execution being excellent. The class of embroidery known as "Mountmellick" was well illustrated by beautiful specimens sent by poor women, whose work proved readily very saleable,—all these exhibits being disposed of.

The exhibit, as a whole, appeared to us so thoroughly good, and the demand so completely exceeded the supply, that I think I am justified in saying that this is a branch of female industry in Ireland in which we are able to hold our own with foreign competitors.

In lace work we had numerous exhibits, and I may say the work was good, but failed in design; the only exception was that sent by Miss Keane, of Coppoquin, from the school under her care, in which she copies, most admirably, old designs of Venetian point. The want of design was particularly remarkable in lace sent from industrial schools and convents, namely, from Youghal, Poor Clares, Kenmare, and Limerick Convent. The execution of these specimens could hardly be surpassed, but the effect was spoilt, and its value, as an article of commerce, depreciated by the want of artistic design.

The following remarks, made by one of the judges, a gentleman who for the last twenty years has been acting as a buyer of lace and crochet for large commercial houses in London, will illustrate my meaning: "In closing the awards, I may remark, many beautiful pieces of work fail in merit from faulty design; it is to be hoped the time is not far distant when designing for lace will be found a beneficent employment in the schools of art throughout this country." I am happy to say that the School of Art in Cork has entered into communication with South Kensington Museum, and the latter has promised most generous help towards starting a lending library of lace designs, and the master of the Cork School looks forward to being able to benefit the lace workers by the designs executed by the pupils under his care, and thus to hold out an incentive to the scholars to excel in designs suitable to lace, and to enable them to turn the artistic knowledge acquired in the school to a profitable account.

In art needlework the same want of design was manifest, with the single exception of the work sent from the Royal Irish School of Art Needlework, Clare Street, Dublin, whose exhibit, in beauty of design, artistic colouring, and execution, left nothing to be desired. This school has been started by ladies in Dublin, to try and improve art needlework in this country. The designs are original and most artistic, but, through the scarcity of good workers, the work is at present too expensive to be of much use to the public of Ireland, though a few of the exhibitors sent work made on the designs supplied from this school.

In crochet we had very few specimens, and, except those sent from the Blackrock Convent, I could not call any good; in these specimens also the same absence of design was conspicuous; it is perhaps owing to the want of new and artistic patterns that the crochet trade from Cork has in the last few years decreased from 25,000*l.* to 15,000*l.* This information was obtained from the buyers of the large Cork houses, who all complain of the great difficulty they find in inducing the crochet workers to disuse the obsolete and inartistic patterns which have so largely contributed to drive Irish crochet out of the market.

The exhibits in knitting were of an ordinary character, and do not require, in my opinion, any special notice.

COMMENDATORE DELANY, T.C., Builder, examined.

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7282. (*Chairman.*) Your trade is that of a builder?—It is.

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7283. And you wish to give evidence as to the value which technical instruction would have to persons engaged in your trade?—Yes; the great difficulty I find amongst my people outside, is to know what technical education is, and I have been doing my best to try to put it before them in this way: that technical education is purely and simply the application of science to arts and industries; and, above all trades in the world, I believe there is no one so much in want of technical education as the building trade. Through every part of the building, from the laying of the foundation stone up to the roof, I find a great want of technical education. Tradesmen, such as I am, have been brought up in early days at the Christian Brothers' Schools; but there they certainly never professed to do more than lay the foundation of a general education. It is not in their power to do otherwise, because we leave school at the age of 14, and our knowledge and the education we have gained up to that time is very small indeed. But if we had a school after our working hours, in which we could see science applied to the different trades, which we are endeavouring to work at, it would be the best means in the world of educating us. For instance, a boy may leave the Christian Brothers' Schools at the age of 14. He may know mensuration thoroughly, and know the six books of Euclid; but it is a thousand chances to one that he does not know how to apply that knowledge of practical geometry to our business. Hence it is that we have terrible disasters in buildings from time to time. For instance, in the building of arches, and raising foundations for superstructures, there is a great want of technical knowledge apparent among the men, such as not knowing how to apply Roche's "lines of building" to building the voussairs and putting them into proper line. There the want of instruction is seen. You will find that the men do not know the principles on which to make mortar for building. They know by "rule of thumb" that two barrels of sand added to a barrel of lime will make good mortar, but in many cases they do not understand why one barrel of sand should not make much better mortar. Again, technical education comes into the question why one class of water would make much better mortar than other water in the same neighbourhood, perhaps. Again, in the cementing of the exterior of houses there is a great want of knowledge sometimes shown. It is all very well when you have an architect superintending a work, but for one building over which you have an educated man, you may have a dozen without anyone at all, and there the men are left dependent on themselves. You send a man off to the country, and tell him to plaster the front of a certain house; frost sets in, and he knows that that frost injures the work, but he does not know what are the atmospheric influences that cause this, and what are the appliances to be used to prevent it. In this way the want of technical education is very great indeed. The carpenter knows how to cover an opening with a piece of timber called a lintel, but he does not know why that piece of timber should be, say, an inch thick for every foot in width of opening. Then, as to the application of machinery, the men fancy the application of it, to my business particularly, would deprive them of a large amount of work.

7284. What is there in common between technical education and the employment of machinery?—I say that provision should be made in the technical schools for all machinery necessary to make a piece of joinery, from the saw bench up to the band-saw and turning lathe. This would

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show the great advantage of machinery, and it would be seen how a door, or any other piece of joinery, could be done much cheaper by machinery than by manual labour ; so that, for one man alone who could buy it on account of its high price, fifty men would buy it when afterwards made by machinery. The great thing is to impress on the men the necessity for applying machinery ; and I hold that in a technical school there should be machinery like this shown.

7285. If machinery were in the school, would it follow that the same class of men should be employed in using machinery as would do the work if there were no machinery ?—Certainly, the very same class of men.

7286. Would you employ skilled artizans to work labour-saving machines, the reason for the existence of which is that unskilled hands can be employed ?—In our particular business, machinery can never be so employed as to do away with skilled labour.

7287. Take a tenoning machine ; you would not employ the same men at a tenoning machine as you would now in making tenons ?—Certainly, sir, the skilled man puts them together always.

7288. Yes, but with respect to the men working at the tenoning machinery, the objection is that unskilled labour is employed at those machines ?—Yes, in addition to these machines, in a technical school we should have a supply of instruments, and lectures would be given. We should have the best models from which we could copy, and the best class of machinery for the different trades, showing how easily they could be carried on by means of those implements.

7289. You would have a special technical school for the building trades ?—No ; it would be part and parcel of a technical school for the various other trades.—

7290. If you had a school adapted to every trade, it would be an enormous establishment ?—Well, if this country is ever to get on there should be a class learning the trade in each school.

7291. But you may imagine that that would be an enormous school ?—Well, we now have a building, the present Exhibition buildings, which would do amply for the purpose.

7292. And you would like that building to be retained for that purpose ?—I should very much.

7293. I suppose a very large sum would be required for the maintenance of that school ?—It would, sir, but that would be easily derived from several sources.

7294. How would you raise it ?—I would have a public meeting of the taxpayers of Cork, and I have not the slightest doubt but they would all agree to a tax of 1*d.* in the £ for the purpose. That would amount to 647*l.*, which, capitalised, would bring in a sum of 21,600*l.*

7295. But you would want to keep it up afterwards ?—I would ask the Government of England to contribute towards that.

7296. Do you think in the first instance you would be able to raise money for building the school ; and in the second place, raise annually some contribution towards the cost ?—I would propose, first of all, to tax ourselves 1*d.* in the £, which would be sufficient to enable us to borrow 21,600*l.* from the Government. That would be sufficient to raise the school and provide machinery for its working ; and then I would ask the Government to provide teachers. That is all we should want.

7297. Have you made any estimate at all of the cost of teachers for such a school, for the trades which you would like to see established in Cork ?—Well, you could get one gentleman, such as Dr. Sullivan, there, who could educate them in all the trades and manufactures of the south

of Ireland, and you could get from the different trades, educated tradesmen, who, for a very small sum, would come and bring their best work and show the practical applications of those machines.

7298. Are you aware that a school is now being established by the City and Guilds Institute in London, the cost of which will be about 100,000*l.*, and that the cost of afterwards giving instruction in this school is estimated at 15,000*l.* a year?—I have heard so, sir, but our pretensions here are not so large. We wish to begin in a very moderate way, and, although we wish to extract all we can out of the consolidated funds, we wish to be moderate and to take only as much as will suit our purpose.

7299. You would be inclined to begin in a modest way and increase as your resources went on?—Yes.

7300. Do you think, if a technical school were established in Cork, provision should be made for teaching the principles underlying the building trade, and also for enabling the artisans in that trade to become acquainted with the machinery used in the trade?—Certainly.

7301. Are you aware—I have no doubt you are—that the Science and Art Department of South Kensington gives grants on results for building instruction and supplies mechanical and various other appliances suitable for the teaching of building construction?—I have heard that, sir, and I have no doubt that by our own self-reliance, and the energy with which we should apply ourselves to the work, we should afterwards, by means of these grants, become self-supporting, inasmuch as that, as I understand, after a short time, premiums and prizes are given for excellence in work and for proficiency, which I am sure would be speedily attained.

7302. Why is it that you have not already established classes of this kind, when you could have done so, and nearly the whole of the expense would have been borne by the Science and Art Department and the City Guilds?—The only answer I can give to that is that we were asleep.

7303. And you are decidedly of opinion that you are now either awakening or are wide awake?—We are wide awake to the exigencies of the present day.

7304. You are now speaking the sentiments of other employers as well as of yourself?—I am.

7305. And are you also speaking the sentiments of the workmen employed in the trade?—Certainly. And here I may give you an instance which shows the desire of the men themselves to advance themselves, and which resulted, in this case, in cheap work being produced. The building trades are formed into guilds, each trade having a separate society of its own, and they have rules which in some cases do not allow of the employment of machinery. At the time the Exhibition buildings were started, and contractors advertised for, builders from Belfast came down here for the purpose of tendering for the works. In Belfast and Dublin they have all the advantages of machinery, and on this occasion that I refer to, the workmen themselves here in Cork came forward and said to the employers, "It would disgrace us if we were to allow this work to go to a man from Belfast or Dublin, and therefore we give you permission to use any machinery you think necessary." Hence it is that the Exhibition buildings were carried out so quickly and cheaply.

7306. And you think that is not a temporary expedient in regard to the use of machinery?—If we could show them, by means of this system of education, that it would be to their benefit and advantage, we should have no difficulty with respect to the use of machinery. Together with that, I may say there is a great want of a free library in the city of Cork.

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Commendatore 7307. With regard to that matter of free libraries, I would ask you
Delany, T.C. whether there is a free library here under the Libraries' Act?—Not
in Cork.

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7308. To what purpose, then, has the rate been applied?—To music. I am sorry to say it was the worst spent money ever expended in Cork. For one person that gets a livelihood out of that 1d. in the £ in the rates of the city of Cork, a hundred only derive amusement.

7309. How is that?—The school of art is not made use of, sir. The buildings are most uninviting. But it is there, I may tell you, that I graduated myself.

7310. A new school, I believe, is now being built?—Not being built, sir; they are only talking about it.

7311. You think the school would have been much more successful if the buildings had been better adapted for the purpose?—Certainly, sir. There is no place in the city of Cork where young tradesmen can go to read or to study. I say that those young tradesmen growing up are most anxious to be self-reliant, and if the means were at their disposal to enable them to go ahead there is no doubt but that they have the energy and ability. There is nothing more necessary for a man—and for a young man especially—than to have a good book which he can take up and read. Take, for instance, such a work as “Self-Help,” by Smiles; if a man only reads that for half-an-hour he is stimulated and invigorated. In that very work it is shown how men from being common carpenters or common masons have by their own self-reliance and self-help become men of eminence afterwards. If such works as those were put into the hands of the young men, and if the advantages of technical schools were afforded to them, you would have, beyond all doubt, first-class men in the city of Cork. I know very well the right stuff is in them.

7312. You speak of having left school at 14 years of age?—Yes, sir; the greatest ambition that boys have, especially those at the Christian Brothers' Schools, is to have it said that they are going to work.

7313. They do not all care to become shopmen and clerks?—They do not; the great majority prefer to be tradesmen rather than to be clerks. They say, “If we become tradesmen, though we may commit one fault in our lives and may be discharged, still we have the means of going ahead; but if we become clerks and we make a mistake we are thrown helpless on the world.”

7314. Are you quite sure that such is their opinion, or was it not rather your own opinion, when you were a young man, because we have been told, not only in Ireland, but in England too, that there is a great tendency on the part of those young boys, who have received a somewhat better education than their fellows in the elementary schools, to endeavour to obtain situations as clerks?—Such is not the case in Ireland. This may be the last occasion on which I shall have an opportunity of expressing my opinion, and it is this: There is a growing idea among the gentlemen and capitalists in Ireland that the English tradesmen are better tradesmen, and better educated than the Irish tradesmen, and the English tradesmen have no doubt greater means and greater facilities for educating themselves. In my early days I was very anxious to know what they were able to do in London, so I went from Cork to London, and worked my journey-work there. I had been only three weeks there when I became a foreman, and in a short time I got charge of a very large and very important business in the city of London, and I found that, as a rule, the men in the building trades in the city of London are by no means as capable of doing good work, and of doing it quickly, as they are in Ireland.

7315. Did you find them to be better educated technically?—By no means, sir. *Commendatore Delany, T.C.*

7316. Although the means which would enable them to educate themselves were much more plentiful?—Much more so.

7317. In this sense that the classes existed;—schools are not established in Cork as they are in London?—Yes, and hence it is that I say, if we had them established here, and if we had the same opportunities as they have in London, we should go far ahead of them.

7318. Well, you know now that the opportunity exists, and you have only to avail yourselves of it?—Yes, and we shall only be too delighted to avail ourselves of it.

7319. I wish to ask you whether such instruction would have been of advantage to you, and whether you would have gained time in your apprenticeship?—From the age of 12 years, had I had the opportunity of going to a technical school, and seeing the applications of different classes of machinery to my trade, it would have been very useful—it would, in fact, have been of the greatest advantage to me.

7320. It would also, I suppose, have been valuable if you had learned in technical classes the principles of construction?—I did not learn the principles of construction until I was out of my time.

7321. I will ask you whether, if there had been attached to the Christian Brothers' School a workshop where you could have gone after school hours, and there have learned the use of the plane, the chisel, and the lathe, that would have enabled you to shorten the term of your apprenticeship?—Most decidedly it would.

7322. And you consider it would be of great use that there should be in primary schools the means of teaching young boys, of the age of 12, or perhaps of a somewhat earlier age, the use of the tools which are employed in the different handicrafts?—A most decided advantage; and to go further than that, if there could be such a law established I would compel every employer of labourers, having 300 hands and upwards, to have a school attached to his factory, of which the workmen could avail themselves after their day's work.

7323. Unless there were some joint provision by different masters, or some other public establishment at which they could obtain better instruction?—Quite so, sir.

7324. (*Mr. Woodall.*) You would make it compulsory on the part of employers to send their apprentices to a school of a technical character?—Certainly.

7325. Are you aware that at the present moment there are classes in machine drawing and building construction in Cork?—I am aware there are such classes, but on a very small scale, at the Christian Brothers' Schools and at the School of Art.

7326. Do you not acknowledge that that instruction is of a very valuable character to apprentices?—Oh, it is very good, but what I mean to convey is this;—a boy goes into this school, takes a very beautiful drawing, and makes a very excellent copy of it; but after all that, what means has he of applying the knowledge he has acquired.

7327. Is he not required to make a drawing from a certain specification furnished to him?—He is.

7328. And is not that instruction of a valuable character?—No doubt it is. Remember, however, not only to the working man is technical education necessary, but also to architects and engineers, fifty out of every hundred of whom will require it, just as much as workmen do. The architect has to make the drawing from the specification, and the working man has to carry it out afterwards.

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Commandators 7329. Do the practical working men in your employment sufficiently
Delany, T. C. understand a working drawing, so as to be able to follow it?—Certainly
not.

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7330. Do not you think instruction, such as is given under the heads of machine drawing and building construction in the art classes here, would enable those workmen to understand working drawings?—With regard to workmen generally I would say, certainly not.

7331. Do you not think it would be valuable technical instruction to them to attend night classes in which building construction is taught; and do you not think that that would enable them to understand the working drawing before them?—It would be most valuable, certainly.

7332. Then, since you would apply compulsion to the employer to establish a special technical class, do not you think it expedient that the employers should encourage those classes already in existence?—Certainly.

7333. And do they do so?—They do.

7334. (*Chairman.*) In what way?—I have several boys in my employment now who go to the School of Art, and I encourage them in every possible way to do so; but what they usually say to me is that they really have nothing there to induce them to go. They have a cheerless old building to go into, and they have not sufficient models there to guide them.

7335. (*Mr. Woodall.*) Your students complain that there are not sufficient models?—Yes.

7336. And for this reason you would advocate a collection of models and examples of the various manufactures, such as may, for instance, be seen in the great industrial edifice now being erected in Cork?—Certainly.

7337. You suggest that the community might raise money by taxing themselves to the extent of 1*d.* in the £, and you think they would willingly do so. Do you think the whole cost of maintenance, including the salaries of teachers, lecturers, and others, should be borne by the Imperial Government?—Certainly.

7338. Are you aware of the expenses of the Munster Dairy School here in Cork?—Yes.

7339. Do not you know that a very large sum is annually raised for the maintenance of that?—I am aware of it.

7339*a.* And do you know the great cause of the success of that institution?—It is simply because you have two gentlemen (Sir George Colthurst and Dr. Sullivan) in the room here who attend to it.

7340. But do not you think that what has been done for a dairy school might be done for a great industry?—Most certainly; I am quite satisfied of it. There is no employer in the south of Ireland that would not freely tax himself annually for such a purpose.

7341. Do not you think the public of Cork might do so?—I am positive that if there were a meeting of ratepayers of the city called to-morrow by the mayor, they would freely agree to be taxed for that purpose.

7342. I suppose you feel that the success of efforts of this kind is very much greater if they are dependent on local management and local support than if they are subsidised from a distant source?—Well, I should like very much at the beginning that they should be subsidised for a time.

7343. But that that subvention should be proportionate to the local effort?—Precisely.

7344. (*Chairman.*) Are you aware that grants varying from 400*l.* a year and upwards are earned in payments from South Kensington,

by schools, somewhat like the one you are describing?—I am aware of it, and that is why I say, if we got a fair start, we should become self-supporting in a short time.

7345. And you are aware also that nothing is required further than to provide good teachers and proper apparatus in order to enable you to earn sums, such as I have mentioned, upon the results of the teaching?—I am aware of it.

7346. And that that applies not only to England but to the whole of the United Kingdom?—I am aware of that.

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Rev. JOHN HAYDE, Manager of the Upton Reformatory School,
examined.

Rev. J. Hayde.

7347. (*Chairman.*) You have resided for some time in England?—Yes, I resided at Cardiff for six years; before that I was in Oldham in Lancashire 19 years; I was born there, in fact.

7348. During your residence in Cardiff were you a member of the school board there?—Yes.

7349. Did you also take part in the management of the free library?—Yes; I was on the committee. I belonged to the Naturalists' Society.

7350. You were also a member of the committee of the local school of art?—Yes.

7351. And took part in the examinations there, in connection with South Kensington?—Yes, I did.

7352. You, consequently, have acquired practical knowledge of the educational systems prevailing in England?—Yes; especially of elementary education.

7353. Are you familiar with the system of primary instruction in Ireland?—I am not practically familiar with it, but I have read a good deal about it.

7354. You know to what extent industrial instruction is encouraged in connection with the National Board?—I do not know to what precise extent, but I have heard persons connected with the National Board of Education speak very often about it, and from what I have heard I feel convinced that primary education in Ireland, though it has advanced during the past twelve years, is very defective, and the sooner we have compulsory elementary education the better. For cities especially, in the first instance. I think in time it might be extended to the country.

7355. Are you of opinion that compulsory attendance may be enforced with the general concurrence of public opinion in the smaller towns as well as the larger ones in Ireland?—So far as I know the opinion of Cork, that is the case. I belong to the Literary and Scientific Society of Cork, and at its meetings we have had several discussions on the point, and I found we were nearly all in favour of compulsory education; that society pretty well represents the opinion of Cork.

7356. Is that fairly representative of working class opinion?—Yes, of all classes; the society is thoroughly representative, I think; it is quite unsectarian, and no politics or religion are allowed in the discussions. Dr. Sullivan was president of it for three years.

7357. But do you consider, that when the principle of compulsion is applied and all the children of school age are brought under the influence of some one or other elementary school, there will be still wanted something or other in the way of technical instruction?—I believe there is absolute necessity at present for technical instruction. Considering the resources of the country, which are very extensive, and how little they

Rev. J. Hayde. are made use of, the ignorance of the people, and the competition with other countries, I think never before this was the necessity more evident.

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7358. Indicate, if you please, what, in your judgment, should be the general aim of such a school, and the methods by which it should pursue its work?—I quite agree with what Dr. Sullivan said yesterday about primary, intermediate, and higher education, but I wish to confine myself specially to the elementary, as I do not know much about the country practically, the wants of the people, local trades, and so on. I could only say, in a general way, what it ought to be. I believe there should be a general education up to a certain point, and that point can only be determined in the various places. A few general principles of science, especially of the science that will have to be applied in the locality where the school is, should be taught. I believe that generally speaking, with regard to the young people, theory and practice should go together. I believe, myself, that theory is useless for young people; it is better to show the reason by the fact, rather than explain the fact to them after giving the reason. Boys, when they see a thing done, naturally inquire the reason of it. I think an object should be shown first, and the reason then explained. These subjects ought to be as practical as possible, and this education ought to be as much as possible an immediate preparation for the workshop. Then when a boy leaves school and goes to work, he will in a short time feel at home, he will take an interest in his work and become proficient in it.

7359. The technical schools proposed to be established should continue the instruction from the point at which it is left off in the elementary school?—I am speaking of boys that have to go to work very soon; often as soon as they leave the elementary school. They then continue their studies in the technical schools after the labours of the day.

7360. Then the technical schools that you suggest should be evening schools?—Yes, mainly.

7361. Your experience at Cardiff would enable you to say how far you think the teaching given in connection with the Science and Art Department would be in itself an element in the technical training you recommend?—The defect I noticed in that kind of education was that it was not practical enough. There was plenty of teaching of principles but it was not shown how to apply the principles. A person who, after having gone through a course of that kind, wished to be really educated technically, would have to go through a good practical training, learning not only the principles, but the mode of applying them; not only seeing the thing, but doing it himself. I think the only way to educate boys properly is to make them do things themselves.

7362. Would it not be a desirable preliminary to that teaching that boys should learn geometrical and machine drawing?—Oh, yes, I believe these things to be very useful as preliminaries, but they are not essential. The instructor at the Upton Reformatory, though an excellent workman, is unacquainted with drawing; he feels however that he would be a very much better workman, and would be able to teach the boys better, if he were acquainted with drawing. With regard to the absolute necessity for technical education, I wish to show the Commission that this necessity for technical education has been felt, not only at the present moment, but for a long time. I have been able to see this in various ways; I have come across a great many young men in the city of Cork, having lectured at the Young Men's Society, at trades unions, and so on, and whenever the question of technical education has come up they have taken the greatest interest in it. This necessity was especially felt by the promoters of the Cork Exhibition.

At the first meeting in regard to it, held in this building, the point on which they all insisted—that is all who made practical speeches—was that if they did not believe that the exhibition would produce permanent effects, especially in the shape of a good technical school, they would have nothing to do with it, and I believe many contributed 20*l.* and 50*l.* from that very conviction—that the Cork Exhibition would not be like the Dublin Exhibition, or the one held in 1852, but would be a real permanent good to the city. From this they went to another point, they said, “We wish to impress on the people that they must be technically educated. We do not intend to confine this exhibition to Ireland, but leave it open to America, England, and other countries, in order that the people here may compare their goods with the goods of those who have had a better technical training, thus showing them the importance of that training, and how necessary this is for them, if they wish to compete with the manufacturers and tradesmen of other countries.” They wished to produce the same effect by inviting celebrated and practical men to come here during the Exhibition and lecture on technical education. A committee was appointed immediately for the purpose, and it was incorporated with our Council of the Literary and Scientific Society, but the committee has been in abeyance for some time. The earnestness that has been shown for the past few days is simply the result of the feeling that has been in existence for some years. The great conviction of the people of Cork, especially of the promoters of the Cork Exhibition, is that there should be established a permanent technical school, and that this school should give a sound practical specific education; that is to say, each man should be prepared, not generally only, but specifically, for the trade he wishes to follow. I may also mention that a sub-committee has been formed, under the presidency of Dr. Sullivan, in order to draw up a scheme of what this school ought to be, what it ought to teach, and what it ought to have.

7363. Do you agree with Mr. Mahony's statement yesterday that the Government should take the initiative?—I do not believe that that is the general feeling in Cork. I believe the general feeling is that we should initiate it, and, as Sir George Colthurst said, it is perfectly useless for the Government to do anything until we initiate. The Government may instruct or encourage persons to make a beginning, but it is the people themselves who must begin. I believe that such is the feeling of the people of Cork, and especially of the promoters of the Exhibition. We must do all that we possibly can, and the Government must come in when we fall short. The less Government has to do with the management the better; Government, of course, should have supervision, to see that the money is properly applied, and that the thing is worked in a proper manner, but the real practical working responsibility should rest with the city itself, with those appointed as a committee over it. They are firmly convinced that a little aid given by the Government would be amply compensated by the advantage that would follow not only to the country, but to the Government themselves. By these means people would be more steady and industrious, would understand their rights and position better, and by degrees they would learn to love the institutions among which they live; they would have a real national idea of what Government is, of their responsibilities towards it, and immense advantages would at once arise for the Government as well as for the country; I am personally convinced that those advantages would arise, from what I know of the Irish character. Another point that strikes me is that the aid given by Government would not necessarily be permanent aid. I believe that after a short time, when the people, in consequence of the practical application of

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technical education, became more industrious and prosperous, they would be able to work by themselves, and would scarcely need any help at all from the Government; they would become more self-reliant, and in the end the Government would scarcely have to give any help at all. As the practical application of one or two of these points, I wish to say that I have seen the many advantages of technical education, even though of an inferior kind, in my own establishment. None of my masters have had a thorough technical education at all; they have had education of the hand and the eye, but not according to the principles, and yet some of them are very good workmen—especially my cabinet-maker. I brought him over from London, and he has done a great deal of good for the boys; in three years he has taught many of the boys to be excellent workmen. In 74, Patrick Street, you will see the work that has been turned out by our boys at Upton. You would hardly believe that the work in my establishment is turned out by boys of such an age. I never force any boy into the shop, but allow each boy to choose his own trade, and give him time to consider the matter. I never send a boy into a shop for some months after he arrives, but leave him to work in the fields.

7364. What departments of industry are followed at your institution?—The numbers on this list are those who were there at the end of last year, but they have increased since; cabinet-makers 18, tailors 30, carpenters 10, shoemakers 31, bakers 2, bookbinders 5, painters, plumbers, blacksmiths 9, gardeners 7, general farm boys 12, horse boys 5, laundry boys 15, stocking knitters 14, masons 3, agricultural labourers 61. I intend, when I can, to increase the trades, but I have a great many difficulties. First of all there is the expense. I have been there six years now, and I have spent on buildings at least 12,000*l.* or 13,000*l.* I have to go on paying interest on that, which gets me a little into debt. Then there is so much jealousy on the part of trades unions that it is not easy to dispose of the work. However, by degrees I am moving on. Two years ago I got a quiet little shop in Cork for the sale of articles made in the institution, so that they could not say very much to abuse us. Now I have got a very large establishment here in Patrick Street, yet the trades have said nothing; but I know there is an *animus* against the thing, and I have to be very careful. As you may see I dare not push my goods or advertise them.

7365. Is the jealousy from the retail tradesmen or from workmen in general?—From tradesmen; from trades unions in general.

7366. Your boys are of all ages up to 16?—Yes, I may say they are from 6 up to 18 years of age. I may add that I have got 14 boys that should not have been sent to a place like that, but to an industrial school.

7367. I would wish to know the result of your experience as to the relationship between the literary and the practical instruction in your institution—the way in which the two would act and re-act one upon the other?—We have to carry on the whole education of the boys, because, in most cases, they come to us perfectly uninstructed. Out of 61 boys that came to us last year, 15 were instructed in religious knowledge when they came to us, 21 very imperfectly, and 25 were quite ignorant. They are better instructed in this country with regard to religion than with regard to anything else. With regard to secular education, seven could read and write moderately well, 15 imperfectly, and 39 not at all. We have to instruct them in everything.

7368. At what age do you begin industrial occupation?—That depends very much of course on the strength of the boys. If they are strong enough we begin at once with them, even if they are only eight years of age.

The very little boys we do not put to anything that requires very much strength; we put them to learning something, to keep them out of mischief. *Rev. J. Hayde.*

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7369. Will you indicate the proportion of time given to literary instruction and industrial teaching at the different ages?—We give them in general three hours a day in the school. On wet days all that are not engaged in the shops, spend additional time in the schools. As we get a good many wet days in the south of Ireland, they get a good deal of schooling. These latter that I speak of are the boys usually employed out in the field: when they go into the shops they do not get that amount of schooling. For the first six months that they are there, the intellectual training occupies the greater part of the time; the boys get a great deal of schooling. From 8.30 a.m. to 12 noon they are employed at industrial occupations; and from 1.30 p.m. to 5.40 p.m. they are again at industrial work.

7370. Do not the boys so occupied receive any literary instruction at all?—Oh, yes. All, without exception, receive three hours a day, even those who go into the shops, which is sometimes six or seven months after coming to the school.

7371. How far do you find that the industrial teaching helps the intelligence of the boys in their literary studies, or *vice versa*?—That depends a good deal on their occupation; for instance, the cabinet makers are a good deal quicker than the others; that is to say, their faculties become better developed, having to learn so many things. They learn how to use the lathe, how to cut fret work and many other things in the different branches of cabinet making, and this sharpens their intelligence very considerably.

7372. Would you give any suggestions, growing out of your experience at the reformatory, which would be applicable to the conduct of the elementary schools of the country?—My opinion on that point is, that the more practical the instruction is made, even in the elementary school, the better. I believe that in many elementary schools, particularly in Ireland, they are too fond of dealing with things which are never of any use afterwards, poetry, general literature, history and biography; things that boys really do not require to learn. Boys should be induced to learn industries, and to live by industries. So far as it can be done, the more examples of these things there are brought before them, and the more they are shown how, practically to apply the principles that guide the different occupations and trades, the better. I do not think it can be carried very far. That would be an introduction also to the technical schools.

7373. Could they be familiarised with the use of tools?—I believe so. I have procured a great many manuals for the use of the boys, and one is specially on the use of tools. A great many of those things, I think, could be shown in schools.

7374. You approve of teaching agriculture?—Yes, certainly, where agriculture would be the avocation of the boys afterwards.

7375. Then as to the technical school you would wish to see established?—I do not wish to enter on that point, but I approve of the general scheme as stated by Dr. Sullivan. I would not like to say anything on trades, because I have not given much thought to them, and secondly, because I am an outsider, and know very little about the local trades.

7376. But you now, in the main, think that there should be evening classes?—Yes, I think that is a necessity; there must be evening classes for apprentices, and for those who cannot attend during the day.

Rev. J. Hyde. 7377. And that the teaching of those classes should be concurrent with the trade education of the boy during the day?—Yes, I think that is the best way: to learn how to do the thing in the day, and in the evening-classes study the reasons why the thing should be done in any particular way. I would never dream of giving my boys the theory first. But this year I bought about 600 books, including a series of technical manuals, and I intend to introduce a number of these into our shops, so that after work hours they may learn the theory of what they have been working at during the day. I think that for the first two or three years there is nothing like teaching handwork and the practical application of principles.

Dr. W. K. Sullivan. DR. W. K. SULLIVAN, President of Queen's College, Cork, re-examined.

7378. (*Chairman.*) I think you told us that a committee has been formed in Cork for the establishment of a technical school?—For that and for several other objects connected therewith—mainly for that purpose.

7379. Do the other purposes affect us?—They are in the same direction, such as a reading room for artisans, mechanics' institutes, and so on.

7380. Have you a scheme in your mind for a technical school?—I have, but not fully developed.

7381. Have we been correctly informed that the task of drawing up a scheme has been imposed upon you, and that you have kindly accepted it?—The latter part would, perhaps, be saying too much, because they have very kindly imposed the task on me in my absence.

7382. Have you undertaken to do it?—I have been obliged to consent, and I shall do my best.

7383. May I ask you to have the kindness to send us a copy of your scheme when you have sufficiently matured it?—With the greatest pleasure.

Adjourned.

TWENTY-NINTH DAY.

Meeting at CORK.

Third Day.

Wednesday, 13th June, 1883.

PRESENT :

MR. BERNHARD SAMUELSON, M.P., F.R.S., IN THE CHAIR.

MR. WM. WOODALL, M.P.

MR. GILBERT R. REDGRAVE, *Secretary*.

Rev. JAMES D. BURKE, Superior of the Order of Christian Brothers,
Cork, examined.

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7384. (*Chairman*.) Your school is a primary school?—Both primary and intermediate; intermediate, inasmuch as our upper classes receive instruction such as is given in intermediate schools, and I may say that this is also the case with all our houses in the country.

7385. What is the nature of the instruction given in your intermediate school?—It embraces mathematics, physical science, chemistry, drawing, music, Latin and Greek, and the modern languages.

7386. What is the curriculum in the primary school?—The primary school course embraces arithmetic, reading, writing, some geography, and some grammar, and a book or two of geometry.

7387. Is there any line of demarcation between the two classes?—No; the boys who receive the primary education generally receive also the intermediate, but, of course, the poorer classes go from our schools to various pursuits in life before they reach the upper class rooms where intermediate education is carried on. We send boys to situations of all kinds, from the highest mercantile positions to that of messenger or porter.

7388. But what I mean is, whether some of the boys might be receiving instruction on certain subjects in the primary school, and at the same time attending the classes in the intermediate school?—No, our school is regularly graduated from the infant school to the highest class, and they have to pass from room to room. Our body has embraced intermediate education heartily. Last year our order passed one-fourth of all the pupils that were passed in Ireland, under the Intermediate Education Act.

7389. You were very successful it seems?—Yes, we were. We have a drawing school, too, which is very successful. Last year we passed more than seventy boys in drawing, most with honours, and also got the silver medal for drawing, being the highest distinction in Ireland. The drawing school is assisted by the Corporation under the Public Libraries' Act.

Rev. 7390. Do these boys pass an examination by the Science and Art
J. D. Burke. Department?—No, but they pass the intermediate examiners.
 18 June 1888. 7391. What is the nature of the drawing that you teach?—Freehand,
 perspective, the use of drawing instruments, and practical geometry.

7392. To which of these do you pay greatest attention?—To freehand drawing.

7393. What is the number of children in each department of your schools, beginning with the infants?—We have three establishments in the city. The principal one is at the north end, the Peacock Lane Establishment it is called, and two branch establishments, one on Sullivan's Quay, and one in Blarney Street. On the whole we have 2,000 boys on the roll, and 1,700 in daily attendance.

7394. How many have you as primary, and how many as intermediate?—We have about 1,400 receiving primary education, and about 240 receiving intermediate education.

7395. You are giving some instruction in handicrafts?—No, not at present. There is an intention to do so, and we are fitting up a technical school.

7396. By "we" do you mean the Christian Brothers or the city of Cork?—We are moving in this way as well as the city of Cork.

7397. We have had evidence on that point, but what we should like to know is, what the Christian Brothers are doing?—With regard to ourselves, we are getting up a technical museum, in the first place, which will show the progress of the various arts and various manufactures from the raw material to the manufactured article. We are also getting instruments which will explain the principles of machinery to the boys before they go to trades, and we are teaching those branches of science, chemistry, and natural philosophy, such as heat and light and electricity, bearing on manufactures.

7398. Have you at present laboratories in which chemistry and the physical sciences are practically taught?—Yes.

7399. Do the boys work in these laboratories?—Yes, but not to a great extent. They see things done experimentally, and are allowed to take part in experiments themselves.

7400. Is it your intention to extend that practical instruction?—Yes. The want of funds, I may say, is the only drawback to us in that department.

7401. You were about to say something about the Cork technical school, and I said we had already received evidence on that subject, but if the Christian Brothers are going to take any part in the organization or carrying on of that school, we shall be glad to hear what you have to say on the subject?—With regard to technical education, I have made it a point of study for some years past. I was led into a consideration of it from the circumstance that thousands of boys leave our schools after five or six years spent in them, with their English and science education so far completed, and that once they leave us, they have no place whatever to go to where they can improve themselves subsequently in matters connected with their various avocations.

7402. At what age do they generally leave the intermediate school?—About 16 or 17.

7403. When you say they leave at that age, do you mean that a large proportion remain until that age?—A very large proportion remain up to 16. I think intelligent parents have a desire that their children should receive a good education, if they could afford it at all. There is, of course, a School of Art in the city where a good many go after they leave school, and where their education is carried on further; and a good many have been very successful after the teaching they received

there in various departments. But I am speaking of tradesmen generally; they have no place for improving themselves after they go to business. There is neither a general, technical, nor industrial museum in the city.

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7404. What part do the Christian Brothers propose to take in this movement?—Any part we should take would be carried on in our own establishment. We should be willing, of course, to take our part, but within our own walls, in anything that would promote the general interests of the community.

7405. In what way do you propose to do that?—The only way is, that we should get into our own establishment all those matters that would be calculated to improve the intelligence of the children, and also train their hands to some degree before going to the various trades.

7406. Then, in point of fact, your object is to establish a private technical school side by side with the great school which is projected by the city?—Yes, and that our boys should subsequently take part in the one intended for the general public after they have been trained to a certain degree by us. The part that we should take, or, I think, could take, would be to give them as much science instruction, and such acquaintance with the general principles of machinery, the use of the principal machines, the lathe, for instance, as would enable them afterwards to derive the greatest possible advantage they could receive at the technical institution of the city.

7407. Do you mean to say, you would let them work at the lathe?—Yes, and get a professed hand to teach them.

7408. You do not consider it would be possible for any of the reverend Brothers to give instruction?—They might, subsequently. Many of them have a turn for that kind of work, and after a little while, when matters would have progressed we might all of us take a turn in teaching it.

7409. Is that your evidence, that some of you should qualify yourselves for it. Is that now in your contemplation?—Yes. The means are at hand at present, for the purchase of a very large self-acting screw-cutting lathe, for instance.

7410. Have you a gas engine?—One is to be got.

7411. You are aware you could not drive a large screw cutting lathe, without some power?—Yes, we have already got a large dynamo machine, which is to be driven by this gas engine, as well as the lathe and other machines; other appliances we intend working by compressed air.

7412. Do you mean that you would have small cylinders attached to these implements?—Yes, they might have them already, and instead of using steam, which would soil the models, we would use compressed air.

7413. Your school is not connected with the National Board?—No, none of our establishments in Ireland are, but I may explain we have Industrial Schools, which are, of course, under Government supervision.

7414. In the event of some further step being taken towards rendering primary instruction more general, for instance if compulsory attendance were gradually introduced into the country, which of course would mean attendance at efficient schools, how do you think the Government could best ascertain the efficiency of schools like yours without interfering greatly with the principles which you have laid down by yourselves, for their conduct?—Well, with regard to compulsory education, as far as we are concerned, our schools are over crowded, we have far more applicants than we can receive, but with regard to the general principles of compulsory education, I was

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examined on that before Lord Rosse's Commission three or four years ago, and I was asked what I thought of compulsory education. I told them that I thought if infant schools were widely established through the country, especially in great centres of population, and the children taken in at an early age, say four or five years, before they get accustomed to the streets, there would be little or no necessity for compulsory education. I also told them that the class of children, at present, to whom compulsory education would be applied, would derive very little advantage from it, because their school going years are nearly passed already. But if children were taken up at four or five years of age as I have stated, it would be of the greatest benefit.

7415. But you do not want to convert the children, but the parents, to recognize the desirableness of education?—I think in most cases the parents have a great desire to have their children educated. If the absence of this desire exists to any extent, it must be among the extremely poor portion of the population.

7416. And what means would you take for getting in this class?—There should be some means for providing the children with suitable clothing, and for the granting of requisites, such as books, free to them.

7417. You do not mean to say that instruction should be absolutely free?—It must be free for them, but in that case the local authorities may perhaps be able to pay for them.

7418. What are the fees in your schools?—Our education is gratuitous, but for the repairs of the establishment, and for providing the necessary appliances something is charged, a few pence a week, varying from twopence to sixpence. This is charged only to children whose parents can afford it; the poorer children are never asked for payment.

7419. Does the sixpence a week represent the payment of the highest class of the intermediate school?—Yes; all that money, I should state, returns to the children, and not one penny of this money goes to the support of our community.

7420. I want to know how the Government should ascertain that schools, not in connection with the National Board, are efficient schools, for the purpose of any Act requiring the attendance of children at school?—I do not represent the body, and I could not say what course the Superior General and his council would be willing to adopt, but I am sure they would be quite ready to meet the requirements of the times in any fair way.

7421. Of that you are convinced?—Yes.

7422. Are you prepared to inform the Commissioners what are the reasons alleged, the public reasons, of the reluctance of the Christian Brothers to put their schools under the National Board?—I may state that our body was in existence prior to the establishment of the Board; we had laid down certain fundamental principles upon which we have acted up to the present time. The National Board was established in 1833, and went on totally different lines, yet in order to give it a trial, several of our houses were connected with the Board, but the Brothers were altogether dissatisfied with the schools that were so connected; they withdrew their houses from them, and we have acted independently from that time up to the present. We have our own books, our own government, our own system of inspection, and our own peculiar system of teaching. All these we should have to sacrifice, if we were connected with the Board in its present line of action.

7423. The line of action of the Board in the present day is scarcely the same as it was in 1833?—Yes; it remains the same as regards the

books, and the use of religious emblems in the schools, as when they started.

7424. These emblems are allowed to be exposed only during the hours of religious instruction?—Yes.

7425. And you prefer that they should be exposed at all times?—Yes, at all times.

7426. (*Mr. Woodall.*) You teach drawing and receive a subvention from the Corporation of Cork. Do you present your boys for examination under the Science and Art Department?—No, we do not, but there is nothing in our rules that would prevent it; if the Science and Art Department made any overtures that would be acceptable we should be glad to avail ourselves of any privileges that would be given under that Department, but from all the accounts I have heard about it myself, or read about it, it seems to be very defective.

7427. In what respect?—Well it is very defective inasmuch as the teaching imparted in it is not of a practical character. The various branches of drawing taught under the system have no practical application to the various manufactures of the country. I have heard gentlemen, both English and Irish, complain that the Science and Art Department did not make its students practical; that while they were skilled in all ordinary styles of drawing, the application of it to the arts or manufactures was not carried out in the schools.

7428. You have a religious house or more than one, I believe, in London?—No, we had houses there, but they were all given up.

7429. Would there be any difficulty on your part in making an inspection of the collection of drawings from provincial schools, which is exhibited annually at South Kensington?—Not in the least.

7430. Your body is very desirous of having children taught drawing?—Yes, and to show this, they have placed the drawing department of a few of their schools under certificated teachers from South Kensington. Some schools in Dublin are so connected.

7431. The objection which applies to connection with the National Board does not in any degree apply to connection with the Science and Art Department?—It does not; but I may mention that one of the reasons why we introduced intermediate education, was to show that if any system were introduced which would be unobjectionable, we would avail ourselves of it. We have embraced the intermediate system throughout the whole of Ireland. We passed one-fourth of all the pupils that passed last year. We got thirteen medals, and several exhibitions.

7432. One of your objections to the system of the Science and Art Department, is, that it is not sufficiently practical?—I did not mention that as an objection of ours, but only as a statement I have heard.

7433. It is not a consideration that deters you from adopting their system?—It is not.

7434. Does examination under the Intermediate Board encourage more practical teaching than the Science and Art Department?—I cannot say that it encourages more practical teaching. The examinations of both are seemingly the same, but I may say this, that no system of education introduced into Ireland for the last century has been so beneficial as that of Intermediate Education. It has completely revolutionised middle class education in the country. It has given a stimulus to the children, which they never had before; and there seems to be a vitality in the whole of that department of education, to which Ireland was altogether unaccustomed before its introduction.

7435. (*Chairman.*) We have heard a good deal about these examinations having a tendency to encourage cram. Is that your impression?—No. I have been connected with intermediate education from the

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beginning, which is now about five years, and I can say that I have seen no tendency whatever to cram, nor does the system itself encourage it. What I understand by cram, or what is generally understood by cram, is the giving an amount of information merely suitable for a special examination without a gradual development of the mind. The Intermediate Board does not sanction that. It requires one hundred days' attendance at least in the schoolroom. We have to certify that the boys have made that attendance before any results can be got for them. Then for that length of time they are under instruction in various subjects for which they go in. Therefore, I say there cannot be any cram in it when they are regularly prepared day after day for their work.

7436. Would you consider it desirable, in order that boys might be capable of being presented for examination under the intermediate system of instruction, in science, more especially in chemistry and physics, that it should be accompanied by practical work in a laboratory as a necessary condition?—Well, the Commissioners of Intermediate Education lay it down as an essential thing now, in the teaching of these branches, that the teaching throughout shall be accompanied by illustrations and experiments.

7437. What means have they of ascertaining that this has been really done?—The style in which the questions are given. They are given in such a manner as to test whether boys have really seen the experiments or not, and I should say that no boy who has not seen the experiments can answer satisfactorily or be entitled to a respectable pass.

7438. The examiners shape the question so that you believe that must be the case?—Yes, if they are to answer satisfactorily. No boy that has not seen experiments in chemistry or philosophy can answer respectably on the paper. A boy standing an examination in natural philosophy or chemistry without having seen physical apparatus at work or having been shown a chemical substance would furnish an excellent illustration of cram. That is altogether discouraged by the Commissioners.

Sir D. V.
O'Sullivan.

SIR DANIEL VINCENT O'SULLIVAN examined.

7439. (*Chairman.*) You are a merchant in the city of Cork?—Yes, a merchant, and a manufacturer in other branches.

7440. You are a large exporter of butter?—We have been on an average of years the largest.

7441. You are also a member of the committee of the Dairy School?—Yes, I have taken a great interest in it.

7442. The Commission would be glad to know what is the influence, present and prospective, of this school on the butter trade?—I think it is calculated to do an immense amount of good. I believe our people have not made so much progress as the people of other countries in the art of butter-making. For instance, I recollect some years ago myself that the American butter was almost unsaleable, its quality was so inferior. Recently I saw it, and it is quite or almost quite as good as ours. There are a number of girls receiving instruction at the Dairy School, and not only do they gain a great deal of knowledge themselves, but they disseminate a great deal of knowledge through the country among their friends and acquaintances.

7443. The export of butter amounts to a very large figure?—To nearly one and a half millions per annum. We ourselves have shipped butter to the amount of a quarter of a million in one year.

7444. That is independent of the consumption of butter in the country itself?—Yes, quite so.

7445. Are you able already to trace some effect from the instruction given in the Dairy School, by the quality of the butter produced in Munster?—I think we can. I have seen essays of those girls in butter making, and certainly they displayed an immense amount of intelligence. I also have seen the practical work, and I think I can already trace a very great improvement, which may be attributed to the Dairy School. I believe in future it will do an incalculable amount of good.

7446. Can you give the Commission any special cases, where the produce of any particular dairy has been improved by the instruction given to the dairymaid at that school?—I can, and I am confident that other members of the committee can also.

7447. Would you undertake to procure some opinions on the subject and append them to your evidence?—I will gladly do that. There has been a steady improvement in the quality of the butter passing through Cork for years, and I will endeavour to get some special cases for you. I may mention that one of the principal prizes won at the show recently held in London was awarded to a Cork farmer, whose daughter was one of the most successful pupils of our model school, and further, I am aware that exceedingly high wages can be obtained by pupils who are willing to go out as dairymaids. In fact they are in great request.

7448. You are also a member of the Committee of Merchants?—Yes, I am.

7449. Do the Committee of Merchants generally approve of this institution (the Dairy School)?—I think they do. I have been connected with it from the very commencement.

7450. Is their approval testified by their being willing to subscribe to its maintenance?—They have subscribed, but they have not subscribed as liberally as they might have. They are now, however, manifesting such an interest in the school, seeing the good it has done, that they are prepared to give it warm support.

7451. Do you consider it is one of those institutions which should be supported by local contributions, in order that it may be entitled to that which it does receive, namely, Government support?—Undoubtedly I do. I think we should take an interest in it ourselves, and show that we are prepared to do our part, and then I think we should get assistance from the Government.

7452. Generally may I ask you whether you think that in all industrial occupations to which school instruction is applicable, it is desirable that local efforts should be made precedent to Government grants being applied for?—Well, I should imagine some local effort should be made, but you know very well that ours is not a very rich country, and we cannot afford to give a very large sum of money. I know this question of technical education is interesting the people here very much, indeed. I am engaged in three or four branches of manufacture, and in our several branches of manufacture, nearly every employé we have in any important position, has been educated at the Christian Brothers' Schools.

7453. And therefore you are glad to testify to their great ability?—I am indeed, sir, and I only wish that the number of boys whose education is of such a high standard, should get an opportunity of becoming really good tradesmen. We have found a very great absence of well-conducted and intelligent tradesmen. I believe there would be a good future for those boys if they could receive technical education.

7454. The citizens of Cork are determined to make a great effort to provide that instruction in future?—I am quite confident they are.

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MR. PHILIP F. JOHNSON, Egmont Arms Hotel, Kanturk, examined.

7455. (*Chairman.*) What is your occupation?—A commission agent, and hotel keeper at Kanturk, and I have been secretary to a Labourers' League for many years.

7456. You have been kind enough to answer a series of questions which the Royal Commission on Technical Instruction caused to be circulated in Ireland?—Yes.

7457. What have you to tell the Commission in regard to that portion of the subject, in which you take the greatest interest?—What I am anxious to put before the Commission is, the desirability of improving the condition of the female members of farm labourers' families, for I find after very lengthened experience all over the country, that the female members of a family are of no assistance whatever in supporting the family, simply from the fact that there is no suitable occupation for them.

7458. That applies particularly to the smaller farmers throughout the country parts of Ireland?—Yes. I have watched the question for over 23 years, and I find that the greatest grievance that small farmers and labourers complain of is the want of suitable occupation for the female members of the family. I think basket-making is a thing that might be gone into very largely; in my district it might be turned to very great advantage, as it is very suitable for the work. They come 16 or 17 miles to Kanturk for twigs, also for what is known as "scallops" for binding the thatch upon houses, and for rough baskets for farmers' use.

7459. Would you like to see that trade extended from Kanturk to different parts of Ireland?—I think it is a trade that might be very easily started at very little cost.

7460. It is very well understood at Kanturk?—Yes, but the basket-making at Kanturk is very rough work, and might be improved very much.

7461. There would be no difficulty in obtaining, at Kanturk, instructors, if the trade were taken up in other parts?—None whatever.

7462. Would you, in addition to that, like to see a finer description of basket work manufactured in Kanturk itself?—Most certainly I should, as the present is the result of male labour.

7463. How would you set about this?—I think if those who are responsible to a large extent, outside the Government, for the improvement of the people would take the question up, they might do it.

7464. Who are the people outside the Government to whom you would look?—The proprietors of land, such as Sir George Colthurst and other gentlemen like him. If Lady Colthurst were in Kanturk I would have basket-making started in 48 hours.

7465. You are dependent on proprietors?—At present, I do not see a chance of doing anything without them.

7466. Is there not sufficient public spirit among the population without them?—There is plenty of public spirit, but no money.

7467. But it does not require much money?—I have an idea, which I think I should be able to work out, if I could only enlist Lady Colthurst's help, I would take a few females over to Germany where finer basket-making is carried on. If there were two or three smart girls taken over to the centres of manufacture in Bavaria, and they were to see what is being done there in the trade, and the benefits arising from it, I am quite sure it would do a great amount of good. I

am quite satisfied that the raw material, at home, would then go on improving, the same as in the butter trade. I know a case that came under my own notice where a young girl was sent up to this Dairy School in Cork. She spent three months at the school, and when she came back she absolutely would not remain in the house she had been living in all her life, and her father had to get 200*l.* to build a new house; I was in fact the means of getting the money for him.

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7468. You would like to see girls sent over to Germany to learn the trade of basket-making?—Yes, I think so, or else to have a public instructor sent through the country to instruct the people.

7469. Do you quite despair of the Irish middle class being able to take a part, at any rate, in providing funds for this kind of instruction?—I do not; but I do not think they will commence it.

7470. But they would contribute if the impulse were given from what we were accustomed to consider as being from above?—Quite so, or from the Government; one of the two.

7471. Is there any other trade besides basket-making that you have in your mind as suitable?—There was a question brought before me some time ago of making reels to supply thread manufacturers in England with. It was being done in Galway.

7472. That is a trade requiring very little machinery?—Not much, sir.

7473. In any place where you have a quantity of wood, and cheap labour, anyone might set up a small factory of that kind?—Yes, they might set up a factory, but they would not have the means of paying the employes. That is where we all fall to the ground in this country. We can start a factory very well, but we cannot afford to pay employes, while we are awaiting the sale of the products.

7474. But when we look at the returns of the saving banks and the various banking companies, we find a very large sum of Irish money deposited there?—I think not by the class of people to whom I am referring.

7475. Well, and who are the depositors?—I think they are mostly the Government employes, pensioners, and others.

7476. But you do not think surely that they have forty millions in the banks?—No, I do not think they have.

7477. Do you think the Government employes have a tenth part of what is invested?—Well, what I mean to say is, that generally speaking the working people have no money.

7478. No, but those who employ the working people have?—Oh! they have sir.

7479. When we find gentlemen conducting brewing establishments in Cork, tanneries and various other large concerns, and with one of the most prosperous steamship companies in the world here, what is to prevent Irishmen from setting up a factory for making reels?—I cannot answer that either; it is in a great measure owing to the absence of public spirit.

7480. But we cannot admit the absence of public spirit, seeing what they do at Cork. Are there any other trades that you think might be established profitably—small trades that would give employment to the class of people that you speak of?—Yes, there are, such as the establishment of tweed mills, of which there are four or five around Kantark, and also work with sawing machines.

7481. Do the work people show themselves favourable to the saw-mill?—Oh yes, people are not nearly so much opposed to machinery as it is thought.

Mr. P. F. Johnson. 7482. And where this opposition does exist, it is a prejudice that is wearing out?—It is a prejudice that is wearing out fast.

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7484. Have you any schools in Kanturk in connection with the Science and Art Department—any drawing schools?—No, only the ordinary national schools.

7485. You are aware of course that if suitable teachers were provided to give proper instruction in drawing, a considerable payment may be earned by the attendance of pupils?—Yes.

7486. What is the population of Kanturk?—A little over 2,000. There was at one time, twenty years ago, an industry established by the present Dean of Cloyne, who was then parish priest of Kanturk, that is the making of lace collars and hair nets; that succeeded among the girls in the town, but not among the women in the country; it was superseded very shortly. There was also crochet work.

7487. Did the crochet work arise out of the other?—Yes.

7488. Was it that it was superseded by machinery?—No, but the fashion changed.

7489. What about lace collars?—It was part of the business too.

7490. Will there be any specimens of that exhibited at the Cork Exhibition?—Yes, the firm of O'Brien Brothers is largely engaged in that trade I think.

7491. It is a trade, then, that is in existence still in the country?—It is.

7492. Though not in Kanturk?—No, there is no manufactory there now.

7493. Are the people thrifty?—They are, but they have very little to save, or to be thrifty about.

7494. Are they anxious for instruction?—They are anxious. Several of them have spoken to me, labourers particularly, and they all expressed a desire that a man should be sent among them to give lectures, and improve them; but they would like that the Government should have some hand in it, as they would otherwise think there was some party business in it.

7495. Do you think that lectures on an improved system of farming would be of much advantage?—I am certain they would.

7496. Would they be attended by the small farmers?—I am sure they would.

7497. And you think if given, and if calculated to meet their wants, they would lead to improvement in the system of farming?—There can be no doubt whatever about it.

7498. Do you consider your small farmers are an industrious race?—They are very industrious.

7499. Would you say the men or the women are the more industrious?—There is no industry for the women at all. Young members of a family up to 14 or 15 years are all idle, and have nothing to do.

7500. Up to what age do they remain at school?—To 12 or 13. When they come to be 15 or 16, they go to America.

7500a. Of course that is a great loss to the country?—Of course it is.

7501. (*Mr. Woodall.*) You told us that people in your neighbourhood looked to the Government for the initiative in this?—That is so.

7502. You have spoken of the beneficial operation of the Dairy School at Cork?—Yes.

7503. And you are aware, I suppose, how largely it is managed and supported by a local committee?—I am.

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7504. Do you think that the same local control, and local support would be essential to the success of any such teaching as you suggest?—I think it would.

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7505. Do you think it would be forthcoming in a place like Kanturk?—I think it would, but there will be no local effort without the initiative being taken by the Government.

7506. (*Chairman.*) But why not try your own personal initiative?—I am only one. I have tried it over and over again with others, whom I supposed would take the initiative, but they did not respond. However, things are mending, and we shall do much better for the future I fancy. I would desire to impress on you the necessity of sending some public lecturer, especially as regards agricultural instruction. The reason I say they should come from Government is, that if they were sent from others, it might be considered a party movement.

Mr. WM. D'ESTERRE PARKER, of Passage West, County Cork,
examined.

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7507. (*Chairman.*) I believe you are an active poor law guardian?—I have been for many years, but I am not a guardian at present.

7508. You have taken, and still take a great interest in primary schools?—Yes.

7509. Both workhouse schools and ordinary schools?—Yes.

7510. I believe you wish to point out to the Commissioners some defects in the plan of educating children both in the ordinary schools of the National Board of Education, and in workhouse schools?—Yes. The workhouse schools generally are under the Board of National Education, but I mention them particularly to distinguish them. The defect that I see in workhouse schools is an almost total absence of industrial education. It is allowed by the Local Government Board that children should be so taught and brought up to trades suitable to their position of life, such as shoemaking, tailoring, carpentry, masons' work, gardening, coopering, and all the different trades, even to basket-making, and all these could be taught in any ordinary country workhouse. I am sorry to say, however, that with very few exceptions there is but very little taught, particularly as compared with the number of children that are attending these schools. There may be a dozen children out of a hundred, and the consequence is, that when children grow up, and are old enough to leave the workhouse they have no particular skill of hand. They are taught reading and writing, and arithmetic; and their religious education is remarkably well attended to; but they are like birds in a cage, so to speak, and when they leave school they are totally unable to work, having been trained up in a cage-like manner. I endeavoured to get the Cork workhouse school placed under the agricultural programme, so that the Inspector of that particular department of the National Board should attend occasionally, and see that the boys and even the girls were taught some mode of gardening or planting, or agriculture, according to the suitability of the establishment.

7511. What quantity of ground is attached to the Cork workhouse?—About eight acres. There are six acres under garden cultivation. I was very much surprised to see in the report of the proceedings of the Hantry Union some time ago, when employment was needed for the people there, and it was proposed to employ them on the workhouse grounds, that the grounds of the establishment were let to a tenant, and

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the inmates were thus deprived of an opportunity of learning some manual work.

7512. I believe that the same is the case with regard to many workhouses?—It may be. It was the case in the Middleton workhouse, but since I heard of it, I spoke to one of the guardians and it has been done away with, and now vegetables for the house are cultivated on the land. I think where the Government gives a grant towards the education of children in these establishments, it is incumbent on the Government to see that the children are brought up in habits of industry as a *sine quâ non*. It is a great blot on the system of national education in workhouses, that the system which is intended to be carried out in all workhouses is not carried out as it ought to be, there is simply a makeshift appearance of it.

7513. Why is industrial education neglected in workhouse schools?—I will explain it, as far as I know. Teachers receive result fees for literary education, and the number of inspectors in the agricultural department, the agricultural or garden inspectors as they are called, is very small. I was very much surprised when on writing to the National Board of Education recently, and asking why it was the garden inspector had not visited the workhouse, as promised, that they wrote to me in reply, that he would visit the house, but only for this year. I thought that an extraordinary answer to say he would only do it for this year.

7514. Are you aware that there is only one inspector of agriculture for the whole of Ireland?—I am aware of that, and I think it is an additional evidence of the case, I make out, of the defect in the nature of the education that is given; for the idea of having only one agricultural inspector for the whole of Ireland is absurd.

7515. They did not tell you that in answer to your letter?—They did not, and if they had, I should have worked it out before this. The total number of schools as mentioned in their report is seven thousand, and by the last return of the Board of Education, I believe the total number of such farm schools, in connection with the Board on the 31st December 1881, was seventy-four.

7516. That you do not consider to be a satisfactory proportion for an agricultural country?—Decidedly not.

7517. How would you set about remedying that?—To remedy that, what I would propose first of all would be, to attach to each national school in the country, an acre or two acres of ground.

7518. We are told there is a great difficulty in getting ground?—Not the slightest, not the most remote; money will get anything I assure you; ground could be as easily got for schools, as it is got for railways, or for any other purposes of that kind.

7519. Whose money ought to be applied to obtaining the ground?—The money of the general tax-payer, for on the proper training of these children, the prosperity of the general tax-payer depends. Every one of those children if they are properly trained, when they come to be 16 years of age, and are able to earn their bread in the world, will give in return his fair proportion to discharge the burdens on the general tax-payer; the want of such schools, as I have pointed out, in the country, has been the cause of the greatest possible loss to the general tax-payer of the community, that is my general answer. As to localizing the public rate for national purposes, I would not think of it for a moment. By all means let the children of the State be supported by the State in the very best possible manner, and Ireland will then become a prosperous and a loyal country. But idleness is our great bane, and ignorance costs us more money than anyone is aware of.

7520. Since the Government is willing to pay four-fifths of the entire cost of the education of the children, it should be given in the way most likely to contribute to the general prosperity of the country?—Precisely so.

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7521. And you think that agricultural education is in that respect as valuable, if not more valuable than literary education?—That is my opinion. We then come to the garden schools, and there are only twenty schools having gardens attached; there has been a tremendous loss of power in the past fifty years, since the establishment of this system of education, in not training the children of the labourer in industrial work.

7522. When boys enter into active life, when they leave the national school or the workhouse school, are they prepared in any way by the instruction they have received for occupying themselves profitably?—They are in a great measure by the literary instruction; of course that has developed their minds to a certain extent, but it would be much more useful to them, if even an hour or two hours were taken out of the literary instruction in the day, and they were afforded some hand training, some technical education suitable to their positions in life, and suitable to the district in which they are brought up. When these children afterwards emigrated, as many of them would do, they would go abroad as skilled labourers, able to take to their work at once, and to become self-supporting.

7523. At all events they would be able to become skilled labourers?—Yes.

7524. Do you say that if some time were abstracted from the time given for literary instruction, if that should be necessary, or if instruction were given in the evening where the opportunity offered, it would be useful?—I think it would be too much to ask them to attend in the evening. I think the confinement in a school room would be too much; there would be ample time during the day; from half-past nine to half-past three o'clock is an exceedingly long time for a little boy to be kept in a school-room. If their brains were exercised and developed in conjunction with manual occupations, they would learn a great deal more, even in the way of literary instruction, and it would take off the pressure in their minds.

7525. And one way or the other, you are convinced that instruction in the rudiments of handicraft, that is in the use of tools, might be given without any difficulty, in the schools?—Most decidedly so; and I think it is absolutely necessary.

7526. Is it the case that the school buildings are adapted for that kind of instruction?—Not at present, but they could be very easily adapted for this, for it would be easy to set up a working room or a shed alongside of the school-room.

7527. And that would not involve much expense, I suppose?—Very little expense.

7528. Do you think that in regard to non-vested schools, patrons would be prepared to incur some expense for that purpose?—Patrons who take an interest in the school would incur any reasonable expense for the benefit of the children, and patrons on the other hand, who take no interest in the schools will do very little. But I think if there were some inducement held out by Government to help them, and also an inducement held out in this way that they would be deprived of the teacher, if they did not do it, it would have a good effect; I think some indirect compulsion, or a stimulus would be required.

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7529. You would pay the teachers by examination results?—Yes certainly, I would give the teachers the benefit of that. Teachers' salaries in the country are excessively low.

7530. What else have you to say on the question of industrial teaching?—Well I heard the evidence with regard to basket-making, and I think that such an industry could be taught admirably in schools with which I am acquainted. The ground is admirably adapted for the growing of twigs there. If there was some arrangement made for their growth, there would be employment for the girls and boys of the school.

7531. But in growing twigs you would want a good deal of moisture, would you not?—Ireland abounds in moisture.

7532. Then you say that you have ground that without any preparation would be sufficiently moist for the growing of twigs?—There is no preparation necessary, when there is a small boggy tract within a quarter of a mile of a school; in other places, of course, it might not be available.

7533. -Between Cork and Queenstown for instance, you do not think of growing twigs?—No I speak of the purely agricultural districts. Another industry carried on in my district and peculiarly adapted for girls, is, the making of Irish lace. That industry is progressing very favourably owing to the influence of Mr. Fox of Booth and Fox of this city, and Mr. O'Brien of the firm of O'Brien Brothers of Douglas, and in fact most of the labourers' cottages in the Carrigaline district, about six miles from Cork, are small manufactories. The owners of the factories, Mr. Fox and Mr. O'Brien, supply the cotton and pay so much for the making of the lace, and they send round their agent every week to collect the articles, and to pay for the work done.

7534. Who furnishes the patterns?—Messrs. Booth and Fox and Messrs. O'Brien, who give the orders for the work.

7535. And do you say that it is an increasing trade?—Yes, it is, and it gives all the young girls, and indeed all the old women in the neighbourhood constant occupation in making crochet.

7536. What sort of wages can they earn at it?—From 3s. to 6s. a week, and it is a great deal for them to earn, during the time they are unemployed at household work.

7537. Do you know where the wholesale houses get their designs?—No.

7538. Would you have the girls in schools taught lace-making, or should they be taught on leaving school?—At school. I would give them an idea there: let them work it out at home.

7539. Is not that done at some of the convent schools?—I should think in almost all the convent schools, in Youghal and Kinsale particularly, and I think also in Cork. The convent schools were, I may say, the first to lead in the way of industrial teaching. They have been most successful, and seeing that it has worked so well in these schools, the thought occurred to me, whether it could not be carried out in other schools for girls.

7540. Do they not teach sewing in the national schools?—Yes.

7541. What kind of sewing?—The sewing is generally of a plain description, except in some particular places. Lately, in a little school I was connected with, the girls have been simply taught ordinary plain sewing. There is a ladies committee who take the duty alternately of attending the schools every day, one or two at a time, and looking after the teaching of the girls, and this is productive of a great deal of good in more than one respect, both as regards the children and the ladies, for it gives the latter occupation and induces them to take an interest in the children, and it creates a friendly feeling between the ladies and

the children. The children get small premiums or gratuities once a year, for their needlework. In that way it is working remarkably well.

7542. Do you think it desirable that there should be some local inspection of boys' schools as well as of girls' schools?—Decidedly. There is an inspection at present by the National Board.

7543. But I mean by persons resident in the locality?—I think it would be most desirable. At present it is left to the managers of schools, and if the managers take an interest in the school, all goes on right; but if the manager does not care about the school, and does not go more than once in six months, the thing is left practically to the master; the district inspector goes there once or twice a year, at the outside.

7544. I suppose that such is specially the case in vested schools?—I am a great advocate of local management and of local inspection in every possible way, because it makes the upper classes take an interest in the lower classes.

7545. Can you suggest any way of establishing local inspection through the country?—The only way that I could suggest at present would be the annual election of a committee, leaving it an open question for the residents to take it up. Suppose for instance in a district there were three ladies and three gentlemen elected annually, through the machinery of the National Board, it would be only those having an interest in the matter that would take it up. I think something could be done, and it would be a very great advantage.

7546. You would not leave it to popular election?—No, I would not. I like popular elections very well, but in that respect we are only beginning to learn something about popular election. In fifty years' time we may be better off, but at present popular election is the election of ignorance. I think fifty years hence, as things have been progressing during the last three or four years we shall be in a good position.

7547. You believe then that progress is being made in regard to education in Ireland?—Amazing progress has been made. There is a very great desire in the very humblest classes to have their children educated. America has done a great deal in that respect, because in the letters received at home, the great cry is; "send the children to school. They are no good if they come out here ignorant." And those who return from America and the Colonies can tell them of the complaint that has been made that the Irish emigrant wants education, and how if that want were supplied he would get on well. With regard to the system of education in the Colonies, I might mention that I was speaking to a friend of mine who has just returned from one of the Colonies, where education is free.

7548. What bearing has that fact upon the condition of education prevailing in Ireland?—Here it is not free. The school fees charged for the children are so excessive, that I am satisfied in my own mind, it is one of the causes of the very irregular attendance, and the non-attendance of a large number of children in our national schools. By the report there are over one million of children on the rolls of the national schools in Ireland, and the average attendance of those children does not come up to even half that. It is a very sad state of things, and a very great loss of educational power. Notwithstanding all the Government have done, the parents will not send their children to school. I have gone to hunt up and find out, from house to house, why the child is not sent to school. The answer I frequently get is, "I cannot afford to pay fivepence or sixpence this week." To my mind, that is too large a sum to be charged as school fees for the children of a

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labourer. Let the tradesman's children pay if they think proper, but it is utterly impossible that the poor labouring man, with 9s. or 10s. a week, can support himself and his family, and pay 1s. or 2s. a week for the education of his children. Suppose he has four children who pay an average of only threepence a week, it would amount to 1s., and that would be a large sum out of his weekly earnings.

7549. You speak of the total sum paid by the father of a numerous family?—I speak of only an ordinary family. For a numerous family he could not pay at all. But it is a very important fact, that such a large number of children absenting themselves from school, points to the necessity I have been advocating of compulsory and free education.

7550. Do you think that if education were compulsory it must necessarily be free?—I would leave it free to the labouring class, and leave it optional with those who were able to pay.

7551. That it should be incumbent upon those to pay who were able to do so, and you would excuse those who cannot pay?—That is already done in the schools of the National Board; but I do not think, unfortunately, that the patrons see it carried out.

7552. What objection is there to our present system that those who cannot afford to pay are excused?—There is no objection, but unfortunately the system is not carried out. I am not aware of any child being at a school free.

7553. What is the authority that excuses the payment of fees?—By the rules of the National Board, the manager of a national school can have the children of very poor people placed in the free list, if he thinks proper. I spoke to one or two managers about getting a child on the free list, and I could not get it done.

7554. What have you to say about the salaries of school teachers and schoolmistresses?—I think they are much too low. Of course on the foundation of the National School Board some fifty years ago, Ireland was in a very dark state with regard to education, and people did not give it a thought. A large number of people thought that children should not be taught anything at all, and that in fact it was a great mistake to teach them; and the salaries then fixed for schoolmasters were wretchedly inadequate. Expenses have increased since then. The National School teachers must naturally make a better appearance than formerly, must dress better, must bring up their children better, and I do think there is no class in the community holding a higher position in the country than our present National School teachers. I do not know of any class, not even leaving the clergy out of consideration, who hold a more responsible position in the country than those men who are endeavouring to train the future men and women of Ireland to become useful, industrious, loyal people. And these men should, above all others, I think, be well taken care of and should be paid a proper salary.

7555. You are aware that within the last few years teachers have been getting fees on results, which was not the case before?—I am.

7556. You are well aware also that as it has been found that Boards of Guardians are not generally willing to contribute to that payment, some modification of the present rule is about to be introduced?—I hope so. The reason Boards of Guardians objected to pay is one worthy of notice. They thought it was very unfair to tax one section of the community for the benefit of the community at large, to put the tax of result fees on land and house property, leaving the general moneyed property of the State wholly exempt, the children of the State have a right to be provided for by the State and every tax-payer has a right to contribute.

7557. Are you quite correct in stating that other tax-payers do not contribute, seeing that they pay the salaries of the school masters?—That is all.

7558. And they also pay a large proportion of the result fees?—Yes, that is all.

7559. Does not that amount to four-fifths of the entire cost of National Education in Ireland?—The thing is, we object to pay two or three thousand a year, in result fees beyond what we are paying already.

7560. I merely called attention to the statement you made that the tax-payer did not contribute, and endeavoured to point out to you that he does contribute to a very considerable extent?—Your remark, is quite correct, but I was pointing out the specific thing people were not contributing to the actual result fees, and I think the Boards of Guardians were right in objecting to pay these claims.

7561. You think that if that difficulty were removed it would put male and female school teachers in a better position?—Yes, and I should be glad to see that improvement.

Mr. Parker further stated :

7561a. In reply to the question, how is it, with all the money lodged in the several banks, and the great prospects of the distillers, brewers, and the Cork Steam Packet Company, there is so much difficulty in promoting industrial employment, the answer is as follows :—

Ireland, at least the southern part, is managed almost exclusively by land agents, whose sole duty is to receive the rents and pay the surplus, after deducting the salaries and expenditure, to the landlord; the agents, as a rule, take no interest in promoting industrial pursuits, neither do the landlords; there are, however, noble exceptions, but those are few and very far between. The manufacture and sale of intoxicating liquors is a trade which requires large capital and returns a large profit. Both distillers and brewers so manage as to obtain possession of the houses for selling their produce, called public-houses, which are spread throughout the country, and in every possible way a taste for such drink is cultivated amongst the people, including children, and a great part of the earnings of the working classes is consumed in such drink, instead of being applied to the purchase of food, clothing, or house accommodation, the working classes will live in single rooms rather than pay for a house. There are not houses in sufficient number in Cork to enable each family to live in separate ones, and although the Corporation of Cork availed itself of the Artizans' Dwellings Act, and removed a number of houses, which were condemned, provision was not made for the accommodation of the evicted tenants who were compelled by necessity to take rooms in the already over crowded houses. It is here that the principal consumers of intoxicating liquors reside, and it is here that the children are often sent for liquor to the public-houses to bring home to their parents, and thus they have had the habit of drunkenness instilled into them by their parents. The main remedies for this, are healthy homes for the working classes, and technical education for their children.

As regards the flourishing trade of the Steam Packet Company, this is easily explained, the want of industrial employment for the people prevents local manufacture, and obliges the shop-keepers to send to England, America, and the Continent, for almost all the necessary articles required in the ordinary dwelling-houses. Those steamers are principally employed bringing over manufactured goods of all kinds, while our people at home are comparatively idle or in the workhouses. If it was the raw material that the steamers brought, and if this was manufactured at home, Ireland would very soon become a prosperous country. Again, those steamers are also employed in carrying over

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to England large quantities of cattle, reared by the farmers. This system of rearing cattle carried on almost exclusively in some parts of Ireland, is highly destructive to the interests of the labourer, the tradesman, the shopkeeper, and all other classes, as the labourer is deprived of the means of working on the land, there being little or no tillage, and when he ceases to be employed, the circulation of money is stopped and all classes consequently suffer; whereas if the cultivation of the land was reverted to in some degree, there would be more industrial employment for all classes. Ireland at present supports foreign labourers who grow corn for her, while she leaves her own to starve; and the carriage of this corn and flour, manufactured abroad, is another great source of revenue to the Cork Steam Packet Company; in fact those ships are principally employed in bringing goods manufactured by foreigners for the use of our people, while the latter are perishing for want of employment.

There is another source of employment which appears to me to require public attention, namely,—the training up of those boys to the sea service, who are anxious to become sailors, and here again, it will be found that foreigners are largely employed, while our own people are left idle and in workhouses, or obliged to emigrate. By the last return of the Board of Trade dated April 2nd, 1883, 195,937 seamen were employed in the British Merchant Service, and of that number no less than 26,017 were foreigners; again, I find by the same return that in 1845 there were 15,704 apprentices, whilst in 1882 the numbers were reduced to 2,992, shewing very plainly a most serious decline in the number of trained sailors in the Merchant Service; and it is an undoubted fact, that captains of ships are now obliged to accept the services of landsmen, principally those known as “corner boys,” not been able to get technically trained sailors. I have recently brought the entire question before the Board of Trade, in the hope that an industrial training ship school might be established in Cork Harbour, for the purpose of training boys to become sailors. If some law was introduced prohibiting men from being employed as sailors who were illiterate and unskilled, and if there was some regulation as regards foreigners, then no doubt an effort would be made by the shipowners to promote the technical education of boys in this branch of industrial employment.

Another question of infinite importance is the training of girls to cooking and domestic service. The workhouse schools present an admirable opportunity for this essential branch of technical education, and a good deal might also be done in the ordinary national schools throughout the country were this branch of education introduced. The Local Government Board have power to have it fully carried out in workhouses, and no doubt a recommendation to that effect would have the desired effect.

Finally, with the view of promoting the general introduction of all branches of technical education suitable to the several localities, I would suggest that lecturers be employed to give lectures, so that the adult members of society may be instructed in the responsibility devolving upon them to promote and assist in the technical education of the young.

Mr.
T. A. Forrest.
—

Mr. T. ANDREW FORREST, Inspector at the Cork Butter Exchange, examined.

7562. (Chairman.) You are a butter inspector of the city of Cork?

—Yes.

7563. Are butter inspectors officials appointed by the Corporation?—
No, they are appointed by both sides of the butter trade—by those who

represent the farmer, and by those who export the butter we stand an examination, in fact.

7564. And the whole of the butter sold in the public market in Cork passes under your inspection?—Yes, we classify all the butter.

7565. Therefore it would be impossible for any change to take place, either for better or for worse, in the quality of the butter brought to the market without coming under your notice?—It would be quite impossible; we should notice any improvement that occurred.

7566. I would wish to know whether, prior to the establishment of the Munster Dairy School, butter was improving in quality or getting worse?—There has been an improvement in butter for the past 15 or 16 years, but in the past 10 years particularly there has been a great improvement in regard to cleanliness, though very many farmers are still insufficiently acquainted with the ways in which butter should be made up; they still stand very much in need of instruction.

7567. Have you any knowledge of the Munster Dairy School?—Yes, I happened to visit it on one occasion, and had an opportunity of judging for myself how the school was worked. I was so much pleased with it that I did everything in my power to get the farmers to send their daughters to be educated there. I believe that that school is calculated to benefit Munster very much.

7568. Were you successful in your attempts to get the farmers to send their daughters there?—I think so. More pupils have attended the school since, at all events. It has not been very long established. I made it my business to see whether there was an improvement on the part of those who passed a session there, and the few students I happened to know who attended the school made very much better butter afterwards than they did before they went there. One that I knew very well never got the highest brand in our market previous to her training at that school. Now she frequently gets the highest quality of butter, and realizes from 10s. to 15s. per cwt. more.

7569. Do the prices realized for butter depend very much on the skill used in its production?—Yes, almost entirely. We are very much behind-hand still in this country in the way butter is made. I have a knowledge of how butter is made in all parts of Munster, and the methods are still, in many instances, very imperfect.

7570. But what I wish particularly to know is this:—Can the produce of a cow remain the same, or is it possible to produce a very much better or a very much worse butter from the same cream?—Oh, certainly, according as it is cared for. Cream is a thing liable to be affected by the smallest impurity in the atmosphere, and according as it is cared for the quality of the butter is good or bad. Churning and the manipulation afterwards, of course, have a good deal to do with it.

7571. All this may be learned in a school like the Munster Dairy School?—Yes; the education there is of a very practical nature, and is calculated to benefit the country very much. At first I was under the impression that it might be too technical, and the people were under that impression themselves; but after the girls had spent a session there, they were greatly pleased. I have spoken of it to many of them, and they have admitted that during the time they spent there they acquired a great deal of valuable information.

7572. You spoke of special instances in which dairymaids who had not been able to attain the highest brand in the market previously, after attending the schools did obtain the highest brand from the inspector?—Yes.

7573. That brand is attached in the market?—Yes; the highest is called the "superfine" brand.

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7574. Are there any other instances of that kind within your observation?—I know a couple of other cases where the make of butter improved after the girls had undergone a period of training in the school.

7575. Which, of course, means a very great advantage to them?—A very great advantage. The difference in the price was very considerable. These parties I speak of were first of all getting the second highest, and then they got the highest quality, making a difference of from 12s. to 14s., and sometimes 20s. per cwt.

7576. That meant an increase from 10 to 20 per cent.?—Yes.

7577. Do you think it sufficient to have but one dairy school in all Munster?—Oh no, I think not. The few persons who are educated in the Cork School in comparison to the whole number is so small that very much good could not be done.

7578. Do the pupils come from a great distance?—Some come from Waterford and from different parts of Munster.

7579. That is inconvenient?—It is, of course, rather inconvenient.

7580. If there was a school at Waterford, do you think it would be attended?—Well, it is very difficult to stir up farmers to these things. They require to have much attention drawn to them before they become at all interested.

7581. But the sooner you bring out the system there, the more likely they are to avail themselves of it?—Certainly; I think there should be several schools like this in different parts of the country. They would do a great deal of good.

7582. Have you any experience of the travelling dairy school?—I saw it here at a cattle show, but I do not think the people gain very much information from its working. It is from curiosity merely that the farmer will come to look at a thing like that.

7583. You think it necessary that girls should spend several weeks at least in receiving instruction?—Yes, that is most essential. I think a session spent at the dairy school is of incalculable benefit. I might tell you that the Committee of Merchants issue instructions every year to the farmers about the improvement in butter, the necessity of keeping the packages clean, of lessening the quantity of salt used, and things to that effect. As I had a good deal of experience of butter management, I wrote a little pamphlet, which obtained a very large circulation in Munster, and in that pamphlet I drew attention to the advantages to be derived from attendance at this dairy school (*pamphlet handed in**).

7584. I suppose you consider that all the literature in the world will make a very much less impression than showing pupils how to work and accustoming them how to do their work properly?—Yes, I am perfectly satisfied of that. This little pamphlet is written in a very simple style, for most of the works published on the same subject had more or less of a technical character, and I think the people did not care to read them.

Rev. Canon
Hegarty.

Rev. CANON HEGARTY, Administrator of S.S. Peter and Paul's Roman Catholic Church, examined.

7585. (*Chairman.*) You are the administrator of the Parish of S.S. Peter and Paul?—I am; and I am the manager of schools where seven hundred children are educated in this city. I have been in various parishes about the city, and I know a good deal about the country.

* Entitled "Practical Butter-making."

7586. Are your schools in connection with the National Board?—Yes. I should wish to say that I have been devoting most unremitting attention to schools for the past 23 years, since I was ordained; I have taken the deepest interest in them because they are, I may say, the germs, the roots out of which all prosperity for the people is to come. I find amongst the people the greatest desire to have recourse to what I must call self-reliance; and with regard to the statement made by Mr. Parker, I may state that I find no unwillingness on the part of the people to pay school fees, nor do I think that the children have been kept away in consequence.

7587. Was your experience in a poor district?—Yes. I was on the shores of Bantry Bay for two and a half years. Then I was at Douglas, and next at Glanmire. I have been 11 years in this city. I spent two and a half years going through America. I saw the school system there, and paid great attention to it. I brought back all the experience I could possibly obtain, taking notes wherever I went through America, and I tried to get the people here to profit by my experience. I think there is absolutely a craving for technical education amongst the people. Last winter I opened a night school for boys who had gone to business, for such persons as had become porters, tradesmen, shop assistants, and so on. It is only when a boy grows up to be about 16, when he is taken away from the school room, that he begins to see the advantage of education; and if I had only 50*l.* at my command I could have made that night school so successful that I am sure it would tend very much to the amelioration of the people, and confer incalculable blessings on them.

7588. Is not that school held in the day school room?—Yes.

7589. Did you earn anything from the working of the school?—Certainly not; I never contemplated making anything by it, but shall be well pleased if I can make it self-supporting.

7590. How much will you be able to earn for your school in the shape of a grant?—They will pay 10*l.* for every 25 boys that attend three nights of the week for a term of six months. They will appoint an assistant also when the numbers increase, and the teachers will get result fees, the same as in the day school.

7591. What are the subjects that you actually teach in the night school?—The three R's principally, but when I myself give, or get the teachers to give experiments in hydrostatics, or show the use of apparatus in a night school, I find the people crowd in, not only the ordinary pupils, but grown men. I was particularly anxious about it, because since my return from America in 1872, I have expended between 7,000*l.* and 8,000*l.* in procuring Church furniture, and over 10,000*l.* in schools. I obtained valuable works of art from Belgium, a pulpit costing 600*l.*, six confessionals costing 100*l.* each, and the sanctuary stalls for the canons at a cost of 350*l.* I got all these things for the purpose of educating the people here. Unfortunately it had not that effect, but on the contrary, I incurred a great deal of odium among the people for getting them. But the fact is, they could not execute them here. In proof of that I may mention that the altar, we are exhibiting at the Cork Exhibition, I got for 400*l.* I could not get that done in Ireland for less than 660*l.* I gave men in Dublin, in Cork, and elsewhere in Ireland a chance of executing this work. They have all the materials here, the various kinds of marble, and everything else, but they could not do it. One man said, "We can do the altar, but we cannot do the figures,"—three statues. Another said, "I can do the figures but not the altar." One sculptor in Dublin, said he would do one work for 230*l.*, while another said he would do the same work

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for 70*l*. The whole work in that way would cost me 660*l*., while I could get it from Belgium for 400*l*. I got some men to put up the pulpit here, but other men who were employed walked away out of the church, and left the scattered fragments of their work lying about day after day for weeks.

7592. What remedy would you provide for that?—Well, if the youths and the rising generation got a fair start, we should be able to keep all those orders at home. We have as good materials as could be found. There is the bog oak of Killarney, which I should prefer to Russian oak. We have five or six different kinds of marble in Ireland, but the people do not know how to use these materials.

7593. You have an art school in Cork?—It is beginning to be useful, and it will do a great amount of good, but hitherto there has been very little of what I would call profitable learning derived from it. The tradesmen were not able to avail themselves of it, and it was not made extensive enough.

7594. Are you hopeful of better results when the new building now contemplated shall have been erected?—Certainly, and when the teachers are increased in number.

7595. Would you begin instruction in manual work in the primary schools?—Certainly. Last week I gave 2*l*. in premiums to the girls of the school in the following way:—for a girl making the best dress, 10*s*.; for a child making the best pinafore, 5*s*.; for a child knitting the best pair of stockings, the same. There is a staff of about twenty teachers in the three schools, and I had the work examined by all the teachers except those who instructed the pupils how to do the work.

7596. If girls are taught sewing, you see no reason why boys should not be taught the use of tools?—Most certainly not. There is an aptitude in the boys to learn, and to profit by the information they receive.

7597. Do you think it necessary that instruction should be given during the present school hours, or that the boys should come afterwards, at four or five o'clock?—Yes, they would return at seven o'clock, and we should then have a better class of boys than those now sent out to work.

7598. What about young boys?—There is a great difficulty about them in this way, that the teachers are paid by results, and they are reluctant to allow any interference with the course of instruction required by the inspector.

7599. But if they had an opportunity of teaching this work in the evening, and they were paid by result it would make some progress?—Most certainly, and I could give convincing proof of that. In our schools the result fees for music will not be divided among the teachers except it be taught within school hours. Now I have engaged that result fees shall be paid to one teacher, to whom I have guaranteed 6*l*. per month, and she teaches music before and after school hours. The children all wait for that instruction, and I have been frequently obliged to break up the music class in order to force the children to go home. They will learn anything from which profit is to be derived hereafter. I might say also that nothing would tell better for the people at large than that a cooking stove should be erected in the schools, which would also serve the purpose of heating the schools during the winter.

7600. What would prevent that being done?—Well, what Mr. Parker said about the managers of schools. I could spend at least 200*l*. a year in ameliorating the condition of the people, if I had paid off the debt on the schools, which have been just completed.

7601. But if your supporters have been so liberal that they have enabled you to get stoves from Belgium, it appears to me there should be no difficulty in raising the money for providing a cooking stove?—Oh, yes, all the money was liberally contributed. The entire community are deeply indebted to Sir George Colthurst, because he has been the means of teaching young women, through the dairy school, the way to cook. The better class feel glad and proud of this step, and I am sure all classes would willingly subscribe to schools of that kind. I promise that if the Government would give 60*l.* a year, 75*l.* would be subscribed for any purpose of that kind. There would not, I think, be much contention about any such thing as technical teaching. Yesterday I was speaking to a few of the principal merchants, and was telling them about coming to give evidence here. They said “Oh, bother, there is too much teaching already,” and they added “that is what led to penny newspapers and demoralized the entire community.” There is a good deal of truth in that, because, unfortunately, people in general do not know anything more than how to read the penny newspaper, that is the narrow confined sphere of intelligence they have.

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7602. That is an additional reason why you are anxious to introduce technical education?—Yes.

Mr. RICHARD CAREY, of Skibbereen, examined.

Mr. R. Carey.

7603. (*Chairman.*) You are, I believe, Director of the Baltimore Fishery Company?—Yes, we take several kinds of fish and cure pilchards. The Company which I represent was started first to cure pilchards, but from that other matters have developed, as, I dare say, you know, and the Baltimore Fishery Company deal extensively in mackerel and other matters. We first started with the idea of curing pilchards only. Our plant has cost over 2,000*l.*

7604. Do the fishermen employed in that part of the coast hail from your district in large numbers?—Yes. We commence taking pilchards in July, and continue from that to the 1st November. The pilchards are then cured, and women and children are employed in bulking them. They are left in salt for a month. They are then washed and put into casks, and the oil is pressed out of them. After lying a fortnight, they are sent to the Italian markets. This is a particularly favourable time for us, because the Cornish fishery is on the decline. They have had very little fishing for the past three or four years, and in consequence we get 4*l.* 10*s.* per barrel, when in other years we thought 2*l.* 15*s.* a very fair price. We also cure cod and ling, when they do not pay the expense of shipping them and sending them across the water. This is very often the case, I am sorry to say, because the railway charges are so enormous. We also catch mackerel, and when there is a great catch and the price falls very much on the other side, we cure them. After we started the pilchard fishery the Baroness Burdett Coutts gave the fishermen of Cape Clear and the islands several thousand pounds to buy boats, and they asked us, instead of going to Kinsale with this fish to buy the mackerel in Baltimore. This we did about four years ago. We sent away 3000 boxes the first year, the next year 20,000. It then rose to 60,000, and this year it is between 70,000 and 80,000 boxes.

7605. That is a very satisfactory state of things, is it not?—Yes.

7606. Where does the fish go to?—The mackerel is sent in ice to the English markets.

7607. That trade seems to be going on very well?—Yes. During the curing of pilchards, some days when we have a good take of

Mr. R. Carey. pilchards, we have between seventy and eighty women and children employed. We pay them twopence an hour, which they are very glad to get. Some Cornish people who have seen them curing pilchards, say that the work could not be done better in Cornwall. I believe, as a matter of fact, that in former years they were cured in Ireland before they were cured in Cornwall.

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7608. Would there be any difficulty in getting Cornish people to teach them?—We had a Cornish man for two or three years, but our people became so expert that we ceased to employ him, and they now do the work themselves.

7609. That is very satisfactory, is it not?—Yes, and it saves a good deal. We have five or six seines which would enclose 200 hogsheds of pilchards at a time. We give those seines out to the fishermen, and they pay for them by giving half the fish to us; we purchase the other half.

7610. Well, this seems to be going on nicely?—Yes, it is doing very well indeed.

7611. You would like to see this trade still further extended?—Certainly. The putting up of a curing cellar is the chief cost. Fifteen hundred pounds will be the price of a good curing cellar, and you can only cure pilchards in this concern. Pilchards are very fragile fish, and must be put in salt within two hours after being caught. We have a small steamer—a launch rather—which goes round the shore within three or four miles of each side of us to pick up the pilchards. They do not care for pilchards in this country, and the fishermen have an idea too, that they rot their nets, there being so much oil in the fish.

7612. Are all those nets tanned?—All ours are, but the nets belonging to the local bands are not.

7613. You understand that this Commission has for one of its objects the inquiry as to what technical instruction may be given to different portions of the population. Is there anything you could state with regard to that arising from your experience of this fishery?—What I would suggest is that the people be taught to pickle the fish round the coast, and then we would take almost any quantity of them. That work would merely mean putting them into pickle in casks. If the people would do that, the fish now worthless to them would be of value, for we would take them at prices very remunerative to them.

7614. It would pay you to teach them to do that?—It would, certainly.

7615. Why do not you do it?—Well, I and a few gentlemen with me tried to do so, but we happened to be otherwise busily employed, and we could not give sufficient attention to it.

7616. You have been so busy organising this large trade in your neighbourhood that you have not had time to attend to it?—We have not time to attend to it further than we have done in our immediate locality.

7617. Are there not other gentlemen along the coast who would be sufficiently patriotic to follow your example and teach them how to pickle the fish?—I do not know that there are; the thing is very simple. It is only to catch the fish and put them in pickle, and send them to us a few weeks afterwards.

7618. Could you suggest any one else who would do it?—I could not indeed. I have been told that at Dungarvan the sea is simply alive with pilchards, but the fishermen will not take them as there is no market for them.

7619. You mean that there is no person who will undertake to cure them?—Precisely so. If they were caught they would have to be used as manure. Mr. R. Carey.
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7620. But then, I would ask you, are there no men in the neighbourhood of Dungarvan sufficiently public-spirited to do what you have done in Skibbereen?—I do not know of any. The oil of pilchards is a most valuable product; we sell the oil in Liverpool, and I am told, though I do not know it of my own knowledge, that it is there distilled and sold as cod liver oil. The refuse after curing the fish is invaluable to farmers. It is splendid manure.

7621. And your opinion is that when the statement which you have made before us to-day is published in the evidence, that it probably may stimulate others to undertake the good and profitable work as you have done?—Precisely. Pilchards formed a very important portion of our exports from Ireland a couple of hundred years ago. And I see no reason why pilchard fishing should not be revived along the coast.

Mr. JAMES BRENNAN, Head Master of the Cork School of Art,
examined.

Mr.
J. Brennan.

7622. (*Chairman.*) How long has the school of art been established in Cork?—Since 1854.

7623. And you have had artisan evening classes ever since?—They have been in existence since the establishment of the school; I have been master of the school since 1862.

7624. And the classes, I suppose, are in the usual subjects connected with the Science and Art Department?—Yes; the usual subjects taught in Schools of Art.

7625. Do you prepare any students for the second grade examinations of the Science and Art Department?—Yes; we do.

7626. What are the class of people that attend? Are they mostly people of the artisan class at the reduced rates?—In the evening classes, almost entirely so; in the morning classes we have various grades of society represented. At the same time a great many attend who are in positions above that of artisan, and yet come within the "industrial," definition of the Department—that is having an income of under 200*l.* a year.

7627. We have had it in evidence from several gentlemen who have been examined, that there is a great want in Cork of instruction in drawing suited to the trade requirements of the town, and it is frequently urged that the South Kensington system does not enable the teachers to give that latitude to the work which is necessary; is that your opinion?—I do not consider this to be the case. The Science and Art Department gives considerable latitude as to the course of study, simply requiring that good examples shall be used. I believe that those who make this statement know nothing of the working of the school. I think that as regards the two subjects of building construction and machine drawing, the course of instruction laid down by the Department is very full indeed, and the best proof of that is in the numbers who attend here. The artisan students who attend the school never make, nor have they at any time made, any complaints as to the unsuitability of the course of instruction to their requirements. I refer more particularly to those attending the classes for descriptive geometry,

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machine drawing, and building construction. We had a large class for machine construction when the ship-building trade was carried on here, but since the Great Southern and Western Railway Company removed their workshops from Blackpool to Inchicore we have had very few students for machine drawing. But the building construction students do very well, and we have a very fair class—from 16 to 20.

7628. These subjects are in connection with the science division in South Kensington, not with the art division?—They are connected with the science division; but the art masters who obtained their certificates before 1869 are, as you know, allowed to teach three subjects, solid geometry, machine drawing, and building construction. When that rule was made I took advantage of it. I also went to London and attended the summer courses of lectures in machine drawing and descriptive geometry, in each of which subjects I obtained a first-class certificate. We have been most successful in passing students in the three science subjects. I can show you lists for years.

7629. Can you state of your own positive knowledge that the classes held here are equally valuable both in the matter of the time at which they are held, and as respects the way in which they are conducted, for the operatives of the building trade of Cork?—Yes, I believe them to be so. The classes are held in the evening at a time when those who are anxious to attend can do so. If they like to come, the facilities are here. As regards the way in which they are conducted, I believe that every student who has attended and gone through the course can testify as to the benefit he has derived from it. Two instances occur to me. A carpenter named Patrick O'Keefe, was apprenticed to a builder in this city, he attended this school, passed the examinations in second grade art, building construction, geometry, &c., and was so far qualified by the instruction received here, that at the expiration of his apprenticeship he was able to take the situation of foreman in Messrs. Bywater's establishment in London, which he retained for some years, until he went into business on his own account. The second instance is rather interesting. When the shipbuilding yards were in operation in Cork, a foreman boilermaker called one night at the school to know if I could give him any information about striking out the plates for a peculiar form of buoy that he had to make. I showed him the method by which the form could be developed; he became a student of this school, passed through the course in solid geometry, and attended regularly until his departure from Cork.

7630. Will you kindly put in a statement, showing the number of passes in these building construction subjects for the past few years?—Yes, I will.

7631. Can you suggest any plan upon which art work here in Cork can be made more generally available for the wants of the town, or by which the manufacturers of Cork could be brought more directly into connection with the school?—There are few manufactures in the city of Cork to which art can be applied. I think manufacturers would be brought more directly into connection with the school if they took a greater interest in their workmen and apprentices. If they really wished them to improve, they would be careful to cause them to attend the school; and perhaps by visiting the school themselves, enquiring into their progress, rewarding those who made improvement, &c., they might accomplish a great deal of good. Art students who intend to devote themselves to art as a means of livelihood always look forward to leaving Cork for London or America, where there is a prospect of obtaining

remuneration for their labours. I do not think there is sufficient manufacturing carried on in Cork to give constant employment to art designers; I think, however, that if the students who purpose to become designers could by any means become acquainted with the technical details of the manufacture for which they intended to design, a very great want would be supplied. I will give you an instance of a lady here who wishes to be a designer. She competed for the prizes for lace, offered last winter by the Dublin Exhibition, and she got the first prize. That was what gave her an impetus. There was nothing in Cork of that nature to which she could turn her attention, and I suggested to her the making of designs for damasks, principally as she mentioned that she had some friends in Belfast who would probably give her some information. She did so, but the designs could not be worked because they were not applicable to the material for which they were intended, and therefore were technically incorrect. After a great deal of correspondence and explanation by letter and drawings, she has at last succeeded in making a workable design which is to be shown at the Cork Exhibition. Now if by any means that lady could have been permitted to visit a manufactory and have become acquainted with the technical processes, I think a great want would have been supplied.

7632. Can you state whether the students who have been trained in the school have been found well fitted for serving as designers for manufactures, and could you give any instances?—I know of several cases where they have been successful as designers. One lady trained in this school is at present engaged as designer at Marcus Ward's, in Belfast. Several of our students designed tiles for a firm in Boston, Lincolnshire, for some years; these tiles were manufactured, and, I believe, had a good sale. Another student furnished designs for poplins, which were manufactured by Messrs. Pim, of Dublin, and another was awarded the first prize for lace at the Dublin Exhibition last year.

7633. Can you suggest any other means by which the manufacturers of Cork can be more directly interested in the work of the school, either by inducing their apprentices to attend, or by supporting the school more thoroughly than they do at present?—If the manufacturers of Cork followed the example of Messrs. Doulton, of Lambeth (who give a small increase of wages to all persons in their employ who pass the examinations of the Science and Art Department), their workpeople would improve, the school would be benefited, and the interest of the manufacturers in the school would be greatly increased.

7634. Do you think anything could be done by getting the permission of manufacturers for the admission of successful students to their works?—I think that students who had proved themselves, by their success in the course of study, capable of becoming designers, might be sent to the manufactories to learn the technical portion of their art, while the handicraftsman who showed some aptitude for drawing or design ought to be induced to attend schools of art and science so as to become acquainted with drawing.

7635. Do you consider it would be advisable to call the attention of the authorities to the want of an industrial museum here in Cork?—I do; because there are no examples in art or its application to design to put before the students, and I believe, too, the insensible influence exercised by constantly observing a number of good examples would be very great indeed. But at present there is no building in Cork calculated for the reception of such a museum. We hope to have a school of art and science with a museum attached to it, and already ground has been purchased for the purpose.

Mr.
J. Brennan.
15 June 1883.

354 ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

Mr. J. Brennan. 7635a. RETURN of STUDENTS attending SCIENCE CLASSES at CORK SCHOOL OF ART.
18 June 1888.

Year 1875.

		Numbers attending the Examinations.	Numbers who passed the Examinations.
Descriptive geometry	-	2	1
Machine drawing	-	4	1
Building construction	-	7	7

1876.

Descriptive geometry	-	3	3
Machine drawing	-	8	8
Building construction	-	10	9

1877.

Descriptive geometry	-	1	1
Machine drawing	-	8	5
Building construction	-	7	6

1878.

Descriptive geometry	-	1	1
Machine drawing	-	4	3
Building construction	-	9	8

1879.

Descriptive geometry	-	1	1
Machine drawing	-	2	0
Building construction	-	11	11

1880.

Descriptive geometry	-	3	3
Machine drawing	-	1	1
Building construction	-	11	10

1881.

Descriptive geometry	-	3	3
Machine drawing	-	0	0
Building construction	-	8	8

1882.

Descriptive geometry	-	4	4
Machine drawing	-	4	1
Building construction	-	5	6

1883.

Descriptive geometry	-	5	4
Machine drawing	-	2	2
Building construction	-	7	6

Mr. THOMAS SCOTT, Millfield, examined.

Mr. T. Scott.

16 June 1888.

7636. (*Chairman.*) You are, I believe, a manufacturer of chemical manures?—Yes; and of other chemicals.

7637. And you employ a considerable number of hands?—Yes, a fair, but not a very large number. I have not been very long carrying on business myself. I was manager of Messrs. Goulding's works for some years, and am intimately acquainted with the trade.

7638. Do you employ skilled workmen, or principally men who are of the nature of labourers?—I have to employ skilled workmen for the management; for instance, I had to send across to England for a man who must get high wages, but others have to work at labour which is quite new and rather difficult to ordinary labouring men. But my experience is that they have sufficient intelligence, though uneducated, to work at those difficult and even hazardous processes; the drawback is that if difficulties arise, and anything goes wrong, they are at a loss, because they do not really understand the nature of the processes they are engaged in.

7639. Am I right in thinking that the men come to you as labourers and not as artisans?—As labourers.

7640. And do you take apprentices?—Oh, there is no such thing as apprenticeship in the business; boys come in and grow up to it; but there is no such thing as binding them to serve a number of years.

7641. Are you of opinion that it would be possible to benefit the workmen in your employment by night schools or by evening instruction?—I am strongly of that opinion, and I think I may say that employers would be glad to subscribe towards the education of their intelligent and deserving lads who would attend such schools. I am sure employers would be glad to subscribe and assist such a project in every way.

7642. Do you think, if such classes were established in Cork, the workmen themselves would be willing to acknowledge the advantage of them, and would attend the classes?—Not at first, without inducement; not until they saw the real benefits of attending them.

7643. How would you propose, then, to draw their attention to those classes—which do not exist at present, we may take it?—Each employer would, as a matter of interest to himself, draw attention to the classes, and use his influence with smart and intelligent boys, whom he found wishful to get on, to induce them to attend the classes, and might agree to assist in paying for their education. The reason I say they would not see the advantage is, because these workmen are not educated, and, as you know, they do not appreciate the advantages of any education.

7644. Are the workmen in your employment sufficiently skilled in the ordinary elements of primary instruction, to benefit by the more advanced technical instruction which you are now proposing they should receive in these evening classes?—The younger ones, the boys, are; but many of the older ones are not able to read or write, and those classes would not be of the same advantage to them.

7645. You have said that you think manufacturers so far see the need of this class of instruction, that they would willingly subscribe or bear part of the expense of it, if means were found to establish those classes; do you think that the Government should take the initiative, or should the initiative come from the manufacturers?—Well, that is a question that I have not considered, but, on the spur of the moment, I think that the circumstances of the country are such that the Government would be quite justified in showing the way; and they would be practically

Mr. T. Scott. backed up by the local manufacturers. I have great reason to believe that all the manufacturers would take this matter up and subscribe, but I think you should give us encouragement by taking the initiative, and I am convinced that many parents would willingly pay for the technical education of their children. But unless the manufacturers and citizens recognised the advantages to be gained by such a school, and showed their recognition practically, I think the Government would be quite right in not doing anything in the matter. As a test of the reality of the desire expressed for a technical school, the Government might require, fairly, that a certain number of pupils should be guaranteed.

18 June 1883.

7646. Do you think that the instruction which might be given should be of a practical nature—that there should be laboratories in which the lads could practise those processes ; or should it be simply theoretical—by means of lectures and experiments ?—I am strongly of opinion that it should be practical. Some of the lads have had a fair education, but lectures would be too difficult—too theoretical for them. Practice would enlist their interest and would draw out their natural energies far more than lectures or mere explanations.

7647. Do you think that the teaching in the National Schools for the more advanced lads might be made of greater value, if so modified as to lead up to and prepare them for the subsequent instruction in those technical schools ?—I do ; I think it should be managed in that way.

7648. Have you any reason to think that the present National School instruction is not calculated to prepare workmen for an industrial career ?—Not specially ; I think not. I have a large family, and I judge from the instruction of my boys who are at a very good National School in Cork. I should say that the education is not at all specially carried out with that view ; but the children receive a very good general education.

7649. The Commissioners have found that in certain of the schools abroad, instruction is given in the primary school—not, it is true, in the school hours, but in the school building—in the use of tools and ordinary industrial work : Do you think that such a system could be introduced into Ireland with advantage ?—I think so. Of course it should be optional ; some parents may have children at school whom they would not wish to be so engaged, though I think the majority of the parents, and indeed of the children too, would desire it. But there may be parents who desire their children to enter professions, who would object to see them spending time on those occupations.

7650. The business in which you are engaged is one requiring a considerable amount of technical skill. Are you of opinion that if technical schools were established, chemical manufactures might be extended in the south of Ireland with advantage, and that young men might be trained who would be capable of helping in the establishment of such manufactories ?—Yes, I am decidedly of that opinion. The difficulty we have to deal with in the south of Ireland is that there are many branches of manufacture which, for want of skilled labour, we cannot take up against English or Scotch competition. There are many things in which, of course, England has the advantage, but there are many other things with respect to which there is no special reason why they should be manufactured in England or Scotland and not in Ireland. Such is the case, I believe, with chemical manufactures. First, the expenditure in the matter of coal in a great many chemical manufactures is relatively very slight, whereas in many other manufactures it is a serious consideration. Then again, chemical products are restricted to no one special locality for their sale ; the large chemical

manufactures in England and Germany do not depend on England or Germany alone for their sales. *Mr. T. Scott.*

7651. In connection with that, the fact of Cork being a seaport town, and having such a capacious and suitable harbour, would facilitate a large export trade. I think that a technical school would give rise to the manufactures of paints and alkalies, by-and-bye, but not until we had some well trained men. I know gentlemen at present living in Cork, with plenty of money, who would willingly invest that money in trade of almost any description, if they could see their way to doing so with profit. But the great difficulty that always arises—as I have heard these men themselves say—is the want of skilled labour. *12 June 1883.*

7652. How are we to get this?—I think by beginning with the technical school, which would give us skilled boys. If such a school were in existence it would gradually give manufacturers and capitalists more confidence in commencing new manufactures, or largely extending existing ones.

7653. May we take it that the chemical trade of this district and of the south of Ireland is at all adequate to the demands of the country at the present time. Are chemical manures largely imported into Ireland?—Very largely imported; a much larger proportion of chemical manures is imported into the country than is made here. For instance, in the city of Cork, more imported manures are sold than those manufactured locally.

7654. Can you suggest any other manufactures of a chemical nature beyond those you have already named which might be applicable to this country?—There might be many others; for instance, the manufacture of sulphuric acid leads to a great many manufactures; but I would not expect those manufactures to arise until we had some really good well trained men, because some of them are rather delicate processes, and the demand for such products does not exist to any great extent in Ireland. The woollen trade now promises to extend largely throughout Ireland, and in that trade various chemicals are required for cleansing and dyeing purposes. There is a small industry that has lately arisen in Cork—the manufacture of lucifer matches; that has been successful, and such a trade as that could be largely increased for exports. I believe the one firm, Messrs. Collins and Hastings, that carries on this manufacture in Cork, had to get their skilled labour from across the water. That is a trade which might be cultivated extensively, of course, and if we had a better class of skilled boys and girls the necessity, to which I have referred, would not have arisen. There are many other manufactures, too, that might be introduced here. The reason why I mentioned paint a little while ago was because we have two or three very good barytes mines in the Clonakilty and Bandon districts, and that barytes is now being sent to America as well as to England for this purpose.

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APPENDIX J.

Appendix J.

See Evidence of Mr. Mulligan (p. 6.)

DUBLIN MUNICIPAL COUNCIL.

REPORT of the Science and Art Museum Committee, re Technical Education.

On the 4th December 1882, the Municipal Council adopted the following resolution, and referred it to the Committee named at the request of the public meeting of citizens in the matter of the Science and Art Museum:—

RESOLVED:—That the Council make a representation to the Government of the extreme importance of extending to Ireland the inquiries of the Royal Commission now engaged in investigating the state of Technical Education in Great Britain and on the Continent; and to empower the Commission to report as to the best plan for establishing a system of technical instruction suitable to the circumstances of the country.

Your Committee have received and adopted the following report, prepared by Councillor John Mulligan and Councillor Webb:—

Your Committee have considered the question of technical education in Ireland. They have had before them the Report of the Royal Commission, so far as it relates to France. They have carefully gone over the scheme being carried out by the Associated Guilds of London, and are aware of much of what has been of late written and spoken in Ireland upon the subject. Their conclusions must take the shape more of general than of very definite proposals.

The more the question is looked into, the more its importance becomes apparent. Your Committee are persuaded that unless immediate steps are taken to carry out the technical idea in the primary, intermediate, and higher schools in Ireland, the people at large will inevitably be left behind in the industrial progress of the time, and as permanent injury may be inflicted upon Ireland as was inflicted upon her in the last century, when her manufactures were deliberately extinguished. The Continental nations are straining every nerve in the matter; England is fully alive to its importance, and in its board schools (backed up by the public opinion of the country, and managed on a flexible system that leaves an opening for different plans and systems being tried side by side), all the intelligence of the country is brought immediately to bear upon every phase of the education question.

We think that the subject is of especial importance in Ireland, where the circumstances of the country have led to large numbers of the people being reared and nurtured in listlessness; where for such a long period, education was forbidden or discouraged; and where, so far as the State is concerned, it has never been brought fully into accord with the feelings of the people.

We conceive that education in Ireland is on too exclusively a literary basis. We believe that from the earliest years the training of the hand, the eye, and the mind, whether by the *kinder-garten* system or otherwise, should be made a matter of primary importance. We think that all alike should be taught drawing, as the best preparation for almost any avocation. We think that for girls who have to go out into the world as domestic servants or tradesmen's wives, there might be some better preparation than a smattering of French or the ability to play a few tunes on the piano. Calisthenics should be a part of the every-day training in all schools. In some way the record of each child's attendance and progress should be carried on from year to year, as a surer incentive to steadiness, and a surer test of character than any examination or examinations.

In the principal towns throughout the country, schools should be more completely equipped for instruction in industries suitable to the particular locality—such as weaving, dyeing, chemistry in its relation to trade,

Appendix J. cookery, seamanship, and fishing; special instruction should be provided for butter-making; schools of agriculture should be re-organised or revived.

To provide for students in the higher branches, and for the education of young men to be managers and foremen, the College of Science in Dublin would very well serve as a central institution—for entrance into which, as into secondary schools, a strict examination (taking into consideration the personal record) should be made, otherwise its uses would be impaired, and its professors would be wasting their energies teaching the rudiments of science. The higher education of women in arts and industries and teaching should be fully provided for in the local schools, and in a central institution upon the plan of the Queen's Institute in Molesworth Street. We consider that the advantages offered by examinations under the London Guild Schools' scheme should be immediately availed of by committees of manufacturers, without prejudice to the ultimate establishment of a similar scheme for Ireland, upon an independent basis.

It might be desirable that the power should be conferred upon boards of guardians of transferring orphans to industrial schools.

To what extent the advantages of the changes we have shadowed forth can be obtained through present institutions in Ireland, and to what extent, and in what manner legislative powers should be sought, this Committee does not take it upon itself to determine. Every legitimate use should be made of existing instrumentalities.

Your Committee must, however, declare its conviction that until the educational institutions of the country are brought fully into accord with the religious and national convictions of the people all education will remain dwarfed, all real progress will be retarded, and the best interests of the people will be irremediably sacrificed.

If such accord were established, your Committee would recommend the introduction of a compulsory system of education.

Under the present system, attendance is exceedingly bad, and whilst this continues, the foundation of success in technical training, namely, sound and accurate primary teaching, cannot be laid. Furthermore, an injustice is inflicted upon the teachers, who do not get a fair chance to sustain their reputation, or of earning the increment to their meagre salaries dependent upon results. There is also injustice to the children, who are only half taught, and, above all, there is an injustice to the country, which suffers from the absence of the sound education of its people, and from the presence in our midst of all the evil consequences of ignorance and idleness.

There is no need of any Act like that of the School Board to effect a reform in this matter of attendance. Committees fairly chosen could, as in several places in England, be charged with this duty. Your Committee strongly press this point upon your notice.

All which we submit as our report this 29th day of January 1883.

CHARLES DAWSON, M.P.,
Lord Mayor,
Chairman.

City Hall.

Appendix K.

APPENDIX K.

See Evidence of Mr. J. Murray (p. 119).

MEMORANDUM FROM IRISH HOME MANUFACTURE ASSOCIATION.

To Her Majesty's Commission on Technical Instruction.

GENTLEMEN,

As a body, the aim of which is the encouragement of manufactures in Ireland, we beg to lay before you the following statement of our opinions upon the subject of your inquiries.

The need of technical training being perhaps, nowhere more apparent, than in Ireland, for in no other country in Europe are the natural resources so little developed, owing in a great measure to the absence of skilled labour, which is the great preventitive if advantage being taken of many of the resources which would yield employment and profit:—

I. There is, therefore, an absolute want for technical instruction.
 II. In imparting which it is necessary to guard against superficial and imperfect methods. Under this head, we would express our condemnation of the system at present pursued in reformatory schools, which, according to the testimony of employers and tradesmen, is of but little practical use.
 III. The necessity of technical training for juvenils and female labour in the lighter branches of manufacture, which would be a means of lessening the cost of production, and enable competition, as regards price, with the goods of foreign countries. For such labour there being little or no employment here.

IV. The introduction of processes of manufactures not now carried out in this country, but for which a fair field exists; such as—

Carpet making.	Wood Carving.
Clock "	Straw plaiting.
Toy "	Glass engraving.
Leather case making.	Leather dressing.
Calico making.	Calico printing.
Pottery "	&c. &c.

V. The introduction of improvements in the processes of manufactures already carried out in this country. Instruction in the use of new tools and of machinery, as far as practicable. A skilled comparison of the goods of other countries, with those manufactured here.

VI. To advocate a system of free lectures in the evening, as given in Paris.

VII. If examinations are to be held, that they should be, as far as possible, viva voce. As many practical and even clever workmen, not being used to furnishing written statements of their views, would, in many instances, but imperfectly express their meaning.

VIII. To remember, that owing to the very different and almost entire want of opportunities for instruction in this country, it might be necessary to have a system differing in many particulars from that which would be suitable in England or Scotland.

IX. Instruction in the use of tools to form a part of the education given under the "National Board" in Ireland.

X. That the system adopted be in sympathy with the people, and that no obstacle be placed in the way of those wishing to join such schools, either for want of previous instruction or position.

The last suggestion may, in the minds of some, seem unnecessary, but when we consider the number of well-meant schemes which have been launched amongst us, and which have proved but a waste of public money, we would wish to emphasize it in the strongest manner.

This statement is made as the result of our discussion upon the question, and if the Commissioners desire to address any queries with reference to their own views, or respecting the statements contained in this paper, two or three of the members of the association, who have been deputed, will, in the event of the Commissioners requiring their attendance, wait upon you.

We, have, &c.

B. MATERNIS, Chairman.
 JAMES MURRAY, Secretary.

APPENDIX L.

*See Evidence of Mr. Murray (p. 120.)*MEMORANDUM RESPECTING TECHNICAL EDUCATION IN DUBLIN FROM
MR. J. MURRAY.29, Lower Sackville Street, Dublin,
July 30th, 1883.

To the Royal Commission on Technical Instruction.

GENTLEMEN,

I beg to lay before you the following suggestions which are made, as the results of some inquiries made amongst the classes for whose benefit technical schools are intended, viz., employers and workmen.

I.—“*Royal College of Science.*”

As I gathered from the statement of one of the members of the Commission, that it was the intention to recommend the use of the building now occupied as the “Royal College of Science,” for the purpose of the Central School for technical education in Dublin, I would first say, that as the number of pupils who attend the college in the day-time is so limited, and as other institutions in Dublin offer facilities for the study of applied science, these classes might be discontinued. The classes held in the evening, however, are fairly well attended, and there is no other place in Dublin where such instruction can be had at night classes; it would be a serious loss to have those classes discontinued.

The collection of minerals, &c., could be sent to the new museum, and ought to be kept intact.

It would be, I think, feasible to carry on the evening classes, now held in the Stephen’s Green building, in the “Royal University,” and under the auspices of the senate and fellows of that corporation.

II.—*Branches.*

Two or more branches to be established where the more elementary subjects only should be taught. These branches to be situated in the more crowded parts of the city, and care to be taken that they be near the residences of the workpeople.

III.—*Technological Museum.*

There is, even at present, need of a collection in which “raw materials,” and their state, and the changes which they undergo in the course of manufacture, would be shown. There being scarcely any part of the specimens exhibited in Dublin of any use for the purpose of showing the stages of manufacture, the temporary museum not excepted.

IV.—“*Dublin Mechanics’ Institute, &c.*”

Facilities, such as exist for the formation of classes under the Science and Art Department, might be offered to institutions such as the “Dublin Mechanics Institute,” “Dublin Working Men’s Club,” &c., for the establishment of primary classes in connection with the Central School. But, I am of opinion, that such institutions in Dublin could not, with any advantage, be otherwise made use of.

V.—“*Model Schools.*”

Although this is a matter that concerns the provinces of Ireland, I will add a word, as it is from the provinces that a great number of the tradesmen of the city are annually drafted.

In different parts of the country the "Model schools," deriving a very large annual grant, are, when attended by pupils at all, attended by such as require no State aid for their education, their parents being almost without exception, well able to pay for their teaching. If such schools were devoted to the purposes of technical education, and the money spent on their maintenance used for a like purpose, a real profit would be derived from them, instead of the glaring loss.

Appendix L.

VI.—Control.

This is really the important point, and is the one at whose doorpost failures are to be laid.

The persons to be selected as "Visitors," "Governors," or whatever title may be given to them, should be such as have gained the favour and confidence of the populace, and should be persons intimately acquainted with their wants and wishes. A greater necessity for such a choice exists in this case for the reason, that as the instructors of technical education must almost of necessity be persons from other countries, every provision should be made to guard against the new institution being viewed with prejudice, as would naturally be the case, where both the governing body and the teachers were persons who were strangers to the people. For, I include under this head many of the well-meaning gentlemen who are usually selected for such appointments in Dublin.

I have, &c.

JAMES MURRAY,
Secretary,
Irish Home Manufacture Association.

APPENDIX M.

Appendix M.

CIRCULAR OF INQUIRY RESPECTING INDUSTRIAL EDUCATION.

The following Circular was issued by the Commissioners to a large number of oligymen, landed gentry, newspaper proprietors, manufacturers, and others in Ireland, and the answers received have been epitomised in the following tables.

The replies are placed according to the position of the counties on the East, going from North to South, and then the Western counties are taken in the same sequence.

ROYAL COMMISSION ON TECHNICAL INSTRUCTION.

IRISH INDUSTRIAL EDUCATION.

"The members of the Royal Commission on Technical Instruction having ascertained that in some Continental countries instruction is being given successfully to the children in elementary schools in the use of the tools ordinarily employed by workers in wood and iron, and that, in remote and poor districts, domestic trades have been and are being taught, with the result of giving fairly remunerative employment to the population, two of their body recently visited Ireland in order to inquire whether similar steps might be taken with advantage to the people, more especially in the West, where employment is at present scarce and greatly needed, in order to supplement the very inadequate sustenance afforded by the cultivation of small patches of a barren soil. They have obtained promises of support from various influential quarters, including His Grace the Catholic Archbishop of Tuam, several Bishops and members of the Protestant and Catholic Clergy, the National Board of Education, the Managers of the Artane Industrial School, and various other public bodies and representative persons. At the suggestion of the Archbishop of Tuam, and of the Very Rev. Dr. McCormack, Bishop of Achonry, they have drawn up the following questions, with the view of obtaining definite information that may guide them in their conclusions and recommen-

Appendix M. datations, and they will be glad to receive such answers thereto as your local knowledge may enable you to give :—

1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needle-work, &c.?
4. How, and from what age, are children occupied?
5. Are the people generally intelligent, industrious, and handy?
6. What natural products or materials (such as wool, leather, wood, straw, marble, or osiers) are obtainable in your district which are not at present profitably employed for industrial purposes?
7. Is water-power easily obtainable from streams?
8. At what distance apart are the National Schools? Name the schools nearest to you.
9. How many children attend the schools?
10. From what distance do the children come to attend school? What are the school hours?
11. Do any of the children learn drawing? If so, how many?
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?
14. Is there any skilled artizan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of tools employed in his trade?
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payments on results?
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?
18. Have you reason to believe that the people
 - (a.) Children
 - (b.) Adults
 would avail themselves with alacrity of such instruction if offered to them?
19. Have you any other suggestions to offer, which may assist the Commissioners in carrying out the objects they have in view?
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.
22. State your own name and occupation, and proper postal address.

(Signed) B. SAMUELSON, *Chairman.*

Please send this form, when filled in with your replies, to

GILBERT R. BEDGRAVE,

Secretary of the Royal Commission on Technical Instruction,
South Kensington Museum,
London, S.W.

REPLIES TO CIRCULARS.

Antrim	12
Down	1
Down and Armagh	1
Louth	3
Monaghan	2
Meath	3
Longford	2
Westmeath	1
King's County	2
Cavan	1
Queen's County	5
Kildare	5
Dublin	8
Wicklow	3
Carlow	2
Kilkenny	1
Donegal	5
Fermanagh	1
Fermanagh and Tyrone	1
Tyrone	2
Sligo	4
Galway	4
Clare	1
Mayo	0
Limerick	10
Kerry	2
Cork	11

Questions.	Answers.	
	ANTHIM.	
22. State your own name and occupation, and proper postal address.	Rev. G. Johnson-Smyth, M.A., clergyman.	Rev. Jno. W. Bleator, clergyman.
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Glenary	Soldierstown, parish of Aghalee.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Farming	The higher class farming; some of the lower class weaving. Many have hardly any means of livelihood.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	. . . . .	Weavers earn 10s. week. Labourers 6s. to 8s. week.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, etc.?	They help in the families. Knitting and needlework, &c. are done by the girls.	"Some of them weave. Hem stitching."
4. How, and from what age, are children occupied?	Generally from the age of 10 years.	From about 10. Many of them wind bobbins for their parents.
5. Are the people generally intelligent, industrious, and handy?	Fairly so	Yes
6. What natural products or materials (such as wool, leather, wood, straw, marble, or osiers) are obtainable in your district which are not at present profitably employed for industrial purposes?	Osiers are cultivated in some districts, and baskets are made.	Straw and osiers
7. Is water-power easily obtainable from streams?	Water-power might be utilized.	In a few places
8. At what distance apart are the National Schools? Name the schools nearest to you.	"There are many in the parish, and three scriptural schools."	3 miles apart. 4 named . . .
9. How many children attend the schools?	"Very good attendance in the scriptural schools; cannot answer for the National Schools."	About an average of 45 per school.
10. From what distance do the children come to attend school? What are the school hours?	. . . . .	½ to 1 mile. 10-5
11. Do any of the children learn drawing? If so, how many?	Not that I am aware of	A few of them

Continued on page 394.

Answers.			No. of Ques- tion.
ANSWERS.			
Rev. Samuel M. Moore, M.A., clergyman.	Rev. Jno. McConnell, Presby- terian Minister.	Rev. Geo. Conway, P.P.	23
Lisburn, Dunmurry, Derrigley, Upper Falls.	Dundrod (Crumlin)	Hannahstown, Rock, Stoneyford, Dunmurry.	21
Agriculture (chiefly), bleaching. Hand-loom weaving still exists.	Farming and dairy work	Farming, quarrying, and break- ing stones.	20
The well-doing work hard and allow themselves little leisure. Earnings not nearly so good as they were.	" " "	6 a.m. to 6 p.m. Barely a suffi- ciency for their support.	19
Yes, largely in the bleach-works, and in house-weaving, lam- bouring, &c. Earnings small.	No home industries	Help on farm and do house- work. No home industries worth speaking of.	18
Half-timers go into the mills at 12. Full-timers at 14	Generally on the farm as soon as they are able to work.	Herding, nursing, &c. from 5 years upwards.	17
A fair proportion are; a few exceptionally so.	Yes	Yes; some of them extremely so.	16
None that I know of	" " "	Some wool, straw, cattle grazing, hay and rushes, heather.	15
Yes	Yes	Yes, with rare facilities	14
About 3 miles. (?) 4 named	About 3 miles. 8 named	Between 3 and 4 miles. 2 named.	13
(?) About 100. Large attend- ances at all.	At Dundrod an average of 70	Hannahstown, 60 to 70. Rock, 30 to 40.	12
Some over 3 miles	From 1 to 3 miles. 10-3	Up to 3 miles. 10-3.	11
No	Does not know of any	No	10

Continued on page 394.

Questions.	Answers.	
	ARTHRIM.	
13. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	As regards the school-rooms under my control arrangements might be made.	Soldierstown School which I am both patron and manager, can be obtained with pleasure.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	See 12	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	- : -	- - -
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Cannot answer	- - -
6. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Could recommend a very intelligent and skilful carpenter.	There are carpenters, blacksmiths, shoemakers, &c. but whether they could teach I do not know.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	This is a very comprehensive question, and the success of such a scheme would, I apprehend, altogether depend on the extent of the advantages offered.	- - -
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	See 17	Yes
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	- - -	Will be happy to assist in any way.
20. What facilities, if any, exist for disposal of the work done by adults or children? What railway or canal communication exists?	Railway communication with Belfast.	Believes articles could be disposed of. Station at Moira; also canal; within 12 miles of Belfast.

Answers.			No. of Question.
ANSWERS.			
Yes	Is sure the school-room would be obtainable.	Yes, with pleasure	13
One erected which could be made available.	Yes	Plenty of room	13
Yes	There is a country carpenter, but cannot say as to his ability to give instruction.	Not more than 3 miles distance	14
Yes, I think so	It is likely the master would	No	15
Several good house carpenters, & . . . . .	. . . . .	Could be found easily	16
Very frequently	We could make the effort and see.	Everything possible will be done under the circumstances.	17
If they saw a prospect of turning it to account they would.	Some probably would	I believe so	18
None at present . . . . .	. . . . .	Not at present	19
Both close at hand	Railway 4 miles distant, canal 3	Railway at Dummurry, 3 miles distant. Railway at Belhat, 3 miles distant.	20

Questions.	Answers.	
	ANTRIM.	
22. State your own name and occupation and proper postal address.	Lancelot Turtle, Esq., gentleman.	Mr. Bennett Magarry, farmer.
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Aghalee	Lisburn, Magheragall, Stonyford.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Linen weaving, farm work	Agriculture, linen weaving, and domestic service. (Women earn same as men, and sometimes more.)
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Farm; 7 a.m. to 6 p.m. (summer), 6 p.m. (winter). Weavers longer time, but irregular. Men earn 6s. to 11s. per week.	8 to 14 hours per day. 6s. to 12s. per week.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Weaving (8s. a week); winding (4s.); needlework (about 6s.); and farm work (4s. to 6s.).	Some dressmaking, others as stated in Question 1.
4. How, and from what age, are children occupied?	From 12 years of age on the farm.	From 10 years of age
5. Are the people generally intelligent, industrious, and handy?	Yes	I should say they are
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Straw and osiers	The only thing is straw that can be sold at a fair price.
7. Is water-power easily obtainable from streams?	Not in the immediate neighbourhood.	No
8. At what distance apart are the National Schools? Name the schools nearest to you.	2 miles. 5 named	1½ miles. 5 named
9. How many children attend the schools?	From 30 to 60 (numbers given)	I think over 200
10. From what distance do the children come to attend school? What are the school hours?	1½ to 2 miles. 10-3.	Up to 2 miles. 10-3
11. Do any of the children learn drawing? If so, how many?	No	I should say 20 at Sheepswall and Ballycarrickmaddy.

Continued on page 200.

Answers.			No. of Question.
ANTRIM.			
Mr. Wm. Dawson, farmer	Sir Ed. Wallace, M.P.	Mr. Richard Bell, farmer	22
Magheragall	Lisburn	Magaberry, Trammery, Soldiers-town, Mullaghearton.	24
Farming; a few in weaving	Flax mills	Farming and agriculture. Some hand-loom weavers	1
10 hours daily. Weavers 10s. a week.	56 hours per week. Average wages, 18s. per week.	7 a.m. to 5 p.m. Labourers 9s. to 10s. per week. Weavers 9s. per week.	3
Some in weaving, and earn 10s. a week; others in household work. No other industries for women.	In weaving and spinning (12s. week). No other employment.	Weaving. Farm work in spring and harvest, 7s. per week. No home industries.	3
Not specially employed, except by their parents.	From 10 to 14 as half-timers. Doffing, as machine boys, &c.	At school till 10; then employed on the land or at weaving.	4
Generally speaking, they are	Yes	They are	5
	None unemployed.	There are none	6
No	Yes	Yes; any mills in this locality are turned by water.	7
1½ to 3 miles. 3 named	In the country about 2 miles. In town about ½ mile. 3 named.	1 to 1½ miles. 4 named	8
105 attend this school here	About 1,000	About an average of 60	9
A few come 2 or 3 miles	Two miles. 0.50-3	Up to one mile. 10-3	10
Yes	Yes, in the school here. 150	About 10 in each school	11

Continued on page 398.
F F 2

Questions.	Answers.	
	ASTRIM.	
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	In Aghalee a permanent room could be obtained for a small remuneration.	I think so, if required - -
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes, Aghalee - - -	There is - - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Yes, if paid - - -	I do not know of any - - -
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	The master would not - -	Thinks the master would not have time.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Yes, if paid - - -	Fears not - - -
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	"An effort would, I believe, be made, but as the people are just now very poor, but little could be expected."	Would have fears on this matter.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	I believe a number would - -	Could not say - - -
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	- - -	The working people are generally employed, and the surplus go into the towns and get work.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	G. N. Railway and Lagan canal.	Abundant accommodation -

Answers.			No. of Question.
ANSWERS.			
School-room could be obtained -	I think they could - - -	I believe the school-rooms could be obtained.	13
No - - - - -	No - - - - -	Any quantity of room - - -	13
No - - - - -	No - - - - -	There are - - - - -	14
No - - - - -	Yes - - - - -	Yes. Many would be very glad of the opportunity.	15
No - - - - -	No - - - - -	Yes, if promised payment on results.	16
No - - - - -	Doubtful - - - - -	They would, and I believe with every prospect of success.	17
I don't believe they would generally.	Yes - - - - -	They would - - - - -	18
No - - - - -	This being a manufacturing district, hardly comes within the scope of the Commissioners' inquiries.	Every assistance would be given to the objects in view.	19
Dublin and Antrim Railway, within 2 miles.	Good markets in Lisburn and Belfast. Railway and canal to Belfast.	G. N. Railway; Lagan canal -	20

Questions.	Answers.	
	ANTRIM.	
22. State your own name and occupation, and proper postal address.	Rev. Canon Sayers, clergyman -	Rev. A. Macaulay, P.P. -
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Ballinderry - - -	Whitehall, Aghalee, &c. -
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Farm labour and hand-loom weaving. A few basket-makers.	Weaving, fishing, and agriculture.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	6 a.m. to 6 p.m. in summer; in winter while light. Farm work, 8s. a week; weaving, 6s. to 12s. a week.	7 a.m.—6 p.m. - - -
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.	Field work, weaving, knitting, and winding; also some embroidery and handkerchief hemming.	Weaving, 10s. week - -
4. How, and from what age, are children occupied?	Generally they go to school till 8 or 10 years old, and then begin work.	Winding - - -
5. Are the people generally intelligent, industrious, and handy?	Fairly so - - -	Yes - - -
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	I know of none - - -	- - -
7. Is water-power easily obtainable from streams?	Not easily; but there are some small streams that might be utilized at some cost.	- - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	About 2 miles. 6 named -	1½ miles. 2 named -
9. How many children attend the schools?	About 300 to 400 - - -	150 - - -
10. From what distance do the children come to attend school? What are the school hours?	Up to 2 miles (except a few who come a great distance). 9.30—3.6.	2 or 3 miles. 10—4 -
11. Do any of the children learn drawing? If so, how many?	I think not - - -	About 20 - - -

Continued on page 402.

APPENDIX.

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Answers.			No. of Question.
DOWNS.	DOWNS and ARMAUGH.	LOUTH.	
Rev. L. B. Price, clergyman -	Maxwell C. Glose, Esq., M.P. -	Henry Bellingham, Esq., M.P. -	22
Downpatrick - - -	Drumbanagher, Newry (co. Down).	Castle Bellingham, Dunauy, Dunleer.	21
Farm labour, carpentry, small shop-keeping.	Entirely agricultural -	Principally agriculture -	1
12 hours. 10s. per week -	12 hours. Labourers 9s. to 10s. a week.	7 a.m. to 7 p.m. 8s. to 10s. per week.	2
Excepting a little hand embroidery, they have no occupation whatever. No home industries.	Farm labour (6s. week). In spinning mills; home weaving; in hem-stitching, girls earn 2s. 6d. per week.	Farm-work (earning something less than the men). Lace is made in the convents, and crochet work by some of the labourers' wives.	3
No employment for children except as shop messengers.	All ages; they assist in farm work and in spinning factories.	In farm operations, often from the age of 10.	4
Intelligent, but unaccustomed to handwork.	Very much so - - -	Yes - - - -	5
Nones, except cisters, of which common baskets are made.	Not any - - - -	- - - - -	6
Yes - - - -	Yes - - - -	Yes - - - -	7
Six National Schools in the town	About 2 miles. 4 named	1½-2 miles. 4 named - -	8
300 to 400 - - - -	Average, 80 to 90 - - -	A fair proportion - - -	9
Town and immediate neighbourhood. 10-3 or 4.	About 1 mile. 10-3 - - -	Up to 2 miles. 11-3.30 -	10
About 20 - - - -	No - - - -	- - - - -	11

Continued on page 403.

Questions.	Answers.	
	ARTHM.	
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	(a.) Yes. (b.) Cannot say	.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes	.
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Probably	.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I am sure of it	.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	There are handy and intelligent persons who would gladly qualify if promised payment.	.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	It is almost impossible, especially at the present time, to obtain local aid.	.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	Can scarcely say. The people here are very slow to take up any new employment; but after a time I should think they would.	.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Not at present	The queries do not, in my opinion, refer to such a district as this. As a rule, all have plenty of work, such as it is.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Railway at hand. Canal within 3 miles.	.

Downs.	Answers.		No. of Question.
	Downs and ARMAGH.	LOUTH.	
Yes. Schools and other rooms -		Should think so; without much difficulty.	12
Probably - - - -		Yes - - - -	13
There are carpenters, upholsterers, &c. who could do this if employed.	Not answered, as the neighbourhood affords no requirements for them.		14
Should think so - - -		Should think the master would	15
Probably - - - -	There are many skilled tradesmen in the locality.	- - - -	16
The Church of England clergyman and his family have always endeavoured to promote any industry; but to make it remunerative is difficult.	"I think not, as there is no poverty, and plenty of work. Not hands enough for farm requirements."	I think they would - -	17
Women and children would be glad of any employment. Could knit and make ordinary clothing. Have not tried anything else.	- - - -	(a.) Yes. (b.) I think so	18
If some one industry were taught at which both men and women (the latter especially) could work, and a sale ensured or prizes given until the thing became general and remunerative, the people (naturally enterprising) might be induced to try to hope for improvement.	- - - -	- - - -	19
- - - -	Two: railway and canal	Two harbours at Dundalk and Drogheda. G.N. Railway.	20

ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

Questions.	Answers.	
	LOUTH.	
22. State your name and occupation, and proper postal address.	Benj. Whitworth, Esq., M.P.	Rev. Jno. Archer, A.B., clergyman (Rural Dean).
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Drogheda	Drogheda
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	A considerable proportion in flax and cotton mills.	Cotton and linen factories. Iron and wood works. Chemical manure works. Some agriculture and fishing.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	10 hours per day. 5s. to 15s. per week.	6 a.m.—6 p.m.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Ample employment in flax and cotton mills at 5s. to 15s. per week. No home industries.	Many in the mills and shops. Dressmakers, milliners, &c.
4. How, and from what age, are children occupied?	From 12 years of age in the factories.	- - -
5. Are the people generally intelligent, industrious, and handy?	Very intelligent and fairly industrious and handy.	- - -
6. What natural products or materials (such as wool, leather, wood, straw, marble, or osiers) are obtainable in your district which are not at present profitably employed for industrial purposes?	None, except a very fine light-coloured limestone.	- - -
7. Is water-power easily obtainable from streams?	Yes, to a moderate extent	- - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	Most of the children are educated in the convent and Christian Brothers Schools.	- - -
9. How many children attend the schools?	Nearly all children attend school, but I do not know number.	120 Protestant children attend the parochial schools.
10. From what distance do the children come to attend school? What are the school hours?	No great distance. Usual hours	- - -
11. Do any of the children learn drawing? If so, how many?	A few in the Christian Brothers Schools.	- - -

Continued on page 406.

Answers.			No. of Question.
MONAGHAN.		MBATH.	
Very Rev. Thos. Smollen, Archdeacon and F.P.	Very Rev. J. J. McMahon, D.D., Dean, V.G. and P.P.	Rev. Jos. S. Bell, LL.D., rector of Kells.	23
Kells and neighbourhood	Donaghmoynne, Carrickmacross, Magheracloone, Killany (part), Inniskeen (part).	Kells and immediate neighbourhood.	21
Agriculture	Agriculture and farm work	Agricultural labour	1
—6 in summer; 7—7 in winter. 1s. 6d., 1s. 9d., and 2s., according to season, and 2s. 6d. (per day) for a short time in spring and harvest.	About 14 hours daily. About 7s. a week; but many of them now have no employment.	7 a.m.—3 p.m. About 2s. a week	2
in spring and harvest in field work at 10d. or 1s. a day. Lace-making and needlework had paid well in the past. Crochet is now paying well.	Some occasional farm work at 10d. per day. Domestic service, 6s. a year and diet. Some home industries, but on very small scale.	Only in spring and harvest. About 1s. 6d. a day. Very little home work.	3
From 10 to 12 years of age at field work or crochet. Go to school at seasons that work cannot be done in fields.	From 12 years upward in domestic service and on farm. Many have no employment.	From 12 years in weeding, &c.	4
Not certainly	They are intelligent and handy, and inclined to be industrious if they had prospect of remuneration.	Intelligent, but not industrious or handy.	5
Nothing of the kind	Leather, wool, flax, straw, wood	Wool, wood, and straw	6
Fox, in great abundance	Yes	Yes	7
½ miles or less. 7 named	About 3 miles. [Carrickmacross National Schools.]	Two in Kells, about ½ mile apart	8
70 is the average at 6 schools	Roughly estimated, about 3,000.	About 200	9
¼ to 2 miles. 10—3	About 1 Irish mile. 10—3	A few from 3 miles. 10—3	10
I think, none	Very few	Yes; I think about one-half	11

Continued on page 407.

Questions.	Answers.			
	Louth.			
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Thinks the school-rooms could be got, if not other rooms could be easily obtained.	-	-	-
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Cannot say	-	-	-
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Thinks not	-	-	-
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Cannot say	-	-	-
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Thinks not	-	-	-
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	It is very difficult to get subscriptions for any object except of a religious or political character.	-	-	-
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	Yes, if free of cost	-	-	-
19. Have you any other suggestions to offer, which may assist the Commissioners in carrying out the objects they have in view?	The district is well situated for manufacturing purposes, coal being cheap.	-	-	-
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Excellent railway communication. Canal to Navan little used.	G. N. Railway. Steamers to Liverpool daily.	-	-

Answers.			No. of Ques- tion.
MONAGHAN.		MSATH.	
Yes, but would scarcely be suitable. In some cases a room could be got for a trifle.	Not easily; but a room could be obtained for a small remuneration.	(a.) I think not. (b.) Cannot say.	12
In 4 or 5 there is room - - -	Yes - - - - -	Yes - - - - -	13
I fear not, except perhaps in 3 cases.	Yes - - - - -	None, except a carpenter - - -	14
No - - - - -	A person (not the master) would so qualify himself.	Doubtful - - - - -	15
I fear not - - - - -	Yes, for remuneration - - -	I cannot say - - - - -	16
Local effort would not be possible.	I am not certain, but I apprehend not; at least, to a large extent.	I fear not; those likely to encourage such efforts having suffered such reductions of their incomes.	17
Something of the kind would be useful, as giving boys the chance of learning their trades quickly and whilst in their own homes, thus rendering unnecessary the slavery of apprenticeship.	If there was a clear prospect of profit they would.	A recent experiment proved they would not.	18
- - - - -	The Irish Railway Companies should offer much better and cheaper facilities for carriage than they do.	None - - - - -	19
Abundant outlet by G. N. Railway.	Railway communication with Dundalk, Drogheda, Dublin, &c.	Railway - - - - -	20

Questions.	Answers.	
	MEATH.	
20. State your own name and occupation, and proper postal address.	Mr. Jno. G. Henderson, printer and editor.	E. H. Meigs, Esq., M.P., land-owner.
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Kells and neighbourhood	Navan, Kilcainr, Skryne, Bohernacreen, &c.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Little tillage. No factories. Only occasional rough work.	Small farming and farm labour
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Impossible to answer. A few weeks' work in spring, summer, and harvest. In winter mostly idle. Probably 30 days' work from end October to end February.	10½ hours summer, 5½ hours winter. 10s. to 14s. week when in constant employ; 6s. week with house; 2s. 6d. to 2s. 6d. day in harvest.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	No, except in spring and harvest, when they may earn 2l. or 3s. A few knit socks at home.	"Field work 10d. to 1s. day. No home industries, except in Navan, where there are several mills giving plenty of employment.
4. How, and from what age, are children occupied?	- - - - -	In the fields, from 8 years; also in the mills at Navan.
5. Are the people generally intelligent, industrious, and handy?	Most intelligent, but not industriously disposed.	Very much so - - - - -
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present probably employed for industrial purposes?	Wool, wood, straw, leather, osiers.	Good demand for all products -
7. Is water-power easily obtainable from streams?	Ample water-power - - -	Any amount - - - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	7 named within 3 to 5 miles around Kells.	3 or 5 miles apart - - -
9. How many children attend the schools?	Mostly all attend, but very irregularly.	50 to 100 - - - - -
10. From what distance do the children come to attend school? What are the school hours?	2-5 miles. 10-5 - - -	Up to 2 or 3 miles - - -

Continued on page 410.

Answers.			No. of Question.
LONGFORD.		WESTMICH.	
Very Rev. N. O'Flanagan, D.D. Archdeacon and V.G.	Very Rev. Canon Reynolds, V.F., P.F., and Rural Dean.	Rev. S. Canon Hoare, P.P.	23
Granard - - - -	Edgeworthstown - - -	Street, Rathowen - - -	24
Farming, labouring, shopkeep- ing, trades.	- - - -	Farming and farm labouring -	1
Labourers' work in summer, 6 a.m. to 6 p.m. 1s. 6d.— 2s. 6d. per day, according to season of year.	- - - -	10 hours. Farm labourers 9s. week.	2
Only in spring and harvest in the fields. 1s. to 1s. 6d. day. No home industries.	The nuns in the adult schools could teach the adults to knit, do lace work and cambric, if they could find a market.	Inconstant farm work; 1s. day. No home industries, except knitting and needlework.	3
From 10 years old, in the fields	- - - -	From 8 years, in farm work -	4
They are intelligent and in- dustrious.	- - - -	Yes - - - -	5
Wool, wood, and straw - - -	- - - -	Wool - - - -	6
Very little water-power - - -	- - - -	Yes - - - -	7
1½ miles. Convent School and National School, Granard.	- - - -	2 miles. 1 named - - -	8
80-100 in each - - - -	- - - -	20 - - - -	9
1-1½ miles. 2-3 - - - -	- - - -	3 miles. 10-3 - - -	10

Continued on page 411.

Questions.	Answers.	
	MR. BATE.	
11. Do any of the children learn drawing? If so, how many?	In Kelle Sisters of Mercy school. About 40.	None
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Yes	In some cases
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Plenty of room	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	I don't know	Yes
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I think not	I don't think so, except in a few cases.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	I think not	I am sure many would offer their services.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	I think not	Very hard to get local aid. Farmers have little to spare.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	(a.) Very many most probably would. (b.) I do not think they would.	Confident that they would
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	-	No. Will endeavour to obtain information.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Two lines of railway to Dublin -	Good railway communication with Drogheda, Dublin, &c.

Answers.		No. of Question.
LONGFORD.	WESTMEREATH.	
about 6 children in convent school.	-	No - 11
es -	I think "Yes" in all cases	Yes - 12
es -	Yes, in most cases	Yes - 13
es -	Yes, in towns; no, in country districts.	No - 14
es -	No -	"Cannot say, because I do not know what amount of qualification would be required." 15
es -	-	I rather think not 16
social efforts in a pecuniary sense would be uncertain.	-	I don't think so at present 17
they would -	Yes	Yes, if offered gratis - 18
there is hardly any employment during the winter months, labourers are on the verge of starvation. Constant work is what is needed, though the wages be small.	-	No - 19
station on M. G. W. Railway, 2 1/2 miles from the town.	"This is the great difficulty, and I fear an insuperable one."	No facilities near here. G. W. Railway. 20

Questions.	Answers.	
	KING'S COUNTY.	
22. State your own name and occupation, and proper postal address.	Rev. Graham Craig, A.M., rector of Tullamore.	Rev. Jno. Canon Monahan, D.D., P.P.
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Tullamore and district - -	Banagher, Cloghan, Shannon Harbour.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agriculture and trade (tobacco manufacture, distilling, milling, shopkeeping).	Small farming - - -
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	10 hours. 12s. a week - -	All the day. Farm labourers 1s. 8d. per day all the year round.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Women earn 3s. 6d. a week by sewing sacks. Dress and shirt making for the shops. No lace-making. Knitting chiefly for home use.	Dairy and farmyard work. No home industries. [Knitting, lace-making, &c. might be easily and profitably established in the nuns' schools.]
4. How, and from what age, are children occupied?	From the legal age in the manufactories (chiefly of tobacco).	At school, and in such domestic work as engages small agriculturists.
5. Are the people generally intelligent, industrious, and handy?	Fairly so - - - -	They are, indeed, without any exaggeration.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	All mentioned are plentiful (except marble). There are limestone quarries, and some good building and monumental work is done.	Abundant wool, straw, and osiers.
7. Is water-power easily obtainable from streams?	Water easily obtained, but not of much power.	Abundant water-power - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	2-3 miles. 1 mentioned - -	4 miles. 3 named - - -
9. How many children attend the schools?	86 on the roll - - -	About 460 - - -
10. From what distance do the children come to attend school? What are the school hours?	Some come 7 miles, the school being superior to those nearer.	Up to 2½ miles. 10-6 - -

Continued on page 414.

Answers.			No. of Question.
Cavan.	Queen's County.		
-Col. H. J. Clements, D.L. and J.P., landowner.	Hon. B. Fitzpatrick, M.P.	Miss Mary Delany, National school teacher.	28
otehill, co. Cavan, and Maam, Maamtrasna, and Derrypark.	District comprising Baronies of Clonmellagh, Clandonagh, and Upper Woods.	Clononagh, Cloncourse, Clonadasey, Maryborough.	31
all farming; migrate to England for harvest.	Agricultural pursuits and herding of cattle.	Their daily work	1
om dawn till dark	10 hours in summer, 6 to 7 in winter. Farmers generally pay 1s. to 1s. 2d. per day. At certain times wages rise to 2s. 6d. per day.	7 a.m. to 7 p.m. 7s. to 10s. per week.	2
men knit socks and weave rieve cloth, but have no market for this production.	Women also occupied in agriculture. There is a very little knitting done and some spinning. Knitting schools formerly existed, but have died out from opposition and carelessness of those using them.	Majority are employed at home, in and out of doors; some dressmaking (10s. week), knitting, and needlework.	3
how	Help on the farms from an early age.	At all work they are capable of performing, and as soon as they are able.	4
oldedly so, but of a very low type of neutral "education."	Intelligent.—Yes. Industrious.—No. Handy.—No.	They are industrious, and some handy.	5
l-straw, wool, marble, indications of lead; oysters could be grown.	Plenty of wool, wood, straw, and some marble. Oysters might be grown to any extent.	Straw is the only plentiful material.	6
me, but not much fall	Yes	Yes, very	7
r 4 miles as a rule. 4 named	4 miles. 5 named	3½ miles. 5 named	8
out 60 in one, 40 in another	About an average of 60 to each school.	30 to 100 in each	9
me come some miles. Hamlets scattered. 10—3.	About 4 miles. 10—3	1½ miles. 10—3	10

Continued on page 415.
G G 2

Questions.	Answers.	
	King's County.	
11. Do any of the children learn drawing? If so, how many?	Yes, about 20 - - -	Yes, 20 - - -
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Yes, and free of cost - -	(a.) Yes. (b.) I have a room at Hanascher I would give free of charge for these purposes.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes - - - - -	Yes, in each case - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of tools employed in his trade?	Yes - - - - -	Yes - - - - -
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Master would hardly have time. He has a S.K. science and art class.	Yes (in 2 cases.) (They have S.K. certificates.)
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	There are stonecutters, basket-makers, shoe and beehive and chair makers, who, I think, would gladly give instruction if paid by results.	Yes, as regards wood, wool, leather, straw, oser, and iron (blacksmiths') work.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	I think there would be some effort made to meet a grant.	Yes, I will make an effort, and, unless the local sum should be too large, I have no doubt it will be subscribed.
18. Have you any reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	The thing is much wanted, there being little variety of occupations. I consider that the desire would grow fast; thus learning trades at home.	I am certain they will - -
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Water-power might be much more used than it is, and wind-mills, of which there are none.	Suggests the sending of an agent to consult with him.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Good market at Tullamore, and railway and canal communication to all parts.	Grand Canal. Railway should be opened (Aug. 1862).

APPENDIX.

415

Answers.			No. of Question.
CAVAN.	QUEEN'S COUNTY.		
me to my knowledge - -	Not that I am aware of. I am informed they learn drawing at Castletown National School.	Yes, in Maryborough and Mount-rath. Cannot say how many.	11.
s, in two places named -	Yes - - - - -	(a.) No. (b.) Yes, I think so -	12.
s - - - - -	Yes - - - - -	No - - - - -	13.
substantial. Carpenter and intelligent blacksmith.	I should say not - - - -	Yes - - - - -	14.
sensibly; indeed very probably	I should certainly imagine that they would.	No master at present. Some other person might.	15.
(a.) Possibly. Quite worth trying for. (b.) Might be managed.	I know of no one who would do so, or is qualified.	Yes - - - - -	16.
certainly would be made by landlord; possibly by one or two of the better class of farmers.	It is possible that in some districts such an undertaking might succeed. Much would depend on initiation.	Yes, as they are badly needed. I cannot say with what prospect of success.	17.
have good reason to think they would; certainly young men, and perhaps the young women.	I am "afraid" not. All would depend on how the undertaking was judged of by the priesthood in the district.	(b.) I have, as they seem very impoverished.	18.
hiera should be grown, and tweed factory established.	[Adverse opinion stated at length on a sheet accompanying the Circular.]	- - - - -	19.
Water carriage by L. Corrib to Galway, and thence to Dublin. Railway $\frac{3}{4}$ miles off.	No markets. Railway communication fairly good, but freight high.	I know of no markets. Gt. S. & W. Railway. No canals.	20.

Questions.	Answers.	
	QUEEN'S COUNTY.	
21. State your own name and occupation, and proper postal address.	Capt. Cosby, J.P., D.L., land-owner.	Mr. Danl. Whelan, V.C.P.L.G., farmer, (90.)
22. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Stradbally - - - -	Borrowhouse, Ballyroe, Churchtown, Ballyinan, Kiltabbin, Misgeney.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agriculture - - - -	On the land - - - -
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	7s. to 8s. per week - -	6 a.m. to 6 p.m. 9s. week -
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lacemaking, needlework, &c.?	Farm work. Lately a good many women employed knitting socks.	Sometimes they are employed on the farms. Knitting and crochet.
4. How, and from what ages, are children occupied?	- - - - -	They begin to do something from 8.
5. Are the people generally intelligent, industrious, and handy?	Yes - - - - -	Generally so - - - -
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Wool, straw, a few others. There is a very large extent of ground under hazel copse on Lord Lansdowne's, Sir Allan Walsh's, Mr. Treneh's, and my own property which might be made into hampers and baskets, and for which hazel there is little or no sale, and it might be used in giving employment to hundreds of women and children.	Wool, wood, straw - - - -
7. Is water-power easily obtainable from streams?	Yes - - - - -	Water-power is available in winter, but fails in summer.
8. At what distance apart are the National Schools? Name the schools nearest to you.	2 and a large convent school -	3 miles. 5 named - - - -
9. How many children attend the schools?	50 and 150; the other I do not know.	From 40 to 70 - - - -
10. From what distance do the children come to attend school? What are the school hours?	2 and 3 Irish miles	Up to 2 miles. 10-3 - -

Continued on page 418.

Answers.			No. of Question.
QUEEN'S COUNTY.	KILDARE.		
hd. Lalor, Esq., M.P., farmer.	Rev. Jas. Doyle, P.P.	Rev. Canon Bagot	20
infrash, Abbeyleix, Maryrough.	Athy	Foulstoun, Kilmood, Narraghmore, Murnoy, Ballyshannon, Suncroft.	21
icultural labour	Agriculture. Brickmaking	Small farming	1
on employed, about 90. a week.	Summer 6 a.m. to 6 p.m.; winter 7 a.m. to 7 p.m. Wages vary with the season.	All their time. Labourers' wages average 1s. 6d. per day.	2
y field labour, and not efficient.	Some little knitting and needlework. Earnings precarious. Except in harvest, they are mostly idle.	Women if instructed in dairy work, &c. could earn a livelihood. Large quantities of poultry are now reared. No home industries.	3
busy seasons only, and at agriculture. From 10 years of age.	As soon as they are able to work they are engaged in whatever employment they can get.	From about 15	4
	They are	Very much so	5
sw, wool, and raw hides in large quantity.	The materials named are obtainable.	Plenty of leather and straw to be had.	6
many places	Abundance of water-power going to waste	Yes	7
out 4 English miles. 4 named	About 4 miles. 5 named	1½-3 miles. 4 named	8
out 60 in each	Nearly 1,000		9
out 2 miles. 10-3	Some come 5 miles. 10-3	From 2 miles and under	10

Continued on page 419.

Questions.	Answers.	
	QUEEN'S COUNTY.	
11. Do any of the children learn drawing? If so, how many?	- - - - -	No - - - - -
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Yes. Also a large room called the Lecture Hall for a small sum.	Yes, with the consent of the manager.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes - - - - -	It could be managed - - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	No. I once tried to get a family to come to teach the people basket and hamper making, but did not succeed.	A carpenter resides within a ½ mile.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	- - - - -	I daresay he would - - -
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	- - - - -	I think they would be willing -
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Yes, certainly - - - - -	I fear the people are unable to offer any assistance.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	Yes - - - - -	I think in many instances they would.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Lace-making flourished some years ago, but succumbed to the low price paid by the trade.	It would be a great boon to have something besides the land to look to for sustenance.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Canal 3 Irish miles distant. Railway 5 miles distant.	Railway and canal at Athy 3 miles distant.

APPENDIX.

419

Answers.			No. of Question.
QUEEN'S COUNTY.	KILDARE.		
o - - - - -	Some 80 or 90 - - - -	No - - - - -	11
s. I think not. (b.) No fit place.	I think so - - - -	At Foulstoun we could give a school-room 40x20 almost exclusively for it.	12
careoly - - - -	Certainly - - - -	Yes - - - - -	13
o - - - - -	Yes, if paid - - - -	No - - - - -	14
o - - - - -	I think so - - - -	Would have to get a qualified master.	15
o person qualified. No person able to qualify without pecuniary assistance.	Certainly, if paid as much as working for employers.	No. But I have no doubt some would qualify for payment by results.	16
think such efforts would be made.	I could not promise for local aid. The people are poor and have sufficient to do to live.	No doubt subscriptions could be had.	17.
believe they would, but I have no reason for my belief, as it has never been tried.	The project would be new to them, but they would take to it if they saw that it led to some beneficial results.	I am sure they would - -	18
not being acquainted with the means at your disposal, I cannot suggest.	No - - - - -	Gives detailed suggestions respecting dairy schools.	19
It R. & W. Railway within a short distance.	Railway and canal to Dublin and Waterford.	- - - - -	20

Questions.	Answers.	
	KILDARE.	
20. State your own name and occupation, and proper postal address.	Edw. Fenelon, Esq., farmer, Vice-Chairman Naas Board of Guardians.	Col. G. B. Dease, J.P. . . .
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Kilcullen, Giltown, Kilgowan, Oak Calverstown.	Celbridge -
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Farmers, labourers, smiths, carpenters, &c.	Agricultural labourer. [3 local flax-mills have been given up.]
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Farmers, &c. all day. Labourers 8s. to 12s. week without board. Labourers 4s. to 6s. with board.	10 hours a day, 10s. a week, when in regular work.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Occasional farm work, &c. Not a few apply themselves to knitting, needlework, and lace-work, &c.	Since stoppage of mills, only farm work. [When in work the mills employed 600-700 hands in all.]
4. How, and from what age, are children occupied?	From 12 to 14 on the farms	-
5. Are the people generally intelligent, industrious, and handy?	Generally intelligent, industrious, and handy under their circumstances.	Not particularly
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Wool, wood, straw, peat, and brick clay.	-
7. Is water-power easily obtainable from streams?	Fairly supplied with water-power.	First-rate water-power, and 3 unused mills in full order.
8. At what distance apart are the National Schools? Name the schools nearest to you.	2 miles. 2 named	About 2 miles. One at Celbridge, besides a nuns' female school.
9. How many children attend the schools?	200-400 attend school, according to the season.	About 200
10. From what distance do the children come to attend school? What are the school hours?	1 to 2 miles. 10-6	3 miles or less. 9-6

Continued on page 422.

Answers.		No. of Question.
KILDARE.	DUBLIN.	
v. Jno. H. Donovan, P.P.	Rev. P. A. Yorks, C.C. Rev. J. K. Walsh, P.P. [Replies identical.]	Rev. D. P. Mulcahy, P.P. - 23
bridge and Straffan	Skerries - - - -	Swords [Malahide, Drumcondra]. - 21
formerly a manufacturing town. 3 flax thread mills employing 300 hands. Now few farmers, &c.	Fishing principally. Also farming.	Men and boys labour in the fields. - 1
day. Labourers 2s. to 3s. or week. Most are very poor.	A fair proportion of their time occupied. Wages very precarious, say 3s. a week.	8 to 11 hours. At present time wages 3s. to 6s. per day. Average 2s. a day. - 2
most parts of the year; they have little employment now. Said work at harvest.	Net mending, knitting, tanning, making of straw envelopes. Much not to be earned in consequence of French competition.	Wishes they had occupation for women "to keep them from gossiping." Good opening for factory. - 3
or leaving school at 12 or 13, they do any work they can get, but there is little to be said now.	General employment, and from about 14 years.	In the fields from the age of 9 - 4
A few tradespeople are	Yes - - - -	As a rule, yes - - - - 5
cl. wood, limestone, &c. nothing special.	Wool, leather, wood, straw, limestone.	Good supply of wool, straw, and limestone. - 6
	Quite abundant - - - -	A constant supply - - - - 7
elementary school for girls and children, and boys' school (National) at Colbride. At Straffan, 3 miles distant, a mixed National School.	Schools in town and country	2½ apart. 3 in parish - - 8
when at best; 260 when at worst.	Daily average in all the parochial schools=487.	Nearly 500 - - - - 9
roads are conveniently situated or most. 10-3.	About 2½ miles. 10-3 - -	1-4 miles. 10-3 - - - 10

Continued on page 423.

Questions.	Answers.	
	KILDARE.	
11. Do any of the children learn drawing? If so, how many?	Drawing is not taught in schools. No encouragement given by Education Board.	A few at nuns' schools . . .
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Yes	There would be no difficulty . . .
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Has no knowledge of what may be intended by proposed instruction, &c.	I know of none
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Master and mistress will qualify if sufficient remuneration is guaranteed.	Probably he would
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	I feel sure that several tradesmen would gladly assist in teaching handicrafts if sure of remuneration.	
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Local efforts will gladly be made in view of remuneration and permanent results.	The district I write about is peculiarly situated, and for many years, whilst the flax-mills were at work, the people depended entirely on the employment therein given. Since they have ceased to work, many of the best of the population have left the district to seek employment elsewhere, leaving the least industrious portion behind.
18. Have you reason to believe that the people (a) Children (b) Adults would avail themselves with alacrity of such instruction if offered to them?	Both children and adults will eagerly avail themselves of any instruction calculated to afford them a means of support.	
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	To be sincere in your desire, and prove to the people that your object is to permanently improve their condition.	
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	No markets. Railway 5 miles; canal 3 miles.	

Answers.			No. of Question.
KILDARE.	DUBLIN.		
- - - -	About 25 or 30 - - - -	None - - - -	11
ere is a place which has been school. Would suit as a workshop.	Yes - - - -	(a.) Yes, in summer; they are used in winter. (b.) Yes, for a small sum.	12
- - - -	Abundant accommodation, workshops already existing.	Yes - - - -	13
renters, masons, bricklayers	Yes - - - -	The usual country carpenter, 3 or 4.	14
- - - -	Yes - - - -	I should think so - - - -	15
ear there is no prospect of any success at present.	Yes - - - -	We have several intelligent young men who are only too willing to be employed.	16
above - - - -	Judging from personal knowledge, I believe efforts would be made.	It is indeed a great pity these offers were not made years ago. We should have less discontent, and our people would be grateful.	17
me might; not many. I fear the attendance of boys would be very small. We had night schools when the factories were at work, and even then the attendance was bad.	I have - - - -	Under proper training, with kindness and firmness, I should have great hope.	18
me, except that some companies should work the factories.	Yes - - - -	If the work is started I will leave nothing undone by word and encouragement to make it a success.	19
S. & W. Railway 1 mile distant. G. W. Railway 3 miles distant. Grand and Royal Canals at some distance.	Communication with Dublin and Belfast by rail; also by sea.	Swords 6 miles from Dublin by road, and 3 miles from Malahide railway station.	20

ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

Questions.	Answers.	
	DUBLIN.	WICKLOW.
20. State your own name and occupation, and proper postal address.	Rev. H. Murphy, C.C. - - -	W. J. Corbet, Esq., M.P. - - -
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Kingstown - - -	Kilcool, Delgany, The Downs, Newton, Mount Kennedy.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Hardly any manufactures. Even ordinary tradesmen sent from Dublin. Chief employment in connection with the sea, railways, and Harbours, &c. Commissioners.	Small farming and farm labour
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	6 a.m.—6 p.m. - - -	The whole time. Labourers 10s. a week.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.	Servants and dressmakers. No home industries.	In harvest time, get 2s. a day for 3 or 4 weeks. No home industries.
How, and from what age, are children occupied?	No occupation except as shop messengers, &c.	From 10 years or so, in the fields
4. Are the people generally intelligent, industrious, and handy?	Fairly so - - -	Very much so - - -
5. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	None. All built upon - - -	Plenty of wool and straw. Others might with a little trouble be had in quantity.
6. Is water-power easily obtainable from streams?	No - - -	Yes. There is a good-sized corn-mill near, lying idle.
7. At what distance apart are the National Schools? Name the schools nearest to you.	No National Schools for boys; two Irish church schools; Christian Brothers' schools.	2 or 3 miles. 4 named - - -
8. How many children attend the schools?	Girls' National School has 300 girls and infant boys.	Cannot say with accuracy. Probably 200 on the average.
10. From what distance do the children come to attend school? What are the school hours?	Up to 1½ miles. 10—8 - - -	2 or 3 miles. 10—8 - - -
11. Do any of the children learn drawing? If so, how many?	About 60 - - -	No - - -

Continued on page 42B.

Answers.			No. of Question.
WICKLOW.		CARLOW.	
Wm. Canon Dillon, P.P. -	Rev. Jas. Dunphy, P.P. -	Rev. F. F. Nolan, Adm. -	23
Arklow, county town -	Arklow - - - -	Tullow - - - -	24
Artisans and labourers. Employment in chemical works.	Chiefly by herring fishing, &c.	Farming and agricultural labour. 50 out of 200 families in the town practically without employment.	1
8 a.m.—3 p.m. Artisans 80s. week; labourers, 10s. to 12s.	All their time - - -	10 hours in summer, 7 hours in winter.	2
with the exception of sempstresses.	Mending nets. Some at knitting guineas.	No occupation, as a rule, except in spring and harvest.	3
occupied, except in message work.	No employment after leaving school.	Generally speaking, the children have no employment.	4
Diligent and very industrious, it not handy.	They are - - - -	Yes - - - -	5
best wool and plenty of food.	Wood, straw, granite in abundance. [Unused saw mills.]	Wool, wood, straw, oats -	6
- - - -	Yes - - - -	Yes - - - -	7
and National Schools in the town and in a village 1½ miles away.	National Schools in the town of Arklow, male and female.	2 to 3 miles. 5 named - -	8
- - - -	About 500 in both schools	Between 500 and 600 children attend.	9
fly from the town and village. 9.30—3.	Up to 2 and 3 miles. 10—3	Up to 2 miles. 10—3 -	10
- - - -	Some in the advanced classes	No - - - -	11

Continued on page 427.

Questions.	Answers.	
	DUBLIN.	WICKLOW.
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration.	Doubtful - - - -	(a.) Doubtful. (b.) No doubt at a trifling cost.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	No - - - -	No doubt - - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade.	- - - -	There are carpenters, smiths, and shoemakers, but I doubt if they could undertake to give instruction.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	- - - -	I think not - - -
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	- - - -	I don't think it likely -
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	I think not - - -	If it is asked, would money be subscribed, I fear the people are too poor to, give much assistance.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	No - - - -	I have no doubt they would eagerly avail themselves of such advantages.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	- - - -	- - - -
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists.	In vicinity of Dublin - -	No local market. Railway communication with Dublin.

Answers.			No. of Ques- tion.
WICKLOW.		CARLOW.	
Yes - - - - -	Yes - - - - -	Rooms could be obtained	12
Yes - - - - -	Yes - - - - -	Yes - - - - -	13
carpenters could be got -	Yes - - - - -	Carpenters, blacksmiths, painters, and glaziers.	14
think the master could give instruction in agriculture.	Yes - - - - -	- - - - -	15
doubt much if such persons could be got.	? - - - - -	Shoemakers, carpenters, smiths, bakers, tailors.	16
think not - - - - -	I think there would	Fears jealousy on part of trades- men already established.	17
think girls would avail them- selves of instruction in needle- work and cooking, and boys of instruction in agriculture and gardening.	Yes - - - - -	Believes that children of 15-20 would.	18
- - - - -	Teach the females with their ordinary course--plain sewing and good plain cooking.	- - - - -	19
railway and a new harbour about to be opened.	Railway; and good harbour about to be constructed.	Railway 8 miles distant -	20

Questions.	Answers.	
	CARLOW.	KILKENNY.
12. State your own name and occupation, and proper postal address.	Chas. Casey, Esq., native timber exporter.	W. J. Hamilton, Esq., Local Government Inspector.
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Carlow town and neighbourhood.	Fiddown [Piltown]. His district, as inspector, under Local Government Board.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Farmers, artisans and labourers	Agriculture
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	8-12 hours per day. Artizans 2s. to 30s. week; labourers 8s. to 12s. week.	8 a.m.—6 p.m. 1s. 6d. per day.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	At harvest, &c. 2s. to 12s. a week. Mostly idle and in want. sempstresses 8s. to 12s. week. No home industries.	Chiefly in the fields. 3s. to 4s. per week. Very few home industries.
4. How, and from what age, are children occupied?	From 12-16 years old at any employment they can get.	From the time they are able to do anything. No compulsory education. Kept at home on slightest pretence to work on farms.
5. Are the people generally intelligent, industrious, and handy?	Intelligent enough and handy, but cannot say they are industrious or thrifty; demoralized by want of steady employment.	Yes . . . but not so good as they were before congested in towns, and idled and demoralized by agitation, drink, &c.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	None unutilized	None
7. Is water-power easily obtainable from streams?	Yes	Yes
8. At what distance apart are the National Schools? Name the schools nearest to you.	1 to 2 miles. named	About 3 miles. 1 named
9. How many children attend the schools?	2 schools with 20, 3 schools with 60, on an average.	
10. From what distance do the children come to attend school? What are the school hours?	Up to 1½ miles. 10-6	2 or 3 miles. 10-6
11. Do any of the children learn drawing? If so, how many?	Very few, if any	A few, especially in convent schools, but not generally in rural schools.

Continued on page 430.

Answers.			No. of Que- s- tion.
DONEGAL.			
W. Sinclair, Esq., landed proprietor.	Most Rev. M. Logue, D.D., Bishop of Raphoe.	Rev. Jas. McFadden, P.R., Letterkenny.	20
West Donegal generally -	Every part of Donegal -	Gweedore -	21
Agriculture and fishing -	Farm produce (crops). Profit on cattle and sheep. Going to England and sending children to service.	Meagre crops and earnings of family by service in England, America, &c.	1
Greater part of population small landholders, who do not work as they ought.	Whole time occupied in summer; none in winter. 7s. to 8s. per week.	About one-fourth of time	2
Knitting, and some in muslin embroidery.	Some in field work in summer. A few in winter earn 11s. to 2s. per day by knitting.	Girls generally go to service during spring and summer. A few earn about 3s. a day at knitting.	3
Begin to knit at 10 to 11 years old.	Children from 12 to 16 tend cattle in summer.	From 6 years upwards are generally put to service.	4
Intelligent enough, but not industrious or handy.	Both intelligent and industrious. Are capable of being trained.	Highly spoken of as general servants and labourers.	5
Wool, wood, straw -	Marl, straw, marble, granite, coals.	Granite, marble, furbary and peat, oxide of iron, wool, fishing, &c.	6
To any extent -	Water-power in every part magnificent.	Magnificent water-power	7
Schools numerous and good -	Two miles apart on average -	8 schools, 2 to 4 miles apart -	8
A very large number -	-	Average per school: winter 100, summer 50.	9
Have seldom more than 3 miles to go, but will go more to favourite schools.	1 or 2 miles. 10-3 -	3 miles. 10-3 -	10
No -	Hardly any -	No -	11

Continued on page 431.
H H 2

Questions.	Answers.	
	CARLOW.	KILKENNY.
13. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Thinks so in all cases - - -	- - -
14. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	In most places, yes - - -	As a rule, yes - - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Local artisans can be had, but cannot say whether they would undertake to give instruction.	Carpenters, masons, stone-cutters, &c.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I think they would - - -	- - -
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	- - -	- - -
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Doubtful - - -	Has no doubt local efforts would be made, but at present there is general poverty amongst all classes.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	(a.) Thinks so. (b.) Doubtful, as they generally live "from hand to mouth."	Yes, very gladly - - -
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	That an Inspector should visit the district and see for himself before entering on the enterprise.	Unless instruction be of the highest class, as at Artane, a question whether it would be of much value.
What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Railway and canal communication.	Rail, river, &c. - - -

Answers.			No. of Question.
DONEGAL.			
Yes	Yes, everywhere	Yes	12
Yes, in most places	At most schools	Yes	13
There are carpenters	Yes, in the small towns, and frequently in the country.	Thinks not	14
Thinks not	I don't believe anyone would, except someone who is already employed at some trade.	Thinks so	15
Fears it would not be easy to find anyone likely to qualify.	Yes, for wool stockings and homespun cloths. Other must be found.	(a.) Thinks not. (b.) Is not sure	16
Thinks that, in consequence of recent legislation, few, if any, contributions would be made.	Little chance, as people are poor and landlords non-resident.	People too poor	17
Cannot say	Yes, both, if prospect of fairly remunerative results.	Would exert them to do so, but cannot speak confidently of result without trial.	18
Teaching of rough carpentry would be useful.	To introduce some of the industries to give a practical proof of the advantages of learning them.	-	19
.	Railways are being extended throughout the country.	Chiefly by sea; only carriage by land.	20

Questions.	Answers.	
	DUBLIN.	
20. State your own name and occupation, and proper postal address.	Very Rev. Jas. Stephens, P.P. -	Rev. Chas. McGlynn, P.P. -
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Killybogs - - -	Lettermacaward, Upper Tompacrona, Dungle, Maghery, Duncary.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agriculture and fishing. A few labourers and artisans.	Crops. Kelp manufacture; children's fibre. Scotch and English harvests.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Sunrise to sunset. Labourers 1s. 6d. per day.	Entire day in spring, summer, and harvest; none in winter.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	A few in "sprigging," knitting, and millinery.	In the harvest (men being absent). 3d. to 4d. per day at knitting (when there is work).
4. How, and from what age, are children occupied?	About one-half from 6 to 12 attend school; others at home.	Boys from 6 years herd cattle and sheep; girls from 6 knit.
5. Are the people generally intelligent, industrious, and handy?	Generally - - -	Difficult to find people more so
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Wool and straw - - -	Red and grey granite (unlimited).
7. Is water-power easily obtainable from streams?	Yes - - -	Any number of streams, and upward of 40 lakes.
8. At what distance apart are the National Schools? Name the schools nearest to you.	1 mile apart. 5 schools -	About 8 miles apart. 15 schools
9. How many children attend the schools?	800 on rolls - - -	820 boys and 721 girls; average 40 per school.
10. From what distance do the children come to attend school? What are the school hours?	2 miles at most. 10-6 - -	1½ miles. 10-6 - - -
11. Do any of the children learn drawing? If so, how many?	20 - - -	Very few - - -

Continued on page 434.

Answers.			No. of Que- s- tion- s.
FERRANAGH.	FERRANAGH, TYBONS, &c.	TYBONS.	
ev. Jno. McKenna, P.P.	Most Rev. J. Denuelly, D.D., R.C., Bishop of Clogher.	A. J. Mathews, Esq., newspaper proprietor.	23
ettigo and Belleek	Diocese of Clogher (Co. Mona- ghan, nearly all Co. Fer- managh, large portion of Tyrone, and portions of Donegal and Louth).	Dungannon and district	21
elleek pottery. A little la- bouring. Bad pasture. Re- mainder waste mountain and bogs.	Agriculture; shopkeepers. A very few in small factories.	Flax spinning, linen weaving, agriculture, coal mining, manufactures, farming imple- ments.	1
hief part idle, for want of em- ployment.	Agricultural hands, labourers, and factory hands in regular employ. Others about half time. Farm labourers 9s. (women 6s.) per week.	6 a.m.—6 p.m. in the linen- mills wages low, and accord- ing to class of work.	2
ome stockings made and wool spun. Girls go 10 miles for 1s. worth of work.	In 2 districts 2s. to 4s. per week earned in crochet and lace- making. Most others at farm or house work, or not at all.	In the mills. Outside the towns little except field work (in summer).	3
fone, except at Belleek pottery. "Naked, and half starved."	From 18 to 14; but at spring and harvest time younger children are at farm work.	In mills and workshops accord- ing to Factory Acts. In other cases no fixed age.	4
es, very	Generally shrewd and intelli- gent; would be industri- ous if they had employ- ment; would be handy if they got some technical education.	Yes, except in mountainous districts.	5
aluable minerals; plenty of wool, marble, clay, iron, lead.	Wood, flax, and others that are general to the country.	Others plentiful; tanning trade once flourished; excellent building stones (is quarried).	6
ery; plenty	Water-power easily obtainable everywhere	Yes	7
	About a mile apart	1½ miles apart. 5 national besides Royal School and private schools.	8
From 100 to 50	Average attendance the year round about 35 to 40 per school.		9
ome 3 miles. 9.30—3.0			10
Almost none	Drawing taught in 3 or 4 schools to about from 100—200 pupils.	To senior pupils in some schools. Science and Art Department class in Dungan- non.	11

Continued on page 432.

Questions.	Answers.	
	Doubtful.	
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	-	Yes
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	-	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	-	Carpenters, smiths, masons, tailors.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Teacher would	Yes, but a good deal would on scale of results.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Many would desire to learn use of sewing-machine.	Quarrymen, but no professional stonecutters.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	-	Too poor
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	-	Yes
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Sewing-machine work, shirt-making, spinning (wheel).	-
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	17 miles to railway station. Passenger car service daily.	Steamers pass every week. No railways, canals, &c.

	Answers.		No. of Question.	
	FERRANAGH.	FERRANAGH, TYRONE, &c.		TYRONE.
		Most probably, or other suitable rooms.	In most cases place of instruction could be had, and school managers would be interested in the subject.	13
		In many cases	Yes	13
enters, blacksmiths, shoemakers, &c.		Skilled artisans could be obtained.	Could be easily arranged, much machinery being worked; have good artisans.	14
most cases		Many, no doubt, gladly would if made worth their while.	Believes so in every case	15
ers; cement and pottery makers.		Is sure such persons could be found.	Believes so, certainly	16
would gladly avail themselves anything that gave employment.		Is not sanguine of co-operation of landed gentry who are the moneyed class.	Believes local effort could be easily enlisted.	17
strong reasons to believe so		(a.) Largely. (b.) To some extent	Believes so, especially the young people.	18
open factories		Those trades preferable which keep the children under parental eye and control.		19
lway with 6 stations in Clogh and Belleek.		Railway within reasonable distances. Markets must be provided.	Both railway and canal to larger towns.	20

Questions.	Answers.	
	Tyrone.	Sligo.
22. State your own name and occupation, and proper postal address.	W. Armstrong, Esq., Local Government Inspector.	Rev. Jno. Gunning, C.A.
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Kilkeery and district -	Tonrlestrane, Tubbercu Kilmactyne, Aclara. (Dist 12 x 6 miles.)
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Labouring - - - -	High by tilling soil, and sowing 4 months in the year in England.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Differs according to time of year. 7s. to 10s. per week.	(1) at home 8 to 10 hours; (2) home, nothing; in Engl 1l. per week.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Needlework and knitting, and house work.	Only in their homes and their own fields.
4. How, and from what age, are children occupied?	In various ways, and at different ages.	In the fields, from 12 -
5. Are the people generally intelligent, industrious, and handy?	They vary - - - -	Yes - - - -
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	I can offer no opinion - -	Wool, wood, straw - -
7. Is water-power easily obtainable from streams?	In several places - - -	Yes - - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	2-3 miles. 3 schools - -	3 miles apart. 5 schools near
9. How many children attend the schools?	- - - - -	700 - - - -
10. From what distance do the children come to attend school? What are the school hours?	10.0-3.0 - - - -	1 1/2 miles. 10-6

Continued on page 438.

Answers.			No. of Question.
Sligo.			
en. Archdeacon O'Rourke, D.D., F.P.	Arthur W. Malley, Esq., newspaper editor.	Rev. Canon Staunton, F.P., V.P.	20
oloonay, Ballysadare - -	Sligo, Ballynedher, Ballisaden, Clifony.	Tubbercurry - - -	21
ome on small farms; others work in mills and stone quarries.	Ordinary labour; farm work; flour and pin (?) mills.	Farmers and labourers - -	1
ll their time. Labourers 9s. per week, stone-cutters 1l. per week.	6 a.m. (summer) 7 a.m. (winter) to 7.0 p.m. 10s. to 20s. per week.	12 hours per day in summer. 7s. to 10s. per week.	2
homestic work. Effort made to start industry in embroidered articles, but very little done (girls got 4s.—5s. per week).	Some few earn a general livelihood, "and could earn more if they were inclined to be industrious."	In the fields when they can be spared from house work. Some knitting for home use.	3
- - -	From 10—16 years, at mill and farm work.	At school till 10, "except when parents are too poor to clothe them."	4
uperior intelligence - -	No 11 - - -	Very industrious and intelligent	5
'enty of wood and limestone -	Wood is manufactured into pins, and some straw mats are made, but, as a rule, this industry is avoided.	Wool and straw in abundance -	6
est water-power in Ireland -	Very easily - - -	River Moy runs through parish for 5 miles, and in that length does not turn a single wheel.	7
.0 National Schools - -	In Sligo a first-class Model School, and smaller National Schools.	Within 2 miles of each other. 10 schools (Tubbercurry 3).	8
100 in each - - -	A fair share - - -	About 1,000 in attendance many more on the rolls.	9
Sometimes 2 miles - -	To the Model School, from long distances.	Some 2 miles. 10—3 - -	10

Continued on page 43

Questions.	Answers.	
	TYROON.	SLIGO.
11. Do any of the children learn drawing? If so, how many?	Thinks not	No
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Should apply to the Committee of school.	(1) Yes. (2) Thinks not
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Same	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade.	Cannot say	Yes
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Same	Yes
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6 and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Same	(1) No. (2) Yes
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Same	Yes, in case of instruction handicraft.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	Same	Yes
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	No	Get support of bishops, priests, and let them recommend the project to the people.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	. . . . .	Railway 12 miles distant

Answers.			No. of Question.
SLIGO.			
- - - - -	A few in the Model School -	About 50 - - - - -	11
- - - - -	Yes. (2) In the country districts, no other places could be had.	Yes. (2) In towns room could easily be had.	12
- - - - -	Certainly - - - - -	Plenty in every case - - -	13
is, if made worth his while -	Plenty - - - - -	Shoemakers, masons, carpenters	14
rdly - - - - -	Certainly - - - - -	Likely, in many cases - - -	15
14 - - - - -	Plenty - - - - -	No doubt, if they had a sufficient inducement.	16
ible to be got from local sources.	Yes - - - - -	Would be glad to give any assistance he could.	17
s - - - - -	Certainly - - - - -	Is sure they would - - -	18
o - - - - -	Make education compulsory -	- - - - -	19
undant railway accommoda- tion.	Plenty - - - - -	Nearest railway 8 Irish miles away (an extension is hoped for).	20

Questions.	Answers.	
	GALWAY.	
20. State your own name and occupation, and proper postal address.	A. Gaffney Scott, Esq., printer and publisher.	Miss Ada Yeates (enlarg teaching cottage industr
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Galway - - - - -	Clynagh, Killeen, and Carr
1. What are the means of livelihood of the population of the districts in which you reside, or with which you are most familiarly acquainted?	Brushmaking; haymaking -	Cultivation of their hold which hardly yield a subsistence.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	9 to 10 hours per day; men 15s.; women 6s.	Every family does its own
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Many old women and young girls are engaged in sewing bags at their own homes. Wages trifling.	Since eviction of 1861 an att has been made to esta cottage industries (knit crochets, lace, needlework
4. How, and from what age, are children occupied?	From 8 or 9 years of age - -	Children from 8 years old learning crochet, &c.
5. Are the people generally intelligent, industrious, and handy?	A great many are, and a great many are not.	Such has proved to be so in cases where they have opportunity of showing it
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Wool, leather, marble, splendid building stone, paving setts, &c.; all idle.	Nothing whatever that could be turned to profitable accou
7. Is water-power easily obtainable from streams?	Any amount refuse waste, and at least two pieces with wheel and machinery lying idle.	Plentiful - - - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	Well supplied with schools -	3 National Schools, 4 miles tant.
9. How many children attend the schools?	Not half. Say the Scotch proportionate average.	150 per school - - -
10. From what distance do the children come to attend school? What are the school hours?	Ordinary hours - - - - -	Up to 5 miles. 10-6 or 1.30
11. Do any of the children learn drawing? If so, how many?	Fair number - - - - -	No - - - - -

Continued on page 662.

Answers.			No. of Question.
GALWAY.		CLARE.	
Richard J. Kelly, Esq., newspaper editor and proprietor.	Wm. Young, Esq., J.P.	Mr. O. L. Nono, professor of music and newspaper editor.	22
iam	Tract of country between Clifden and Roundstone.	Ennis	21
employment (except small wood factory with 20 hands) wholly agricultural, and only half the year occupied.	Tillage farming and sea-fishing.	Labouring	1
work very broken and precarious (subject to weather). Average wage: summer, men 2s., boys 1s.; winter, men 1s. 6d., boys 10d. a day. Annual average for man 1s. a day.	Time well occupied in fishing, cutting turf, gathering seaweed, &c. when not farming. Wages comparatively high, and labour scarce, at 1s. 6d. to 2s. a day.	6 a.m. to 6 p.m., with 2 hours for meals.	2
No domestic industries except a little knitting (whilst in Connemara knitting is largely done).	Household and farm work. Some spinning and weaving of wool.	Women work on farms like the men. No home industries.	3
employed, except for a few weeks at haymaking.	Sheep and cattle tending and farm work.	At any age, almost in same way.	4
extremely so; "if taught some domestic trade, as the Swiss peasantry, would be found as handy and energetic."	Very intelligent, fairly handy, but certainly <i>not</i> industrious.	Very much so	5
Wool, wood, straw, marble (excellent at Connemara), oysters.	Wool (which is all worked up); a little flax grown for fishing-lines, &c. Oysters grow badly, and are <i>invariably</i> stolen.	Plenty of wool, kid skins, oysters	6
excellent	Yes	Very easy to obtain	7
excellent school accommodation	1 to 2 miles. 4 named	4 to 5 miles	8
early every child attends school	Fair attendance		9
known some to come every day 8 Irish miles to school.	Short distances only, the schools being near. 10-3.	9 to 3 or 4	10
technical training of every (even the most elementary) kind absent.	Thinks not	In some of them	11

Continued on page 442.

Questions.	Answers.	
	GALWAY.	
13. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Any or either could be had pretty easily, as much wanted, and would be greatly appreciated.	School-room could be most likely got in evening. No suitable room.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	That could be found easily	Suitable sites at both schools
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	They are to be had, but are fast dying out, especially the Connemara polishing trade, which is a secret, and only one man in the town knows it.	No trade practised in the neighbourhood.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	They would	"No person capable of teaching a trade."
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	They would	Neither persons qualified work nor material on which practise.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Great efforts would be made readily (he thinks) and would pay well.	A grant of money could be fitably expended in the extension of work already commenced.
18. Have you reason to believe that the people (a) Children (b) Adults would avail themselves with alacrity of such instruction if offered to them?	Thinks they would	The people (men, women, children) would grasp earnestly any means of employment or improvement offered.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	None, except that there being great natural facilities, a good field is offered for turning a large idle population into an industrious one.	Suggests a grant of money aid the work commenced, to find a teacher for the trade.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Plenty of communication by road and rail.	No means of disposal in neighbourhood. Nearest rail 26 miles. Nearest mail 16 miles. Goods sent to Craggy by small fishing-boats.

Answers.		No. of Question.	
GALWAY.	CLARE.		
Several suitable rooms (chiefly in connection with the convent) could be found.	Thinks there would be no difficulty.	Not the slightest doubt but that several buildings would be given gratis.	13
	Yes, in all cases	Yes; and also at the Town Hall, formerly a Mechanics' Institute.	13
If connection with the convent persons could be found competent to teach any simple trade.	Fairly good carpenter	Is sure there are plenty in Ennis.	14
	Thinks not	Has no doubt of this with respect to the Christian Brothers.	15
See 14	Persons qualified to teach stone-cutting, carpentry, sawing, &c. required.	None that he knows of. Believes the Christian Brothers would.	16
	Fears that the Land Act has so impoverished the landowners as to render them unable to assist.	Cannot say	17
The people (having no resources) would be most desirous of availing themselves of any facilities offered.	Thinks the young people would, with a view to the utility of the knowledge, in America.	Yes	18
	Considers emigration the only panacea for the privation in co. Galway.		19
Railway connection with Dublin	No canal or railway nearer than 40 miles. A narrow-gauge railway or steam tramway would do more for Connemara than all other private or public works.	Good railway connections	20

Questions.	Answers.	
	MAYO.	
23. State your own name and occupation, and proper postal address.	Rev. Jas. Canon Waldron, P.P., parish of Arinagh.	Rev. D. O'Hara, P.P., E. C. Ad.
24. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Ballyhaunis (post-town)	Parish of Killoonhan and Carrmore, Ballyhadareen.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Tilling, small farms. English and Scotch harvesting.	Agriculture. A few artisans
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Most of time occupied in farm work.	Most of the men spend a considerable part of the year in England. At home they work 9 hours daily.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	None, except house keeping, pig feeding, and poultry keeping.	None - - -
4. How, and from what age, are children occupied?	Not employed except at farm work and at home.	At 10 begin to help parents cultivating the land.
5. Are the people generally intelligent, industrious, and handy?	As a rule intelligent and industrious if they had any work to do.	Not very; fairly so
6. What natural products or materials (such as wool, leather, wood, straw, marble, or stone) are obtainable in your district, which are not at present profitably employed for industrial purposes?	Wool only (this is sold to travelling merchants).	District very poor and with little of such products.
7. Is water-power easily obtainable from streams?	Yes (at present is used for small mills which manufacture oatmeal and Indian meal).	Yes - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	3 miles apart. 5 schools	About 3 miles. 14 National Schools.
9. How many children attend the schools?	80 to 150 per school	About 1,400
10. From what distance do the children come to attend school? What are the school hours?	Up to 2 miles. 10-3.	Up to 3 miles. 10-3
11. Do any of the children learn drawing? If so, how many?	No - - -	A few in convent school -

(Continued on page 445.)

Answers.			No. of Question.
MAXO.			
Very Rev. M. Finn, P.P., Dean, &c.	Rev. Jno. O'Grady, P.P.	Jas. Daly, Esq., newspaper proprietor.	27
11 places within a radius of 10 miles of Swinford.	Bohola, near Swinford	Castletur	28
small patches of poor land, and working in England 3 or 4 months in the year.	Earnings from England and small crop of potatoes and oats.	Majority hold 5 acres of land and are very poor. Labourers 1s. 3d. a day without food.	1
working till night. Hired labour brings 1s. per day, but there is very little of it.	In winter no employment. Heat of year 7 a.m. to 8.30 p.m.	6 a.m.—8 p.m. Labourers without keep 6s. to 8s. per week.	2
No home industries; do all they can for their little tillage whilst their males are absent.	Women take men's place on farm in their absence. There are no home industries, and there might be if encouraged.	Adults—(men) go to England. Large section of young girls go to Scotland as farm and factory hands. Those left attend to the land.	3
Go to school; "but many, before doing so, come to neighbouring town to sell an ass load of turf (for 8d.)	At 10 or 12 have to quit school to do father's and brother's work in their absence.	From 10 to 12; work in the fields.	4
For - - - -	Remarkably so - - - -	Very intelligent and industrious and easily taught.	5
None - - - -	Wool; flax; wood; straw	Wool; wood; straw; marble; oisier.	6
Very easily - - - -	Quite so - - - -	Unlimited - - - -	7
1 to 2 miles. 11 schools mentioned.	1-2 miles. "Abound in schools."	Abundant National Schools; about 6 in the parish.	8
At least 1,000 - - - -	626 at present - - - -	160 per school - - - -	9
1 to 1½ miles. 10-3.50 - -	1-2 miles. 10-3 - -	Average distance 2 miles. 10-3	10
None - - - -	None - - - -	Scarcely any - - - -	11

Continued on page 447.

Questions.	Answers.	
	MAYO.	
13. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	In most cases, and other rooms could be had.	Room could be got at small remuneration.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	In most cases	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Does not think so	Yes
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Cannot say with certainty. Teachers' spare time occupied by study to gain higher salary.	Yes
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Not aware of any	Persons would qualify the selves.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	If aid were granted, efforts to establish cottages, &c. industries would be made.	
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	Yes; if it was brought to them in such a tangible way that it would help them to earn a little.	They would
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Reclamation of waste land	
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Railway to Dublin, &c.; seaports	Railway to Dublin and Sligo

Answers.			No. of Question.
MAYO.			
(1.) No. (2.) No; except at Bwinford.	(1.) Very cheerfully. (2.) Free of cost.	Several places could be got, some free, others at low rent.	12
No; but there would be no diffi- culty in getting room near for a small remuneration.	Yes, on the school plot, which is generally 3 roods.	Nearly in every instance	13
Scarcely any; and where there is one we can scarcely rely on his skill or punctuality.	Yes - - - - -	Carpenters, shoemakers, tailors	14
It is to be regretted that the teachers are already too hard worked to do so.	Should think so if encouraged (at least in some cases).	Thinks many of them would	15
No; except (as is probable) qualified adults could be got from Artene and other indus- trial schools.	Yes - - - - -	Thinks there are many	16
Certainly, and with success	Quite too poor - - - - -	Thinks local assistance could be got.	17
Thinks so; especially if instru- tion be given in or near school.	(a.) Strongest reasons to believe so.	(a.) Sure they would	18
- - - - -	Workshop in connection with a central school in parish. It would become a shop to which people from the surrounding town, &c. would come; and would soon be self-supporting.	Thinks such work would not only become self-supporting, but ultimately source of pro- fit.	19
Railway station 8 miles distant	- - - - -	Railway on spot, and shipping 3 miles distant.	20

Questions.	Answers.	
	MAYO.	
23. State your own name and occupation, and proper postal address.	Chas. L. Fitzgerald, Esq., J.P., D.L. for Mayo. (80.)	Martin Sheridan, Esq., ed and proprietor of "Mayo, & miner."
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Parishes of Turlough, Castlebar, and Kildonmogh.	Mayo county - -
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiar acquainted?	Agriculture on own holdings. Some daily labours.	Land chiefly. Artizans h little employment.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	10 hours daily. 7s. to 8s. per week.	Small farmers have little oc pation in winter; 40s. annum average earning these.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Women in fields, 4s. to 6s. per week. No home industries.	Very limited - -
4. How, and from what age, are children occupied?	School. Those are glad of herding, &c. who can get it.	No general employment. E gration large.
5. Are the people generally intelligent, industrious, and handy?	Generally intelligent; tolerably handy; not at all industrious.	Very; but want of work ; wages injures them.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or oysters) are obtainable in your district which are not at present probably employed for industrial purposes?	Wool and wood; straw; marble; oysters.	Wool, straw, oysters -
7. Is water-power easily obtainable from streams?	Very easily - - -	Everywhere, and at all seasons
8. At what distance apart are the National Schools? Name the schools nearest to you.	4 National Schools within radius of 4 miles.	Schools convenient -
9. How many children attend the schools?	- - - -	Attendance good -
10. From what distance do the children come to attend school? What are the school hours?	No great distance - - -	10-4 - - -
11. Do any of the children learn drawing? If so, how many?	No - - - -	In some schools -

Continued on page 456.

Answers.			No. of Question.
MAYO.		LIMERICK.	
Mr. Jno. Kilkenny, teacher and farmer.	Rev. R. Canon O'Hara, P.P.	Rev. Wm. Casey, adm.	29
Murneen, Claremorris	Clooniron, Eggeol, Caralacky, Bushena, Bailenwohir, Cloonanna, Shraheena, Clooneera, Culclara, Maherabey (postal address, Levedick).	Abbyfoale	31
Agriculture	Almost exclusively agricultural	Agriculture (small farmers and labourers).	1
8 to 14 hours. No employment for labour.	10 hours or 12 hours in busy season; 6-8 hours in winter. 10s. to 12s. per annum.	Work all day, and earn about 4s. 6d. per week.	2
Field labour; pig-feeding; home work.	Field labour. Some as domestic servants at 4s.-5s. per annum. Very few home industries.	No	3
10-12. School and field labour alternately.	10-12 to 16-18 on farms, after which they migrate to England for 6 or 8 months of year for employment.	From 10 years	4
Yes	Yes	Very much so	5
All, except marble	Wool, wood, leather; straw easily obtained, but not used.	"All the land in the neighbourhood is bog."	6
In abundance	In abundance	Indeed it is	7
About 2 miles. 3 schools	2-3 miles	About 2 miles	8
40 to 100, according to season	District populous, and schools well attended.	1,100 children attend the schools in the parish.	9
1-2 miles	1-2 miles. 10-3.30	Some come 5 miles 10-4	10
No	No	About 20 in the convent	11

Continued on page 351.

Questions.	Answers.	
	MAYO.	
13. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Does not know	Thinks so. . . .
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes	No
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Should say, No	Fears there would be difficult in present tone of the times
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Time too much occupied	No
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Good carpenter	Fears not (as 14)
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Doubts it	Mentions Board of Education
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	In some instances, but not to great extent.	Thinks many would
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Flax factory. Refers to his unsuccessful attempt.	Apprenticing to mechanics might be tried if there were work.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Good railway accommodation (Dublin, Westport).	Ample

	Answers.		No. of Question.
	MAYO.	LIMERICK.	
Most likely - - -	Rooms could be got at small cost.	Yes - - - -	12
Plot of land vested in trustees -	Yes - - - -	Yes - - - -	13
A smith - - -	Yes - - - -	Yes - - - -	14
Teacher can't, but his three daughters, aged 16, 15, 13, will if paid for it.	Yes, if suggestion below (19) were carried out.	Yes - - - -	15
	Workers in wool, wood, leather, &c. would prefer surety of a market to payment on results.	No qualified persons, but numbers who would qualify.	16
Sure of success - - -	Effort would be made, but there are but few local gentry.	Of course - - - -	17
Believes they will with alacrity	Believes so - - - -	Yes - - - -	18
Suggests a sort of agricultural station.	Suggests teaching with central depot for sale of articles made (lace, knitted goods, needle-work).	No - - - -	19
Railway station at Claremorris, 4 miles.	Railway at nearest post-town in connection with Dublin, Sligo, &c.	Railway - - - -	20

Questions.	Answers.	
	LIMERICK.	
22. State your own name and occupation, and proper postal address.	Maurice Leneham, Esq., J.P., M.R.I.A., newspaper proprietor.	R. O'Shaughnessy, Esq., J.
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Limerick city and district; Tipperary town; Ennistown, county Clare; Balthasco, county Limerick; Killisnoe, county Clare; Newcastle West, &c.	Limerick city - - -
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agriculture (except in the cities).	Generally unskilled labour
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Labourers at harvest time get 2s. 6d. per day and food. But they are idle occasionally; in some places mostly.	Work very inconstant, yield scarcely enough to live on.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	The old home industries of knitting, lace-making, needlework seem to have died out.	Lace-making (which is very remun-rative); army clothing factory; unskilled lab
4. How, and from what age, are children occupied?	The boys keep their parents -	None, except going to school
5. Are the people generally intelligent, industrious, and handy?	Quick witted, learn easily, and when employed are industrious.	Intelligent?—Yes. Industrious?—Yes, if they have occupation. Handy?—Yes
6. What natural products or materials (such as wool, leather, wood, straw, marble, or osiers) are obtainable in your district which are not at present profitably employed for industrial purposes?	All the materials named, and only a small quantity of leather and osiers used.	Leather, marble, osiers; all abundance.
7. Is water-power easily obtainable from streams?	"Nowhere in the world is there more water-power, and it is going to waste.	Yes - - - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	City is crowded with schools (Christian Bros., Nuns, &c.)	Several primary schools, more under religious bodies.
9. How many children attend the schools?	- - - - -	About half the number that ought.
10. From what distance do the children come to attend school? What are the school hours?	2-3 miles. 10-12 - - -	From the city, 9 or 10-5

Continued on page 454.

Answers.			No. Question.
LIMERICK.			
Wm. H. O'Sullivan, Esq., M.P.	Mr. Cornelius O'Brien, farmer	Mr. Martin O'Sullivan, National School teacher.	22
Kilmallock - - - -	Ballyhatrill, Loughill, Glin, Ballyguiltenans.	Athea - - - -	21
Land tilling, quarrying, shoemaking, tailoring, painting, and slating.	Farm work - - -	Agriculture and dairy farming and labour.	1
10 hours per day. 8s. to 21s. per week.	12 hours daily. 6s. per week. Farm servant, 10l. per annum with diet.	6 a.m.—6 p.m. when they can get work (spring and harvest). 8s.—9s. per week. Farm servants: male, 10l.—12l. female, 8l.—8l. (with diet and lodging).	2
Only as milkmaids, servants, and as some farm work in spring and autumn.	No employment, save on odd days in harvest.	None, except as domestic servants.	3
Nil - - - -	No employment till manhood -	To school till 15; then help their parents or are hired out.	4
Yes - - - -	Yes - - - -	Very much so - - - -	5
Straw (rough), marble, osiers -	Wool, wood, straw, and osiers -	Very superior stone quarries. Other natural products undeveloped for want of capital.	6
Yes - - - -	Yes, plentifully - - - -	Yes - - - -	7
3—4 miles. Kilmallock - -	3 miles. 4 named - -	About 3 miles. 4 named -	8
About 700 - - - -	About 100 in each - -	Average 50 to 100 - -	9
About an average of 1 mile. 10—3.30.	1½ miles. 9—3 - - - -	2, 3, and more miles. 10—3 winter, 10—4 summer (but could be lessened).	10

Continued on page 155.

Questions.	Answers.	
	LIMBRICK.	
11. Do any of the children learn drawing? If so, how many?	Yes, in Christian Broc. Schools -	Yes, in the good primary school in the higher classes.
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Thinks so, decidedly - -	Thinks so - - -
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Thinks so, in most cases -	Thinks not, generally -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Believes there are such - -	Many, all over the city -
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Cannot say. [The Christian Broc. have a large school in which car and cart making, &c. are carried on.]	Does not think so, except in the case of the nuns, who will do anything and everything with very little regard to payment by results.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts such as the working up of the materials named in Question 8, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Quite certain many such could be found.	Payment by results will induce many to qualify themselves.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Believes so - - -	If the thing is really to succeed you must enlist the clergy, the people, and not ask to much money.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	No doubt - - - -	Yes, certainly - - -
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Making a personal visit - -	Begin in a small way; avoid high social patronage. Get an intelligent priest on your side, and for girls take the advice of Sisters of Mercy.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	Excellent railway and canal accommodation.	Not stated. Good transit

Answers.			No. of Question.
LIMERICK.			
Thinks so	None	No	11
Cannot say	Yes, after school hours, and other rooms for remuneration.	Yes; the manager will give every facility and help. (3) Yes.	12
Thinks so	Yes, in all cases	Excellent facilities for doing so	13
Thinks so	Yes	Smith, carpenters, coopers, &c. Females qualified to give instruction in knitting, lace-making, embroidery, &c.	14
Yes	Yes		15
Is not aware	None save wood workers. Many would qualify for payment on results.	Yes; and willing to do so for small consideration by result or otherwise.	16
Thinks so	Efforts would be made, and believes they would be successful.	Locality very mountainous, people poor, and no local gentry; so fears local efforts would be small in result.	17
Yes	Would be most anxious to avail themselves of it.	They certainly would . . .	18
Thinks young boys ought to have some instruction in farming.	Knows families in the Glin district actually starving for want of employment.	None, except to urge the necessity of such instruction.	19
G. S. & W. Railway Station .	Daily steamer to Limerick, and in connection with Foynes train 8 miles distant.	Railway a few miles distant. River Shannon within 6 miles.	20

Questions.	Answers.	
	LIMERICK.	
22. State your own name and occupation, and proper postal address?	Richard Bourke, Esq., Local Government Inspector.	Mr. W. C. Upton, carpenter and builder (Secretary of Labourers' League).
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Castle Connell (Lismagry)	Ardagh
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agricultural labour	Labour on farms or on works of the roughest nature.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	12 hours in summer; 8 to 10 in winter. Men about 2s. week, women 2s. 6d., boys 4s.	7 a.m. to 6 p.m., except 1 winter; but they do not last half the year employed. 7 week. Servant boys 10l. year.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	No special employment	In service to farmers; earn 10 year. No home industries.
4. How, and from what age, are children occupied?	Children get some work at times on the farms.	Go in service to farmers
5. Are the people generally intelligent, industrious, and handy?	Intelligent and tolerably handy, but not industrious.	They are
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	All the products named. Wool is manufactured at some small mills (worked by water). A few basket-makers.	All on list obtainable (except marble, which is 7 miles away). Leather and wood alone use profitably.
7. Is water-power easily obtainable from streams?	Yes	Yes
8. At what distance apart are the National Schools? Name the schools nearest to you.	From 4 to 5 miles. His own school in own grounds.	National Schools 3 miles apart. Ardagh National School.
9. How many children attend the schools?	75-80 boys; 30-40 girls	An average of 60
10. From what distance do the children come to attend school? What are the school hours?	Sometimes 3 miles. 12-4	To 3 miles. 12-3
11. Do any of the children learn drawing? If so, how many?	No	No

Continued on page 462.

Answers.			No. of Question.
LIMERICK.		CORK.	
Mr. Jeremiah Dineen, carpenter	Mr. Patrick O'Shaughnessy, draper.	Mr. F. F. Johnson, innkeeper	22
Ballingarry	Bruff	Kanturk	21
Farm labour	Labourers, and shoemakers (a few).	Casual manual labour	1
7 a.m. to 7 p.m. (summer), or 8 p.m. (winter). Without diet 2s. week, with diet 2s.	6 a.m. to 6 p.m. Labourers in spring and harvest 2s.—3s. a day; artisans 3s.—4s. day.	12 hours daily. 8d. per day with 2 meals; 1s. per day with no meal.	2
None; would gladly avail themselves of such if they had opportunity.	None, except in the fields. There are many girls and women trained to crochet, but trade has died out, there being no demand.	No work except weeding in spring; and in autumn binding.	3
From 10 years, in such work as weeding, haymaking, &c.	No occupation	No employment for children under 14; girls above that age help in the dairy.	4
They generally are	They are	Intelligent, but spirit of industry dead.	5
Wool and straw	Wool, straw, osiers	Wool, wood, straw, and osiers	
It is. [There is an old mill near the town, not used.]	Yes	Superabundant	7
4 miles apart. Ballingarry school.	Nine schools within a radius of 4 miles.	4 and 5 miles; Kanturk nearest	
Average: male 127, female 95	Christian Bros. School, 120 boys; Convent School, 108 girls; 8 National Schools, 225 boys 235 girls.	400 on an average, male and female.	9
Up to 3 miles. 10—4	About 2 miles. 9—4	Females come 6 to 8 miles to convent schools under National Board.	10
No	No	No	11

Continued on page 460.

Questions.	Answers.	
	LIMERICK.	
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	School-room would be given, and also room in another building available, free of cost.	Use of school-room would be inconvenient on account school furniture. Place can be got for a few shillings weekly.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes -	Yes -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Only tradesmen, except perhaps a basket-maker.	Yes -
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	Teacher would do his best, but is at present acquainted with no handicraft.	Yes -
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 4, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	No such person; but probably some might be found willing to learn.	None fully qualified, but persons would (be himself, for example) teach what they could and strive to qualify themselves.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	They probably would	Local efforts would be made with every chance of success.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	No doubt that plenty of children and a few adults would commence; but unless found remunerative they would soon give up.	Has found from inquiry that both children and adults would.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Wood carving and, perhaps, decorative art might offer best chance of striking root.	Yes -
20. What facilities, if any, exist for disposal of the work done by adults or children? What railway or canal communication exists?	Railway excellent. The market would be rather scanty and precarious.	No market. Drapers in local towns could be got to purchase female work. Trade and Limerick Railway.

Answers.			No. of Question.
LIMMICK.		CORK.	
(1) Could not be got - -	(1) Yes. (2) No- - -	Yes; no difficulty whatever -	15
There is room for such a shed, &c.	Room at four of the schools -	Yes; plenty of available room -	15
There are artisans, most of whom have nothing to do.	No - - - - -	Yes - - - - -	14
Yes (not the master of the schools).	Thinks the masters would -	I should say so - - - -	15
There are such persons - -	No; but persons would qualify	Yes. Orders may be largely used for basket work.	16
Efforts would be made - -	Thinks that if woollen fabrics were made they would repay a good deal of the advances.	Would personally guarantee assistance.	17
Yes, both - - - - -	Thinks they would - - -	Yes, though nothing has been done to stimulate them.	18
Lord of the soil is a good landlord, and would aid in carrying out the work.	- - - - -	Send a representation and I will point out how the scheme may be developed.	19
Nearest railway 5 miles. Many goods might be sold in locality.	Railway within 3 miles - -	Large demand for basket work in Cork. Station 2 miles distant.	20

Questions.	Answers.	
	KERRY.	
20. State your own name and occupation, and proper postal address.	Capt. J. C. R. Colomb, J.F.	Miss Frances FitzGerald
21. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Drounquinna, Kenmore	Valencia Island
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Mountain farming - - -	Farming, labouring, flint slate industry (but it is working well at present)
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Very little of their time fully occupied. Ordinary labourers in constant work 9s. per week.	The whole day could be profitably employed by industrious farmers most of the Good labourers, when employed, earn about 9s. 6d.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Butter-making. Here and there wool-carding. Lace-making at convent school.	Farm service (4s. a year), lace work, and "sawing" turf per day. Dairy work at farm; farmers' wives; knit lately started.
4. How, and from what age, are children occupied?	At school - - -	Boys from 12, field work
5. Are the people generally intelligent, industrious, and handy?	Most extraordinarily intelligent; not industrious, for there are no influences to make them so; in youth naturally handy, but get awkward for want of practice.	Very intelligent; industrious; put in the way; very handy.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	None to speak of at present	Wool, slate (quarry). [O would probably do well.]
7. Is water-power easily obtainable from streams?	Yes - - - - -	Yes; one very good stream middle of island.
8. At what distance apart are the National Schools? Name the schools nearest to you.	Most convenient; the most remarkable being the convent school	3 in the island (a separate one for boys and girls in an island 7 by 6 miles.
9. How many children attend the schools?	- - - - -	50 boys and 55 girls in (probably more in the other)
10. From what distance do the children come to attend school? What are the school hours?	10-4 - - - - -	Up to 2 miles. 10-5 - -

Continued on page 462.

Answers.			No. of Ques- tion.
CORK.			
Rev. Peter Hill, clergyman -	Rev. Jas. J. Stoney, clergyman	Rev. Thos. C. Abbott, clergy- man.	22
Skibbereen and West Cork -	Goleen, Skibbereen - -	Schull - - - - -	21
Agriculture, combined (along the sea coast) with fishing.	Agriculture and fishing -	Principally small, and very poor farmers and farm labourers. A few indifferent workmen.	1
Early morning till 7 or 8 p.m. Labourers earn 1s. 6d. per day.	Most of their time is thus occupied, but time could be found for other remunerative labour if provided. A bare subsistence.	Generally from light till dark (dependent on season of year). Labourers 1s. a week; trades- men 3s. a day.	2
No particular work for women, except at house work.	House work, carding, and spin- ning for family purposes. No home industries.	Wives of small farmers fully occupied at home. No home industries.	3
Generally as domestic servants, and from the age of 15.	Leave school at 15, and are employed at home as occasion requires.	From 15, at farm and labourers' work.	4
Shrewd, and fairly educated in reading, writing, and arith- metic.	Very intelligent, and fairly handy; but they certainly might make more of their time than they do.	Intelligent and industrious -	5
Wool and straw good. (There is a tanning establishment at Skibbereen.)	Wool and straw, and only in limited quantity. Slate quarries could be worked under proper management.	- - - - -	6
Abundant water-power - -	It is - - - - -	Yes - - - - -	7
2-4 miles. 6 named -	5 miles. 3 mentioned -	3 miles. 4 named -	8
An average of about 70 - -	About 300 attend the above schools.	- - - - -	9
2-3 miles. 10-3.30 - -	An average of 2 miles. 10-3.30	- - - - -	10

Continued on page 463.

K K 2

Questions.	Answers.	
	KERRY.	
11. Do any of the children learn drawing? If so, how many?	Yes, at convent school	Yes, a few
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	In all probability, with sanction of National Board.	Yes
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Many square miles of room	Yes
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Many might undertake, but would not be really competent.	Carpenter and stone-cutter
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I should say so	Some other person probably
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	(a.) No. (b.) Would depend upon payment.	Most probably
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	Possibly	Efforts would be made
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	(a.) Yes. (b.) No	Yes
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Country is being ruined by book-learning, and honest industry is going out of fashion.	To send teacher of book-making.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?		Very difficult. Steamer to Valencia to Cork.

Answers.		No. of Question.	
CORK.			
None, except about 70 in the convent school.	Not that I am aware of	11	
Yes, in the town and other places; also there is a mill idle which would form a factory at a small cost.	Would depend upon the National Board, the patrons, and the arrangements proposed. Possibly rooms could be got for small remuneration.	12	
Yes	Yes, in some cases	13	
Yes	Carpenter and boat-builder, who might be induced to do so.	14	
Schoolmasters have quite enough to attend to. Others could be got.	Cannot say	15	
None, except for leather work. A person should be trained.	Probably such could be found	There are carpenters	16
Undoubtedly, and with prospect of success, if trained instructors were at first employed for some time.	Under a local committee, with a manager or overseer, a good measure of success would attend such efforts, but no local source of revenue.		17
I believe so	I think they would	At first there would be great difficulty in inducing the people to take any interest in it.	18
Factory for fishing-nets. Woollen and linen factory.	Lace work and knitting of various kind might be taught in the schools with a prospect of being remunerative.	Home industries mentioned in Question 3, if well taught, might be profitable.	19
Railway to Cork	No local facilities, except in case of carpentry work and boat-building. Nearest railway 20 miles.	None	20

Questions.	Answers.	
	COBK.	
22. State your own name and occupation, and proper postal address.	Rev. Robt. Noble, clergyman	Rev. Ed. H. Hopley, clergy
23. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Ballydehob, Skibbereen - -	Toomore, Skibbereen
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	On small farms - - -	Labouring, farming, and f
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	Their whole time when not asleep. (2.) Does not know.	The whole day. Lab: 1s. 6d. per diem.
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	House and farm work. No home industries.	Generally assist the fami out-door work. A little n work and knitting done.
4. How, and from what age, are children occupied?	From 12-14. Are engaged in farm work, or go to shops, &c.	Leave school at 15 or 16, then employed in wor home, in England, o America.
5. Are the people generally intelligent, industrious, and handy?	Yes - - -	Mostly intelligent; gen industries; only a few be called handy.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	A grass and furs district. Copper works abandoned because unremunerative.	None, except straw -
7. Is water-power easily obtainable from streams?	Not in the immediate neigh- bourhood.	No - - -
8. At what distance apart are the National Schools? Name the schools nearest to you.	2 miles. 4 named - -	1½ miles. 4 mentioned
9. How many children attend the schools?	20 in attendance of two of his own schools.	Average of 70 - -
10. From what distance do the children come to attend school? What are the school hours?	Most only a short distance; some 2 miles. 10-4.	Up to 1½ miles - -

Continued on page 465.

Answers.			No. of Question.
CORE.			
Rev. Stephen Moxley, LL.D., clergyman.	Rev. Wm. W. O'Grady, clergy- man.	Rev. Jno. Pratt, A.M., clergy- man (Rural Dean).	22
Drumoleague	Bantry district	Durrus	21
Agriculture of the rudest and most thriftless kind.	Agriculture (and on the sea coast fishing).	Entirely agricultural	1
3 or 7 a.m. to 7 p.m. in summer; sunrise to sunset in winter. Generally 1s. 6d. per day.	Time occupied varies with the season of the year. 2s. a week.	All their time	2
Sitting in the house and minding their numerous children.	Farm and household work. No local industries.	No work by which they earn money.	3
Children are allowed to play in the streets till they are 11 or 12 years of age.	- - - -	From 14 years, at farm work	4
Not intelligent; not indus- trious; not handy; in fact, not willing to do anything but beg.	I think so	Yes	5
These materials do not exist, or if they did the people would not turn them to any account. Slate quarries.	All mentioned (except marble) may be had in limited quantity.	Yes	6
Water supply most copious	It is	- - - -	7
1½ miles. 3 schools named	3 miles. 3 in the town of Bantry.	About 5 miles. Durrus.	8
Average of the 3 schools 158	80 to 100	- - - -	9
Up to 4 miles. 10-3 or 4	Up to 3 to 4 miles. 10-3	- - - -	10

Continued on page 467.

Questions.	Answers.	
	CORR.	
11. Do any of the children learn drawing? If so, how many?	No - - - -	No - - - -
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	Yes, if they would not be damaged. A room could be got for a small remuneration.	Places could be obtained - -
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	Yes, near country schools, but not so easily near village schools.	Yes - - - -
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	None whose instruction would be valued much.	Good house and boat carpenter
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I fear not - - -	I think not - - -
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 8, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	I do not know of any fit person	Carpenters as above named -
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	I fear not - - -	Most probable in such case -
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction, if offered to them?	I think they would be slow to attend at first, but I could not say what they might do after some time.	I think so - - -
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	No - - - -	No - - - -
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?	None. Nearest railway station at Skibberoo, 9 to 10 miles. No canal.	The remoteness and isolation of this locality create a great difficulty.

Answers.		No. of Question.
CORK.		
I think not - - -	Only a few, as extra subject -	No - - - - 11
Yes - - - -	Rooms could be got - - -	Buildings could be got - - - 12
There already exist rooms which are available.	Yes, in nearly all cases - - -	- - - - - 13
Yes, near the Drimoleague School.	Nons - - - - -	- - - - - 14
I fear not; they are in no way enterprising.	I should say they would - - -	I think not - - - - - 15
(1.) No. (2.) I do not think they would.	(1.) None. (2.) If made worth their while, some would, I think.	No - - - - - 16
A grant might operate as stimulant, but effect would soon die out. None; charity and give; give is the standing rule here.	No funds available in the present state of the country.	
I do not think either children or adults would so avail themselves.	If they saw any prospect of earning even a little by it, I am sure they would eagerly.	46
Train technically the paupers in workhouses, the prisoners in gaols; those outside those places are incorrigibly lazy, and will work only when they see want approaching.	There are two mills (now idle) available, with water-power and spacious buildings.	18
Railway - - - -	(1.) No local market. (2.) Railway and steamboat communication.	20

Remarks on emigration here added.

Questions.	Answers.	
	CORE.	
23. State your own name and occupation, and proper postal address.	Very Rev. Canon McLevinay, F.P., V.F., Parish Priest.	Wm. D'Hesterre Parker, Esq. solicitor.
24. Please state the names and full postal addresses of the locality or districts to which the foregoing particulars relate.	Bandon	Passage West.
1. What are the means of livelihood of the population of the district in which you reside, or with which you are most familiarly acquainted?	Agriculture, some wool-spinning, &c. in the rural districts. In the town ordinary trades, basket-making, &c.	In the dockyards and shipping tradesmen and labourers.
2. What portion of their time is occupied in their ordinary daily work? How much do they earn per week, or per annum?	About 6 a.m. to 7 p.m. Wages from 4s. or 6s. to 80s. per week.	6 a.m. to 6 p.m. in the summer. From 14s. to 21. or per week
3. Are the women occupied in any work by which they earn money? If so, how much? If not, what is their occupation? Are there any home industries such as knitting, lace-making, needlework, &c.?	Some knitting and needlework, but no lace-making or crochet. Millinery, mantle-making, &c. Work for bootmakers; earn 4s. to 10s. per week.	Some few women work at knitting, crochetwork, and needlework, and their earnings may be about 2s. or 3s. per week.
4. How, and from what age, are children occupied?	Some boys from 12 upwards at bottling stores, &c., and get 2s. 6d. to 6s. a week.	At school to 14 or 15.
5. Are the people generally intelligent, industrious, and handy?	There are, and desirous of work, but don't find it.	Yes.
6. What natural products or materials (such as wool, leather, wood, straw, marble, or others) are obtainable in your district which are not at present profitably employed for industrial purposes?	Wool, leather (hides), wood, straw, others.	Wool, wood, straw.
7. Is water-power easily obtainable from streams?	Everywhere	Yes.
8. At what distance apart are the National Schools? Name the schools nearest to you.	Several in town, and at distances of 3 or 8 miles elsewhere.	5 to 6 miles. Nearest school 1/2 a mile.
9. How many children attend the schools?	Convent schools, 700; others from 70 to 160.	250.
10. From what distance do the children come to attend school? What are the school hours?	2 or 3 miles. 9.30 to 3.30	About 1 1/2 miles. 10-4.
11. Do any of the children learn drawing? If so, how many?	A few learn drawing	Very few.

Continued on next page.

Questions:	Answers.	
	CORK.	
12. Could the use of the school-rooms be obtained after school hours for giving instruction in the use of tools or in any particular trade? Could any other room be obtained temporarily or permanently for such a purpose, free of cost, or for a small remuneration?	I fear not, but others could	Yes.
13. Is there room to erect a shed or temporary building to serve as a workshop near to, or in connection with, the school building?	I think not	Yes.
14. Is there any skilled artisan near to the school, engaged in some handicraft or not, who would undertake to give instruction in the use of the tools employed in his trade?	Carpenters, masons, blacksmiths, and horse-shoers everywhere.	Yes.
15. Would the master of the school or any other person qualify himself to give such instruction, if promised payment on results?	I think not	Yes.
16. Is there any person in the neighbourhood who is qualified and will undertake to teach handicrafts, such as the working up of the materials named in Question 6, and if not, would any persons qualify themselves for that purpose, if promised payment on results?	Such might be found	Yes.
17. If a grant from an extraneous source were offered in aid of local efforts, would such efforts be made, and with what prospect of success, towards defraying the cost of instruction in the use of tools or in a handicraft?	I think so	It depends upon the managers of the schools. The public are much in favour of technical education.
18. Have you reason to believe that the people (a.) Children (b.) Adults would avail themselves with alacrity of such instruction if offered to them?	I have	Yes.
19. Have you any other suggestions to offer which may assist the Commissioners in carrying out the objects they have in view?	Such industries and others might usefully and successfully be introduced into union workhouses for inmates, and perhaps in or near them, but separate from them, for out-purses also.	That the local managers be consulted and their co-operation solicited.
20. What facilities, if any, exist for disposing of the work done by adults or children? What railway or canal communication exists?		Railway and steam-packet communication with all parts.

REPLIES TO CIRCULAR OF INQUIRY by Mr. W. J. DOHERTY.

IRISH INDUSTRIAL EDUCATION.

1.—Agriculture is the principal means of support of the country districts with which I am familiar. In two of the cities and towns in which I have resided, Dublin and Belfast, other commercial pursuits are available, Dublin being largely dependent on the agricultural prosperity of the country generally, whilst Belfast depends both on agriculture and the linen trade.

2.—The time of *agricultural labourers* is fully occupied, and they earn from 7s., 8s., or 9s., and even 12s. weekly, or an equivalent in house-rent and gardens in some cases. In the vicinity of towns where labourers are scarce, or where public works are in progress, their rate of wages increases from 12s. to 14s. or 15s. per week for *selected and steady hands*; but the great bulk of the agricultural classes of Ireland are chiefly employed on the small farms belonging to their own immediate families, and do not earn any specified wages, all the labour of the family being absorbed in the common work of daily labour, the produce of the crops going to pay the rent, taxes, and supply food, clothing, and other necessaries.

3.—The bulk of the women in the agricultural districts are engaged in like manner on the requirements of the holdings, in turnip cleaning, turf-winning, flax pulling (in Ulster), haymaking, and all other employment attending to the management of poultry, dairy produce, and marketing. Where there exists a redundancy of home assistance, many of the girls are hired out as domestic servants into districts where the farms are larger in area, and in which the daughters of the larger farmers do not from their better position work at out-door labour; in these cases the girls receive from 3l. 10s. and upwards per six months, that being generally the time for which they are engaged, say, from 1st May to 1st November, many of them remaining at home from 1st November to 1st May, during the slack season of agricultural pursuits, during which time they devote themselves to knitting, &c., generally for the use of their own domestic circle. In many cases, in the west and north-west of Donegal, knitting is an employment largely availed of by girls and boys alike, because they receive payment of from 2s. and upwards per week for their labour through local agencies, chiefly through the medium of one well-known establishment, the Messrs. Mac Devitis of Glenties. In the eastern district of Donegal, shirt-making was formerly done on a large scale, but at present, since the introduction of sewing machines, this hand-sewing has been largely discontinued.

4.—In the agricultural districts among small farmers, those children are not hired out to larger farmers, are invariably engaged attending to the watching and herding of cattle, and assisting in the domestic arrangements of the household; many are sent to the national schools from five years upwards till they are 13 years old. In the case of many of the people of the congested districts, where no occupation is available for them on their own small holdings, the larger children are hired out for small sums half-yearly, as is the case with the more grown boys and girls. *This hiring out is a very unfortunate system, as it does not afford any opportunity to the youth so treated to avail themselves of school or education, and it results in many cases in moral destruction. Frequently they are removed from all the influence of home, and in many instances, are not looked after either morally or intellectually, in the households where they are engaged*

For these people any training at home whereby they could earn 4l. yearly would be an untold blessing. Appendix N.

5.—The intelligence and industry of the people, considering the means at their disposal for acquiring the one, or applying themselves to the latter can, be best judged from the fact that thousands of the labouring classes emigrate year after year to Scotland and England during the harvest, which is earlier in England than with themselves, in order to earn as much money as may pay the rent of the small holdings they occupy. If this is not industry in the midst of hardships and privations I know of none greater; journeying miles to the nearest seaport, and undergoing all kinds of fatigue during the eight or ten weeks they are so engaged.

As to being handy, that want is their great defect; they are handy, so far as they have been taught, or have had an opportunity of learning. How is it possible for the bulk of our poor Irish labourers, without any instruction in industrial occupation, to be anything else but coal carriers and earth fillers, brick and clay carters, and mortar mixers and carriers, to the more educated and technically trained workmen of the more favoured countries of England and Scotland?

6.—Wool could be produced in quantity, but is not in great abundance at present the small tanneries, formerly numerous in the country have disappeared, and having become profitless to the owners, too, they are not worked. This is owing in a great measure to the importation, on a large scale, of hides from Buenos Ayres, Australia, and elsewhere—cargo lots, which can be imported at a cheaper rate than home-produced hides, and the tanning of leather, not only in the district, but throughout Ireland generally, has been in a great measure abandoned through the competition of Leeds, Manchester, and London, with capital to work it on a large scale available, they have been able to drive the Irish leather trade out of the market. Even shoes and boots, the produce of Northampton Maybole, and other centres of bootmaking in England and Scotland, has crowded the markets, tempted the sellers of such wares in Ireland with long credit, the result of capital, so that clean, unmanufactured English leather, that is leather ready for the bootmaker, harness maker, or belt maker, can be sold at from 1d. to 2d. per lb. cheaper than Irish tanned leather.

Salt Pans, for the production of salt, were formerly frequent around the sea coast. This employment has also disappeared. A large trade could be introduced by the converting of peat into litter, as is now practised in Holland. Bent growing and mat-weaving, sackings, and textile weaving should also be introduced.

Wood.—The country has been denuded of timber, and would become improved by plantations judiciously arranged as shelter plantations, not wholesale re-forestry, as has been advocated in some quarters, except that forestry could with advantage be taken up as a branch of technical study in districts where large tracts of mountains otherwise incapable of being rendered productive could be set apart for that particular use; but sufficient wood of the meaner kinds, such as alder, ash, larch, fir, and birch, are to be found that could be converted and used for the requirements of technical instruction, and in many parts a trade could be established by articles manufactured from local woods.

The want of plantations, judiciously arranged, has been a great neglect of the landlord class in Ireland, as the law gave the right of every tree planted by the tenant to the landlord, so that tenants did not plant, and very rarely did the landlords do so.

Oriens are not abundant, but they could be profitably produced if the demand existed for their use, and the children were taught how best to convert them into marketable articles. This is one branch of reproductive work that would be specially taught in a technical school for the young children of both sexes. In many parts of the marshy districts of Ireland this would become in a few years (from the quickness of growth of the

Appendix N. plants) a most important adjunct to the every-day work of a technical parochial school—the planting, rearing, and treatment of various sizes and the full grown osier and its conversion into wicker and basket work of the class required in the district and local towns, might become, under proper treatment, a remunerative employment.

Straw is available over the greater portion of Ireland; and straw-plaiting, bottle-casing, and such like employments should be one of the trades taught everywhere to children. In this branch much could be done, especially by girls if properly taught.

Marble.—In many districts of Donegal, notably near Dunfanaghy, marble quarries exist, but have never been worked to any advantage. There also exists on the mountains of Muckish, in the latter district, large deposits of glass-making sand, but, owing to the want of inter-communication, it remains an unmarketable article; also fuller's earth and soap stone (French chalk) are to be found in many parts of the north-west of the same county.

Granite and slate quarries, limestone and freestone, abound in many districts of the country, but all are more or less valueless on account of want of means of conveyance. Light, narrow-gauge railways, are the great want of the country, and until proper means of transport are provided, many of the industries of these congested districts cannot be profitably carried on; but education can be introduced everywhere, so that the rising generation may be able to apply their hands to do work they now know nothing of.

Bog iron ore deposits have been found among the worn out bogs, and cargoes have been shipped from Dunfanaghy, Crossroads, and Bunclrana. It is used for clarifying purposes in gas works and aniline dyes.

7.—*Water-power* is the one natural agent that is almost everywhere available throughout Ireland. Streams and rivers abound, and could, with intelligence, be applied to drive any amount of machinery, turbines, and water-wheels, and their use as a medium of imparting motion to machines and engines should be taught practically in every district. They might be on as primitive a scale as the ancient Persian wheel, so as not to be expensive in their construction nor difficult of application. This should not prevent the more modern systems from being taught; but it is useless teaching people how to use and construct a machine that would cost 1,000*l.*, if they could only provide one at 50*l.* for their own use. Yet pupils should be instructed in the higher grades at the advanced schools. Water-power in all its branches, the use of levels, reservoirs, aqueducts, sluices, and also turbines, power of falls of water, and everything connected with hydraulics in an applied form, ought to be taught, whereby the farmer could apply it to threshing his grain, churning his milk, working his flax mills, and other industries; in fact, this question of water-power as applicable to the furthering of Irish industries should be one of the chief features of any technical training, because it is available everywhere.

8.—National schools are about three to four miles apart (except in mountain districts, where they may be more); as a rule sufficient schools for primary education in the three R's exist, but there is a total want of even the semblance of technical instruction imparted in any of them. So far as primary education is concerned, plenty of opportunities are afforded by the National Board of Education, but they seem to have neglected altogether the important question of technical instruction.

The Resident Commissioner, Sir P. J. Keenan (with whom the writer has spoken years ago on this subject), is fully alive to the existence of the want. The means whereby it could be applied seemed to him the difficulty. No doubt the distance of schools from each other could be best supplied by a national school chart.

9 and 10.—In country districts the average attendance would be about 60, and the distance would be from $1\frac{1}{2}$ to 2 miles radius generally.

11.—In none of the national schools (that I am acquainted with) do drawing classes exist. It is one of the most essential branches of technical knowledge, and should be taught to every child from the age of six years and upwards, in the same way as their alphabet. Black-boards, and chalk for rough drawings of lines and forms, should be introduced into every school, and as the pupils advanced in knowledge the finer instruments could be put into their hands. Objects in every-day use instead of flat surfaces should be the examples selected. Appendix N.

12.—The school-rooms, as they are at present arranged, could not well be adapted to technical instruction. Benches and forms used for reading and writing would not suit pupils using tools.

In many places suitable rooms might be obtained at a small rent, but temporary sheds could be constructed adjacent to the school-room, of a uniform pattern for general technical instruction, and of other shapes for special districts. This could only be determined upon by the local authority, assisted by the directions of the inspecting demonstrators.

13.—In the case of almost all country school grounds there is sufficient room whereon to erect a workshop, and these technical workshops would be best erected at or near the existing schools, being well known centres in every district.

14.—The skilled artizans in country districts in Ireland consist of the village blacksmith, the carpenter and wheelwright combined, the shoemaker, the tailor, and the gardener. Many of the best blacksmiths the writer has known in England have been first educated, technically, in some village in Ireland. The trade of country carpenter in Ireland embraces all branches of the business, from glazier to that of cabinet-maker, of course mostly in a rude way. The smith performs all the duties of agricultural implement maker, up to the finer art of the locksmith. Millwrights, or superior carpenters, are fast disappearing, since the supply of American flour and Indian-corn meal has reduced home milling to an unremunerative art. The use of machinery and the power of capital has destroyed almost every branch of local technology in Ireland, so that the inducements for sending boys to learn trades that existed half a century ago are not now present, and yet the want of the development of these local trades have never been more keenly felt from an economical point. Cash has now to be paid for the imported article, whereas formerly it was supplied from home industry, and consequently allowed the value to be spent in the locality.

In the vicinity of towns many skilled artizans would yet be found, ready for a fixed remuneration to give practical lessons in their various arts. But with an awakening to the value of this class of education many years would not elapse before apt pupils would have learned, who would be able to bring better educated minds to bear on their various callings.

A few selected and skilled demonstrators could impart technical knowledge to a district, but the local tradesmen in many cases would be found available for supplying the drudgery of the instruction. Masons are yet abundant, but stone-cutters and workers in the advanced forms of building construction are deficient, except in the vicinity of large towns; and in the dwellings of the people this class of knowledge is particularly required.

15.—The present masters of schools could not well qualify for the position of technical instructors, and it would require some years before they could do so, even if they were willing to apply themselves. What is required is a central technical college or training establishment, where all future masters would require to take out certificates of merit, on the general theoretic study of technical knowledge, as applicable to their several schools and districts, whereby they could impart the literary portion of the lectures to their pupils, whilst the skilled artisan or demonstrator practically explained the use of the tools, and the technical teaching

Appendix N. required to put the theoretical into practice; thus the masters should be taught how to teach drawing in its general principles, colouring, mapping, surveying, levelling, and proportion of plans, simple architectural drawing, as adapted to country districts, or such other special training as the sub-committee in charge of the district considered should be taught.

In addition to this central training college, district schools of higher technical knowledge should be provided in the vicinity of the local towns where apt pupils from the general schools would receive an advanced technical instruction, and where parochial teachers could be further strengthened in the knowledge they obtained at the central establishment, whereby they might obtain payment for results from the proficiency of the pupils they taught, in the same way that the intermediate schools and scholars now receive remuneration.

Assistance should be given to local pupils at the primary schools, who showed marked progress, to enable them, by means of free education or otherwise, to attend the baronial or intermediate technical schools, and also to further assist those who would excel to proceed to the central establishment or technic university.

Any aid given through the medium of the Government should be given alike to all schools, whether conducted by the Government or by the religious orders, or by denominational bodies.

The new Science and Art Museum about to be erected in Dublin should be constituted wholly a technical college, the same as the Swiss College at Zurich or the Polytechnic Schools.

If this were done, and a system of baronial affiliations established throughout Ireland as intermediate schools or county colleges for higher technical instruction, making every national school a feeder in the branches of knowledge required for its particular district, it would only require the means and the governing power to produce in Ireland, during the next twenty-five years, a very superior class of educated artisans, workers, and labourers skilled in the various callings of industry required either at home or abroad.

16.—In the vicinity of towns many persons qualified to teach handicrafts would be found; in the country districts, owing to the absence of all manufacturing industries, there would be greater difficulty in obtaining qualified teachers, but with a central and distributive system this difficulty would soon vanish. Only once show the people that they can gain intrinsically by attending to technical instruction, and you will soon have them applying themselves assiduously towards acquiring it. The most simple forms of technical knowledge is what is first required in the country districts, and the skilled teachers therein would not be a highly expensive quantity. It must be remembered that the case of Ireland (if we exclude Belfast and one or two other manufacturing centres) is different from almost any other country; there has been no means hitherto available for the people to acquire technical knowledge.

In England and Scotland every establishment and workshop is more or less a technical school, where boys earning their daily wage learn the art of manufacturing. We have to create all this in Ireland, so that domestic trades and home employments are the first technical wants for the country.

17. There cannot exist any doubt that if an extraneous grant were offered, and this the writer considers would be an absolute necessity, local efforts hereafter would be forthcoming, so soon as the advantages of the system were seen and appreciated; but to create local aid among the majority where the usefulness of technical instruction is at present unknown would be a matter of time.

The funds for the development of technical instruction should be a Government grant; there are many sources from which this grant would be derivable in a country such as Ireland, provided the whole details of its internal taxation were within the management of local boards.

These are matters appertaining more to the region of politics than education, but to anyone acquainted with the efforts made in the direction of educating the Irish people they are unfortunately made aware at every step of their inquiry that politics have hitherto invariably held the first place in the consideration of the promoters.

That education in Ireland has been largely provided for by means of grants derivable from landed property, it is only necessary to name Trinity College (or the Dublin University); the intermediate education scheme out of the proceeds of the sale of the lands of the disestablished Church, provision for national school teachers' annuities, &c.

Appendix N.

18.—That grown up boys, girls, and children, would avail themselves of such instruction is a question the reply to which does not permit of a doubt. If the 33,000*l.* per annum now available is already considered too little for the purpose of the Intermediate Act, which has been only a few years in existence, wherein only the more advanced pupils can avail themselves of its advantages, and whereby they learn no trades or occupations, it would be found that with the whole of the 450,000 pupils on the rolls of the national schools, being taught, in some degree, the use of tools, and handicrafts that a large grant would be required; and if only 15*l.* yearly were offered to each school, it would absorb about 100,000*l.* per annum.

That this sum would be well spent, and that the education it produced would be taken advantage of by the children, is my impression. Hereafter, this amount might be augmented by local efforts.

I am of opinion that, if the Government offers a suitable grant for technical instruction and places the disposal of it in the hands of popular bodies, some local aid would be forthcoming towards supplementing it. For instance, a general fund for this purpose might be raised in the parts of the country which are better off, either by means of contributions or subscriptions, for the benefit of the poorer districts.

19.—The observations already made under the heads of the different queries have been hurriedly written down as they occurred to me, but, as already stated in my letter to the Secretary of 6th February last, I am of opinion that a clearly distinguishable Irish Council or Board of Technical Instruction, separate and apart from the present Educational Government of Irish Education, should be elected by the people themselves for the purpose of administering the project.

If technical workshops are to be erected at the national schools, or in their vicinity, the teachers of the national schools should be allowed, if they were qualified, to teach therein, in every case, the general principles of technical instruction. Drawing, &c. should be taught in the national schools, and under the present educational body, but purely technical and industrial training should be reserved for the Council of Technical Education and the sub-committees of the parish, of which the manager of every national school would be a member ex officio.

These sub-committees should arrange with local artisans for the time they could devote, and, with the aid of the inspectors or demonstrators of the council, decide upon the course of technical instruction to be learnt at every particular school, which should always be in accord with the wants of the district.

In manufacturing districts the value of trained hands would soon be found out by manufacturers, who could locally assist eager and apt pupils to excel in their specialties, and whose efforts to advancement would soon become efficient in that direction. What ought to be avoided in any system of Irish technology would be the aiming at too high a standard at the commencement and the teaching of subjects unsuited to the every-day wants of the population.

The education of a country should accord with the views and feelings of the people, otherwise you cannot attract to it that confidence so essential to ensure its success. Hence my desire for an elective board. The great drawback to all subjects of legislation in Ireland taking root therein has been that the people have never been taken into the confidence of the legislators; they are not trusted, and from a variety of circumstances, every effort, no matter how well intended, because of this thrusting of it upon the people without consulting them, in a short time becomes barren in its results. The endowed schools, the charter working schools, the Erasmus Smith schools, the model schools, and the Queen's Universities are all examples.

Appendix N. Technically educated, Irish children at home would find other employments besides depending on the small farm, and emigrants would be enabled to occupy the post of vantage now occupied by technically instructed immigrants from the other portions of the United Kingdom and the Continent.

Industries now unknown would rapidly spring into existence. All these questions are becoming clear to many of the thinking Irishmen of the present day, who would, if they possessed the power of local self-government, not only employ it towards educating the people in industries, but would open up the country by means of light railways, so as to enable them to come forth from their seclusion. If the English Government who have undertaken these duties for the people, keep them from progressing by neglecting the means adopted by every other country similarly situated from the fault of their being behind every other nation cannot be laid at the door of the Irish nation.

20.—The facilities for disposing of the work done by adults and children would be the demand in the various localities for articles of domestic and farming requirements. Much of the furniture and pottery, kitchen utensils, and crockery ware, baskets, and such articles, are now imported into Ireland; all these might and ought to be made in the country.

Railway and canal communication throughout the country is entirely inadequate, and can never be constructed to the extent it should be done solely by local efforts.

21.—The district I have spoken of applies in great part to County Donegal and to the country generally, both north and south. Of the west of Ireland I do not know sufficient to speak with authority.

22.—Although I do not believe that much good can be produced from a hasty examination of this subject, considering that it is not inquired into locally, yet believing as I do that the Commissioners are anxious to give the case of Ireland as fair consideration as the limited time at their disposal will permit, I am wishful to contribute replies to their queries without prejudice, especially as Ireland requires primary technical education in a greater degree than either England or Scotland.

WILLIAM J. DOHERTY,
C.E., and Contractor;
Associate Mem. Inst. C.E.
Member Royal Irish Academy.

29, Rogerson's Quay, Dublin,
February 8, 1863.

Appendix O.

APPENDIX O.

MEMORANDUM ON IRISH INDUSTRIAL EDUCATION by Mr. A. HARRIS.

SUGGESTIONS with regard to IRELAND for the use of the ROYAL COMMISSION ON TECHNICAL INSTRUCTION.

I would propose that a *Department of Industry* be formed in Dublin; its functions to extend over the industrial education of the people, and the development of the industrial resources of the country.

The aims of the department should be—

1st. As regards education—

Appendix C.

To bring within reach of industrial training all children, of both sexes, now dependent upon public funds or private charity for their support;

To supply means and appliances for extending industrial training to all other children whose parents may desire to have such instruction imparted to them;

To enable youths of both sexes after leaving school, and adults, to continue to receive a course of industrial education;

To establish technical schools in connection with various industries; and training schools for teachers.

2nd. As regards development of industries—

The Department should be provided with large discretionary powers in the means to be adopted for encouraging in Ireland industries which have already existed in the country, or which it may be found expedient to introduce or develop.

These powers should include the disbursement of money for the purpose of utilising water power, and for the introduction of steam engines and other motive power into schools for teaching trades and manufactures on a practical basis.

Loans to skilled workmen for the purpose of establishing workshop schools.

The payment of apprentice fees for indigent boys at such schools; the inspection of schools.

The establishment of museums for tools, machines both agricultural and manufacturing, new patents, &c., in various part of the country, with free access and loans of same on conditions.

The formation of trade guilds and chambers of commerce in the larger towns, to co-operate with and assist the Department in their trades or districts. Travelling teachers to be sent to the smaller towns and country districts to give technical instruction and to teach special trades and handicrafts.

The formation of libraries of works bearing on trade knowledge and general industries in connection with the museums of tools, &c.

The functions of the Department would be of a paternal character.

It would strive to develop "local influences" now almost non-existent; its ultimate aim being to enlist local co-operation and to create local interests. Wherever these remain in abeyance the department would have to take the initiative by direct action, withdrawing gradually from too much interference as local influences began to develop.

With regard to Section 1.—*Education*.—The Department would take under its supervision and continue on their present basis, the existing industrial schools. It should encourage present managers to extend their schools and afford reasonable assistance to enable them to do so. It should also promote the formation of new schools, so as by this combined operation to enable all children now in workhouses to receive instruction in industrial schools.

The Treasury would continue to make the weekly payment for children as at present. The Unions would be relieved from the cost of the workhouse children, and it would be desirable for the local payments for children throughout the country to be provided on an even scale and by a uniform rate, instead of by the present unequal payments from the grand jury cess.

New schools would be located where none now exist, so that every part of the country would have a free industrial school within easy reach. The process of admittance to these schools should be carefully guarded so as to admit only the really destitute. Children convicted of crime being (as at present) committed to the reformatories.

These schools should, so far as practicable, be made to have a bearing on the industrial resources of the localities in which they are placed (general handicrafts being taught in all); for instance:—Fishing and seafaring schools on the coast. Textile industries where wool or flax

Appendix O. abounds. Agriculture and gardening everywhere. In these schools water and steam power should be used, and the trades taught should be made as real as possible. Everything required by the school should as far as possible be made in its workshops, and such products as were not required by the school should be of a saleable quality, and be sold for the benefit of the school.

For the training of children who are not destitute, but whose parents are too poor to pay the cost of industrial education with maintenance (as in the existing industrial schools), I would recommend mixed day schools (scholastic and industrial) at which a low scale of charge should be made.

In these, the standard of scholastic teaching might be lower than that now adopted in the national schools.

In these schools, two or three useful handicrafts might be taught, in addition to sewing, knitting, and other similar work which is now taught to the younger children at Artane and other industrial schools.

For young persons who have left school, and for adults who desire to improve themselves, evening classes should be established. The instruction should be of a generally useful character and should have a bearing on local industries or resources. The course of teaching should resemble that adopted at the German Fortbildung schools. The classes might be held in existing school-houses or other buildings hired or built for the purpose. A low scale of fees should be charged which might vary (as at the national schools) according to the means of the students.

The rooms should be provided by the locality. The expenses should be defrayed, 1st, by school fees; 2nd, by the locality; 3rd, by the Department. The two latter in equal proportions.

The teachers should be practical men who have received good instruction; say, clever artificers, English or Irish, who hold science or art certificates, or are otherwise qualified. They could employ part of their time for their own advantage, and teach in the evenings at a moderate rate of payment.

Elementary drawing should be taught in all the schools and classes.

Should the ideas which I have propounded be pronounced utopian or impracticable, I may refer to the Kingdom of Wurtemberg, which 50 years ago was a purely agricultural country, without minerals and with but few trades. By means of the formation of a Department of Industry, which has spread its operations to every town, village, and hamlet in the country, a most beneficial change has been effected. Trades, both large and small, have been everywhere established and flourish, and agriculture is carried on upon vastly improved systems. The active energy of one man (Dr. Von Steinbeis) has effected a great part of this extraordinary economical revolution.* Wurtemberg, however, had the advantage of a long established system of compulsory education, upon which the industrial system was grafted.

As regards Ireland, probably three-fifths of her children are equally ripe for industrial training, and she has the advantage of a system of excellent instruction in industry at her industrial schools, and a staff of careful and conscientious teachers of both sexes ready to hand.

In conclusion, I may add that Ireland does not avail herself of the advantages of the Art Department at South Kensington, and I consider it necessary that she should have a department for industrial art distinct from South Kensington, and better adapted to the requirements of the country.

The Department of Industry would have to take the place of South Kensington, and to combine education in technical and industrial art along with its other duties; the two subjects, industry and art, being indissoluble so far as early training is concerned. It is greatly to be hoped that any system of art instruction as applied to industry which

* Mr. A. Tylor, who was Dr. Von Steinbeis' correspondent since 1866, is about to communicate with you on the subject of the Wurtemberg system.

may be adopted in Ireland may work free from the defects of the South Kensington system, which cannot be said to fulfil satisfactorily the requirements of Great Britain as regards industrial art, and which as regards Ireland might almost be non-existent, as the following figures show:—

The total grants made to elementary schools in the United Kingdom for instruction in drawing are	35,048
Of which Ireland receives only 88%.	
Total aid to art classes	5,840
Of which Ireland receives only 20%.	
Total aid to schools of art	20,193
Of which Ireland for six schools receives 56%.	

ALFRED HARRIS.

Lunefield, Kirkby Lonsdale.

NOTE.—The above suggestions are the result of personal observation of the present wants of Ireland, and of a knowledge of the practical work which is being done in Wurtemberg and other countries on the Continent for the development of industries by means of education and other stimulating methods.

APPENDIX P.

Appendix P.

MEMORANDUM ON TECHNICAL EDUCATION FOR IRELAND by
Mr. J. PERRY.

To the Royal Commissioners for Technical Instruction.

GENTLEMEN,

I beg to put in writing, as concisely as I can, the points which I think of importance in regard to technical education. By technical education I understand any education which keeps in distinct view the fitting of the pupils for any particular trade or profession, or for a set of trades, &c., which the course of instruction will serve by a common influence. Primary education comprehends all school education below the standard which ought to be set up as the minimum for every individual of average capacity in the rudiments of what are called subjects of general information. It has a technical aspect which is easily apparent. The children of the very poor cannot see in their own homes a proper differentiation of utensils. A stool, for instance, which should only be a seat, is also made to do duty as a barrier across the door, to keep the youngest child in the house; on it the turnips and cabbages are sliced for the cow, and the same stool supports the bread set up to bake before the fire. Unfortunately, the same system is also followed in the school, and so the child has difficulty in acquiring what is the instinct of a good workman, that tools have distinct uses. The outraging of tools is expressed among workmen by a very vulgar but expressive phrase. With young children, the memory is most easily trained to hold things, which must be acquired, by mere repeating, as, for instance, the multiplication table; and habits of observation have to be set up. I am of opinion that the most intelligent men should be the masters of primary schools, and, if there is to be a place for "dames" in the educational system, I should be rather disposed to put them in the Chairs, and make them holders of teaching fellowships in the Universities. I do not wish to be misunderstood, and I explain that the intelligence is needed less for cramming the children than to make the teacher resolute in leaving the children to

M-P 2

Appendix F. themselves. The Irish schoolmaster is now, socially, the equal of the policeman. I should like to see him, socially, equal to the clergyman, who is now the "manager." There are, at present, difficulties about this whole subject, but especially in Ireland, which, I am quite sure will, within a reasonable time, work their own solution. I observe a good many schoolhouses being built which fairly agree with my ideas; these are built, under the supervision of the Board of Works, for the Commissioners of Education, in agreement with the local authorities.

In answering the question as to whether the schoolhouses should be made use of for purely technical education, I said I thought they should; but I imagine they will really be of very little utility in this way. Technical schools will require special fittings and furniture, for the lecture will be only a portion of any effective system.

In rural districts I am of opinion that the rural handicraftsmen will not be available even to the extent of teaching the use of tools in any regular sort of way in a school. Individual jealousies in small country villages are more important than in towns. The man who is commonly employed to make a door or a window has a profound contempt for the cart-maker, and the jobbing smith in a small village is an artist by comparison with the man who only shoes horses, and such men would condemn each other's methods. There is less need for effort in such places than in large towns; the country village workmen work with tools of no great nicety, and they good-naturedly allow boys to practise in their shops, and even to make use of cuttings of materials, which boys work into small articles. In my own experience there were at least two cart-makers' shops in which I was at perfect liberty to make birdcages, manufacture small boats and sundry firearms, and turn spinning tops. The use of tools is a very small part of a workman's education; indeed, if he works at all, what may be called the knack or the sleight of a particular tool becomes his, by what is called practice. Good workmanship is not at all proportional to this *knack*, except where the work requires absolutely no thought, as, for instance, in nailmaking. It requires no special cultivation; it is manifested in so many operations necessary to life. It makes a man handy as a carver at table, makes him a neat batsman or bowler at cricket, and helps him as a performer on a musical instrument; and it would largely determine the superiority of a savage among savages. In the use of tools in technical schools, I would have for object rather to teach the best shape of tool for a particular work, and to teach the differences among materials, than the mere knack of the tool. The object of technical instruction is to produce the results of work, the best of their several kinds with the least possible waste of materials and labour. Among workmen, the man who will be the best foreman is not necessarily the best workman; my experience is that he is not usually a first-class workman, but he can do good work when he likes, and he can make naturally bad or indifferent workmen do good work. The type of the foreman ought to be the ideal in technical education.

Establishing workshops in connection with schools where the boys are not likely to become workmen is a very useful thing, but I would not call this a part of technical education, except, of course, where they enable a young man to become an engineer without passing through the stage of workman; if they merely produce amateurs they fall outside my definition of "technical." In like manner the laboratories of one kind and another in Universities are only technical in so far as they are used in giving a professional education to men who will actually practise.

The technical education of the workman does not resemble the work done by the professional laboratories. In the one case the object is to impart the science to a young man or boy already practising a handicraft; in the other case, the attempt is to give practice in experimenting with theories set forth in books or lectures. Their common bond of connection is the combination of theory and practice. The furniture of the laboratory may be the same for both kinds of students, and the experiments may be very much identical; but the object of the teacher must vary with the

class of his pupils. I can imagine a number of University men meeting an equal number of workmen in a common workshop to work out a pre-arranged programme, and succeeding in the work in pairs, without any teacher whatever.

The chief difficulty with the workman is that, as a rule, existing elementary text-books have been written without regard to him, or by persons unable to approach the subjects from the workman's point of view. The text-book may make a great deal of fuss about something the workman knows very well, and which he considers commonplace, and in other places it assumes that he knows more than he does know. In all technical schools for workmen, elementary science must be taught, but taught somewhat differently from the usual way; indeed, in almost the reverse of the usual order; for example in chemistry;—the usual course is to make the lecture precede the laboratory. Begin as simply as you please, but show the workman results, before you give him reasons; in a little time it will be possible to take him either way. Explain to him the setting of plaster of Paris, which has probably puzzled him, or why a smoky wall will get damp in wet weather, however unnatural it may be for damp to appear on it. Tell him why a lead tank corrodes into holes with rain water, and will not do so with pump water. Explain why white-lead paint blackens in some situations, and why zinc-white does not; why house-painters must "flat" white, or light coloured work, inside a house, and so on, and he feels at once the usefulness of what you are able to do for him.

Again, mechanics, as a subject of education, is usually approached through mathematics, more or less advanced, the reverse order is necessary; for the practising mechanic, mathematics must be reached through mechanics. This, however, is only the case with the mere elements; a stage is soon reached which is common, after which the progress is, for all kinds of students, in the same direction.

I think I was asked if I would advocate teaching a dyer, say, the elements of chemistry, or only what might be thought directly useful. It is the elements I would aim at teaching him, but, if possible, making use of the experience his trade has given him.

The system of South Kensington has been of immense benefit as compared with no system, but a much more effective way of doing the work is needed. Hardly any other subject except that of pure mathematics can be efficiently taught without apparatus of one kind or another. Apparatus in places like Belfast would be supplied by the local people, and a good deal has actually been done in this way; but the schools which have been set up from time to time have been of a more or less ephemeral character; and the whole thing is more or less loose and incoherent. Teachers of the best kind are not continuous; they are usually young men who are pushing themselves for some of the professions, and they take up these classes merely to earn some money. These men usually commenced as pupils, and the phenomenon is at once the glory and the bane of the system. I can count, without effort, even such teachers of 12 years ago who are now, four of them, graduated civil engineers in practice, and three of them doctors of medicine in practice.

Of course, the business of technical education is not to make "professional" men of workmen, but to uniformly raise the standard of intelligence among workmen, and to have direct application to the various handicrafts. A system imperfectly carried out may weaken the ranks of the workmen, by merely giving facilities to a few of the best men to escape from the ranks, and it may, from a national point of view, be even pernicious. In my opinion the lines of demarcation between the professional classes and the working classes will ultimately disappear, through the equal technical education the State will ultimately set up; and, while I will not set a "profession" as a goal before every working man, I would break down every barrier between the workman, who has acquired elementary science in technical schools, and the further pursuit of science in the Universities, whether the object is to get knowledge for its own sake, or to get a higher qualification as a superior foreman or engineer.

Appendix P. The late Queen's University was well calculated to take part in this work. The Queen's Colleges, no doubt, remain, but they have been injured by the separation from the University; and the Royal University, both, by insisting on the ancient classical languages and by the age-limitation for prizes, has effectually put an end, for the present, to an important educational current which had set up, especially in connection with Queen's College, Belfast.

I am, Gentlemen,
Your obedient servant,
JAMES PERRY.

Appendix Q.

APPENDIX Q.

MEMORANDUM ON RECREATION CLASSES as a means of INDUSTRIAL TRAINING by Mrs. E. L. JEBB.

SIR,

The Lyth, Ellesmere, February 8, 1883.

In reply to your letter, I beg leave to say that, besides some in Dublin, "recreation classes" have been formed in country places in the counties of Dublin, Wicklow, Monaghan, Limerick, and Kilkenny. Beginnings are also being made in Fermanagh, Queen's County, and Donegal. The "recreation classes" are held on Saturdays by voluntary teachers, with or without professional assistance, for the purpose of teaching boys and youths handwork. Wood-carving has been the occupation hitherto chosen. I call these "recreation classes," lest by giving them any more ambitious name it should be imagined that by classes of this kind it is proposed in any serious degree to supply the great existing need of classes for handwork for those who cannot obtain a thorough industrial training.

In some cases our recreation classes are held in the village schools, and in one instance a plan has been adopted which may interest some who are waiting to see the report of the Technical Commissioners, before considering in what manner they can best initiate those "local efforts" to establish industrial education in Ireland, which we are told must precede any of an official character. One difficulty which will have to be considered is space. In the school to which I allude, a very strong carving bench has been erected down one side of the schoolroom, but it is constructed as a flap, and when not required can quickly be let down, when it hangs flat against the wall. The iron legs hook up underneath, and when in use stand in small iron sockets let into the floor. This arrangement is found to answer perfectly, the table being as steady as a rock. No practical inconvenience whatever is found to arise from the schoolroom being used once a week as a workshop.

I believe that "recreation classes" are not merely useful in themselves as tending against idleness and intemperance, but that if a certain amount of encouragement were afforded they would conduce to a large amount of effort being made to establish real industrial training throughout the country. They act as the thin end of a wedge, which it is difficult to introduce less abruptly. It is an easy matter to get a few workers in the temperance cause to start a recreation class in a parish. When subscriptions are asked for to meet the small preliminary outlay, the subject of handwork for boys is introduced in a practical form to the neighbourhood. To judge by the questions asked, and objections often raised in the beginning, there is much need to familiarize the upper classes with the elementary principles of industrial education. At first our class is regarded with scepticism, but by degrees interest is evinced. One

neighbour offers presents of wood, another, models or patterns, a third requests admission for a promising boy. The boys and their parents, moreover, begin to acquire new ideas of education. It is but a step from this to making a "local effort" to procure a qualified teacher to hold a regular class for handwork. If a small grant were allowed for every child who received a certain number of hours instruction in the half year from a certificated teacher, I believe that, in a locality where the minds of rich and poor had become sufficiently familiarized with the advantages of teaching handwork to both sexes, it would not be difficult to raise the remainder of the sum which would be required for the teacher's salary and the necessary plant. There are many simple handicrafts which could be taught in the village school in cases where a regular workshop could not be afforded. A teacher established in a central position might instruct several schools in the course of the week, as is done in the case of teachers of cookery in England. Such a teacher ought to be qualified to introduce such exercises in handwork as are taught in the Salles d'Asiles, and to the junior classes in some of the elementary schools in France, as well as some more advanced kind of industry for the older pupils.

May I be allowed to suggest that it would lead to a considerable amount of local effort if peasant pupils, taught in recreation classes or by any other private agency, were allowed, under certain conditions, to present themselves for examination by an authorised examiner; and that, in the case of a certain number of pupils from one parish or township simultaneously passing a satisfactory examination, a grant should be offered to the managers of the schools of that locality in aid of the salary of a certificated teacher?

Judging from my own experience in interesting rich and poor in industrial education, I am convinced that the prospect of leading, by means of small individual efforts, to substantial and permanent results, would have the most beneficial effect in stimulating exertion of the kind which is so much needed in Ireland.

In making this suggestion I venture to quote the words of the Abbé Martin in the "XIXth Century" for October 1882. In writing of the system of payment by results, he observes: "the business of the State is not to fill the place of individual enterprise but to foster and aid it The increased sense of responsibility in the teachers, their feeling of satisfaction in the fulfilment of their duties, the zeal and self-devotion called forth, the economical administration of the funds, the self-reliance fostered by a system which gives free scope for action to all, the high moral tone and kindness of bearing which prevails, are an unmixed good in themselves, and they extend an influence as far reaching as it is salutary."

I remain, Sir,
Faithfully yours,
E. L. JMB.

Gilbert R. Redgrave, Esq.

APPENDIX R.

Appendix R.

LETTER FROM MISS F. FITZGERALD.

Glanleern, Valencia Island, Ireland,
29th November 1882.

SIR,

I HAVE just read some questions signed by you about Irish local industries, also a pamphlet dedicated to you by Mr. Bloomfield on the same subject. I should like to bear my testimony to the eagerness with which the poor people avail themselves of any means of employment and their cleverness in learning, and also to beg for advice and possibly assistance in promoting other industries.

Appendix B. In the Island of Valencia, in March 1880, we began to employ a few women in knitting (assisted by a small grant from the Relief Committee). Then *very few* could knit well; most of them not at all. The beginning was not very cheering, but we felt when we saw the anxiety of the people for work, that we *must* go on. Now we have been able to undertake an order for 12 dozen jerseys for one of the American Lines, and excellent gloves are made, as well as socks and stockings.

Strangers who used to say that our women sat with folded hands, have quite changed their tone, and see that they are only too glad to work. Farmers say I have injured them, as I have "raised the wages on them," which means that girls are able to ask rather higher wages for the three months of the year during which the farmers employ them! One great use of the knitting is that it gives work to those whose time is not fully occupied, but who have no other means of earning. My great wish is, now that they are taught, that the work should be taken up by some business people, on thoroughly business principles, as it is bad to have it depending on individual exertions to get orders. Perhaps in time a woollen factory might be established.

But one of my chief objects in writing to you is about willows and basket work. I have long wished that willows (or osiers) were more grown here, and perhaps you, or Mr. Bloomfield (whom I do not know how to reach), could give advice from some understanding person as to the best means of growing osiers and the best kind to grow, and then later, if this plan of promoting local industries is carried out, and basket-making could be established here, we should be ready to supply our own materials.

Formerly many of the people of this island were employed in the slate quarries, but now, owing either to the incompetence or want of funds of the present lessee, it is worked in a most unsatisfactory manner, and the people are suffering in consequence.

We are 40 miles from a railway station (Killarney), but we have a steamer calling once a week from Cork—very good for imperishable goods.

I am most willing to take any trouble, provided any industry could be established on lasting business principles. I trust you will forgive my troubling you.

I am, &c.
(Signed) FRANCIS FITZGERALD.

Appendix S.

APPENDIX S.

LETTERS FROM THE BISHOP OF ARDAGH AND CLONMACNOISE.

I.

St. Mel's Cathedral, Longford,
13th December 1882.

SIR, I SHALL be most happy to give your Commissioners all the assistance in my power in the laudable object they have in view. This diocese is very extensive, stretching into seven counties, and into three out of our four provinces. May I beg you, then, to send me a few copies of your query-sheet, and I will endeavour to get answers from well-informed members of my clergy in various localities.

I have, &c.

(Signed) BARTH WOODLOCK,

G. B. Redgrave, Esq., Bishop of Ardagh and Clonmacnoise.
Secretary of the Royal Commission
on Technical Instruction.

II.

Appendix E

St. Mel's Cathedral, Longford, Ireland,
20th March 1883.

SIR, I HAVE delayed answering your letter of the 18th of December last, in order to be able to give your Commission all the information I could on the important subject about which you write.

I now beg leave to enclose the answers which I have received to your query-sheet from three of the most influential members of my clergy, two of whom reside in this county, and one in the county of Westmeath. I regret to say that the discouraging reports as to want of employment, and difficulty of setting on foot any organisation for supplying this want, which are given in these letters, seem equally applicable to every part of this extensive diocese, with scarcely any exception. This town of Longford, comprising over 4,000 inhabitants, and Athlone, which is larger, but of which only one-half is in the diocese of Clonmacnoise, are the largest towns in the diocese, which thus may be said to be a purely rural one, extending into seven counties, and into three of our four provinces.

The great desideratum seems to be—some remunerative employment other than agriculture, which would give occupation to hands which are now idle, and by work, capable of being done at all seasons and by persons of either sex, and of various ages, would supplement the precarious and insufficient earnings to be gained in the fields.

Part of the machinery of the Board of National Education in Ireland is a so-called Organiser, whose duty it is to visit schools and give practical instruction for some weeks on discipline, organisation of classes, &c. Now I beg to suggest, that some such officer, in connection with technical education might be found useful, who, according to the wants and capabilities of the various localities, would visit the schools of the neighbourhood, and give practical instruction in handicrafts, and still more awaken an interest in the young, and in others, so that all might co-operate, each in his own way, to develop the industrial resources of the place. These industrial developments would, probably, be on a very small scale, especially at the beginning, through want of capital; but, there seems no reason why they should not increase, and perhaps rapidly, when capitalists would find it to their interest to help local efforts.

There is one industrial resource, which appears to be offered in a special manner by the geographical position of this diocese, stretching, as it does, for over 120 miles along the left bank of the Shannon. The sluggish waters of that river and the low lands adjoining, through the greater part of its course through the diocese, seem to afford special facilities for the growth of osiers, a crop, which I am told, would be most profitable to the owners, and at the same time furnish employment to a great many persons.

Again, the number of lakes and rivers in this diocese is very great; two of the rivers, the Shannon and the Inny, are considerable. If measures were taken to multiply fish in these lakes and rivers, and then to teach the people, and especially the young, how to utilise the supply thus brought to their doors, an addition might be made both to the food available for the people, and to their income, in those waters which are now unproductive.

But, I think, the greatest and most wide-spread advantage would be obtained for our population, whether in the country or in our small towns, and at the least possible investment of capital, if encouragement were given in a practical way to those industries which are specially adapted for girls and women, namely, knitting and needlework in their various branches. For this purpose, however, two things seem necessary: 1stly, that centres should be established, where work would be given out, to be taken and executed at home; and 2ndly, that a market should be found for the work, when done.

The Messrs. McDevitt have, I am informed, carried out this plan at Glenties, in the county of Donegal, with great profit, both to themselves and the locality. Their manufactory is of woollens. There

Appendix S. seems no reason why the system might not be extended so as to embrace the beautiful needle-work executed in some of our convent schools. What is needed is, organisation, and that a market for the work be secured in London and other rich centres. If your Commission were to form such an organisation and to secure such a market, it would, in my opinion, confer incalculable benefits on Ireland; and there are at hand, as it seems to me, numerous local agencies in every way highly qualified for carrying out the plan in the many convents scattered up and down, throughout the country, some of them in the poorest localities, the members of which devote themselves to the education of poor girls. The religious ladies in these convents possess a thorough knowledge of the circumstances of the places where they reside, and especially of the poor, and in particular of the female poor of the population; and they thoroughly enjoy the confidence of the clergy and people, whose co-operation they would be sure to have, and on the other hand, as they devote themselves gratuitously to the sacred work of education and the care of the poor, their valuable aid would be obtained at the least possible cost to the undertaking.

To resume: I beg to offer to your Commission the following suggestions in reply to the letters and circulars with which you have favoured me:—

1st. The expediency of having persons skilled in various kinds of technical knowledge, who would visit schools in various localities, and impart instruction according to the requirements and capabilities of each neighbourhood, and awaken interest;

2nd. The development, in connection with the Shannon and adjacent lowlands, of the growth of osiers, and the instruction of the people in their cultivation and manufacture;

3rd. The stocking our lakes and rivers with fish, and the instruction of the people in their neighbourhood in the mode of utilising the advantages thus brought home to them; and

4th. The encouragement of those industries, such as knitting and needle-work in their various branches, which are specially suited for girls and women, by establishing centres for the distribution of such work to be executed in the workers' homes, and securing a market for the work, when executed, and in particular by utilising for the purposes of such organisation, the convents, in which female children are educated in every part of Ireland.

I have, &c.
+ BARTH WOODLOCK,
Bishop of Ardagh and Clonmacnoise.

Gilbert R. Redgrave, Esq.,
Secretary, Royal Commission,
Technical Instruction.

Appendix T.

APPENDIX T.

LETTER from the BISHOP of CLOGHER.

St. Patrick's Purgatory,
Lough Derg, Pettigo, co. Donegal,
8th July 1882.

DEAR MR. BLOOMFIELD,

YOUR valued communication has reached me, as you see, on the island of Lough Derg. Though busily occupied here, I shall at once reply to your letter by assuring you and all concerned, that I would consider home industries, such as you describe, to be the most desirable boon that could be brought within reach of our people. Industries of the character indicated would seem peculiarly suited to a population, like ours, mostly

engaged in agriculture; and having, therefore, a large proportion of time for other pursuits. Occupations too, practised by the members of the family under the parental care and guardianship would be vastly preferable to the factory system, which is found so deteriorating, morally and physically, and which at best is only applicable to towns and cities. I feel assured that the encouragement and support of the Irish Catholic bishops and clergy may be counted on as a certainty for such industries, and of course for the schools of instruction in which our young people might be trained to exercise them. From my knowledge of the people, I am also persuaded that they would take warmly to occupations of this nature, and from their well-known talent and adaptability of character, I venture to presume that the task of instruction and training would be found comparatively easy.

Appendix T.

I have, &c.
 (Signed) JAMES DONNELLY,
 Bishop of Clogher.

T. C. Bloomfield, Esq., J.P., D. L.

APPENDIX U.

LETTER FROM MR. W. F. M. BLOOMFIELD.

SIR, Kildare Street Club, Dublin, 15th June 1888.

WHEN I had an interview with the Royal Commissioners on Technical Instruction, I had only intended introducing the Rev. John M'Kenna, the parish priest of Belleek and Pettigo, in which the family property and Belleek Pottery are situated, and was, therefore, quite unprepared to give evidence myself, but as my name has appeared as giving evidence I beg to enclose a written statement.

Technical education, used in a national sense, means, in my opinion, the education of the youth of a country in such trades and professions as are most suited to their class in life, and most likely to make them useful and industrious members of society, and such education does not at present exist in Ireland.

The only national education is represented by the national schools, and these form the rules under which the masters are appointed. The examinations required, and acquirements necessary do not impart in the slightest degree what technical education, in the sense I attribute to it, should do, and, are in fact, in my opinion, more of an obstacle to its development than otherwise. My reasons for this supposition are as follows:

The youth of Ireland are quick and easily impressionable, and, unfortunately for themselves, much more inclined to talk than to work; looking upon anyone who excels in speechmaking, provided he holds forth on their wrongs, as a great man. Consequently every village has its spokesman, generally, if not always, educated at these schools, who is nothing else than an embryo political agitator, giving his own version of history, "a subject untaught in these schools;" and this class or profession, as it now undoubtedly is, from the encouragement it has received by recent legislation rendering it so profitable, is, I am sorry to say, greatly on the increase.

The stock in trade of these individuals is well known. It consists of abuse of everything and person connected with England, assigning to them, according to their version of history, every misery that exists in this unfortunate country, and thereby instilling into the minds of the multitude a feeling of hatred and a longing for vengeance against their enemies, who are solely represented as the English, thus rendering them restless in spirit, dissatisfied with their lot, and ready to join in any

Appendix U. organisation, secret or otherwise, so long as its object is revenge, and they are consequently, ready tools in the hands of unscrupulous and clever agitators.

To undermine and counteract this feeling is my chief reason for strongly advocating the claims of technical education, in the hope of its diverting the thoughts and feelings of the rising generation (by having other hopes and aspirations placed before them from childhood) from a state of feeling so injurious to themselves and fraught with such danger to the State.

I will now endeavour to lay before the Commission how, in my opinion, the same expenditure of money, slightly altered in its application, may be made the means of rendering the education of the future more in accordance with the best interests of the country.

The present expense of the national system is, in round figures, about 750,000*l.*, and for this you have an educated population of about 89 per cent., out of which 80 per cent. at least are disloyal and discontented, without either knowledge of, or inclination for, any industrial pursuit whatever, except agriculture, and this being only theoretically taught, and only compulsory for teachers to know since 1881, is for practical purposes, almost useless.

This being so, I hold that the present system of education in Ireland, supported as it is by such vast sums of money, is simply educating the people in a wrong direction, and results solely to the advantage of the few who having ability enough to turn their proficiency in the higher branches to account, become successful agitators, members of the extreme section of the Irish representatives, and the worst enemies of the commonwealth; while the many receive just sufficient education to render them discontented with their lot; disinclined to adopt any manual or industrial occupation; and from being idle and earning nothing become equally a burden to their families and to the State.

In arguing thus, I should not like it to be supposed I am an advocate for lessening the education of the people, far from it, I am strongly in favour of its extension, but I should like such extension to be in the direction of those pursuits the wants of which are, I think, the chief cause of the ills of Ireland, and, therefore, it is that I am anxious that some part of the large amount of nearly a million of money, which is now spent upon what might be called the aristocratic branch of the subject, should be placed to the credit of the commoner but more useful branch for this country, namely, that known as technical education.

The only comparison I will draw between the two countries, England and Ireland, which, I think, fairly justifies me in asking this, is as follows:

The numbers per cent. that can both read and write in the two countries are, I think, if anything, in favour of Ireland, while those employed in industrial pursuits are in England 33 per cent., and in Ireland only 11. Thus you have, in England, with a slightly smaller percentage of people with the rudiments of education, three times the percentage engaged in those pursuits which require technical education, and to which you may attribute her wealth, contentment, and happiness, as compared with the poverty, misery, and discontent of Ireland. Thus, also, you can see even in Ireland the difference in those parts of Ireland where trade and manufactures exist, and are therefore brought prominently to the notice of the young. I do not think it could be better exemplified than in the very extensive parish, the Roman Catholic priest of which, the Rev. Mr. McKenna, I introduced to your Commission for examination. In the one part, where the Belleek pottery exists, they are comfortably housed and clothed; the scholars from the schools find employment, because from boyhood they have had their attention drawn to industrial pursuits. In the other part there is misery, squalor, and discontent; the parents urging the priests to find employment for their children who having been educated at their schools under the present system, will not work, cannot earn money, and are therefore idle and a burden to them.

The alterations which I would therefore advocate in the present national system would be as follows:— Appendix U.

To every national school there *should be of necessity* a plot of ground, sufficiently large, according to the number of pupils, to enable them to learn practical farming. This could be easily got, and would, I am certain, be reproductive, no money grant being required for the teachers, as the knowledge of agriculture is now compulsory.

To every school should be attached instructors in the different trades, such as tailoring, shoemaking, carpentering, and masonry for the boys; cooking, sewing, spinning, for the girls; that such instructors should be allowed to prosecute their own trades, giving so many hours a week, according to the numbers to be taught, to their duties as instructors, for which a small addition to their earnings, as salaries, would be sufficient, knowing, as they would, how much to their advantage it would be to have skilled hands in their district, and thereby to be enabled to do at home a great portion of that work, payment for which is now given to strangers and foreigners, because no hands qualified can be found at home. Instructors should also be provided for any special branch of industry suitable to the district, such, for instance, as basket making, where osiers exist, acres of which, grown in Ireland, are manufactured in England and elsewhere.

My scheme would therefore run thus:—

After the pupils had arrived at the requirements of the third class the parents should be consulted, after being told the different trades or occupations connected with the school, whether they wished their children to continue at the school with an education such as at present, or to learn the trade so connected with the school, the youths had most fancy for. This being decided on, the youths should be transferred to the number of those coming under the technical division, in a similar way to that now used at public schools where they are divided into classical, mathematical, &c. Payment for such instruction, according to the use, difficulties or importance of the trade should be provided by a deduction from the fees of the school, at the same rate as the capitation grants now payable, according to average attendance. No deductions could of course be made from present teachers, but as the result fees from the higher orders of education would, I imagine, be, by thus diminishing the numbers likely to compete, much reduced, a considerable amount would be available, to which might be added the sums now spent on the special national agricultural schools, which I feel certain the Commission, on inquiry, would find to have been of little use, the only one worthy of being kept being the model farm at Glasnevin, which might be reserved for the education of the teachers. The permanent salaries of the appointed instructors to be at the rate now paid to monitors.

This, I know, is both in its inception and in the mode of carrying it out only a rude attempt at laying the foundation of *how*, I think, technical education could be grafted on to the system already existing in this country. The want of turning the attention of the people into some other channel than that of merely ousting the landlords, and thereby procuring separation from England, is now acknowledged by every description of politician in the Kingdom, and if not soon accomplished must, ere long, lead to results the most disastrous to the empire. Therefore, I would beg of the Commission to forward, as far as in them lies, the policy of creation, in opposition to that of destruction, which has been so extensively tried, and has so signally failed within the last few years, and thereby they would have the satisfaction, in after years, of knowing that their inquiries and report were the thin end of the wedge, which when driven home, was found to have upset the agitator's calculations, and become the foundation of a people's happiness whose previous lot had been that of misery and discontent.

Faithfully yours,
W. F. M. BLOOMFIELD.

Appendix V.

APPENDIX V.

LETTER from the Rev. R. MAXWELL, Superior General of the ORDER of CHRISTIAN BROTHERS.

DEAR SIR, Marino, Dublin, March 4, 1884.

Not will kindly excuse my delay in replying to your letter. My numerous engagements do not allow me to be as punctual in my correspondence as I should wish to be.

I have carefully considered the subject of day industrial schools for Ireland, referred to in your letter of 23rd January last, and I do not think, even admitting the scheme were practicable, that the result would be equal to your expectations. I do not think the combining together of elementary teaching and instruction in industrial pursuits would be productive of real practical utility. On the contrary, I greatly fear it would end in disappointment.

The school time devoted to elementary teaching in ordinary day schools, even for subjects as simple as the 3 R's, is limited enough at present, and when we consider the extreme irregularity in the attendance of many of these children, the difficulty of imparting this scanty amount of knowledge is much increased, but to crush into this narrow space of time devoted to elementary subjects, the teaching of industrial trades will, it seems to me, end in failure for both branches.

This the result of my own experience and I give it with diffidence, others of larger experience may and very probably will differ from me.

If however it were intended to confine industrial teaching to after hours, such as evening classes, no doubt a certain amount of knowledge of the trades taught might be acquired, and, so far the object in view would be thereby promoted, but in order to secure this satisfactory result, great care would be required to guard against the evil effects that might follow from the indiscriminate assembling of a number of youths at late hours.

As a rule, the children attending the day schools of the elementary class are absent for a good portion of the school time, particularly such as come from agricultural districts in many instances, too, the parents are indifferent to their children's education, hence it is always a difficult matter to keep up the school attendance. All this would tell, I apprehend, with still greater force upon industrial teaching in day schools, but which could not affect the ordinary industrial schools.

But if to counteract the evil effects of this irregular attendance, the Imperial Parliament should pass a law of compulsory attendance, such a measure would, I believe, have a beneficial effect on the children in the cities and large towns, where numbers of them are daily met carelessly wandering about the streets, apparently neglected by their parents, who may very likely be then of necessity at their work, but I would not advocate such a law for the agricultural districts, where the need of employing youths in field-labour at certain seasons is now more than ever called for, by reason of the great drain, hitherto in the country districts, of the young and able bodied men by emigration. A measure of compulsory attendance at school without well-considered qualifications would, in my opinion, press heavily upon very many honest hard-working and deserving country families.

It is hardly necessary for me to refer to others matters in connection with day industrial schools, doubtless these and others bearing on the question have been already fully considered by the members of the Commission, nevertheless I shall here mention them. They are for example, suitable accommodation for workshops in connection with the schools, masters or skilled workmen to instruct in the various trades, a sufficient supply of raw material to work with, a market for the sale of the goods when manufactured, and, in time, a complete organization established for the proper and efficient working of the system.

And here I may be permitted to observe, that in the case of markets for disposing of the manufactured wares, a grave question suggests itself to my mind, whether or not the sale of these goods may excite the keen susceptibilities of the artizan class, who may regard an extensive system of day industrial schools as an infringement on their own prescriptive rights, and an interference with their legitimate means of livelihood; this consideration, it seems to me, ought not to be overlooked.

As to our joining in this meritorious work, I feel bound by circumstances to say that, considering our present numerous engagements, I could not promise my co-operation, however willing I should be to do so.

I am, &c.

(Signed) RICHARD MAXWELL.

William Woodall, Esq., M.P.

APPENDIX W.

LETTER FROM MR. T. F. BRADY.

Office of Irish Fisheries,

Dublin Castle,

7th December 1882.

DEAR SIR,

I AM favoured with your letter of the 5th instant, and in reply beg to say that I have had an idea for some time that it would be of great importance if the wives and daughters of the fishermen, particularly on the west coast of Ireland, were taught the art of making nets. I need not say how much employment is wanted, and of what importance it would be to create any industry in the country. Thousands of pounds annually leave this country for England and Scotland for the supply of nets and fishing lines, not only for the sea coast fishermen, but also for the proprietors of large salmon fisheries, who, as a rule, are of a wealthy class, and pay cash for their nets.

If instructors were sent to certain localities where there are a number of women belonging to the fishing population, they might teach a certain number of their women the trade. Depots might be formed at these stations to keep the manufactured nets for sale, and many coastguard stations and officers might, I think, without injury to their own service be made available. These women could make the nets for their husbands and fathers when the thread was supplied to them, which could be done at first cost from the best markets, under the provisions of the Irish Reproductive Loan Fund Act.

This is a rough outline of my ideas on this subject. I have not entered into the details by which they might be carried out, as it would take a good deal of writing to do so; but if I could have a personal interview great with you or with the Royal Commissioners at any time, it would give me pleasure. I have a strong feeling that any apparent difficulties in carrying out any scheme could be easily overcome; that it would not be an expensive one to carry out; and that the Act under which the inspectors are entitled to make loans to poor fishermen might under it be availed of largely and with great profit, not only to these people, but to the country at large.

I beg to assure you that it will afford me great pleasure to give you all the information in my power that you may require.

I am, &c.

THOS. F. BRADY.

Gilbert R. Redgrave, Esq.,

Royal Commission on Technical Instruction,
South Kensington.

Appendix X.

APPENDIX X.

LETTER from MR. W. C. SULLIVAN.

SIR, Bandon, Cork, January 22, 1883.
 THE town of Bandon, in the county of Cork, had a population of 14,100 in the year 1824, the majority of whom were artisans employed in the manufacture of linens, woollens, corduroys, &c., which were produced by hand looms; females being employed in weaving and spinning. There were two extensive cotton mills, driven by water power, in full work for upwards of a half a century, until 1826, when the protecting duty was removed, and the country became flooded with English manufactures, resulting in the total destruction of the trade, and causing quite a panic in the local industries.

Manual labour was superseded by machinery, the power loom taking the place of the hand loom. Bandon was at that time considered the Manchester of Ireland. The population rapidly declined. Thousands of our artisans left for England and for America.

The present population is 5,880, being a falling off of 8,000 inhabitants. There is scarcely any manufacture at present in Bandon, except a large distillery, a brewery, and three flour-mills. There are very few artisans in the town, while a number of labourers flock in from the country in search of employment, on account of many of the large farmers lessening hand labour and adopting machinery. In a word there are thousands of our young people growing up without any means of employment whatever.

I should say about 1,500 children attend the national schools in the town, and when grown up, there is no industrial occupation for them.

This will apply to all the small towns in the south of Ireland. I think if night schools, both for children and adults, were established for instruction in branches of industry, it may lead to the revival of manufactures. It appears to me that the national schools may be utilized for industrial education. Singing and music may also be taught as a means of recreation and promotion of happiness, and good conduct. In Germany and Belgium, schools are established for industrial education in connection with factories for the production of textile fabrics. If assistance were given for the encouragement of factories, the result, no doubt, would be favourable. Bandon is eminently eligible for trade, having an industrious and peaceable population. I venture to say there is not in Ireland a better circumstanced locality than Bandon for the starting of any project intended for the re-establishment of industry amongst us. Now that the country is settled, and that law and order are restored, we may look for brighter and happier days for this hitherto unhappy land.

I have the honour to be, Sir,
 To Gilbert B. Redgrave, Esq., Your obedient servant,
 Secretary of the Royal Commission on W. C. SULLIVAN,
 Technical Instruction. J. P.]

✓ SECOND REPORT

OF THE

ROYAL COMMISSIONERS

ON

TECHNICAL INSTRUCTION.

Vol. V.

FOREIGN REPORTS, APPENDICES, &c.

Presented to both Houses of Parliament by Command of Her Majesty.



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APPENDIX AA.

Appendix A.A.

Handwork
Instruction in
Sweden.

REPORT ON HAND-WORK INSTRUCTION IN SWEDEN.*

By Professor JOHN M. ORDWAY, Boston.

To the Hon. JOHN W. DICKINSON.

DEAR SIR,—In a flying visit to Sweden in August of this year, I was much impressed by the prevalent interest which is there practically shown in hand-work instruction. While the other nations of Europe have only here and there taken some tentative steps towards meeting the requirements of the age, this free-minded northern people have gone forward in earnest and have found it possible, with very limited means, to enlarge in the right direction their already excellent system of general education. In Stockholm I received much information and kind attention from Herr C. J. Meijerberg, who has been for many years the efficient inspector of common schools for the city. Though it was vacation time, we fortunately found a class of boys busily at work in the joiners' shop of one of the public-school buildings, the teacher having kindly yielded to their request for extra instruction and practice. In the Stockholm schools the manual instruction is limited to wood-working, and the teachers are men who have learned the trade. At Näs (pronounced *nass*), some sixteen miles from Göteborg, we were very hospitably received by Herr August Abrahamson, the munificent founder and supporter of the Normal Slöjd Seminary, and by Herr Otto Salomon, the superintendent. Thirty-one common-school teachers and one very bright young lady from Göteborg were taking a six weeks' vacation course in hand-work to enable them to teach this branch in their respective schools. These teachers, as well as the regular students of the seminary, receive instruction and lodging free, having to pay only the bare cost of board. Connected with the Normal School is a model school of boys from the neighbourhood who, on the day of our visit, were just beginning a new school year, so that we had a chance to see them also at work. The seminary building is a neat well-arranged structure, in the midst of Herr Abrahamson's own delightful grounds. It contains under one roof airy and well lighted school-rooms, work-rooms, study-room, sleeping-rooms, and a model-room. Herr Abrahamson also sustains another home-like school near by, for giving girls a regular course in all branches of house-keeping.

As Mr. Salomon considers wood-working the most suitable branch for schools, the hand-work at Näs is limited to joinery, turning, and simple carving. Like some other intelligent educators in Sweden, he very justly looks on hand-work instruction as calculated to assist and round out the general training of the faculties, rather than as something particularly desirable of itself, and he therefore deems a variety of branches unnecessary. But in some places a greater range is provided for. Thus at Göteborg, by the kindness of Herr Rubensen, we were shown through one of the public-school buildings in which there were, in the upper loft, a room for bookbinding and a joiners' shop, and in the basement a room for smiths' work and a tinkers' shop.

In the very limited time at my command it was not possible to visit any of the public schools in the country, or in the other cities of Scandinavia;

* Extracted from the 46th Annual Report of the Board of Education, Boston, U.S.A.

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Appendix AA. and since my return home incessant occupation with various duties has hitherto hindered my making a full digest of the considerable mass of printed educational matter gathered together during the summer tour. But happily there is at hand an excellent report by a Norwegian school inspector, who has had time and means to make a full study of the Swedish schools, and this I will take the liberty of translating in full from the original Danish. Besides this, in order to give some idea of the origin of the system, I will first give in English an extract from one of the four very interesting papers which have been published by Mr. Salomon, in 1876-78-80-82, on "Slöjd* Schools and Common Schools." These translations I send herewith.

Handwork
Instruction in
Sweden.

Respectfully yours,
JOHN M. ORDWAY.

Mass. Inst. Technology, Dec. 17, 1882.

[From "Slöjdskolan och Folkeskolan, IV. En pedagogisk Studie, af Otto SALOMON, Göteborg, 1882," pp. 70-2, Finland.]

Without doubt we can properly say that to this country belongs the honour of having been the first, at the present day, to realize the idea of hand-work as a regular exercise in the common schools. For its being so, Finland is under obligation to the founder of its public school system, Uno Cygnæus.

From his early youth, taken about by his father to various workshops, Cygnæus had opportunity, when young, to acquire a general manual skill, of whose value and advantage he had good chances to convince himself during his shifting and varied life. Perhaps for that very reason, when, having arrived at manhood, he began his pedagogic studies, the philanthropic experiment occurred to him of introducing hand-work into schools as an important means of instruction and cultivation. By thorough study of Pestalozzi's and Fröbel's writings, the idea of hand-work as a regular means of development gradually became clear to him. He conceived that, with the design of seeking to awaken the sense of form and beauty, there should be introduced into the school certain kinds of hand-work which, unlike Fröbel's play lessons, should be perfectly suitable for older pupils. With this intent, there should of course be no attempt in the common schools to acquire any great skill as artisans in the different branches, or, in respect of the articles made, to come in competition with men of the trade, but pupils should merely learn something of how to use their hands, and should acquire the habit of doing all their work neatly and methodically, making all the joints exact and the forms in good proportion and style. In his opinion we should carefully guard against considering hand-work in school, as recreation or play, rather than as an actual means of cultivation, and also against entrusting the instruction therein to artisans without any pedagogic training. Hand-work must necessarily be put on the same footing with the other school work, and be conducted by a person of pedagogic education, and in the country public schools, wholly and with the proper aim, by the school teacher himself. At the seminary he should gain both theoretical and practical knowledge in this subject, just as in others which enter into the programme of common schools; that is, he should first get a just comprehension of manual exercise as a regular means of cultivation; and, secondly, he should learn such manipulations as are needful to enable him at least to guide and assist the pupils of common schools in this branch.

With this idea of the importance of hand-work in common schools, which he had cherished ever since the middle of the year 1840, Cygnæus, at the order of the imperial senate, in the autumn of 1858, undertook his pedagogic tour in foreign countries, visiting, on that occasion, Sweden, Denmark, Germany, Austria, Switzerland, and Holland. Whenever he met with teachers, he set forth enthusiastically and with the entire warmth of conviction his proposals of reform in matters of education, maintaining

* The Swedish word "slöjd," which means work with the hands and with simple tools, has no exact English equivalent, and I have in many places transferred the word instead of giving an insufficient rendering in our language.

decidedly the great importance of hand-work as a regular means of cultivation and the advantage of employing it as such. In consequence of an innate dislike of any appearance in public, it was mostly in private circles and before some interested persons that he sought to propound his pedagogic system, which comes very near to the principles of Pestalozzi, Fröbel, and Diesterweg. Appendix AA.
Handwork
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Sweden.

After his return home, being appointed inspector of public schools in Finland, in 1861, and director of the seminary established by him in Jyväskylä, opened in 1863, Cynäsus was placed in circumstances to carry out in practice his ideas touching the use of hand-work in the service of education. The statute of 1866, respecting the organization of the common school system in the Grand Duchy of Finland, drawn up chiefly according to his recommendations, is certainly the first common school ordinance which adopts "technical hand-work" as an obligatory exercise in seminaries, and slöjd for boys in the country schools. As a proof that this instruction is on the same footing as other subjects, it should be observed that the teachers thereof, in the seminaries, like the other teachers, have the title of "lector" (professor). In the seminaries, and partly even in the common schools, the instruction embraces joinery, carving, smiths' work, tin-plate working, and basket making.

[Extracts from "Work Schools for Boys in Town and Country." "Their Object and Arrangement." By H. K. KJENNERUD, School Superintendent. Kristiania, Alb. Cammermeyer, 1882.]

Preface.

In 1880 I obtained a public appropriation for a journey to Sweden, and into the interior, to visit the public schools and such work schools as I might find on my way.

On my journey I visited Stockholm, Upsala, the Näs Slöjd Seminary, Göteborg, Wenersborg, Kristiania, and Fredrikstad.

Having for many years had the immediate charge of the work schools of the Fredrikahald Slöjd Union, partly as member of the board of directors of this Union, and partly, for the last two years, as inspector of schools, there was on my part a strong desire to find out how such schools worked elsewhere. In an undertaking of a new kind, as work schools for boys must still be everywhere regarded, there is need of groping and feeling the way forward; and one is always desirous to assure himself that the experience of others agrees with his own.

In the establishment of a work school and in its later management questions often arise, among which may be mentioned: What should be set forth as the most important object of a work school? Should hand-work for boys be taken up as a branch in the public schools, and if so, what proportion should the time of instruction bear to that appointed for the other departments of the school? In what manner and according to what plan should the instruction be given? What branches of industry should be preferred? How should the workshops be arranged and furnished? How many pupils can probably be instructed at a time? How must the economy of the school be regulated, and what is the least possible expense required to set such a school in operation? Is it a right principle that the instruction should be paid for? Should the pupils earn anything by their work? and so on. Although this subject is still somewhat new to us, and has hitherto received but little attention from the press, it is one of the highest importance, as regards not only the education of our youth, but also the future progress of our fatherland, and it may prove interesting to communicate what I have learned on my journey as to what has been done for the advancement of these schools in our brotherland, and to what extent they have thus far been introduced.

The Swedish Slöjd Instruction.

The subject of "slöjd" has developed wonderfully in Sweden during the last few years. Slöjd, a word derived from the old Norse, is, in the signification in which it will be used here, a peculiarly Swedish word, the

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Appendix AA. meaning of which is very comprehensive and difficult to define, but which it is convenient and natural, in this paper, to adopt from the Swedish. Handwork Instruction in Sweden. The signification will be shown by the connection.

According to a lecture which was given in the summer of 1880 by O. Salomon, superintendent of the Slöjd Seminary, and which has been printed in the Göteborg "Handel's og Sjöfartstidende" (Journal of Commerce and Navigation), the Swedish slöjd schools for boys have been in existence only ten years. In making this statement no account is taken of two establishments, the Willinsk school in Göteborg and the Prince Carl's Institute at Gäddede, which are institutions established as homes for children, and not schools in the ordinary sense.

The kind of industry in which instruction was given at first was that which was in fashion at that time, scroll sawing, which "did not hold out as well as it promised, but which, nevertheless, as a starting-point gave a strong prominence to the subject whereby it came under earnest discussion, and whereby they little by little came to a clear understanding of the direction which hand-work instruction should not take, in order to gain sympathy at home."

The year 1872 is mentioned by Herr Salomon as the birth-year of some of the larger slöjd schools, as those of Upsala, Näås, Ulsäter, and Wenersborg. In the flourishing times of the year 1875 many new ones came into existence; in 1876, 80 were already known, in 1877, 100, in 1878, 120, and now there are in all about 300 slöjd schools in the country. Particularly in the year 1880, as Herr Salomon told me in conversation, the matter has made such progress that intelligence of the establishment of new schools is constantly arriving.

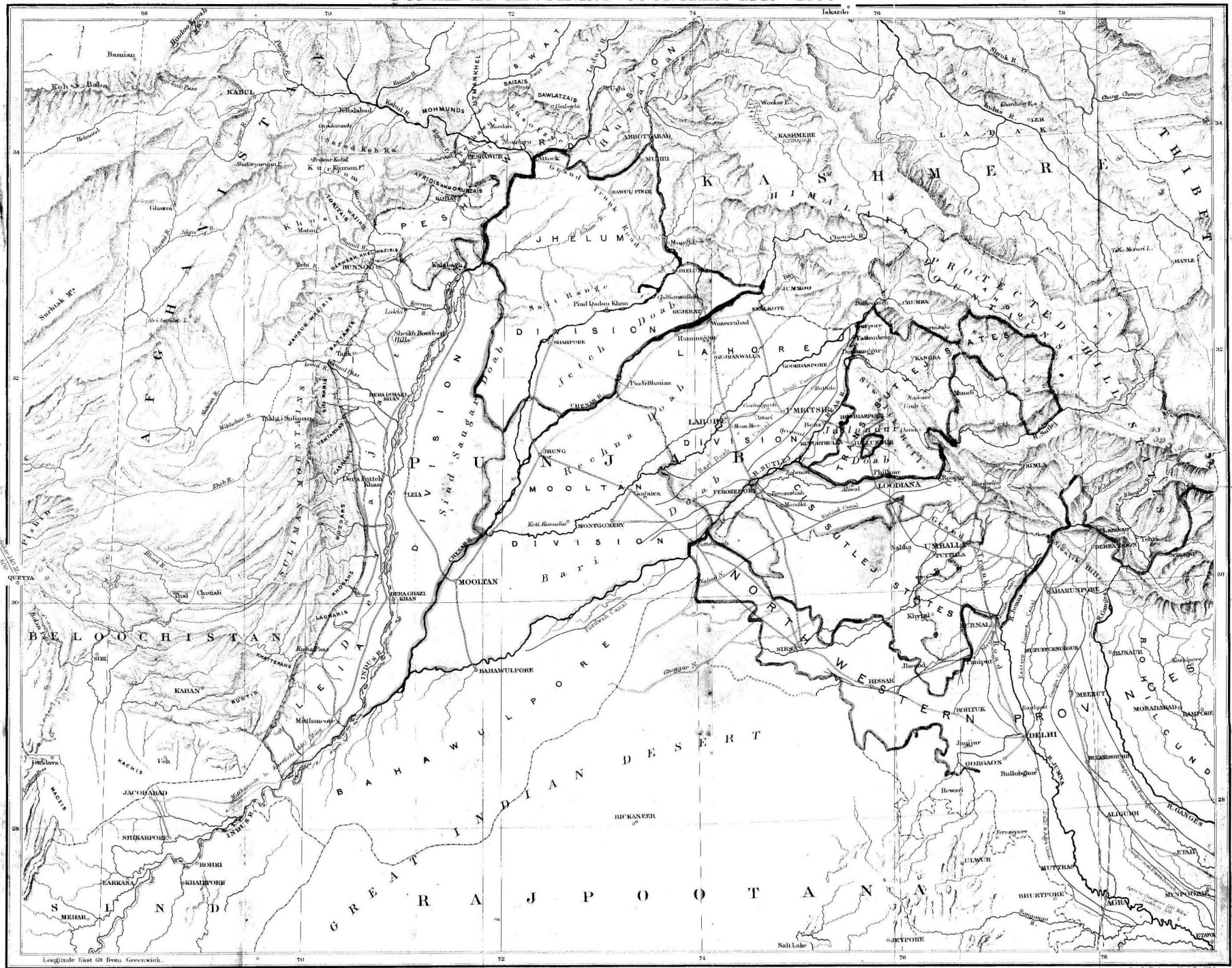
We have a striking confirmation of this in the circumstance that the parliamentary appropriation for 1880, from which it was calculated that every slöjd school in the country should receive 75 kronor (4l. 2s. 6d.) as a direct State contribution, actually sufficed to give only 63 kronor; and the demand for the two slöjd inspectors paid by the State and sent about by the Agricultural Academy, one of whom was appointed in 1875, and the other in 1878, and whose duty it is to travel about and hold courses for slöjd teachers and to instruct the people, is so great that they can answer only a third of the calls.

A proof of the interest with which work schools are regarded in Sweden was given also by the home-slöjd exhibition, held in Stockholm in the winter of 1880, wherein, notwithstanding the very short notice, not less than 147 slöjd schools were represented, 97 of them for boys. In addition to prizes in money, there were offered for award among the boys' schools 4 gold medals, 6 silver medals, and 21 in bronze. Gold medals were given to the Näås slöjd seminary, the Kongsholm slöjd school, which was strongly recommended to me, but which I unfortunately had no opportunity to visit, Gäddede slöjd school, and Göteborg common school. In the award regard was paid to the principle and plan of the schools, the age and number of pupils, and likewise to the consideration whether the work exhibited was of an honest character; that is to say, whether it was done in the manner and by the person represented. The "Friends of Handwork," whose permanent exhibition in Stockholm I visited twice, took no part in the competition for prizes.

It is becoming more and more general in Sweden to combine slöjd instruction with the common schools, and to employ the school teachers themselves to give the instruction. The idea of this probably came to Sweden from Finland. About one-half of the Swedish slöjd schools have been already united with the common schools. Of 80 slöjd schools in Elfsborg län, there are, according to a statement kindly given me in writing by Herr Salomon, not more than 12 in which the instruction is not provided by common-school teachers themselves. The courses for slöjd teachers which are held in the län were intended exclusively for the already appointed teachers of the common schools.

The Swedish slöjd instruction is, however, not limited to children's schools. There are also here and there in Sweden schools and courses in operation for grown persons. Two such schools, which are much frequented by young country boys, will be described below.

"PUNJAB AND ADJOINING COUNTRIES 1849-1858"



Longitude East of Greenwich.

Scale of British Miles

Standard Geographical Establishment

This instruction is also introduced into the public high schools, but I have no data showing to what extent. A Swede who had for some years given slöjd instruction in Fredrikshald, in 1880 received an appointment to a Swedish public high school.

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Slöjd Schools in Elfsborg and Upsala Län. Sale of Products of Domestic Industry.

The Economic Society of Elfsborg has set apart slöjd, from its work, as a separate branch, whose interests are attended to by a so-called Slöjd Union, which is divided into two sections; the northern having its seat in Wenersborg, the southern in Borås. The administration of the section consists of a member from each district, and this member again is the chairman of the district administration. The governors are chairmen of both sections. Slöjd unions are supported, according to a statement of Herr Salomon, by 8,000 kronor from the State, 8,000 kronor from Parliament, and 8,000 kronor from the Economic Society. The operations of the union extend to the establishment and maintenance of its own slöjd schools and the support of the slöjd school pupils; but its most important work consists in labouring for the introduction of slöjd into the common schools of the län. It holds courses in slöjd and drawing for common school teachers, pays to every teacher who instructs in slöjd in his school 100 kronor yearly, loans models to the schools, and gives in some cases assistance in the purchase of tools and materials. It pays the town schools in the län 200 kronor each. The Union controls the work in the schools through three unsalaried slöjd inspectors, the parish priest Gillgren in Amål, chamberlain Westfeldt in Källingsholm, and Herr Salomon, superintendent of the seminary at Nääs; and common school teachers do not have their salary paid for slöjd, unless they have procured from the slöjd inspectors an approval of the school's plan and work.

The union has been fortunate to an astonishing degree in securing an interest in slöjd on the part of the teachers. The inspectors are flooded with letters from them. Herr Salomon showed me two which he had received the day before, asking advice in regard to the introduction of slöjd into their schools, and the many questions which arise, concerning the starting and maintenance of such schools. Occasionally the teacher shows so much zeal that, when there is a difficulty in obtaining a work-room, he has one constructed at his own expense. At other times, on the contrary, he may be opposed to it, and allows himself to be sent to take part in a slöjd course, only because compelled by the strong feeling in his district in favour of the matter. But the experience of the superintendent of the seminary shows that such men, in almost all cases, have changed, and often even become the best advocates of slöjd.

As to the economy of the country schools, it has been already explained that the teachers have a salary of 100 kronor, paid by the union; still, 75 kronor is said to be a sufficient amount. The time devoted to slöjd was six to eight hours per week. I omitted informing myself how many months in the year the schools are in session, but, judging by what is the case in Upsala län, it is eight months. The outlay for tools for a moderately furnished school is estimated at from 150 to 300 kronor (84. 2s. 6d. to 16l. 5s.).

The number of hours' instruction which each child receives depends on whether or not the number of boys from 11 to 14 years of age is so great that they must be divided into two sections. The average number mentioned was 24, and so, when the pupils are divided into two sections, there are three to four hours for each, otherwise the number of hours might be twice as great. An experienced and capable teacher is considered able to instruct 16 at a time; it might also be six, eight, or 12 who are instructed at once. Schools had the opportunity to purchase models from the Nääs slöjd seminary at a low price.

Courses for the improvement of slöjd teachers are generally held in the summer vacation. They are differently arranged in different län. In this län (Elfsborg) the courses last five to six weeks. They are held in Wenersborg, Borås, Källingsholm, and at the Nääs slöjd seminary. The average age of the teachers who took part in these courses was stated as about 40 years, but many were even as much as 50 years.

Appendix AA. It must be mentioned that instruction in hand-work is not yet, as in Finland, made obligatory in the Swedish teachers' seminaries (normal schools), and it is optional in only two seminaries, and then at private expense. On the contrary, Sweden has a separate place for the instruction of slöjd teachers. The slöjd seminary in Elfsborg län was founded in Näs, two Swedish miles from Göteborg, as a private institution, to supply the demand for teachers of slöjd. About 16 pupils have gone out yearly, having had a one year course. The founder, Herr Abrahamson, a wholesale merchant, on whose estate in one of the pleasantest places in Sweden his own seminary is built, has secured its future continuance by a donation once for all of 200,000 kronor (11,012*l.*), of which only the interest can be spent. The principal seminary building was first ready for use in the summer of 1880. It contains two workshops and two school-rooms (for the seminary students and for a boys' school), two sleeping halls with the adjoining toilet rooms, a study room with a writing-desk for each pupil, and finally an exhibition room for the collection of models and tools. There is a separate building for the superintendent, and another in which a girls' school is kept and the steward lives. The plan of the school is given in the report of our journey by the chief of the expedition, Herr Hertzberg.

Notwithstanding I was so unfortunate as to arrive at the seminary just as the superintendent was about to start on a journey, and therefore had opportunity for only a short conversation, I yet consider this little visit the most instructive respecting work schools that I had anywhere. I received many explanations and hints that appear to me very valuable.

What particularly attracted my attention there was that they work according to models arranged in a systematic series. I obtained a printed catalogue of the models, and had an opportunity to spend some hours among the collection, which I examined piece by piece. The superintendent with great courtesy consented to fill an order from Fredrikshald for supplying a workshop collection of models.

The catalogue contains 216 numbers, and is divided into the following sections:—1. Models of full size; 2. Polished work; 3. Wood carvings; 4. Models on a smaller scale. Seminary students are capable of working all the numbers. Objects coming under the denomination of *toys* are zestlessly excluded.

Pupils of the boys' school receive no pay for their work, although this had been considered necessary at first, before the significance of the work school was fully recognised by the public. The school is now so firmly established that we may assume that hand-work is now taught in school, like any other branch, for its own sake. Indeed, as children receive no pay for their exercise in writing, ciphering, &c., they should, in the superintendent's opinion, learn to regard hand-work in the same way.

Respecting the slöjd committee of Upsala län, I learned during my stay in the city of Upsala that it has a secretary and a slöjd commission, which has, among other duties, that of inspecting the work schools of the län. The slöjd committee assists each of the schools with a payment of fifty kronor, provided that the instruction in slöjd is so managed that the common school inspector can give the school a recommendation which entitles it to a state contribution, and provided, also, that an annual report is made containing accounts of the time of instruction and the branches of work, number and ages of the children, information as to the teachers' qualifications and pay, area of the slöjd-rooms, and their distance from the common schools, and so on. With the addition of the state contribution, every school here thus receives a yearly subsidy of 125 kronor. The slöjd committee loans school models, sometimes also tools. They have for a number of years kept up in the city of Upsala a sale of domestic industrial products and a home slöjd school, with a two years' course. In the last-named institution slöjd teachers have also been further instructed, as a rule common joiners in some of the finer joiner's work, and basket making. During that part of the year in which the building was not used for the courses of the committee the school has been kept in operation on private account. In January 1890 the school was for the first time arranged exclusively for common school teachers, and thirteen of these obtained a month's stay at the school and a stipend

from the Economic Society of forty kronor. The instruction embraced joinery, turning, simple carving, and basket work. Pupils received gratis the articles which they had made.

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In Upsala I was so fortunate as to obtain the slöjd committee's report of August 31, 1880, from which I learn that at the end of the school year 1879-80 work-schools were in operation in six communes in the län. They have not made as much progress here as in Elfsborg län. Pupils received four, six, and eight hours' instruction per week, which was deferred to Saturday. The reason for choosing this day I inferred to be that the common school teachers in the country, in Sweden, who are engaged for thirty hours' instruction weekly, can divide this time into five or six days, and they generally arrange it so as to have Saturday a free day. Then, too, since these teachers do not as yet give the slöjd instruction, making it necessary to employ a special teacher, it was found more convenient to have it given all on one day. In Elfsborg län, on the contrary, where circumstances are different, hand-work was assigned to different days in the week. In the account of two schools the teacher's pay is given as 125 kronor and 75 kronor respectively for six hours weekly during eight months. In one province, where there are five schools established, they pay 86 öre an hour.

Fourteen to sixteen pupils were instructed at a time. The subjects were joinery, including turning, and in some cases blacksmithing and wire-working. Respecting the schools in one of the districts, it is specified that the instruction shall be such that the pupils will acquire dexterity and ability in making such articles, particularly, as are necessary for working people—as rakes, spades, axe-handles, harness-pins, lids, &c. In most of the schools models are borrowed from the slöjd committee in Upsala, and sometimes tools also. In one school the boys receive as their own property what they make, and in another they have half the value of the work, or may buy it at half price. Shops, the capacity of which amounts to from 13,000 to 19,000 Swedish cubic feet, might be situated as far as one-eighth of a mile (about one English mile) from the common schools.

Judging from the articles which I saw exhibited in the store of Upsala län, which, as already mentioned, is kept in the city of Upsala, domestic industry is in an advanced state in the län. The exhibition was particularly rich, comprising men's and women's work, useful objects, and articles of luxury in infinite variety.

The work of producers is bought, while the work of schools is sold on commission at ten to twenty per cent. profit. The sales were at first made in the interest of the "Country Economic Society"; but, owing to the great difficulty of inspection and revision, it became a private enterprise, and the agency of the above-mentioned slöjd committee was undertaken by the bailiff of the neighbouring district, Dannemora, who is granted a loan of 4,000 kronor without interest, and a yearly subsidy of 1,000 kronor to maintain it. It was said that this arrangement has been found satisfactory. The services of a capable woman, who is entrusted with all purchases, and of an assistant, are also furnished. These two are paid respectively 400 and 140 kronor yearly.

There are several such agencies in Sweden, mainly of a private character, but receiving more or less support from public means. Work is partly bought, partly taken on commission, at the rate of five per cent. for producers within the län and 10 per cent. for others, as I learn from a Swedish journal, "Uddevalla Times," which contains a description of the conditions of many such recent sales. Arrangements of this kind are of great advantage to schools, and make the success of domestic industry almost a necessity, since by means of them the poor producer is enabled to turn his work directly into skillings; while, if this could not be done, industrial work would be a failure. Since our industry is as yet but slightly developed, there is, as far as I know, only one such agency in Norway, and this was established in Kristiansand, in 1877, by a gift of 8,000 kronor from the Distillers' Union of that place. Of this fund there have been used in the past four years 2,350 kronor, or, in other words, there has been needed to maintain it, on an average, a yearly subsidy of

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Appendix AA. about 800 kronor. The yearly sales have varied between 3,500 and 4,500 kronor. The manager's pay has been 880 kronor, besides two per cent. of the sales and free rent. The articles sold consisted principally of those required about the house, and kitchen utensils. Models have been loaned to constant workers.

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Slöjd Schools in the Cities of Stockholm, Upsala, Göteborg, and Wenersborg.

Hand-work for boys has been introduced into the common schools of Stockholm. A plan under consideration for several years, for making hand-work obligatory in the upper class, and for the appointment of a slöjd inspector of all the schools, has not yet been carried out. But in five of the "föreläring" or parish schools, meanwhile, hand-work has been optional, so that in the school year 1879-80 253 boys in all received such instruction. The workshops were scantily furnished, and gave one the impression of a want of care and system; but the instruction is to be re-organised in due time. They had no collections of models. Pupils who succeeded in securing places had two and one-half hours' instruction, three afternoons in the week, throughout the whole school year. Pupils did not pay for instruction, but received 20 per cent. of the proceeds of the sale of their work. The work was sold after examination. The teacher's pay was 20 kronor per week for 28 hours' instruction. The subjects were joinery and turning, and in one school modelling in clay, bookbinding, shoemaking, and tailoring. There were, as a rule, 12 boys in each department; in bookbinding there were only eight, as the workroom did not allow places for more. The work was generally well done.

Rector Palmgren's school in Stockholm corresponds in subjects taught to the higher private schools in Kristiania, but in the two years of its existence it has not become so far advanced that pupils can go from the school to the university. Since I may suppose the principle and plan of this school already known from the report of Hertzberg, chief of the expedition, and since, moreover, I took no notes of it on my journey, as belonging to a kind of school the investigation of which was not included in my plan, I shall limit myself to two observations.

The school receives younger pupils than such schools generally do; I saw boys under six years of age busy with such work as paper-braiding and straw-plaiting in patterns, sewing buttons on cards, &c. A little boy of six years was engaged on a very simple, but neat, piece of embroidery. The workshop was furnished with very small lathes, of which there were many, and by means of which the ornamentation of wood was much practised by the older pupils, in the old Norse style preserved by the Norwegians, of which I found a rich collection in the Norwegian division of the Ethnographic Museum at Stockholm, but hardly any in the Swedish division.

Objects useful and ornamental, carved in this way, formed the furniture in Herr Palmgren's private apartments. The same idea was noticed in the school-rooms. On the tasteful school-desks varnished to preserve the natural colour of the wood, and on the curtains, the well-known twining dragons were to be recognised.

The work school of the city of Upsala is separate and under the care of the slöjd committee of the län; there is everywhere in Sweden, in town and country, an association concerned with school affairs. This is the oldest in the country, since it was established under the lead of the governor, Count Hamilton, as early as 1872. Hand work for boys is made obligatory in the two upper classes of the common schools and as such stands on a par with the other branches taught. The slöjd has also its work-room in the public school building. The arrangements are such that boys work three hours in succession. Normally the boys have 18 hours of lessons and 12 hours of slöjd, or in all 30 hours per week in school. The subjects are joinery with turning, a little carving and basket making, as well as shoemaking, according to the pupils' own choice. Pupils receive conditionally even as much as half the proceeds of the sale

of their work, paid after approval, and they earn in a year from 50 öre to six kronor and upwards. The number of those who were instructed at once in the joinery department varied according to the number of pupils in the classes, and when I visited the school it was respectively 20, 12, and 30. Teachers had for their assistance in the numerous classes a boy past the age for confirmation, who is paid five öre per hour, and who has also to instruct pupils in turning.

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The work is distinguished by solidity and neatness in execution; I have not seen stronger or better work in any children's school. But it would be hardly correct to call it the work of the pupils; for when the schools aimed especially to make saleable commodities and received orders from the townspeople, it was, of course, the teachers who executed the difficult parts. The conditions according to which the teacher was appointed were peculiar for schools. His working time was reckoned from 6 a.m. to 8 p.m., with the usual times of rest for day labourers. Out of school hours it was his duty to split out and mortise together the children's work, to give it a final finish, and moreover to busy himself in filling the orders given by the townspeople. He received a salary of 1,000 kronor and a house containing two rooms and a kitchen, with firewood. He had a vacation of eight days at Christmas; during nearly all the summer vacation of two months. However, he gave instruction to pupils from all the classes in school who voluntarily enrolled themselves for slöjd for that time.

In shoemaking, as in joinery, the school keeps the products. Poor children, but not particularly those who needed charity, were allowed their shoes-mending free, while those who had the means paid for materials; and the same arrangement was made in regard to new work. It seemed strange to me that a class of more than six pupils in shoemaking should be considered too large there when the teacher of this branch in Fredrikshald succeeds so well in taking care of 16. The shoemaker had 500 kronor per year for 30 hours a week.

The slöjd division of the common schools had a special superintendent, one of the public school teachers, who at the same time was secretary of the slöjd committee, and attended to the private business of the home-slöjd school. He superintends the arrangement of the school, the purchase of material, and the sale of work, determines what shall be made, fixes the children's pay for the work, and keeps the accounts of the school, for which labour he receives a salary of 500 kronor. According to his statement the slöjd schools of Upsala commune cost yearly 2,500 kronor.

Nowhere in Sweden has so much been done for slöjd as in Göteborg. It has been introduced as obligatory for the older classes into all the common schools, which have 26 different work-rooms, and which furnish instruction to about 1,400 children. The working time of the pupils is ten hours per week. For the supervision of all this there is appointed a technically and practically educated slöjd inspector, a man eminently qualified for the place, who has a salary of 4,000 kronor. At the time of my visit to Göteborg, in 1880, slöjd had been in operation only two full years; but in 1879 the outlay had amounted to about 30,000 kronor, from which, however, must be deducted the value of the articles made. The teacher's pay was 900 kronor for seven hours' instruction daily, but eight hours of duty, and with two and one-half weeks of summer vacation. It is advanced to 1,000 kronor after six years. Overtime is paid for at 30 öre an hour. Joiners could gain as many as 100 extra hours a month.

The subjects in which instruction was given were joinery with turning, basket-work, blacksmithing, tin-plate working, painting, and bookbinding.

The school is considered a preparatory school for hand-work, wherefore the teachers are, without exception, hand-workers. As the school is only preparatory and the aim is not for the pupil to acquire general dexterity, one to three months are spent in each department, and the remaining time, when possible, devoted to that work for which he has shown greatest interest and aptitude. But there is not always, by any means, opportunity for this. The pupils oftentimes wish to be joiners; but it has been found necessary so to arrange it that tall boys should be put to the lathes and small ones to tin-plate work, bookbinding, or painting. It was a rule that

Appendix AA. the teachers should help the pupils as much as possible. The demand determined what articles were to be made, but there were some indications of a method for beginners. "Thus in one workshop I found some beginners who, according to the teacher's statement, in two months had done

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nothing but saw and plane on a piece of wood and use the rasp in making hammer handles. This would hardly do except in schools where hand-work is obligatory, since it pre-supposes a perseverance which children do not commonly have in optional work. The pupils had not, as far as I understood, anywhere in the school particular occasion to finish a piece of work independently, since the school aimed to be productive, and for this reason there were generally several engaged with one piece of work, the putting together and the difficult parts of which were left for the teacher to attend to in extra hours.

So far as possible they did work for the common schools, since they hardly wished to come in competition with the trade and thereby run the risk of incurring the opposition of artisans to the slöjd schools. Thus at the time when I visited the workshops there were in process of construction a great many electrical machines; as nearly as I recollect, a whole score for supplying material for instruction to the common schools. Nearly every part was made in the shop, even to the shaping of the round discs, which were made out of a common thick glass plate. The manufacture of a number of lathes also gave employment to the joiners, turners, and smiths. There were already finished several school closets for books, etc., each one the result of the work of many pupils and the teacher. In the bookbinders' shop a great number of plates for schools were being mounted. In the paint shop they were busied with the polishing of school desks. The making of toys, which was rejected as a matter of principle at the slöjd seminary, here found its defence; I saw of such work, among many other things, very well made objects, partly in tin-plate and lathework, which had been at the Stockholm Exhibition. Work which was not done for communes was disposed of in a Christmas bazaar.

Pupils received a profit from their work; but at the examination premiums were given to the most skilful, provided they had also given satisfaction in the school studies: for this purpose 1,000 kronor were granted out of the school funds last summer. The premiums consisted of tools or a reward in money of 5.40 kronor, according to the pupil's choice; but most of them preferred the former. In the new school buildings of Göteborg rooms for the workshops are suitably arranged at the outset. They are placed partly in the basement, partly in the upper loft, and show nothing unusual except that they are provided with a great number of very small windows (I counted in one room not less than 12), which stand so close together that they allow the light to enter equally all parts of the room. The rooms are spacious, and this is necessary, since, not infrequently, there are to be found as many as 20 or 25 pupils in one branch, as in joinery and bookbinding. In consequence of this great number, however, the pupils are not, of course, kept fully occupied; many must stand idle. The teachers said that they considered 15 pupils a suitable number. Still it would seem that in smith's work more could be kept busy.

Slöjd instruction in the common schools of Göteborg has attracted much attention, and certainly with good reason, when we consider the great sacrifice which the city has made, and the truly, in many respects remarkable, skill with which it is managed. But it may well be a question whether in the management of these institutions there is not rather a want of the right pedagogic view, and whether the work schools have not come to run in the service of the trades and in a track in which they should not go.

In Göteborg there is also a so-called "school of restraint," or, as it is termed at present, a reform school (strafeskolan), in which hand exercise forms an integral part of the instruction. Though I took occasion to make myself well acquainted with this institution, I shall omit particulars in order not to be prolix. Since the introduction of hand exercise for boys into the common schools has found no support in Swedish legislation, and hand-work is nevertheless compulsory in many places, I inquired of

the slöjd inspectors in Göteborg what was done in case the parent positively refused to send his child to the slöjd instruction. I was answered that such a case had never been met with. On the contrary, I learned later, in my visit to the reform school, that many boys were sent to this school on account of truancy in slöjd.

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In Wenersborg slöjd has been compulsory in the common schools since 1872. Before that time every child had 30 hours of school studies; but on the introduction of slöjd the number of hours was increased to 36, one-half being devoted to school studies and the other half to slöjd, from the child's eleventh to his fifteenth year. Instruction is given from 9 to 12 o'clock in the forenoon, and from 2 to 5 o'clock in the afternoon.

The branches of instruction are joinery, smith's work, shoemaking, and tailoring. The school furnishes material, and the products are the property of the school. But the pupils, as a reward for diligence, are allowed to make repairs for themselves. The joiners' school makes various useful objects; the tailors' school sews, particularly on trousers for sale; the shoemakers' school makes up boots and shoes, which are sold at about the cost of material; and the smithy turns out such things as hammers, tongs, screw-taps, and the like, well made and neatly polished. The smithy was remarkable for its great neatness and a regard for order, which made a good impression. As for tailoring, the experience has been that boys, as a rule, had no inclination for this. The workshops were small, and the pupils were so divided that there were not more than eight or ten in a party at once. The school took orders, and the things made up were sold at auction.

The joiner and the smith had 600 kronor a year, the tailor and the shoemaker 500 kronor; the times of instruction were 36 hours a week, with a summer vacation of two months.

One of the elementary school teachers was appointed superintendent of the slöjd departments with a salary of 600 kronor.

In Wenersborg is held the school of the northern division of Elfsborg län, which has been in operation four years and is intended to teach grown-up young men from town and country to be useful at home. The school is most frequented by young country boys who have their food from home and hire rooms in town. Turning, joinery, carving, smith's work, and drawing are the subjects taught. The school, whose course is continued from the 15th of September to the 15th of May, with eight and a half hours' instruction daily, costs, with the rooms, 2,000 kronor a year, from which the earnings of the school are to be deducted. They employ the smith and use the smithy of the common school.

Work Schools in Kristiania and Fredrikstad.

A very favourable impression was made by the work school of the Kristiania Workmen's Union, which, however, for a city of the size of Kristiania, is to be considered as nothing. The school is held in the evening, for children whose parents belong to the Union. There were two classes in joinery, one class in basket work, and two classes in drawing, each having exercises six times a week, besides classes for women's hand-work. The working classes consisted of 16 pupils each. The teachers were paid one kronor per hour. I had an opportunity on two evenings to see the class in basket-making at work, under the instruction of an uncommonly able teacher.

The school owns the material, and the work, which is disposed of at an exhibition at the close of the course, belongs to the school. Still the most active and diligent pupils reserve one piece of their own work, which is given as a premium. What I saw of models and work executed gave evidence of good taste.

The work school in Fredrikstad is, I presume, an exceptional one of its kind in this country, since it is maintained by the common-school funds. For hand-work there is arranged a roomy place in the second story of the gymnasium of a public-school building. The teacher is paid 1,200 kronor per year, and has besides 240 kronor for six extra hours weekly in drawing. He receives the State allowance as a public-school teacher, which, by

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reason of the number of hours, is greater than that of the other teachers. He instructs pupils in joinery, turning, basket work, painting, and tin-plate work. The work school has in all 60 pupils, divided into classes of 15 each. The pupils have 12 hours weekly, and every pupil must go through the different branches of work. Most of the pupils paint their own work. The most diligent are allowed in the summer vacation to paint in the school and other public buildings, and receive therefor 50 öre per day. The boys, after they have been pupils in the school two years, have leave to make for themselves a part of the tools. Other encouragement is regarded unnecessary, since there is a competition for places.

Work Schools of the Fredrikshald Slöjd Union.

Hardly anywhere in this country (Norway) have greater sacrifices been made for hand-work instruction than in Fredrikshald. Both for this reason, and because, as a consequence of the relation in which I stand to the Fredrikshald work schools, I can give a clearer representation of this than of schools in which I have had opportunity for only a brief visit, I will allow myself to communicate some more particular information respecting their origin and mode of working.

Fredrikshald Slöjd Union, invitations for the foundation of which had been already sent out in 1873, at the instance of candidate Oskar Anderson Dietz, was formed in 1875, with the object of labouring for the advancement of domestic work and habits of industry. While the union was still hardly organized, the committee of arrangements invited Herr Ahlborn of Stockholm to give a lecture on domestic industry, and when the union was established there were already subscribers for the purchase of models and a part of the wood-carving tools intended for loans. A more striking sign of the existence of the union was the establishment of a work school immediately after New Year, 1876. The school was first opened in Tistedal for 48 pupils, and a little later in town for 130 pupils, but at first for a course of short duration only, since the means of the union still consisted only of the gifts of subscribers and the yearly fees of the members, amounting to about 400 kronor.

But, fortunately for the school, it happened that the Distillers' Association of Fredrikshald in 1876 made so great a surplus profit that it could assist the union with 800 kronor. The city also made a contribution of 400 kronor. Meanwhile the Association's contribution was successively increased. It has been in the three last years respectively 2,000, 1,940, and 3,000 kronor, and the contribution of the city has in consequence ceased.

As a result of these circumstances, so fortunate for the union, the work school from a small beginning has constantly gone on in its development. It has by degrees been furnished with a fine collection of tools and models, and this last year it has likewise obtained the lease of a suitable new building with three very spacious work-rooms, besides a room for models and a store-room. In 1882 the school will move into a newly opened public school building, in which there have been placed at its disposal four large rooms in the basement, each 14 yards by 12, and of good height. One of the rooms has been divided by a wainscotted wall, so that the school gets a joiner's shop, a shoemaker's shop, a room for bookbinding, and separate classes in wood carving, one for painting and materials, and a model room in which the finished work is exposed for sale.

A regular work school for boys is also established in the Tistedal suburb of the city, located in the commercial building of that place. The work-schools are no longer under the direct control of the slöjd union, but have a separate board of three members, of whom one must be a member of the slöjd union board and the other the inspector of work-schools.

The number of pupils has varied somewhat, but is for the present (first half of 1881) 177. These are divided into 14 classes, with an average of 13 pupils each. One hundred and six of them are common-school boys, 67 are pupils of the Latin school, and four are grown persons who go with

the boys. One hundred and twenty are joiners, nine bookbinders, 43 shoemakers, and five tailors. All the bookbinders and 11 of the shoemakers are from the Latin school. The Latin school boys have four hours per week, boys of the paying division of the public school six hours, of the free schools nine hours; but the shoemakers have all, without exception, had six hours per week. The number of hours has always, however, depended in some degree on how the classes could be arranged.

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The chief teacher of the school is a joiner with a salary of 1,000 kronor for eight months' instruction, and a special payment of 50 öre for every hour of instruction between the 1st of May and the 30th of August.

The regular term of the school is from the 1st of September to the last day of April, but Latin school pupils may begin October 1. It is the teacher's duty to instruct on an average seven hours a day, and in addition to spend six hours a week in keeping the tools in repair, &c. He is a very skillful carver, and can also, when required, give instruction in basket-work, brush-making, and painting; sometimes also in bookbinding. The school has at present five teachers by the hour, one shoemaker for 18 hours, one tailor for six hours, one bookbinder for eight hours, and one journeyman joiner for six hours a week. The pay per hour for them is partly 40 öre, partly 30 öre. In Tistedal they have, moreover, a teacher who has gone through two courses of domestic industry in eight months of the year, 13 times a week (at 30 öre per hour), and a shoemaker four months, six times a week (at 40 öre).

Besides the more regular work of the school, there have been held every year extra courses. At present (first half of 1881) there are instructed in the city school eight grown women and 12 young girls in bookbinding and wood-carving. Of the courses given before, we must mention two in the manufacture of wooden shoes. In Tistedal there have been held likewise other courses, especially in joinery, including some for grown-up workmen in the winter-time, when they have been either not at all or only partly engaged in their business. Last winter the school made an expenditure of 347 kronor as teacher's pay alone for such extra instruction for grown-up artisans. By this means instruction was given to 64 persons in basket work, tin-plate work, shoemaking, and wooden shoe manufacturing. It should be said decidedly, with respect to the two last-named branches, as well as joinery, that the instruction has shown itself very fruitful. Much time which would otherwise have been spent in idleness has been turned to account in this way. Now every winter there are made for sale in Tistedal various simple articles of furniture, as well as wooden shoes; the costly boots and shoes of leather have been to a great extent replaced by the cheap wooden shoes, and workmen with trades have been in part employed in place of mere hand-workers.

The pupils in the Fredrikshald work-schools have themselves made choice of the branches of work with which they have busied themselves. These branches I shall take occasion to speak of singly.

Joinery.—Together with joinery, that is to say, by the same teachers and in the same place, instruction has been given in turning, carving, basket-making, and brush-making. At first there were several pupils in basket-work and brush-making, but generally these two branches fell off of themselves. The school furnishes all the tools, except saw-blades, which are used in wood-carving, as well as all the material, and it retains the pupils' work.

The workshop is furnished with 10 smaller carpenters' benches, and one longer bench along the side by the windows, on which places are made for three joiners. In each bench is a drawer containing three chisels, one rasp, one file, one rule, two squares, one brad-awl, and one draw-knife. In addition, every bench has a small jointer plane, a jack plane, a smoothing plane, a saw, a mallet, and a hammer. The other tools are used by the pupils in common.

From New Year, 1881, they have worked, according to a systematic collection of models, the idea of which is derived from the *Nåas löjd*

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seminary. We had, indeed, before this, tried to have a little system for example, the pupils were given easier work at first, but no definite scheme was drawn up. Our order of work differs, however, in many important points from that laid out for the slojd seminary. Herr Salomon's catalogue has 216 numbers for joiner's work. Our list has not more than 32; but in very few cases is there only a single article which it has thought advantageous for every pupil to make. On the contrary, the articles are generally included from two to six different things, of which the pupil according to circumstances, has to make one or all; but no number may be wholly past over. The reason for having so many articles under each number is partly that, otherwise, of some objects there would be so many made that they would be unmanageable, partly because it is desirable that sometimes the pupil should have a chance to make his own choice. We enjoin the pupils, and especially the more skilful ones, to make two pieces after the same pattern. If, when one piece is finished, they can make another of the same kind without receiving any assistance from the teacher, that is, without any other help on his part than oversight and guidance, such a work is particularly commended.

The catalogue from Näås begins with some articles which are intended to exercise the pupils in the use of knives. We begin, on the contrary, as we have always done, with small objects, on which the pupil practices handling the saw, the plane, and the file. With us whittling exercises are taken at a certain time in the year, several weeks in succession, by all classes in joinery at the same time. Formerly it was considered risky to trust the youngest pupils with knives, but in the whittling exercises given latterly all took part, and the whole was done without any other mishap than a very inconsiderable scratch of the skin by a single pupil. At the same time the teachers were at their posts and warned the pupils against dangerous handling, and the inspectors likewise constantly enjoined them to be careful. The pupils in joinery also received instruction twice a week in soldering, although this is not connected with joinery; the oldest boys bring tin-plate utensils from home for repairing. January is the month employed for whittling and soldering.

In the Swedish list of articles there are also inserted pieces of turning work and simple carving; but with us the turning work is put into a separate list, since we desire that it should be voluntary on the part of the pupils. A very few simple pieces of carving are made by requirement, but the pupil can, if he wishes, get leave to devote himself more exclusively to wood-carving, although not before the 18th number of the work-list is completed. The school has an especially rich collection of patterns in wood-carving, which has been supplied during the last year with things entirely in the Norse style.

In the order of work thus laid out, the aim has been to go from the easier to the more difficult, as far as possible to practise one mode of hand-work at a time, to teach the pupils the most important manipulations and methods of working; and finally to make the work less tiresome by giving opportunity for change. After one has examined the list of articles below he will have no doubt of the suitability of following a fixed plan of work. The pupils themselves appear to be much interested in having an object in view. The teachers on their part are much pleased with this arrangement, for the reason that before they found it difficult and tiresome to guide each pupil in the choice of work.

There is, however, reason to suppose that the plan cannot always be followed entirely to the end. When a work-school has laboured for some years in a place, the homes in the vicinity are furnished with the productions, and it is then necessary to seek some other way of disposing of them.* This may be done partly by letting the more skilful pupils, when somewhat advanced in the course, omit some, and partly by constantly seeking to bring in to use new and suitable models and drawings.

* Hitherto it has not been difficult to dispose of articles through exhibitions and lotteries.

The plan of work, of which many copies are hung up in the workshop, is from New Year 1882 as follows:—

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A. JOINERS' WORK.

- | | | |
|---------------------------------------|--------------------------------------|-------------------|
| 1. Stick for flower-pot. | carving). | buttering - board |
| 2. Clothes-pin. | (common). | |
| 3. Key-tag. | 19. Wood-box, coal-box, book-shelf | |
| 4. Cutting-board, bat (simple), | (large). | |
| clothes-peg, stocking-board. | 20. Doll's bedstead, boot-jack (with | |
| 5. Hammer handle. | carving). | |
| 6. Axe handle. | 21. Large meal-chest, potato-box, | |
| 7. Coat-hanger, boot-jack. | small table. | |
| 8. Ruler (which the pupil keeps). | 22. Meal-chest (with sliding cover), | |
| 9. Egg-rack, fish-fork, flower-pot | stool, bat (with carving), | |
| shelf. | sausage-press. | |
| 10. Stool, flower-pot stand, little | 23. Chopping-board, book-case (with | |
| rake. | turning), doll-waggon, photo- | |
| 11. Wooden slippers.* | graph frame (carved). | |
| 12. American axe-handle. | 24. Spice-box (with two sliding | |
| 13. Polish box, salt or meal box. | covers), house-keeper's box. | |
| 14. Single knife-case, double knife- | 25. Saw-frame, other joiners' tools. | |
| case, rake (common size), | 26. Field-tent bedstead, flower-pot | |
| match-chest. | case, small spice-box. | |
| 15. Small wheelbarrow, small book- | 27. Child's commode, doll's com- | |
| shelf, clothes-horse (to draw | mode, child's stool, stool. | |
| out), snow-shovel. | 28. Stairs, table, bedboard. | |
| 16. Baking utensils, scoop, scap- | 29. Wash-stand, trunk. | |
| trough, bat (common). | 30. Sled. | |
| 17. Bread-board, work-box, baby- | 31. Wardrobe (polished), tobacco- | |
| stool, wooden gun. | box, key-hanger, tooth-brush | |
| 18. Foot-scraper, grater-stand, shoe- | holder. | |
| brush, buttering-board (with | 32. Stool with legs. | |

B. WHITTLING.

- | | |
|----------------------|-----------------------------|
| 1. Sausage-peg. | 6. Harness-pin. |
| 2. Rake-tooth. | 7. Jumping-jack. |
| 3. Mouse-trap pin. | 8. Different small animals. |
| 4. Clothes-pin. | 9. Butter-spoon. |
| 5. Flower-pot stick. | 10. Butter-spade, &c. |

C. TURNING WORK.

- | | |
|-------------------------------|------------------------------|
| 1. Tool-handles (many forms). | 10. Chair-legs (many forms). |
| 2. Knobs (many forms). | 11. Barrel-tap. |
| 3. Harness-pin (many forms). | 12. Rolling-pin. |
| 4. Meat-club (many forms). | 13. Coffee-crusher. |
| 5. Stocking-last. | 14. Match-holder. |
| 6. Beefsteak pounder. | 15. Fish-fork. |
| 7. Meat-clubs (round). | 16. Plate-rack. |
| 8. Potato-masher. | 17. Wardrobe pins. |
| 9. Fish-masher. | 18. Yarn reel, &c. |

The plan for the instruction in wood-carving has not yet been completed, but is being worked out.

In shoemaking the arrangement here is somewhat different from what I saw in Sweden. Pupils take all their work from home, and purchase for themselves the needed material. They are busied particularly in repairing their boots and shoes, but not unfrequently they make new ones. A capable and industrious boy often keeps in repair the shoes of a whole family. After the course in the joinery school, pupils make themselves a pair of wooden soles on which they put the upper leather. Of tools the school has only lasts, nippers, some polishing tools, and very few hammers, knives, and like things very much needed, so that the pupils will be

* Pupils who furnish the upper leather may keep these. In other cases only the wooden bottoms are made.

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Tailoring has been tried for two years. Since the town has a great number of seamen, it was supposed that the chance to learn how to mend and to make simple working-clothes would be improved both by grown people and by boys who were going to sea. But the experiment did not succeed, as none of the seamen have presented themselves, and of the boys not more than four or seven have been got together at one time. So the class was given up in 1882.

Painting has not yet been established a full year as an independent branch; but, at the end of the regular eight months' school time, they have undertaken to paint all the joiners' work made up. Not all the pupils of the joiners' school have been engaged in it, but only those who have desired it. Staining has been carried on, particularly in imitation of walnut and oak. One year, during the vacation of the common school, the boys carried on, under the direction of the teachers, different kinds of work for schools, such as painting school-desks, floors, and walls, at forty öre per day.

In the bookbinding the pupils do work for themselves, and so bring to school, books and material, the school supplying only the tools. Without including grown people, nearly all the pupils are from the Latin school.

Instruction in drawing has been introduced into the work schools only since the autumn of 1881, when a course was arranged for thirty of the pupils (common-school boys) with three hours' instruction weekly, after the Stuhlmann method, which is not particularly known in this country, but has been introduced generally into Sweden, where it is the one authorized for all technical and other public schools in which such instruction is given. We may state as one advantage, so far as it has been practised here, that it makes the first trivial exercises interesting to the pupils, who have the immediate satisfaction of forming very pretty figures and patterns without its being difficult or departing from the common pedagogic principle of going from the easier to the more difficult. The drawing is done first in a book ruled in squares, and next in a dotted one, according to the teacher's sketch on a dotted blackboard painted for this method. Further on, after figures in straight and curved lines have been drawn, with the help of lines and points in the two books, there are commonly used drawing books for geometrical figures according to the teacher's sketch on the blackboard, with the use of the Stuhlmann plates. Then follow other figures, and, finally, drawing from plaster, objects in bas-relief, blocks without shading, plaster figures in alto relievo, and blocks with shading. One can learn about the method by reading Dr. Stuhlmann's original work published in Hamburg, or the Swedish translation, both of which are to be had in the bookstores (six kronor).

As to the teaching and the course pursued in the schools, the rules and instructions given below furnish some further information. As to the children, the method of ordinary schools is carried out as far as possible. The school has regard to good behaviour and aims to inculcate habits of courtesy, neatness, and order. The teachers, for example, must require of the pupils a neat appearance, and when school is dismissed must see that everything is put away in exactly the right place.

It was found, as a rule, that it was the younger boys who came to school, and that they left it when they came to the age at which they would derive most profit from the instruction. Such has been the case with pupils in the public high schools, because home work makes great demands on their time when they become farther advanced in school. The reason seems to be that older boys are more useful at home and often can earn wages for work; also, in great part, that older boys have generally a dislike of any constraint. To remedy this, and to try to keep the pupils longer in school, it was decided, instead of giving premiums as rewards for diligence, constant attendance, and good conduct, to credit the pupils in those branches of work, in which the school furnishes materials and keeps the products,

with wages, which are regularly entered in a work book, and are not paid to them until they leave the school, after having been for a certain time constant pupils. These work wages should, as a rule, not exceed half the value of the work, and they depend on its saleability; but a work carried out without the teacher's help receives the highest pay. The work is judged in the pupils' presence by inspectors and teachers jointly, and any observed inaccuracy is pointed out on this occasion. What further care is taken will be seen from the following rules for pupils, who must pass an examination at this time. When the pupil leaves school, instead of money, a savings-bank pass-book is given him, with encouragement to use it for future savings. The idea of this arrangement respecting work-books is derived from the slöjd department of the Upsala common school.

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Since it has been supposed that the school will be more highly esteemed and more constantly attended if there is fixed a fee, ever so small, for instruction, there has been demanded a yearly enrolment fee of 3 kronor, which amount for the children of the public schools is lowered to one-half and paid in two terms. This enrolment fee has served to do away with the inconvenience of having a great many report themselves, attend a few times, and finally disappear, which is unavoidable, unless measures are taken to prevent it, in places where a great part of the working class is on a low level morally.

School Statutes.

SECTION 1.—The object of the school is to promote dexterity and domestic industry in the Fredrickshald community, to give instruction in hand-work to persons of both sexes, and particularly to children.

SECT. 2.—Its operations are maintained by, 1, school tuition money; 2, sale of articles made; 3, contributions by slöjd unions or others.

SECT. 3.—It is managed in all parts by a board of three members chosen by the government of the slöjd union, of whom one in each case is chosen from the government itself.

The school-board members remain in office two school years, so that one or two go out every year.

In case the slöjd union government employs a paid inspector of schools, he is a member of the board, which can then have two chosen members, of whom one goes out every year.

In case woman's hand-work is included among the objects of the school, the board may call to its assistance one or more ladies, who are willing to aid.

The president of the slöjd union takes part in the meetings of the board when he chooses.

SECT. 4.—The board chooses its president and adopts its own rules of business; it must make a report of its doings. It makes out instructions for the school inspector, when such a one is chosen, and arranges the daily care of the school.

It makes out a budget for the school year, which extends from Aug. 1 to July 31, and sends to the slöjd union's government at the close of the school year a detailed account of the school's receipts and expenditure, together with an account of the doings of the school for the past year. It chooses an accountant and treasurer, who have to give suitable security.

It manages the means of the school, except so far as that the salaries of the permanent teachers are determined by the government of the slöjd union after the board has made a recommendation. It sees that the school property is suitably insured against fire.

SECT. 5.—Provided either the operations of the school are discontinued and closed, or the Fredrickshald community should choose to set up a school with a similar object, the school property of every kind, according to an arrangement formerly made, is to be given over to the city without any payment in return.

Extract from Instructions for Teachers.

5. The teacher must show the pupils the use of tools, explain the names and arrangement of the parts, and, both by word of mouth and by showing,

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make plain the mode of working, which must be done not only for the single pupils, but, as often as opportunity affords, for the whole division at a time, while all keep still and give attention. That the pupils may learn to help themselves, the teacher must not, on the other hand, help them, except when absolutely necessary. Still, the finishing touches must be given to the work by the teacher, when the pupil cannot do it himself. The teacher must keep his attention directed to the exercise of the pupil in accuracy of eye, the awakening of his thought, and the opening of his eyes to the forms of objects.

Extract from Rules for Pupils.

7. The wages earned are entered in a savings-bank book made out in the pupil's name, but he does not receive this until he leaves school; and, as a rule, not then unless he has been a pupil of the school without interruption for three years, or three half-years after the age of 12 years. It may be forfeited by staying away from school, except in case of sickness or with permission of the teacher, or by the pupil rendering himself undeserving by his conduct in or out of school.

8. Pupils can make a purchase of their work at two-thirds of a moderate valuation; but in this case no wages are given for the work.

9. If the pupils furnish their material themselves, as in shoemaking, tailoring, or bookbinding, they have the product free.

10. Unconfirmed pupils pay for enrolment money three kronor (3s. 3d.) per year, payment being made in advance; pupils who are enrolled at New Year pay two kronor. Those who are not in good circumstances can, on request, be let off with half payment. The inspector may demand of free pupils that they deposit fifty öre, which they receive back at the expiration of the school year if they observe the rules of the school.

Object of Hand-work Instruction.

Having now finished this description of the method of instruction in hand-work followed in this city, where I have had occasion to study it thoroughly, I shall attempt to answer the questions proposed at the beginning of this paper, so far as this has not been done already in what has gone before.

One question left unanswered is this: What is the object of hand-work instruction? That the answer has not been the same in the different places that I have visited arises partly from differences in the methods of instruction, partly from the unequal importance which is attached to hand-work in relation to the other school work.

It has been maintained with great force and with much justice that hand-work does not have its full rights unless it is regularly incorporated in the school course, and receives such treatment that it may exert an educating influence on the child, inasmuch as, like modelling and drawing, it aims to develop the pupil's eye, and his sense of form and of beauty. Therefore it should have an acknowledged place, in the higher, as in the lower schools.

This idea of hand-work as a means of intellectual cultivation is represented in Sweden by Rector Palmgren in Stockholm, and by the provincial governor, Count Eric Sparre, who, in virtue of his office as inspector of the higher elementary schools in Wenersborg, at a closing festival in July 1880, gave a long discourse, which is reported in the city journals under the title "A Plain School Talk," wherein hand-work considered from different sides is brought forward as an important link in the higher cultivation. The same ideal view of hand-work as a branch of instruction is also maintained by the first defender of hand-work schools in the North, the Finlander, Dr. Cygnæus. But now, when a regard for the hand-work school has been but recently awakened, it may certainly very easily be somewhat overrated as positively refining, and some may, in a great measure, fail to look at its practical side, which is what the well-known Finnish teacher must have done in a late letter concerning this subject, published in a Norwegian newspaper.

In other respects, on the contrary, hand-work can scarcely be ranked too high as a link in the true education. This is no place, however, to

consider its significance for moral training. But if we start with the idea that schools likewise have acknowledged it as their business to impart such skill to female children as every child ought to possess, so ought the public school to give instruction to boys also in the use of the hands, so that every man, to whatever station he belongs, should have acquired such power that he may not stand helpless in many occasions of life, as a consequence of a one-sided education; then will a path have been broken by which to arrive at the method in which the school must work.

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The exercises should begin with the handling of the tools most often used in daily life, as, for example, the knife, axe, hammer, plane, saw, file, and possibly the paint-brush, because a person with but a very moderate ability in the use of these tools, or only one of them, will many a time find it of value to him; at any rate he will have acquired a practical judgment which will be of use, and he will be prepared to employ his spare time for the repair of furniture and utensils, as well as for the making of simple objects for the practical uses of life, or for the embellishment of his home.

The chief importance must be attached to joiners' work, for the reason that he who understands how to handle joiners' tools will have little difficulty with other simple work. Although turning will train the eye and the sense of form and symmetry, it must still take a subordinate place, particularly for him who cannot be supposed to have the means to procure the necessary tools. A little wood carving can be practised, not only because it serves in a high degree for the cultivation and refining of taste, but because one need not practise it much to be able to produce tasteful pieces of work for his own recreation.

Whittling should not be neglected in the hand-work instruction for boys, since the knife is a tool for the use of which many opportunities will be found at home. If the school omits to give this instruction, there is a risk that the boys will not realize what can be done with this simple and easily available, but, in many respects, superior tool. A certain care, however, must be observed, particularly for the smaller boys. There is more security in this respect when there is opportunity to undertake whittling exercises with the whole school, as in this case rules of prudence can be more forcibly inculcated. At any rate, whittling exercises should begin in this way.

Whether basket making should have a place in school may be exceedingly doubtful. Here, indeed, is a material which happily can be easily made to take any required form, and hence the work therewith may be said to be instructive, and some things for use and ornament can be easily made. But basket making commonly requires much practice and strong hands; the work is of inferior strength and durability, the material cannot be procured in many places, since our native species of willow have a very limited use; and, finally, it cannot be maintained that exercises in basket making have a general value. In order, therefore, not to undertake too much, they should, as a rule, hardly meddle with it. It is another matter to give courses in basket work to grown people with a trained and skilful teacher when there can be hope of fostering an industry thereby, and when, at the same time, instruction can be given in regard to the planting of osiers.*

That undue weight, however, may not be given to my perhaps entirely individual opinion, I should mention that basket work is taught in most of the Norwegian and Swedish schools which I visited on my journey. But here in Fredrikshald, where pupils themselves have their choice of work, it is said to have dropped out of itself, I presume, by reason of a correct instinct in the children or their parents.

Painting, particularly of manufactured articles of wood, appears to be suitable for work schools. I have found by personal experience how easy

* It is very doubtful whether osier planting is suitable for our (i.e., the Norwegian) climate. The experiment which was made at the Aas Agricultural School did not succeed, because of the severe winter cold.

Appendix AA. it is to produce on furniture and household utensils, in an acceptable, though perhaps not artistic, manner, the common wood colours, as oak and walnut, particularly the latter. Moreover, floor and other painting may be done when good colours can be obtained by the mere grinding of the colours, and without the help of any other tool than the brush. Very little, therefore, is needed to contribute in this way to convenience and comfort at home, and many will not do without it when it can be done by their own work.

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It would be well to give a short course in smiths' work, since some practice in the use of the file always proves of use in daily life, and in many cases a forge is not necessary. Tin-plate work, on the contrary, may be said to be less necessary. Still, a little soldering often comes in use and is quickly learned. Other classes can have instruction in this four or five hours every year, the pupils bringing with them old vessels of tin-plate or utensils in need of repair upon which to practise.

It can hardly be allowed that shoemaking is of great importance as a means of cultivation. The position which this requires during work is by no means the most suitable for bodily development. Herr Ahlborn of Stockholm said that the medical council of Dresden, for this reason, expressed themselves against its introduction as a school branch. But, on the other hand, skill in mending shoes is so important for people of the working class, both economically and on sanitary grounds, that its place in school may be said to be justified on this account, which cannot be said of tailoring, for instance, for which the boys have shown no liking. The making of wooden shoes with leather uppers should, as a part of the joiner's work, be taught in every working school for boys of the poorer class.

Bookbinding can hardly be of practical importance in any other schools than those which are intended for children in whose homes there are books to bind.

According to the proposition which is laid down as a basis for the consideration of the place of each thing in the work school, namely, that hand-work must be considered as a link in the common education, the work to be carried out should be particularly limited to actually useful objects, and such as do not lie above the pupil's power to make with little assistance. It should be customary for the pupil, as far as possible, to be self-helping, and he should not be deprived of the satisfaction and encouragement to diligence and perseverance which are always sure to follow when one has accomplished a piece of work with only his own help. And that there may be opportunity for the development of taste and a sense of beauty in work, when procuring models, the coarseness and ugliness which often characterizes the work of schools should be avoided.

A plan derived from any other fundamental principle than that the school is for life in general will very certainly lead astray, as has happened, in my opinion, in some places in Sweden where a disproportionate number of hours has been assigned to hand-work, even as many as half the whole time of instruction. With three to six hours a week of obligatory hand-work running through two or three years, any reasonable demand would appear to be satisfied.

The Question of Economy.

As to the simple question of economy, which arises when a work school is to be established, the information from different places which has been already given will, I hope, afford sufficient guidance as to the pay of teachers. A limitation in the outlay for teachers' help may happen when the number of pupils is very large, but the workshop spacious; in which case, as in Upsala alld school, it may be advantageous to make use of a steady half-grown boy as the teacher's assistant. Such a one would without doubt be able to furnish many of the aids to pupils which are necessary in order that they may not stand idle.

In regard to the outfit of tools for the workshop, it is difficult to determine what sum to apply for, inasmuch as it depends, among other things,

on how many pupils may be calculated upon, what they require, and how far the teacher understands how to use the means placed at his disposal.

If there is not a sufficient number of joiner's benches, planks furnished with cheap appliances with which to fasten the work, and placed along the walls of the workshop, may be used to advantage.*

It is also a question touching the economy of the school, how far teachers should furnish material to the pupils. Even if it should be found that this affords certain advantages, still the arrangement is hardly advisable, since in such a case the teachers will be tempted to be too sparing of material, to the detriment of the instruction. On my journey I had opportunity to see to what such regard for saving might lead.

Nor is it advisable to let the pupils themselves furnish material. In the work school of the Fredrikshald Slöjd Union in Tistedal this has been tried one year by reason of the ease with which pupils in this place may obtain wood material. But it was given up because the lumber furnished by the children was very often poor, and because it was made impossible to follow a definite plan of work.

Although it would be a great encouragement to the pupils to be allowed to keep their work, there is something to be said against this. In the nature of things, when this is done, parents will demand to have the choice of what the children shall work at, and they will be dissatisfied if this right is not granted. This is true, particularly of joiners' work, while it need not be said that in branches like shoemaking and book-binding, for example, preponderant reasons may be found for a different arrangement.

Teachers in Hand-work. School Superintendence.

It is a question of no inconsiderable importance, and one which has not been plainly brought forward before, whom we should choose for teachers of the work schools, or, in other words, what are the principal qualifications which one should seek for in them.

It must be unconditionally insisted on that only one who is able to give explanations fluently can make this instruction a means of cultivation for the pupil, awaken his thought, and lead him to the apprehension and understanding of his work. Likewise only he will have the power to preserve discipline who himself either has had a pedagogic education or possesses a decided innate gift in this respect. If hand-work is a compulsory branch, ability to preserve discipline will naturally be one of the first conditions for a useful teacher, while a very little deduction can be made in the requirements where it is in his power to keep out of school those of less easily manageable dispositions.

In Fredrikshald, where, as a matter of course, they have been obliged to seek, for teachers of work schools, men brought up as artisans, they have still been so fortunate as to get respectable and in other respects, particularly suitable teachers; but hitherto it has not been altogether as could be desired as respects the ability of the teachers to give the pupils a full understanding of their work by oral instruction. Discipline, likewise, has not appeared to be their strongest side, and, therefore, they

* From the third in the series of pamphlets by O. Salomon, which has lately come out—"Slöjdskolan och Föreläsningen"—we subjoin the following extract from the description of a Finnish school for eighteen pupils, the Nygård Educational Institution for Neglected Children:

* Eighteen of the boys are instructed in slöjd at the same time by the superintendent, who does not consider this number large. As a guide for those who perchance wish to introduce joiner's work as an object of practice into common schools, I here give a list of the slöjd tools and utensils which the teacher at the Nygård school had at his disposal, and which he considered amply sufficient for the male pupils. They were: three planing benches, six hatchets, eighteen hammers, eighteen knives, eight vices, twelve wedges, twelve pairs pinons, six gouges, twelve mortising chisels, fifteen dimer chisels, four turning chisels, five scroll saw frames, four saws, six small and two large gimlets, two bitstocks with bits, three drawknives, three mallets, two pairs compasses, one pair calipers, two jackplanes, two jointers, two smoothing planes, one butt plane, three squares, two bevels, one two-foot rule, one drill, one filing vice, one glass cutter, one gait, one gauge, one screw driver, one whetstone, one scraper, one rasp, one lathe.

* Many, to be sure, would find the above enumerated tools all too few for instructing at one time so many as eighteen pupils, but proof is here given that one can, without much difficulty, get along with small means, if the will is good. The Superintendent himself directs the instruction of all the boys. He assured me that he considered it by no means a burden,—this alternate guidance in theoretical and practical objects of teaching. His interest in the former does not hinder him from being warmly enthusiastic for the latter."

Appendix A.A. have sometimes been under the necessity of sending unruly boys out of school.

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The superintendent of the Swedish slöjd seminary expressed it as his settled opinion that we should strive to obtain slöjd teachers who have been pedagogically trained. The reason for the desire in Sweden that teachers of the common schools shall give instruction in slöjd must be sought partly in this idea. But among teachers so cultivated, even when they have gone through an institution like the Naäs seminary, there will not be found such practical skill as in a man who has served his time in a trade. But when I expressed to the superintendent of the seminary some doubt of the sufficiency of this short course which the Swedish teachers commonly take he remarked that it is not of so much consequence for teachers to possess a full degree of skill as artisans as to learn modes of work for the simple operations, and to understand the handling of tools. It is, moreover, astonishing, he said, how much an enthusiastic man can learn in a short course, and how much the common-school teachers thus instructed usually accomplish with the little that they have learned in a vacation course.

But directly the contrary view was expressed by the slöjd inspector in Göteborg, who did not wish to hear of any other teachers than hand-workers. He thought it was not difficult to impart the pedagogic habit to them in a tolerably short time, which, however, must be more easily said than done.

If there is occasion to procure a teacher for a work school, of course he will be the best who has acquired a perfect education, both pedagogic and practical; as, for example, if, after having wholly or half served his time at a trade, he has obtained continued instruction in a pedagogic and practical institution.

Such an institution would have been formed in a certain degree if the seminary course among us had been widened out, and at the same time hand-work had been made a compulsory branch in it. Our country boys not so very rarely possess already considerable dexterity, which is sometimes held back. But it would be otherwise with those who came to the seminary after hand-work had been introduced. Probably many of the young boys who intended to be teachers would employ the time between confirmation and their entrance into the seminary, far more than hitherto, in acquiring manual skill, since this now would have a real value for what is to be their life-work. In this way it would be possible to get very eligible teachers for work schools, and this in a still higher degree if matters develop so far that everybody already as school boys should receive instruction in hand-work. Then those in seminaries who distinguished themselves in hand-work would not lack opportunity for continued development, and would be able to prepare to serve as practical teachers of hand-work for schools which have need of such.

I have seen the thought expressed that we should have a seminary exclusively for hand-work. But it is not to be supposed that such an arrangement would in the long run be sought for among us, because there will not, in general and to a great extent, be found special employment for practical teachers of hand-work. As respects the country districts, as a rule, it will be necessary only so to arrange the hours that there will be no occasion to employ a special man for the sake of this branch. In the towns, and particularly the larger ones, practical teachers will be necessary; but it is doubtful whether the need can be supposed to be so great that it is reasonable to have a permanent special school established. Probably for some time to come we shall have to look to artisans, and among them seek out such as naturally possess the ability to manage and instruct children.

If circumstances are such as to make it desirable to have one and the same man undertake instruction in many branches of work, as a rule it will be best to engage an active joiner who will consent to take, either in his own town or some other, if he prefers it, a short course in such hand-work as is most commonly practised by a man of the trade.

In case the instruction in hand-work is thus left to teachers trained only in the way of the trade, and, in particular, when the school is so large

that it has many teachers in hand-work, the superintendence of a pedagogically educated man should not be dispensed with. But we cannot suppose that this superintendence will be satisfactorily provided by an ordinary school board; on the contrary, we must start with the idea that among the teachers of a large city, either in the higher or lower schools, some one may be found who is so endowed that he will be able to undertake this superintendence with success. Examples of such cases are already adduced from Sweden. In Upsala one of the common-school subordinate teachers, and in Wenersborg a teacher in the elementary school, is superintendent of the slöjd department of the common schools.

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But as to the country districts, when a step is taken, at the public expense, to put aside the obstacles to the introduction of this instruction into schools, care should be taken that the want of assistance for teaching may be supplied by the establishment of courses, like the Swedish in vacation time, for those who are already appointed teachers.

But too many branches of work should not be undertaken. In a course of five to six weeks it can hardly be advisable to be busied with anything except joiner's work together with a little carving and wood turning, unless some make trials in painting, guided by written instructions. Desirable as it would be to include drawing, still the time is too short for it. In Sweden they are accustomed commonly to arrange so that there are provided separate drawing courses, and this as well for the female as the male teachers of the common schools. In such courses, for teachers in manual exercises, the work should be done according to an established series of models, and it will be of great advantage for each one to carry home with him the work done, not for his own private property, but to belong to the school, as the foundation of a collection of models. The Fredrikshald Slöjd Union has taken the initiative in having a course arranged according to this principle, held yearly in Fredrikshald, in the summer vacation, at the public expense. The outlay for materials is estimated at Näs at five kronor for each pupil in a five weeks' course, and in Upsala at one hundred kronor for a course of one month for thirteen pupils.

If such courses are extended, according to Herr O. Th. Ödes' plan, to three months, time may be spared for drawing; but still it should be unhesitatingly decided to lay stress on joinery and to institute basket-work, &c., as being branches of like character. Yet there are certainly important circumstances which are unfavourable to courses of such long continuance. Teachers will not, as a rule, have a chance to be away from their work so long, and there will be no use for trade teachers instructed in so many kinds and at the same time to so small an extent.

The need of carrying instruction further than is possible in a short vacation course must be satisfied in another manner, as by the establishment of special courses for those who have gone further, or by reserving for those who have gone through one course, places in a following course. In general, we shall hardly be able to reckon on giving teachers opportunity to attend more than one.

While it is desirable to take a step for the introduction of hand-work into schools, by the establishment of yearly courses at convenient places around in the country, it is important that the instruction, from the very beginning, should be brought into the right track. For the districts which would introduce this instruction into the schools there should be a chance to obtain guidance for their arrangement, and the schools which must obtain public aid, therefore, should be subject to an inspection to make sure:

1. That the work is done according to a well-devised plan.
2. That the work is done, not after clumsy patterns, but tasteful ones.
3. That teachers know how to induce their pupils to carry out their work with exactness and care.

To this should be added, perhaps:

4. That schools in places where circumstances invite thereto should try to work in the service of industry.

Appendix AA.

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Sweden.

Introduction of Hand-work into our Country Schools.

It is asserted that domestic industry in our country districts has retrograded in the last decade. The long winter evenings, when hard labour does not tax all the working force, in many places, as we are assured, are now passed in idleness, while before it was common to find the family busy around the fire-place, the male and female members each with his and her own work. No doubt, also, the extended operations of factories in later times have made it easy to obtain many objects of necessity which one must formerly make for himself or do without; and then, too, advancing civilization has brought in a division of labour, whereby much of that which earlier lay within the field of the farmer's industry has been absorbed in trade work. If such a division of time is an inestimable gain for him who always has his time occupied, it by no means follows that the same is the case when one has, at certain times of the year, many leisure hours to spare. If it is true that the large industries in our time are likely to stifle domestic industry, and that the farmer, the cottager, and lodger are often without occupation, then there certainly is no better remedy for this evil than the introduction of hand-work for both sexes into the common schools. Thereby will children be given early an inclination and desire for work and a comprehension of the value of time which will be useful to themselves and others. There will no longer be such clumsy and awkward servants as before; there will be laid a good foundation for diligence and domestic industry in all homes. In Finland Sweden, and Germany philanthropists have made great efforts for this object, and with good fruit. Then why shall not we also follow this good example, and with a means so natural seek to promote the welfare of our poor people and bring the blessings of industry into the house and cabin.

There can be no doubt that what is called labour does not stand in high estimation in our country among the higher class of the community. It was formerly so that only the young girls avoided as base almost every thing that is called work, this view now presses itself as a cancer more deeply into the family, and it has outwardly reached even the better situated class of farmers. The introduction of hand-work into the schools will certainly also help to remove this contempt for bodily labour and promote a recognition of its actual nobleness.

To be sure, it would be of great advantage to have established here and there separate work schools; but the work school is first assured a permanent existence when attached to an established institution. Moreover, there are, as already mentioned, many circumstances which show the advantage of their connection with the school. When only a very limited number of hours is to be allowed, we cannot reckon on any other teacher in hand-work than the common-school teacher, whose pedagogic training and practice in preserving discipline, and in giving oral instruction besides, must be of great value; moreover, the objection cannot be raised any more in boys' hand-work than it can in girls' work, as well as in such branches as writing and gymnastics, that it will serve to divert the teacher from his proper business and spread out his labour, since such branches must much rather be a rest for him and a beneficial change of work.

It is at length established by the experiments made in Sweden that what may be lacking to him in practical skill can be replaced by his superiority in other respects, especially when by exercise in a definite plan of work he has accustomed himself to the commonest manipulations and modes of work, beyond which instruction, in a boys' school, can never be carried. I have in this connection sought to show what may be said in favour of the employment of school teachers for instruction in hand-work, notwithstanding I have been obliged to repeat some things which have been said before.

It does not require a very great outlay to introduce hand-work into the common-schools, the district schools, and the public high schools of the country, and I shall add some remarks on what it will cost to introduce hand-work for boys as an ordinary branch in a common-school in the country, in which thirty-two weeks is fixed as the average amount of

school time. There must, of course, never be any idea of bringing in hand-work at the expense of the studies, and so there must be a little increase in the teacher's salary. If we call the time of instruction six hours per week, and the pay per hour 50 öre, we have 96 kronor a year. On the supposition that this outlay is equally divided between the State, the country, and the district, it is not very much for each. We may consider that the cost of material, as far as relates to joinery, will be about covered by the income from the pupils' work.

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Sweden.

Providing a shop is undoubtedly one of the greatest difficulties in the introduction of hand-work, since in the very rarest cases only will there be a vacant room suitable for it in the school-house or in the immediate neighbourhood; and it will not do to arrange the school-house loft for this purpose, wherefore a small building must be erected. But even this is hardly impracticable if there is only an interest awakened. Furnishing the workshop with tools will occasion no great difficulty; there need be procured only just the things necessary. Even if a beginning is made at first by borrowing, the teacher, with the assistance of the largest and more skilful pupils, can make a part. It will do to have two at one planing bench, and the pupils can busy themselves by turns with turning, carving, whittling, shoemaking, etc. In Sweden the tools are moderately reckoned at 150 kronor.

*Catalogue of Tools for a Liberally Furnished School-room for Joinery.**

10-12 small planing benches, 35 kronor each; 1 wrench, 1.5 kronor; 1 to 3 bench screws with bench-hook and drawer for fixed bench, 7 kronor each; 13 jointer-planes, 5 kronor each; 13 smoothing planes, 3.5 kronor each; 13 jack planes, 1.5 kronor each; 13 gauges, 1.5 kronor each; 13 saws with brass mounted frames, 2 kronor each; 13 turned wooden mallets, 39 English chisels, 80 öre each; 13 English rasps, 1 kronor each; 13 English files, 80 öre each; 13 hammers, 1 kronor each; 26 squares, 40 öre each; 13 scraper-blades, 40 öre each; 13 scratch-awls, 25 öre each; 1 large saw, 2 kronor; 1 tenon-saw, 50 öre; 1 back saw, 2 kronor; 1 compass saw, 1.5 kronor; 1 filing clamp, 80 öre; 1 saw-set, 30 öre, 1 tonguing-plane with iron, 2.5 kronor; 1 grooving-plane, 11 kronor; 1 butt-plane, 3.5 kronor; 1 rabbet-plane, 1.7 kronor; 1 screw-plate, 3 kronor; 12 hand-vises, 1.25 kronor each; 2 screw drivers, 1.75 kronor each; 1 bevel, 60 öre; 1 beveled rule, 80 öre; 1 pair beam compasses, 1 kronor; 1 meter-stick, 60 öre; 1 pair compasses, 50 öre; 1 spoke-shave, 1.5 kronor; 3 reamers, 40 öre each; 1 brace with auger and centre-bits, 4 kronor; 1 pair pincers, 80 öre; 1 screw-tap, 50 öre; 1 American axe, 2.5 kronor; 1 vise, 9 kronor; 1 glue-pot, 1.6 kronor; 1 paraffine heating lamp, 5 kronor; 1 grindstone, 6 kronor; 1 whetstone; 1 chalk line; 2 lathes, 50 to 80 kronor each; 1 oil can, 60 öre; turning-tools, in all, 7 kronor; 2 pairs calipers, 50 öre each; 3 saw-frames, 2 kronor each; 36 carving chisels, in all, 30 kronor; 15 sheath-knives, 2 kronor.

(Equal to 886.71 kr. = 484. 16s. 8d.)

APPENDIX BB.

Appendix BB.

PRÉCIS OF A REPORT HANDED IN BY SIGNOR GIOVANNI CUCCO.

Technical
Instruction in
Italy.

TECHNICAL INSTRUCTION IN ITALY.

The primary schools for boys in Italy are called Quattro Elementari, being divided into four standards, and in them are taught the ordinary rudiments of education. Boys remain at these schools till they are about 13 years old, when they either are sent to work, or go to other educational establishments for the pursuit of higher branches of study.

Primary schools
in Italy.

* The catalogue corresponds to the furnishing of the joiner's workshop in the Fredrikshald work school; the annexed prices are in most cases reckoned from the work school of the Birman foundation in Kristiania, which received its tools from Fredrikshald.

32 ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

Appendix BB. These establishments are of two kinds, classical and technical ; the former being divided into gymnasia, lycenms, and universities, and the latter into technical schools, technical institutes, and polytechnics. There was, however, a lack of technical education for those who had to leave the schools at 13, and who were unable from want of means to attend the higher schools. To meet this want, an agitation was set on foot by Signor Quintoni Sella, which ended in the formation at Biella of a professional school, of which the following is a brief description :—

Course of instruction. The course extends over a period of three years, and embraces Italian literature, arithmetic, book-keeping, elementary algebra, geometry, descriptive and applied, kinematics, applied mechanics, physical and mechanical technology, chemistry and its application to industrial arts, building construction, dyeing, drawing, plastic and engraving arts, and textile manufacturing. The school is furnished with laboratories fitted with ample apparatus, as well as with a large library and museum.

Laboratories.

How supported. It is supported by annual grants from—

	Francs.
(a.) The Government - - - -	12,000
(b.) Chamber of Commerce, Turin - - - -	3,500
(c.) Provincial Corporation of Novara - - - -	5,500
(d.) Municipality of Biella - - - -	5,000
The last also gives the school, the premises rent free, which is equal to an annual sum of - 4,000	
Total - - - -	30,000

Administration. The administration of the Institution is in the hands of a Committee of Advice, which elects the director, professors, assistants, &c., and reports to the Government on the condition of the school.

The teaching is divided into two sections, namely, that given in the daytime and that which is given in the evening and on Sundays, and is further divided into such courses as suit those intending to engage in large public works, engineering, textile manufacturing, and ornamental engraving work respectively.

All apparatus is provided by the school ; for its use a laboratory-fee of 16s. per year is charged to each student requiring its aid.

Examinations; diplomas. Examinations are held and diplomas and certificates are awarded to successful students.

Prizes. Prizes also are given each year to the best students.

Fees. The fees vary from 6 to 20 francs per annum, but these are dispensed with in the case of poor students who have shown themselves to be diligent.

Analyses and other experiments for the public advantage are performed in the school laboratories.

Appendix CC.

APPENDIX CC.

French
Technical
Art Schools.

FRENCH TECHNICAL ART SCHOOLS.

Memorandum by Monsieur L. ARNOUX.

EXTRACT FROM THE "MONITEUR DE LA CÉRAMIQUE," 1882.

The municipality of Paris are about to open a new special drawing school in the school buildings situated in the Rue des Petits Hôtels. It will be called the *École d'application des Beaux Arts à l'Industrie*.

The teaching will be gratuitous, and will comprise the practical science of drawing, painting, and decorative modelling and carving, architectural drawing, lectures on the history of art, and the analysis of the styles of various periods. Furthermore three technical studios (*ateliers d'application*) will be annexed to the school:—one for pottery, glass, and enamels; a second for carving in wood and ivory, and metal-work; and a third for wood engraving, designs for fabrics, decorative panels, tapestry, and mosaic work.

Appendix CC.
French
Technical Art
Schools.

The number of pupils will be strictly limited to about 100, and the requisite knowledge for admission to the school will involve an acquaintance with the elements of the artistic and scientific facts indispensable for the practice of pottery and glass-working, carving and engraving on wood, metal work, designing for fabrics and furniture, the decoration of panels and of the different parts of the house.

All Frenchmen, without any distinction, who have attained the age of 15 years completed, will be eligible to compete at the entrance examination.

FRENCH ART SCHOOLS.

EXTRACT from the "MONITEUR DE LA CÉRAMIQUE," in reference to the Establishment of two new Schools in Paris for the teaching of Drawing, &c., applied to Industrial Art.

Deliberation of the Municipal Council (20th December 1882).

New school, Rue Ste. Elisabeth—Number of teachers, assistants, and salaries:—		£	s.	d.
1 ^o . Director, professor of architectural drawing	- - - - -	200	0	0
To be raised gradually to	- - - - -	240	0	0
2 ^o . Drawing master	- - - - -	112	0	0
To be raised gradually to	- - - - -	136	0	0
3 ^o . Modelling master	- - - - -	96	0	0
To be raised gradually to	- - - - -	120	0	0
4 ^o . Professor of mathematics and geometrical design	- - - - -	32	0	0
To be raised to	- - - - -	58	0	0
Assistant masters for each class	- - - - -	51	4	0

New school, Rue des Petits Hôtels—School of application for a defined number of artistic industries:—		£	s.	d.
1 ^o . Director, professor of architecture	- - - - -	200	0	0
To be raised gradually to	- - - - -	240	0	0
2 ^o . Professor for drawing and painting	- - - - -	144	0	0
To be raised to	- - - - -	168	0	0
3 ^o . Professor for modelling and engraving	- - - - -	104	0	0
To be raised to	- - - - -	128	0	0
4 ^o . Professor of mathematics and geometrical drawing	- - - - -	40	0	0
To be raised to	- - - - -	64	0	0
5 ^o . Assistant master for drawing and painting	- - - - -	96	0	0
6 ^o . " " for engraving and modelling	- - - - -	70	8	0
7 ^o . " " for mathematics and geometrical drawing	- - - - -	64	0	0

In both schools the assistant masters may be appointed masters after two years' teaching.

In both schools pupils who may be noticed for their *good conduct* and *regular attendance* will be entitled to money premiums (or purses) in the following way:—

3	purses for students of the 1st year, 10 <i>l.</i> ; 8 <i>l.</i> ; 6 <i>l.</i>
3	" " " 2nd year, 10 <i>l.</i> ; 8 <i>l.</i> ; 6 <i>l.</i>
3	" " " 3rd year, 12 <i>l.</i> ; 10 <i>l.</i> ; 8 <i>l.</i>

The students qualified for prizes will be proposed by the directors and professors, and approved by the committees appointed for the superintendence and improvements to be carried out in these schools.

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APPENDIX DD.

MANCHESTER MECHANICS' INSTITUTION.

DEAR SIR,

October 27, 1882

IN compliance with your request, I will endeavour to indicate some deficiencies in the course of study usually pursued in Art classes and School of Art connected with the Science and Art Department, having regard to the broad requirements of technical training and general utility. Train as I have been in the system, it would have been impossible for me to have brought an unbiassed judgment to bear upon the question, were it that I have been for many years associated as teacher with that class students who most require that the instruction they get shall be practical as possible in its bearings, so that in some degree I have been able to form opinions upon the utilitarian side of our system. I wish to be understood as dealing mainly with the elementary portion of the instruction, estimating, as I do, that 95 per cent. of our artisan Art students come within the range of no other instruction than that contained in what is known as the Second Grade course, which is perfectly and completely fixed in its nature and extent by the Second Grade examinations of the Department, which occur usually after about seven months of study. Thus the time is short, and the teacher, conscious that it is his main hope of remuneration, goes for the examination in the most direct manner he knows.

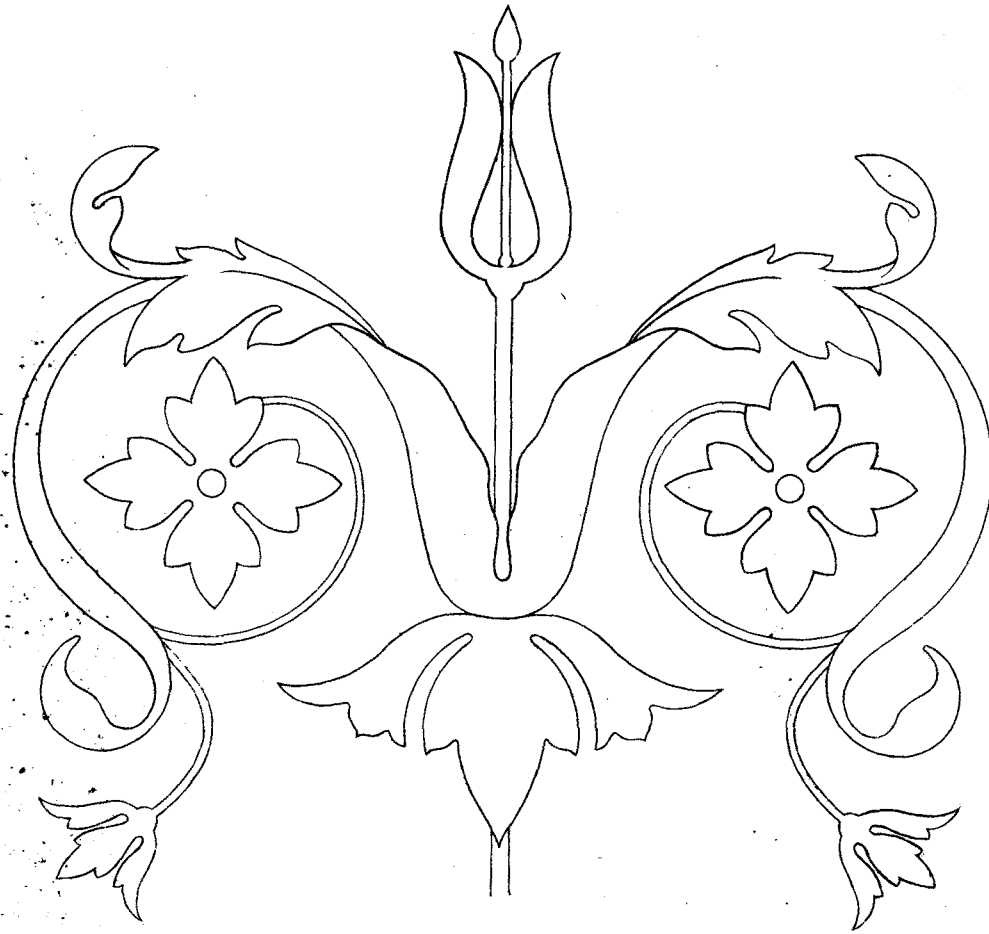
This course must be regarded as the preparatory or grounding course of our system, as it is the first upon which any grant is made for the teaching of artisan students, and it is divided into four subjects of study and examination, viz., freehand drawing from flat copies; model drawing in perspective; and plane with elementary solid geometry.

With regard to freehand from the copy, it will be at once evident, from the sample examination papers I send herewith, that the preparation necessary to enable a student to draw such a piece of foliated or flor ornament in a given time, does not constitute a grounding in the general principles of drawing, even if it were admitted that any course of drawing from drawings could do so. Without entering here upon this question I complain that this examination is at once too high and too narrow to be applied and prepared for by a general body of elementary students. It is too highly specialized to call for a general grounding in the principles of drawing. I should even regard it as being too highly specialized for a mixed class of designers and Art workmen, since, to reach the degree of manual skill it demands, in the working time comprised in the session of an Art class, many matters of more importance may have to be neglected.

It is, then, almost useless as a grounding in the principles and practice of general drawing, and but little less so as a special training for Art workmen; nor can it, I think, be defended as an incubator of correct ideas in good taste, being too narrow in its scope to be of material use in that way. The students receive through their preparation for this examination no grounding in the broad principles which should in all cases be the first care of the system, even for those whose ultimate desire is of a narrow technical nature. I believe that the course is much too abstract in its nature, since all such training as would tend towards enabling students to draw plants, implements, instruments, tools, utensils, arch tecture, the human figure, and objects of general occurrence, finds no place in it, neither, therefore, does it tend to store the memory with any useful or tasteful forms, such as constitute the materials of design and efforts of representation. On the other hand, it certainly does give in its own narrow field, great love for accuracy and refinement, together with manual control of a high order.

SCIENCE AND ART DEPARTMENT OF THE COMMITTEE OF COUNCIL, ON EDUCATION:

SECOND GRADE ART EXAMINATION PAPER.—FREEHAND.—T1.



D

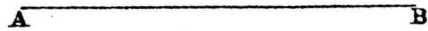
Copy in pencil, with a clear outline, the above figure, increasing the height to CD, opposite, and the width in proportion. No ruling, squaring or measuring of any kind is allowed. The Candidate must not *write* anything on this paper.

One hour and a half allowed for working this Exercise.

Fig. 1.

A
⊙

Fig. 2.



⊙D

Fig. 4.



FIG. 1. Construct at point A a plain scale of 7ft. to 1 inch, showing 30 ft.

FIG. 2. On the line AB as base, construct an irregular five sided polygon. The side BC = $1\frac{1}{4}$ in.; CD = $1\frac{3}{4}$ in.; EA = $1\frac{1}{2}$ in., and is perpendicular to the base. One diagonal AD = 3 in. Another AC makes 30° with AB.

Fig. 3.

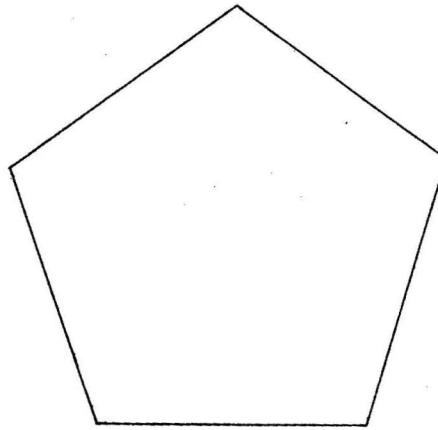


Fig. 5.

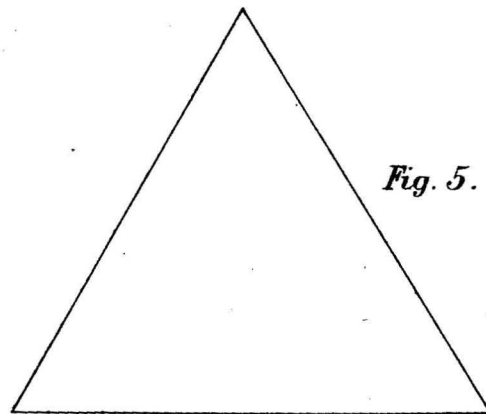


FIG. 3. Place a square in the given pentagon, each angle to touch a side of the pentagon.

FIG. 4. Draw a circle touching AB in point C, and passing through point D.

Fig. 6.

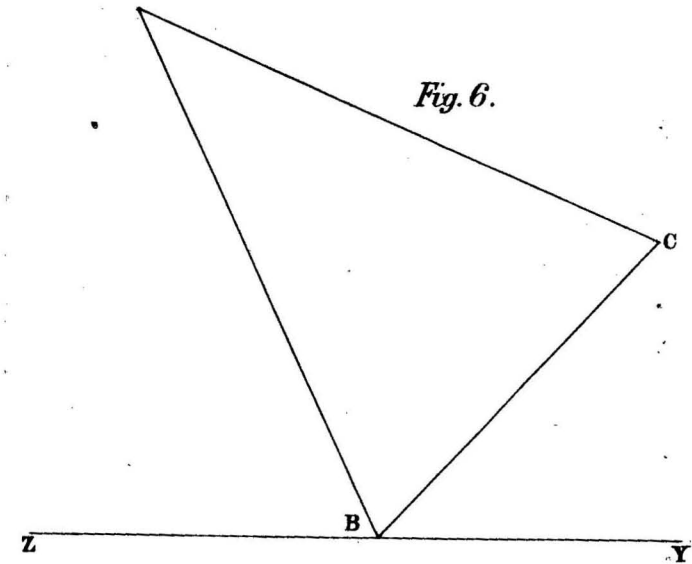


FIG. 5. In the given equilateral triangle place six equal circles, each in contact with two others and one or more sides of the figure.

FIG. 6. ABC is the elevation of a right cone. Give the plan of the solid.

The course in model drawing is of a sounder character, as it gives at least some of the instruction necessary for the drawing of simple objects, singly or in groups, when situated on a plane below the level of the eye. It is to be regretted, however, that the models used for the purposes of examination are very limited in number and abstract in character, so leading to a corresponding narrowness and unreality in the actual instruction. The models prescribed for study by the Department consist of the cube in solid and skeleton forms, the cylinder, cone, hexagonal prism, sphere, together with nine forms of vases. As the teacher has always the option of using a group of three of these objects in the examination, there exists a great temptation to work all the session at these models only, and not to introduce other forms to the notice of his students.

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I think it would be better for the Department to insist that the geometric models should not be used at all in the examination, but to test the power of the students in referring general objects to their geometric bases, and correctly drawing them with reference thereto. In addition to this, the drawing of geometric models alone, gives no power of managing even the simple detail which is found more or less on common objects, such, for instance, as handles, points of attachment, thickness of edges, &c., the proper drawing of which is a most essential part of a good representation. I have repeatedly experienced that students prepared for the geometric model examination of the Department fail in the drawing examinations of the University local examination schemes, because, in them, domestic and other common objects are given, bearing detail which they are totally unaccustomed to. I do not see why, if general drawing power is sought, the objects should always be placed below the level of the eye. As often as not in actual experience, we desire to draw things which are fixed in other positions, nor is there any reason why the models should be at a constant distance, and of a fixed size. Any such fixity of conditions is contrary to the spirit of the subject, and has a strong tendency to produce "cramming" for examination.

I may dismiss the subject of perspective by saying that in the Department system the representations are gained by methods which, though scientific and beautiful in their reasoning, are at once long, tedious, and never used in practical work outside the class-room. As usually happens where rules will supersede reasoning, the rules only are given, and our students of perspective work blindly according to them, so that they are quite unable to prove that their picture is correct when they have made it. Indeed, there must be very few students who even recognise that it is a mathematical operation upon which they are engaged, and that it is consequently capable of proof. The method which the architects employ is not less true, yet it is much easier to understand thoroughly, and much easier to learn practically, whilst being much more rapid and quite sufficient for all useful purposes.

Practically, linear perspective with the aid of mathematical instruments is only required for technical purposes by architects, and perhaps occasionally by engineers. All the practically useful perspective that is necessary for the common problems of representation comes naturally in the course of model drawing, and I think I should not hesitate to exclude linear perspective with instruments from an elementary course of drawing, since whatever slight good effect its study may have, if taken concurrently with model drawing, can be much less laboriously obtained by occasional references to perspective laws. I regard model drawing as including practical perspective, especially if care is taken to use objects of geometric form, so that the perspective effects may be readily discerned.

I send you a copy of the syllabus in geometry, and also a sample examination paper. From the former you will gather that an attempt has been made to give the subject a practical turn, an impression which will not, however, be confirmed by the examination paper. The questions on the construction of polygons, ellipses, scales, irregular figures to given angles and dimensions, are all most useful, as also is the elementary solid geometry. Drawing to a different scale simple geometric patterns is mentioned in the syllabus; but questions of the kind are very rarely given.

Appendix DD. The conditions specify that all lines used in working the problems must be shown, which is, I think, absurdly, held to include the working of right angles and parallel lines by ruler and compasses whenever they are required.

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The time of examination is too short, viz., one hour, as in most drawing, so that students are always nervous about not having time enough to do all they might do.

The paper would be much more interesting, and would encourage a more useful course of preparation, if, wherever possible, a practical word was applied to the questions. As, for instance, instead of "Construct a regular pentagon having an altitude of 3" let it be, "Show how you would cut out of a sheet of metal 12" wide the largest possible regular pentagon, scale $\frac{1}{2}$." Did the examination assume this character nothing would be easier for the teacher than to show his students numerous useful applications of the subject which they would not otherwise learn. It should, I think, be regarded as an axiom as applied to the technical instruction of artisans that, unless the application is pointed out by the teacher, it will not be seen by the students. Every effort should, in my view, be made to encourage the study of solid geometry. Representation in plan and elevation is of pre-eminent value for the purpose of conveying information about the solids and constructions used in the Arts, hence its value to the technical teacher is great. Being, as between him and his students, at once the vehicle of knowledge, the proof of its reception, a powerful auxiliary in its retention, its importance cannot, I think, be easily overestimated, especially as it confers a truly scientific imagination upon its possessor, giving a power over solids in their absence, rendering him able to understand the interactions of yet unmade combinations of solids, and how things may be best arranged to produce a required result with perfect clearness and accuracy. Its most immediate benefit is to enable the workman to understand common working drawings, and to produce, in the solid, things which may be, perhaps, obliquely represented on the paper.

I would take as a test of the soundness of a system of teaching elementary drawing that it should enable the student to draw with clearness anything he may meet with or be able to picture in his imagination, either from memory or invention, in a method suitable to the occasion, the object, and the requirements. This consideration leads to the conviction that our system must be broad enough to include at least types of all such objects as may be required to be represented, both natural and artificial.

I would take as an auxiliary test of the system that it shall tend to store the memory with natural or artificial forms of useful nature, and so produce the full memory necessary to designers and first producers. I should also prefer that the system should negative in every possible way the idea of studying art for its own sake. Pure art, like pure science, is pure nonsense, at all events for the workman. I am afraid that our system has a distinct tendency to annul ideas of the usefulness of drawing and that it takes advantage of the docility and respect of its students to work them a moral injury by leading them through an inexperienced system. Practically, all useful objects are excluded from our Art school. It would not, of course, be possible to introduce all the useful and chaste objects into a drawing school; but surely such a school should possess such useful and chaste objects as have the well-defined form necessary to fit them for use as types of the classes of forms to which they belong, together with good representations of them to serve as exemplars to the students.

Under the system of the Department the student of elementary drawing has no natural forms and the fewest possible artificial forms brought to his notice.

I would also prefer that the system should, as far as possible, arouse and intensify the imaginative powers, the faculty of internal picturing which I have referred to as being up to the present the special province of what is known as solid geometry.

I would reject entirely drawing from drawings, as not being drawing in a true sense, being too dangerously illnsory, and unnecessary for instruction in the drawing of actual things or abstractions thereof, such as the conventionalites of ornamental forms, &c. I would endeavour to inculcate refinement, accuracy, and good qualities in drawing by the near presence and inspection of manually executed exemplars possessing the desired attributes.

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I should desire that our system should be capable of endowing the constructive artizan with such powers as Mr. Naemyth claims from drawing in the following passage: "Sixty years' experience with engineering works, and with the mechanics and other classes of workmen engaged in such occupations, enables me to say that of all the useful acquirements beyond those of 'the three R's' is that of drawing. By the term drawing, I mean the art of representing the forms of natural or artificial objects by lines which, when even rapidly sketched by a practised hand and educated eye, can bring an object before you with a distinctness and rapidity such as no oral or written description could accomplish. During a long and active life, engaged in occupations in which I have daily occasion to communicate definite ideas to others in respect of forms and combinations of forms, the possession, to a certain extent, of the power of rapidly sketching such, in order to convey ideas of what I desired to communicate to others, has done me more real service than any other acquirement or faculty I may be in possession of. If we desire to produce really useful and effective men by means of our schools, let the pupils by every opportunity acquire this valuable art of hand sketching. . . . Nothing but a most earnest feeling of the practical importance of this subject would have caused me to venture to place it before your attention."

So the power of drawing with simplicity and clearness, though it cannot be regarded as technical education in itself, is at least the most important aid in effecting such training.

I would have, however, all artizans employed in the ornamental arts to regard drawing as a most essential portion of their technical training, giving them, in addition to manual skill, a true and accurate knowledge of their working materials. They should regard it as a harvester of the material forms of design, such as plants, animals, the human figure, instruments, implements, either in a natural or conventional dress, and as showing the fundamental principles of their application to the purpose in view, such as geometric distribution, contrast, and balance of tints, &c. To the purely constructive designer it should stand in place of the laborious task of model-making, in addition to teaching him graphically the details and principles of his work.

To the non-artizan student it should give a general power of making and fully understanding representations. It should give him standards of good taste, since he would not be permitted to draw anything in bad taste, or of extravagant and unchaste form.

I now venture to suggest the following course of work as comprising much that is essential:—

First attempts of children and untrained persons to consist of drawing straight-lined and simple common objects in various positions and at various distances. Such things as boxes (square and round), slates, simple bowls and ewers of various sizes, for attempts at perspective representation. For a more diagrammatic treatment, such objects as simple leaves, fans, wheels, scissors, hand mirror, spoons, casts of simple natural forms in low relief, certain musical instruments, &c., &c., might be used. In elementary day schools, at least, the children should draw the printed and written alphabet to a large scale, shading the thick parts by strokes or flat washes of colour. They should also draw maps with more or less generalized outline on prepared diagrams of parallels and meridians, and learn to flat-wash them with colour and print the names with neatness. To arouse emulation, each pupil, if possible, should have beside him a good drawing of a somewhat similar object previously executed by one of his more skillful fellow-students. A student is too certain to think a

Appendix DD. printed example inimitable, and will not try to imitate it, so much as he would try to imitate or improve upon a manually executed work.

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Concurrently with the above should proceed lessons in elementary plane geometrical constructions, and exercises therein; also making with ruler, squares, and compass simple drawings, from measurement, of simple tools, &c.; simple pattern drawing. Geometry usually arouses a more intelligent interest than arithmetic amongst young boys, because it is a handicraft, and because the reasoning is seen, being graphic, whereas in arithmetic it is hidden greatly by rules. I consider that geometry might most advantageously take the place of arithmetic to some extent in schools. Elder pupils should learn modelling in clay and papier-maché. Such work as making relievé-maps might usefully be done in the latter material. All work to be done in the presence of exemplars, such as the pupils might reasonably hope to equal or excel if they tried. Whenever a pupil equals or excels his exemplar his work should be purchased by money or a prize, and added to the school collection, a certificate stating the purchase, and the reason thereof being also given.

As a more advanced course, say in night classes, the student might learn to draw more difficult objects of all kinds and sizes in any position, at various distances and directions of view, for general perspective work. For refined drawing, the detail on such things, and the drawing of plants, leaves, natural products, tools, implements, instruments, ornamented vases, and objects of refined form. Drawing from bas-reliefs and round casts of animals, ornament, the human figure. Studying the essential forms of plants and flower petals, seeds, buds, leaves, details of branching, &c. Drawing from memory or imagination any common or well-known thing in any required position. The ability to add such slight, but well-managed, shading as will enhance the clearness of the representation of form or suggest the texture whilst not demanding too much time for its accomplishment. Pen and ink work, such as printing, and more especially lining-in drawings, would be advisable. Elementary modelling from natural forms, casts, and shaded drawings. Matching and laying tints in tempera and water-colour, forming diagrams of colour rules, contrast, and balance. Plane geometry. Space covering combinations of geometrical figures. Filling the same with tints of colour. Practical problems in geometrical constructions. (The wording of every problem or exercise to refer to some actual thing or things.) Scales, their use and construction. Practical solid geometry. Making different views of simple solids and constructive details, drawings and sections of tools and appliances, developments of surfaces, true forms, cuts and bevells. Isometric drawings and sketches of similar forms. Inserting dimensions neatly, drawing to one scale and setting off dimensions from another. Making freehand dimensioned sketches of constructions and finished drawings therefrom to scale.

Perspective by architects' method. All work to be done in the presence of exemplars of similar subjects previously executed by the more skilful students, so that each student may see what can be done, and thus, by having evidence of another's thought and care placed before him, be induced to think himself about the treatment of his own subject with reference to such matters as the qualities of the line, selecting point of view, introduction and management of shading, position on paper, suggesting perspective, suggesting texture, &c. &c. All sufficiently good work to be purchased for use as exemplars, such drawings being either framed and glazed, varnished, or gelatinized, to protect them from injury. Such a system would, I think, be worked with a minimum of labour, when once the collection of exemplars was completed. At the same time it would be progressive, since the best exemplars would sooner or later be excelled.

The students should be encouraged by prizes to draw, away from the class, tools, instruments, utensils, ornaments, natural forms, new constructive arrangements, or anything which may interest them in their workshops or homes, either by the freehand or geometric method, with the object of giving them an aptitude of application in actual life, of the class-room training.

It would be unadvisable to make all the subjects I have mentioned compulsory to all students. Whenever the work of a student's life is decided upon he should be allowed to spend by far the greatest portion of his time in studying subjects which have bearing upon it. Thus art-workmen and designers would spend much time in drawing and learning from nature the material forms suited to their work; reading the principles of their work, their progress being tested by sufficiently frequent examinations requiring written and graphic answers. Lithographers would practice stippling, &c. &c. All artizans engaged in the art trades would be encouraged to undertake the preparation of sheets of specimens of work bearing upon their respective trades, such sheets having a high commercial value when applications are made for situations. In fact, some employers decline to employ persons who have no specimens of work to show.

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The 23 stages of instruction defined in the Art Directory of the Science and Art Department specify many of the subjects I have mentioned above, and the perusal of them would lead to the impression that we have already a fairly practical system in operation.

It is, however, the incidence given to the grants in aid of instruction which entirely determines the kind of work done in the classes. The Department has a most complete command over the work done in its classes, inasmuch as *all drawings* done in them are annually gathered to South Kensington, and are there submitted to an examination which fixes, in large proportion, the grants due to the classes and schools, and the amount allowed upon the instruction of each individual student.

Having such a system as this, it should be easy to effect a change, for let an alteration be made, after due notice, in the incidence of the grants upon different kinds of work, and an immediate change will follow in the character of the work done.

There is, perhaps, one obstacle in the way. The number of works sent up is now so large, being last April 300,000, that an efficient examination of them cannot be made because of the large amount of labour involved in it, together with the virtually duplicate examination of the same students by means of the papers locally worked in May. I see no reason for this double testing; and, as the shortest way of commencing reform, I would sweep away the local examinations. What more can be required, in order to estimate the degree of merit, than that the whole session's work of the student be submitted for inspection? The sum of the internal evidence as to industry, progress, and attainments contained in such a set of drawings is infinitely greater than can possibly be gleaned by the examination of a single hour's work.

I regret that I have not been able to include even within the compass of this long letter all the information I had desired to convey with reference both to the matters discussed within it and to others upon which I have not touched, such, for instance, as the technical value of the more advanced work of our schools, and the changes I would propose in it with the object of increasing its value to persons engaged in specified artistic handicrafts, the possibilities and means of forming connections between the schools and the art workshops, and several other matters of like importance.

I am,
 Faithfully yours,
 (Signed) W. E. CROWTHER.

To Professor Henry Roscoe, F.R.S.,
 The Owens College,
 Manchester.

P.S.—Certain objections have been raised to the system of art teaching advocated in my letter. It is urged, for instance, that, if the Department awarded grants entirely by examination of drawings, there would be great danger of an unfair quantity of the master's skill being spent upon some at least of the drawings sent up for inspection. If the Department, under the present system, can make sound awards in respect of all the most

Appendix DD. important prizes and medals, and also distribute the greater portion of the total grant upon inspection of the works sent up, this mode of judging should be sufficiently sound to be extended. It is undeniable, however, that abuses in the way of unfair helping do exist in certain schools, and if a still greater proportion or the whole of the grant depended upon the work sent up, such abuses would probably become increased, unless the Department definitely interdicted any work being done by the master upon the drawings sent to the examiners. Whatever system of teaching a master adopts, it is distinctly unfair that his work should in any degree be made the subject of an award. It is not necessary that there should be any danger of this, as a master's manual illustrations can be as well done marginally as on the actual drawing. I think the Department would be justified in issuing a well-considered set of rules to the Art Schools, and this interdiction might form one of them. (Such rules to be sent out ready mounted for hanging permanently in the school.)

The preparation of such exemplars as I recommend would probably in the beginning fall to a considerable extent upon the masters, and, I think, properly so. The graphic reproductive processes are, however, available for the multiplication of the drawings so prepared. Such reproductions to be used *pro tem.*, that is to say, until a collection of manually executed exemplars had accumulated through some such process as the following. When the works are sent up in April, let those drawings which the master would desire to have as exemplars be marked by him. These, if approved of by the examiners, would carry a sufficient grant to effect fairly their purchase from the student, together with a certificate of purchase and a prize. Such drawings should then be fixed, varnished, or otherwise suitably treated, and sent back to the school in a permanent form. To such drawings might be affixed any desirable examiners' notes. The master would thus be at liberty to form such a collection of exemplars as would best suit the needs of his school and benefit its locality, and it would become the object of his ambition to possess an imposing collection, such as would be a clear expositor to strangers of the work done in the school, a valuable guide and incentive to students, and a strong element in the prestige of the school. (The power of compulsory purchase might be another of the proposed set of rules.) The system of instruction would consist, from beginning to end, in the drawing of actual objects, with the guidance of oral instruction from the teacher, and an actual piece of similar work approved by a South Kensington examiner and possibly annotated by him. The incentives would be the hopes of purchase, certificate, and prize, together with the pleasure and interest which comes from doing actual work. Further, in the case of artisans, there would exist the feeling of improving in their art or industry.

Middle class students might not, in some cases, like to have their drawings compulsorily purchased from them, but artisans, as a rule, would be glad of it.

Permit me to recommend to your notice a pamphlet issued by Messrs. Rand, Avery, & Co., 117, Franklin St., Boston, entitled "Lectures upon Drawing," by Walter Smith.

I am,
Faithfully yours,
(Signed) W. E. CROWTHER.

P.P.S.—With the object of encouraging the study of modelling, might not the Department accept photographs as evidence of the class-work in this subject, and award its grant upon an inspection of them? It is difficult otherwise to make evident at South Kensington the progress of a provincial class in modelling, and, as a consequence, this study has been greatly neglected. Wet models in clay photograph extremely well. No casting in plaster would be required. Photography would be introduced into art schools. Students would get a record of their work. If necessary or advisable, glass positives could be sent to be examined with the aid of a lantern and screen at South Kensington, so that no printing would have

to be done. If you consider the suggestion of value, I will send some prints and glass positives of specimens of elementary modelling, in order that you may judge whether they could be made the means of estimating a student's progress. After mature consideration, I am able to say that I feel sure such a scheme would greatly encourage the direct study of form.

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The want of contact between the Art schools and the industries for whose benefit they exist is, in my opinion, the cardinal defect of our present system. If such contact could be brought about, the necessary utilitarian reactions would at once follow. Some points of contact might be easily established, such as the institution of a custom amongst employers of applying to Art schools for their apprentices and young workmen in those cases where artistic skill is essential. Nor would it be difficult to make the Art school of a town the recognised centre for such odd jobs of designing and drawing as may be required by the manufacturers in the neighbourhood who do not keep designers or draughtsmen upon their own premises. The introduction of practical workshop art into the schools so far as it is practicable, as, for instance, drawing on the lithographic stone or grained paper in litho ink or crayon, drawing on the wood block for wood engraving, line and scroll exercises on the copper plate for young engravers, wood-carving, modelling in clay, modelling in wax as employed by jewellers and fine metal workers, ornamental lettering, the drawing of plants and other things in a style suitable for designing. The preparation of specimen sheets of drawings bearing upon particular trades I have already referred to. Endeavours should be made to give the Art school, or at least the technical portion of it, something of the character of an art workshop and emporium for the district.

If Art study is to become practical and useful in its bearings, the time spent upon each piece of work should be noted upon it and taken into account in estimating the value and success of the student. Our English art student takes no note of time. This surely is a very unpractical trait. With a view to the correct appreciation by the examiners of the progress made by the students, the Department should at least require that the sheets be fastened together in the order of their execution. The system of sending up drawings to South Kensington has gradually developed to comparatively overwhelming importance compared to the local examinations, yet the rules for sending up the drawings are the same now as when only advanced works were sent.

In my opinion there is great need of systematization in this, the most important, function of the Department.

Grants upon a higher scale should be made upon the works of bonâ fide art workmen than those of amateurs. This could be managed by taking an employer's certificate when such grants are claimed.

Note on teaching the values of lines.—A student, it is true, imitates these values when working from a flat outline copy, but without understanding them. And, though imitating, he is not applying these values to the solution of any real problem in representation, and cannot therefore learn that which he is not trying to learn, viz., the means taken to ensure correspondence of impression between the drawing and the object.

It is erroneous to suppose that, when working from the flat, he will store his mind with values which he will apply on being set to draw the real object, for even if his teacher explains these values to him (a proceeding not necessary to the immediate object in view) his remarks will fall unheeded or partially so, since they do not apply to the problem or work in hand, and so will not be appreciated and remembered. Theoretical art instruction is not assimilated by artisan students unless it has an immediate practical application of some kind.

To allow the student to fall into a difficulty, only in order that he may be rescued from it by theory, is often the only means of impressing the value of theoretical instruction upon him.

In teaching the art of drawing, I believe that the right way is to use flat examples, to show what is required, and to illustrate some of the necessary explanations, but to require the drawing to be made from reality. A flat copy represents a solved problem. Will the copying of such a solution confer the power of solving a similar problem?

Appendix DD. Is there any reason why the annual summer courses of teachers' training lectures at South Kensington should be confined to scientific subjects and science teachers? These courses were first suggested by Professor Huxley, and have resulted in much benefit to science teachers. I think the principle of the suggestion applies with equal force to art, and that its application would do something to remedy the present lack of theoretical teaching.

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I would strongly urge upon the Department the advisability of in some way recognising the home work of students, as by (1) allowing such work to be included in the sets of drawings sent up for inspection, (2) by the provision of separate grants and prizes for such work.

The educational influence of voluntary home work or private study is of a thoroughly healthy nature, and should be encouraged.

I think that a special grant might be made to any school which forms and maintains a museum or collection of examples illustrating the contemporaneous state of such art industries as may be carried on in its neighbourhood, with special reference to the processes employed.

A school should endeavour to arrange for the occasional visits of such managers or foremen of art workshops as can be induced to interest themselves in the teaching. From such persons the master would learn with accuracy the precise wants of the locality. Indeed, only from such persons can they be learnt.

FIRST AND SECOND GRADE ART.

SYLLABUS OF SUBJECTS OF EXAMINATION.

I. FIRST GRADE ART.

The subjects of examination in elementary drawing of the first grade are—

1. Freehand drawing from flat examples.
2. Freehand drawing from models.
3. Practical geometry.

These examinations are of a very elementary character, being intended for the children of elementary day schools only.

(1.) *First Grade Freehand Drawing.*

By freehand drawing is meant drawing without the aid of any kind of mechanical means of execution, such as ruling, measuring, or tracing, or the use of anything but pencil, paper (or slates), and india-rubber.

The very simple character of the first grade examination in this subject will be understood from the following specimens, which are reduced to about two-thirds of the size of the examples actually set in the Department's examinations (see p. 44). The children are required to draw their copies on the papers on which the examples are printed, one half of the same side of each paper being left blank for the purpose. An F or HB pencil is the best for outline work. Care should be taken not to press so heavily with the pencil as to indent the paper, as the lines which may have to be corrected cannot then be so easily rubbed out; and by drawing too heavily the hand is cramped, and freedom is lost.

(2.) *First Grade Model Drawing.*

In the examination in first grade model drawing, candidates are required to draw the outlines only of two simple solids, or other objects, of different form, arranged so that the candidates may have to draw both curved and straight lines. The candidates must be so seated as to be able to see more than one side or end of at least one of the models, and they are expected to be able to make a freehand copy of the models as they appear from the position in which each candidate happens to be placed.

No ruling, measuring, or use of instruments is allowed in working this exercise.

(3.) *First Grade Art Geometry.**

Appendix DDA

FOR CHILDREN IN ELEMENTARY SCHOOLS ONLY.

Manchester
Mechanics'
Institution.

The instruments required are a plain scale of inches divided into eighths, a pair of dividers, a pair of pencil compasses, two set squares, an H. pencil, and a piece of india-rubber; a drawing board and T square, although not indispensable, are very desirable.

This stage is intended to teach elementary notions of practical geometry, and the use of simple drawing instruments.

The pupil should be taught to draw clean, join lines passing fairly through indicated points, and the greatest care should be exercised to prevent the formation of slovenly habits, such as using both hands to the dividers, or forcing their points into the paper. He should then be shown how to take given distances from the scale, and step them along a given line, and he should be practised in the use of set squares for drawing lines parallel and perpendicular to each other.

By the help of the blackboard the teacher should explain and define an angle, a triangle, a square, a rectangle, a circle, &c. The pupil may then be practised in such simple exercises as the following:—Construct a square or rectangle, the lengths of the sides being given in inches and eighths. Divide them when drawn into a given number of equal parts. An irregular four-sided figure is roughly sketched on the blackboard; the dimensions of its sides and diagonals are given. Draw the figure its proper size. Neatness and accuracy should be insisted upon, and, if unsatisfactory in these respects, the figures should be withdrawn. It is desirable to accustom the pupil to the erasure of superfluous lines or portions of lines, and to the employment of "dotted" or "chain-dotted" lines and arcs to distinguish lines drawn for constructional purposes.

The examination will be confined to examples in the following constructions, and equal value will be attached to neat drawing and to geometrical accuracy.

1. The division of a given line into a given number of equal parts by trial with the dividers, and also by construction.
2. To draw lines parallel and perpendicular to given lines by means of the set squares, and also by construction.
3. To construct an equilateral triangle and a square of given sides.
4. To construct an angle equal to a given angle.
5. To bisect a given angle.
6. To construct a triangle, given the sides, or sides and angles.
7. To construct a triangle similar to a given triangle and standing on a given base.
8. To describe two circles of given radii touching each other.

II. SECOND GRADE ART.

The subjects of examination comprised in the second grade course are these four:—

1. Freehand drawing from flat examples.
2. Freehand drawing from models.
3. Practical geometry.
4. Perspective.

The second grade examinations are of a considerably higher standard than those of the first grade, though still elementary. One hour and a half is allowed for working the exercises in freehand drawing and perspective, and one hour for model drawing and geometry.

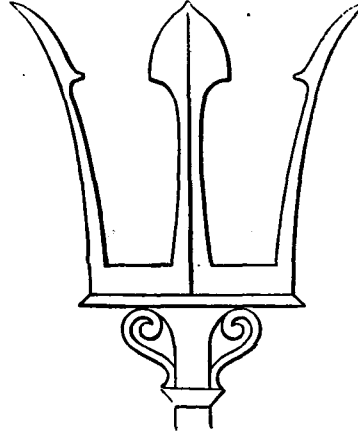
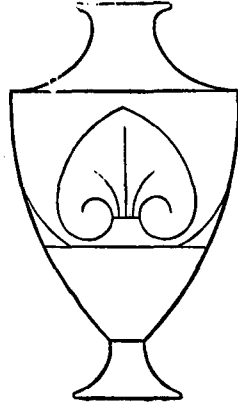
- Teachers of Public Elementary Schools are also required to pass in—
5. Drawing on the blackboard.

(1.) *Second Grade Freehand Drawing.*

See the specimens of Second Grade Freehand examples given on the following page. An F. or HB. pencil is the best for outline work. Care

* The course of practical geometry prescribed for the Art examinations of the 1st and 2nd Grades may be considered as preliminary to the study of Science Subject I, as well as to the Art examinations of the 3rd Grade.

Specimens, in a reduced size, of First Grade Freehand Drawing Exercises.

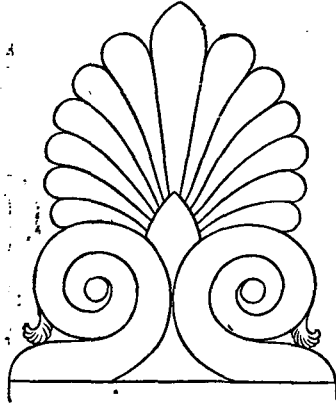


Write here—

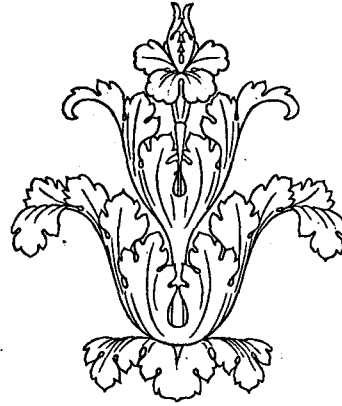
1. Your Name at full length _____
2. Your age _____
3. The Name of your School _____

The copy may be required to be drawn a little larger or smaller than the example.
An HB or F Pencil should be used.
No ruling, measuring, or tracing of any kind is allowed.
Forty minutes are allowed for this exercise.

Specimens, in a reduced size, of Second Grade Freehand Drawing Exercises.



A.



B.

Candidates for Examination in Freehand Drawing of the Second Grade are required to draw, from a copy, outlines like the above, either enlarged or reduced in size. No ruling, measuring, tracing, or use of instruments is allowed.
One hour and a half allowed for working this exercise.

Appendix DD.
 Manchester
 Mechanics'
 Institution.

should be taken not to press so heavily with the pencil as to indent the paper, as the lines which may have to be corrected cannot then be so easily rubbed out; and by drawing too heavily the hand is cramped, and freedom is lost.

(2.) *Second Grade Model Drawing.*

The exercise in this subject consists in drawing from a group of three or more objects of well-defined form, such as geometrical models, simple vases, or objects of plain construction. The Candidate is required to draw the objects placed before him as they appear from the point of view in which he may be seated, and Candidates are expected to show a knowledge of the effect of perspective in modifying the appearance of the models.

No ruling, measuring, or use of instruments is allowed in working this exercise; but the pencil may be held between the eye and the objects for the purpose of estimating their apparent relative size.

(3.) *Second Grade Art Geometry.*

The instruments required in this stage are the same as before (*see p. 41*), with the addition of an inking pen to the compasses, a drawing pen for lines, a protractor, and a set of scales on a six-inch rule.

This stage is intended to embrace simple plane geometrical constructions relating to lines, circles, and tangents to circles. The pupil should be shown how to hold a drawing pen, and practised in ruling ink lines and describing ink circles of different strengths. Indian ink should be used, as ordinary inks corrode and destroy the nibs of the pen.

A general idea of the form of such simple solids as the cube, pyramid, prism, cylinder, cone, and sphere, is to be imparted at this stage. For this purpose models should be employed. By means of sketches on the blackboard the elementary notions of orthographic projection and of section should be explained.

The examination paper will embrace the following:—

Plane Geometry.—Elementary constructions required in geometrical pattern drawing and simple tracery. Construction for circles passing through three given points, or touching three given lines. Tangents to two circles. Construction of regular polygons by any general method, together with their inscribed and circumscribed circle. Construction of irregular polygons from given sides, diagonals, and angles. Proportional division of lines. Reduction and enlargement of plane figures. The use of plane scales and scales of chords. Elementary construction of the ellipse. *Solid Geometry.*—Plan, elevation, and section of the solids above named, in simple positions. Projection of plane figures.

(4.) *Perspective.*

In this exercise candidates will be required to show a knowledge of the use of vanishing and measuring points used in horizontal planes; and to represent simple solids, or objects on the ground plane in any position.

(5.) *Drawing from Memory on the Blackboard.*

This exercise is intended to test the candidates' power to use, in aid of their general teaching, the skill which they may have obtained in drawing. In addition to facility in the use of chalk and the black-board, it is required that they should be able to give a fair representation of the form of any familiar object. To do this from memory should be the result of sound instruction in model drawing, in the course of which teachers of drawing should form in their pupils habits of observation enabling them to represent familiar objects in any point of view. Candidates will therefore be required to draw from memory one of three or four objects of ordinary household furniture or domestic utensils of well-defined form, to be named by the examiner.

Candidates will also be required to draw Roman or Italic letters about nine inches high.

Ten or fifteen minutes are allowed for working this exercise.

APPENDIX EE.

Appendix EE.

TECHNICAL EDUCATION IN WURTEMBERG.

Technical
Education in
Wurtemberg.

TO THE ROYAL COMMISSION ON TECHNICAL INSTRUCTION.

GENTLEMEN,

I HAVE during the past 30 years been in correspondence with Doctor von Steinbeis of Stuttgart, who presided over the creation and development of the Wurtemberg system for the advancement of agriculture, industrial pursuits, and technical knowledge. I have much pleasure in testifying to the efficiency of the system. After the war, Wurtemberg was left in a state of great prostration, improved machinery was unknown, and trades were carried on upon the old Bethnal Green system. By means of instituting local and central exhibitions, by training industrial teachers, by transplanting trades from other countries, and watching over them until they rooted, Doctor von Steinbeis converted a population without mechanical knowledge into one carrying on most of the small trades practised in Europe. This has helped the agricultural interest very much, as it has provided a manufacturing population close to the farmer. The expenses have not been excessive, about 150,000*l.*, a year. Mr. Julius von Diefenbach has succeeded Dr. von Steinbeis as President; he formerly resided many years in England. I strongly recommend the Commissioners, or whoever introduces the Wurtemberg system into Ireland, to ask the Wurtemberg Government to allow Mr. Julius von Diefenbach to spend a year in Ireland, so as to implant the system throughout the whole of that country at one time. This system would bring the local people together, and would also bring consumers to the immediate neighbourhood of the farmers. I strongly approve of Mr. Harris's report. I may add that 30 years ago I never thought that Dr. von Steinbeis would succeed, but that year by year I have seen the wisdom of his plans, which I feel sure, if carried out in Ireland, would be of the greatest service to the people.

Yours truly,
(Signed) ALFRED TYLOR.

APPENDIX FF.

Appendix FF.

MEMORANDUM BY MR. T. R. ABLETT on the TEACHING OF DRAWING.

System of teaching
drawing under the
London School
Board.

The Offices of the School Board for London,
Victoria Embankment, London,

February 5th, 1884.

SIR,

IN response to your letter stating that you were directed to ask me to be good enough to furnish a brief statement with respect to the teaching of drawing under the London School Board, and the system I advocate, I am happy to forward the following account:—

Section A. is a statement of facts as to the instruction actually given in the schools of the Board.

Section B. is a statement of the system I advocate.

Appendix FF.

System of teaching drawing under the London School Board.

SECTION A.

Statement as to the teaching of Drawing under the London School Board.

The School Board for London has passed these, among other regulations:—

- “1. In every department of a school there must be at least one teacher with a full drawing certificate (D).
2. Two hours a week in all boys' schools, and one and a half hours a week in all girls' schools must be devoted to drawing. (The hours of attendance per week are 27½.)
3. Every school must submit its pupils to the examination by the Science and Art examiners.”

There is an annual exhibition of the best drawings made in the schools. The pupil-teachers are taught drawing at the central classes formed for their general education, at each of which an art class has been recently established under the Science and Art Department.

A grant for instruction in drawing is allowed by the Science and Art Department, but the subject is not included in the New Code of the Education Department, Whitehall, except as part of the instruction for pupil-teachers.

The success of the teaching of drawing in the schools, as shown by the Science and Art Department's examinations, is of the most varied description. For the information of the Board and for purposes of comparison between school and school, the results of these examinations are represented each by a numerical value. During the year ending September 30th, 1883, the highest number gained, in this comparison was 302·3 as showing the most successful of the boys', and 5·6 as showing the least successful of the girls' schools. The average numbers gained in the schools has risen from—

	Boys' Departments.	Girls' Departments.	Mixed Departments.
Half-year ending:			
March 1883	101·5	49·8	55·4
March 1884	135·5	71·9	119·1

Some years ago, owing to the lack of teachers holding the full drawing certificate (D.), the Board gave a sum of 5*l.* annually to each teacher possessing this qualification. The sum paid on this account for the year ending September 30th, 1883, was 8,860*l.* Under the recently adopted scheme of giving an inclusive salary, this payment will not be made. The teachers received, for the like period, about 5,000*l.* as grant from the Science and Art Department for success in drawing, that is, on the average, a payment of 25*s.* to each of the 4,000 teachers.

Many head teachers, on my earlier visits to the schools, told me that drawing was not taught with the same vigour as the other subjects, because success in it was not essential to their reputation, and because the grant from the Science and Art Department had diminished. In one of the schools, still amongst the most successful, the grant was (1880) 16*l.* 12*s.* 3*d.*, (1881) 12*l.* 17*s.* 2*d.*, (1882) 9*l.* 4*s.* 4*d.* I found on my unannounced visits, many schools not teaching drawing during the time set down for it on the time-table.

The teaching of drawing is much more vigorous in the boys' schools than in those of the girls. A greater proportion of the teachers of the former hold the drawing certificate (D).

Since my appointment, I have been occupied in visiting the schools, superintending the teaching of the pupil-teachers, lecturing on methods of teaching, and in assisting a body of head and assistant teachers to work for the Art Class Teacher's certificate.

One or more of the following subjects are taught:—

First Grade.—Freehand, geometry, model, drawing to scale.

Second Grade.—Freehand, geometry, perspective, model, and drawing on the black-board.

Third Grade.—Freehand, geometry, model, and shading.

The work of the children is chiefly of the first grade, and the work of the pupil-teachers is entirely of the second grade. At the Saffron Hill School of Art the head and assistant teachers are working at the third grade.

Appendix FF.
System of teaching drawing under the London School Board.

The qualifications of those who teach the pupil-teachers are not, as a rule, sufficiently high.

Of the subjects of instruction, the freehand drawing, which is practised almost entirely from outlines of conventional forms of a decorative character, unintelligible to the vast majority of the pupils, is uninteresting. The hard lining in, also, which is insisted on and can never be skillfully performed by young students, encourages an unfeeling habit of making lines directly opposed to artistic drawing. No practical application is evolved from the geometry, and the model drawing is little less than a failure. In the few schools in which the last subject is taught, the great majority of the children, who are carefully trained in drawing the models given in the examination, do not really grasp the idea that the appearance of an object differs from its real form, and if required to represent a simple object, such as the glazed panel of a door opened towards them, in the delineation of which they have not been coached, do so as though entirely ignorant of the first principles of drawing from objects. Drawing to scale, recently introduced, may, it is thought, prove useful if made more practical and not too difficult.

The fluctuating standard of the examination, held by the Science and Art Department, is said to be very prejudicial to the best interests of the drawing by seriously discouraging the teachers.

SECTION B.

Statement of System advocated.

The teaching of drawing in elementary schools should have first an educational and then a technical character. Respecting the *educational benefits* to be derived from it, which are not yet generally acknowledged, I need not quote the words of Professor Huxley, Mons. Guillaume, Mr. Herbert Spencer, and others. They may be summarized as being,—

System advocated.

1. The development of habits of,—
 - a. Precision.
 - b. Accurate observation.
 - c. Delicate manipulation.
2. An increase in,—
 - a. The powers of description (a sketch is often the shortest and best description).
 - b. The capacity for enjoyment and culture in the realms of natural beauty and of art.

What sort of drawing is likely to secure these gains to the children of the poor who come chiefly from pictureless homes, having had little or none of the unconscious training of the eye and mind which the children of the well-to-do receive from pictures and picture books? A plentiful supply of pictures on the school walls will supply the information illustrations give, and which other children get at home as a matter of course. These should be of high excellence, and, above all things, deal with subjects attractive to children. The illustrations usually contained in the picture books of the nursery will naturally take a prominent place. Reproductions from the old masters, however valuable or attractive to adults, are generally beyond the comprehension of ordinary children. The drawing lessons should excite the interest to the greatest possible extent, and be adapted with great nicety to the powers of the intelligence. Good drawing can only come from intelligent and zealous effort on the part of the pupil. Instead of a dreary discipline of copying the lines of decorative forms, meaningless to the young, it would be much better to give practice in outlining from common flat objects (placed so as to present no difficulties of foreshortening), such as slates, books, kites,

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 System of teaching drawing under the London School Board.

shovels, dishes, &c., which are familiar and real. If outline copies are used, let them be made attractive by the addition of colour. Children delight much more in colour than in form, and need to be tempted to draw outline well. Learning the curves of written letters may be made to train the powers of observation and the graphic memory, if writing and drawing are taught by the one kind of stroke natural to children, and which is acquired by finished artists. It is an open question whether the plain line of the drawing teacher might not be entirely laid aside. The judgment at sight of the length, proportion, and inclination of lines may be taught with or without any drawing by the employment of apparatus made for the purpose. Young pupils should be provided with a ruler marked with inches and the simple divisions of an inch, and use it constantly until the judgment of length at sight is somewhat developed. Coloured written drawing, combined with the drawing in outline of common objects, furnishes a means, I believe, of developing good writing and drawing at an early age. Geometrical and model drawing should be made a part of the first course, and be at first entirely practical. After representing a rule and measuring the real dimensions of an object, geometrically, a glass plate should be used on which to trace experimentally its apparent shape. The differences in the result having been pointed out, a drawing should be made by each pupil of the appearance of the object in application of the knowledge gained. Model drawing should be a real power gained by delineating the objects of everyday experience. The present system of teaching this subject from cubes, cylinders, prisms, and the like, calculated to lead to the belief that it is a mysterious process only to be employed in representing odd-shaped figures made especially for the purpose. When a student is so far advanced and interested as to be able and willing to work alone, the solution of knotty little problems of model drawing will be pleasing. Put at the beginning of a course, they produce listlessness. The drawing of objects bounded by straight lines or simple curves may be speedily acquired if practice is given from those which have a size so large that the effects of foreshortening and perspective can be readily seen by the pupil when holding the pencil between the eye and them.

The first principles of solid geometry can be experimentally shown, as well as simple methods of drawing plan and elevation, without the aid of much practical plane geometry. The processes of the latter, however, may be made interesting if employed in working figures combined and coloured so as to form pleasing patterns.

Dictated drawing necessitates the employment of a precise language between teacher and pupil.

Memory drawing makes it necessary to look well and intelligently in order to retain that which is seen as so much preserved observation.

Much finish ought not to be required in early efforts, as the intelligent must not be held in abeyance for the sake of developing a mechanical precision, which would come of itself, in course of time, without causing the disgust it now so often does. Any system that leaves the children without less delight in, or enthusiasm for, drawing at the end of the course than they had at the beginning is a failure. Industrious, clever children, with only average ability for drawing, will, by steady perseverance, gain skill in any kind of work given them. Those who have the special aptitudes of ingenuity, and imagination of the artist are precisely those who lose interest and become listless in plodding through a course of work which they find distasteful. At present, so far as I can see in the London Board schools, in the middle class schools with which I am acquainted, and from the experience which I gained as an examiner for the Science and Art Department, we bring to the fore those who have no particular talent, and "snuff out" the really gifted scholars.

Some there are with quick intelligence, but little manual dexterity, who can benefit by a training in drawing without ever being able to produce good drawing.

The drawing that all can learn should be taught to all, and form a definite part of elementary education as does writing. If it were included in the code and examined by Her Majesty's Inspectors, which

could be economically done, it would, I believe, soon be as well taught as that subject. Appendix FF.

That art may reach its full development in England, drawing must be an essential subject in all schools. The producer has but a poor field open if the consumer is uncultivated. As bearing on this, I may say, that after seeing the elaborate system of teaching drawing and modelling at the Ecole Turgot, Paris, I learned from the annual publication of the "Association Amicale" of the school that, out of some 1,500 old pupils, about 150 by the widest estimate had betaken themselves to art work, two of these only being picture painters, and three sculptors. The Lycées have much the same course of work, and the elementary schools have a syllabus much beyond that provided for our young people.

System of teaching drawing under the London School Board.

Respecting the *technical character* of drawing, it may be said that the drawing, which is of value to the art workman, and that which is the written language of the workshop, can be properly taught only by specially qualified teachers, and inspected and examined only by experts.

Lectures on methods of teaching drawing are not of the benefit one could wish, to teachers in elementary schools, because they have so little skill in artistic drawing. Such drawing as freehand, geometry, and perspective of a mechanical kind, forms the chief part of their training. Pupil-teachers and students at training colleges appear to require instruction from more highly qualified teachers.

Those children who have obtained some skill, and who show special aptitude, should be drawn together at a convenient centre and receive their lesson from a person accustomed to deal with such pupils and specially qualified in drawing. Good artistic drawing is the root of all art work. This appears to be felt and acted upon more strongly in France than in England.

The work at such centres should be, at first, advanced model drawing, special stress being given to the effect of foreshortening on curves, and drawing from objects with rounded surfaces, such as casts large enough to enable the teacher to illustrate with unmistakable distinctness each principle of good outline drawing. The use of the brush should be encouraged as much as possible in the representation of form and in direct design. As knowledge and power is gained, the casts used should gradually exchange their roughness and boldness for the refinement of the antique figure. For first practice, a thick rope, pumpkin, large shell, group of vegetable marrows, &c., are very suitable. Concurrently with these the typical boughs of trees and the foliage of the largest growing plants may be represented.

Time and energy are wasted in drawing from very refined forms before some delicacy of appreciation is developed.

Modelling in clay should be begun as soon as some fair notions of drawing have been gained.

In order to economise the brief time the working class can give to the study of art the most productive methods of teaching should be employed. All the work mentioned above lends itself to collective or class methods of teaching. A body of 20 or 30 pupils should work from the same large object, placed so as to give to all, approximately, the same view, and be constantly attended by a teacher who would explain principles and demonstrate processes on a large scale in front of the pupils and beside the object. Very little individual assistance will be required if the demonstration is good.

Eighty head and assistant teachers of the London Board schools began, last September under my direction, to work for the Art Class Teacher's certificate. It was desirable to enable these students to work up to the required standard in the least possible time, as attendance at the class necessitated considerable sacrifices on their part. For six weeks the teaching was entirely by class methods. The progress was rapid and the average attendance very good. When the actual work for the certificate was begun, the regulations of the Science and Art Department necessitated the abandonment of almost all the class teaching. With individual teaching from small casts the attendance fell off and the progress of the

Appendix FF.
 System of teaching drawing under the London School Board.

students became painfully slow. Our teaching power, amply sufficient for class methods, was altogether inadequate for individual methods.

The Science and Art Department has encouraged the use of casts and examples, and arranged the examinations in a way which countenances individual teaching and precludes, in the majority of the work, the employment of class methods. Possibly the explanation may be that the lines of the Science and Art Department were laid down 20 or 30 years ago, before the great development in the science and practice of teaching of the past 10 years had begun.

Something of the organisation and methods of a well-conducted high school, board school, or grammar school, might with advantage be copied in art teaching.

The French are quite alive to the advantages of class teaching, and the newest drawing class-rooms, built in Paris, in connection with the elementary schools, are fitted up and furnished with the view of giving every help to its extension and development. Even there M. Jules Pillet (Inspecteur de l'enseignement du dessin) could say, in a lecture to art teachers at the *École des Beaux-arts* of Paris, in 1882, that art teaching hitherto lacked system, and was especially wanting in methods of collective teaching.

There appears to be no doubt that if we are to make any considerable advance it must be in consequence of the development of class teaching. By it may be reached the nine-tenths of the artisans who, Mr. Armstrong says in the Thirtieth Report of the Science and Art Department, would be all the better workmen for some knowledge of and practice in drawing or modelling, and who do not come to our schools or art classes.

Good class teaching can only be given by a teacher who is experienced or who has been trained in teaching. There are many assistant teachers and pupil-teachers in the elementary schools who have decided talent for art work and a desire to improve their qualifications. If encouragement and help were given to such individuals to work onwards, and a career were opened for them as special art teachers, indifferent schoolmasters would in some cases develop into good drawing masters.

At the present time a great amount of latent ability is allowed to drift away undeveloped. It has been pointed out that a nature acutely sensitive to the influences of art training may become a blessing or a curse to itself and society, according as it is encouraged in, or balked of, its legitimate development.

To the most promising boys and girls attending the drawing centres already alluded to, scholarships might be given on the termination of the ordinary school course, which should be interwoven with an apprenticeship to some art-work, so that the scholar would become a half-timer at a drawing centre.

To those who had made good use of such a scholarship, first-class instruction in the evening might be given free of cost, and a chance of winning a travelling scholarship.

Possibly each drawing centre might become of such importance that it could be intrusted to the organisation and management of a thoroughly competent teacher, who would insure that the instruction proceeded on approved pedagogic principles. Lessons of the highest description could be given by teachers thoroughly skilful in some one branch, such as figure drawing, modelling, the principles of designing, or the practical designing and art workmanship of the shop. A staff of such teachers could be organised so that a definite class lesson would be given at regular times stated in the time-table. The teachers of the staff would pass round to the various centres at regular intervals for the purpose.

It seems undesirable to train each art teacher in every branch of art. Many years are occupied in giving a little of everything and no particular skill in anything. For each subject a really competent teacher should be trained.

At sixteen, a clever boy or girl ought to have been well trained in the appreciation of the beauties of form, and in those qualities of light and shade, tone, texture, and colour, which underlie all art. The awakening and training of the inventive faculty of the designer, best effected by class

teaching, as it calls on a number of minds mutually to assist one another in working out the same idea, should run side by side with the general art education. Appendix FF.

Good decorative art will not come by teaching nothing but decorative art. The best designers and the most intelligent decorative artists will always come from those who have the best grasp of the vital principles of art. System of teaching drawing under the London School Board.

Englishmen stand first in landscape painting, and yield to no one in water-colour drawing. We need not question the art capacity of the descendants of those who built our cathedrals.

The possibilities of an immense art development are very great if, by the exercise of economy, we lose little of the latent power which has hitherto been almost untouched.

Our pressing wants appear to be such rooms and appliances as will enable a teacher to exert his or her powers to the utmost advantage; special teachers, so that the short and therefore precious school life of the pupils may not be wasted by profitless study; organisation, system, and a development of class teaching which will secure to each individual just such instruction as he or she is fitted to receive; and lastly, an examination that will necessitate the pursuance of the most suitable course of study, and encourage to further efforts good teachers and diligent pupils.

I have the honour to be,

Sir,

Your obedient Servant,

(Signed)

T. R. ABLETT,

The Drawing Instructor to the
School Board for London.

Gilbert E. Redgrave, Esq.,
Secretary to the Royal Commission on
Technical Instruction.

APPENDIX GG.

Appendix GG.

SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES, AND
COMMERCE, John Street, Adelphi, London, W.C.

Technological
examinations of
the Society of
Arts.

TECHNOLOGICAL EXAMINATIONS.

SIR, March 22, 1882.

In accordance with your letter of the 4th instant, I have now the honour to submit, for the information of the members of the Royal Commission on Technical Instruction, the following Memorandum on the Society of Arts Technological Examinations.

I am, Sir,

Your obedient Servant,

(Signed)

H. T. WOOD,

Secretary.

Gilbert Redgrave, Esq.

In 1872 the Society of Arts added to the scheme of examinations they were then carrying on a series of examinations in the technology of arts and manufactures. The idea was originated by Col., then Major, Donnelly, a member of the Council of the Society of Arts; and, indeed, to Col. Donnelly was due, not merely the proposal for holding these examinations, but the whole system on which they were carried out by the Society. Col. Donnelly's plan was based upon that of the science exami-

Appendix GG. nations of the Department of Science and Art, and the examinations were conducted through the agency of the Department. A candidate for examination in each industry was required to have passed in certain specified subjects of the Science and Art Department's examination, and he was also required to produce a certificate, signed by his employer, stating the nature of his employment, and affirming that he was practically conversant with at least one branch of the industry in which he was examined. Certificates in three grades were awarded, elementary, advanced, and honours. Money prizes were offered by the Society to the best candidate in each grade, and special additional prizes were offered in certain of the subjects by some of the City Guilds, private individuals, and institutions.

Technological
examinations of
the Society of
Arts.

For the examinations in 1873, the first year in which they were held, five subjects were put forward, cotton manufacture, silk manufacture, paper manufacture, steel manufacture, and carriage building. In 1874 the five subjects above-mentioned were retained, with the addition of four more, cloth manufacture, glass-making, pottery and porcelain, and the manufacture of gas. In 1875 five more were added: agriculture, silk dyeing, wool dyeing, calico bleaching, dyeing, and printing, and alkali manufacture. Agriculture was afterwards omitted on its being included in the list of the subjects of the Science and Art Department examination. In 1878 telegraphy was added, and in 1879 photography.

In the first year three of the five subjects were taken up, the number of candidates being only six. In the second year, with nine subjects, five were taken up, and the total number of candidates increased to 36; in the third year, with 14 subjects, eight were taken up, and the number of candidates advanced to 46; in the fourth year seven subjects were taken up by 62 candidates; and in the fifth year eight subjects by 68. In the sixth year the numbers increased to 164, the number of subjects taken up being only seven. The reason for this increase was that, before the holding of the examinations in 1878, the Clothworkers' Company voted 200 guineas to pay the teachers of successful students in the same way as science teachers were paid by the Department. In consequence of this several classes were formed for the teaching of technological subjects, and the students from these classes swelled the number of candidates for the examinations. In the following year the examinations were transferred to the then newly established City and Guilds' Institute for the Advancement of Technical Education. The arrangements for the examinations were made by the Society, but the Institute took them over before the date fixed for holding them. The number of candidates that year was 202.

The programme for the following year was remodelled by myself for a Committee of the Institute, and various alterations made in the hope that larger numbers might be attracted to the examinations than had hitherto offered themselves. Ten new subjects were added, and a system organized by which the examinations were conducted independently of, though concurrently with, those of the Department of Science and Art. The result of these changes was an increase in the number of candidates to 803.

In 1877 a practical examination in blowpipe analysis was started by the Society of Arts, prizes amounting to 10*l.* being offered for proficiency in qualitative blowpipe analysis. The examination was held in Cornwall. These examinations were transferred with the technological examinations to the Institute, but after having been held by them for one year the Committee decided to abandon them.

For the past two years the City Guilds have carried on the technological examinations mainly on the same system as that prepared for the examinations in 1880. Any information, however, respecting the progress of the examinations since the City Guilds Institute have taken charge of them would of course be obtained, if desired, from the Institute itself.

APPENDIX HH.

Appendix HH.

Uppingham
School work-
shops.

WORKSHOPS IN UPPINGHAM SCHOOL, by the REV. E. THRING, M.A.

This carpentry at Uppingham School was opened in October 1862, and put in the hands of a very-clever man, recommended by the late Mr. G. E. Street. A payment of 1l. 10s. per annum gave a boy the right of admission to the workshop as a learner, and at first tools were found for beginners. From 50 to 80 boys, year by year, were carpentry pupils, and from time to time very good work was done, but little need be said of this period, as no true system was followed, and the teacher, clever as he was, failed to work the thing in a satisfactory manner. Individuals did well, and profited, but there was no real effective description, or definite plan. Matters continued in this state until the year 1882.

In the autumn of 1882 a class was formed for the purpose of giving greater reality to the science teaching. The boys who joined were taught to make scientific apparatus of a simple kind, and then to experiment with it.

A small room was fitted up as a workshop, with a lathe, and a couple of benches. The class was not a part of the regular school work, but was taken up voluntarily by the pupils. Attendance, when a boy had joined, was compulsory.

During the first term various instruments were made: a barometer, an acoustic bridge, several galvanometers, &c.

As the numbers promised to increase, it was considered advisable to engage an assistant to be constantly at work under the superintendence of the science master. A first-class mechanic was found, who had considerable experience in scientific instrument making. A larger room was fitted up, and the classes grew in size.

In the spring of 1883 the carpenters' workshop was thrown under the same direction as the new scientific workshop. All the mechanical branches are now under the superintendence of the science master.

A forge was established by the head-master, who also defrayed the expenses of the fitting up of a new carpenters' shop. But, apart from this, no pecuniary assistance has been received from without for the works.

THE CARPENTERS' WORKSHOP.

There are two departments, a lower shop and an upper. In the lower shop the boys begin with (1) tenon and mortise, (2) tool-box, dovetailed, (3) cabinet door panelled, and so on. There is a certain amount of work set for each term. Boys who have completed this are allowed to submit a design to the teacher, and to work at it if approved of. Drawing is not obligatory.

There are two times of attendance in the week for each boy, during which he receives lessons. If he wants to work out of his regular time, he applies for a bench, and if there is one vacant it is allotted to him. There are a number of small benches, at which pupils are allowed to occupy themselves with fretwork, &c. But this is not allowed in the regular time. It is considered advisable to provide an opportunity for amusement in a mechanical pursuit for the boys who have an inclination; but this is quite separate from regular work in the shop.

In the upper workshop, at stated times, lessons are given in cabinet-making. But, except for these, attendance is not obligatory. Drawings are required. There are only a limited number in this shop, and there

Appendix HH. is always room for those who are promoted to it. In this manner, a boy who has won his promotion has full opportunity for getting through a great deal of work.

Uppingham School workshop.

The wood-turning lathes stand in this shop.

Terms :

Carpentry, 10s. } a term.
Turning, 5s. }

The cost of an outfit is about 30s. All materials are charged for, and the work done belongs to the pupils.

Number of pupils - - - - - 70.

Men employed: Carpenters—foreman, man, and boy; cabinet maker and assistant - 5 hands.

THE FORGE.

The forge.

In the forge the pupils make nails, brackets, hammer-heads, &c. Forgings are made for the metal workshop; boys make their turning tools. When some familiarity with the work has been acquired, pupils are taught to make horse-shoes, and to fit them on the dead hoof, and when they can do this they are allowed, under careful supervision, to shoe horses brought into the forge.

Number of boys - - - - - 12.

Fee - - - - - 11. a term.

The forge teaching is partly undertaken by the mechanical teacher from the metal shop, partly by a local blacksmith.

METAL WORKSHOP.

Metal workshop.

This workshop was started for the purpose of making scientific apparatus, but it has grown into a mechanical workshop for all kinds of work.

Boys do not pass into it from the carpenters' shop, but can enter it without previous training.

The work commences with the forging and filing of a set of turning tools. Then an electric bell is made, which affords a variety of work, none of it of too difficult a nature. Opportunity is taken to interest the boys in the scientific facts connected with everything which they make, or see being made, and no trivial work is allowed, except by special permission out of work hours.

When the bell is completed, which generally takes more than one term, various pieces of apparatus are chosen to be made, such as a scribing block, a pump, an electric motor, or an induction coil.

Stress is laid on the boys learning to make and sharpen their own tools. They are required to make a drawing of the machine to be made.

In this shop a set of scientific instruments is being made for the use of the school.

Work is also being turned out for outside orders, and in every way the pupils are given to understand that they are admitted to a place in which real work is turned out, not to a place in which they can play with metal and tools.

A room is set apart for experiments with the instruments made. The boys are led as much as possible to take an intelligent interest in science. But the workshops are distinct from the scientific teaching of the school, although boys working at physics are often sent into the workshops for special purposes, and the facilities of the mechanical department are always ready for scientific requirements.

Boys who intend to take up the engineering profession are allowed more time at practical work, drawing, and mathematics during the last year of their stay than is laid down in the ordinary school-course.

Also, after leaving school, boys occasionally stay in the workshops for a special training to fit them for their further education in technical work. Appendix HH.

The times of attendance are twice a week, an hour and a half each time. But many boys come six or more hours a week. The fee is £1. 10s. 8d. a term. There are 23 boys in the workshop. Every boy buys a set of necessary tools and castings. The work turned out belongs to the boy.

A foreman, a man, and a boy are employed in this shop.

The machinery consists of two Whitworth screw-cutting lathes, eight 5-inch lathes, one planing machine, vices, benches, &c.

(Signed) EDWARD THRING.

Uppingham School workshops.

Uppingham, March 1884.

Time Table of Uppingham School workshops.

FORCE.

Time.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	—
12 to 1.30		Mr. Tyler's Class.		Mr. Lee's Class.			The number of each class does not exceed 15. There are different from the Metal Work pupils; but, in general, each Metal Work pupil works for one hour in the Forge. Tyler is a local blacksmith.
2.15 to 3.30	Mr. Lee's Class.	Mr. Tyler's Class.			Mr. Lee's Class.		
3.50 to 4.45		Mr. Tyler's Class.					

METAL WORK.

Time.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	—
12 to 1.30	6	6	5	5	6	3	The numbers refer to the attendance of the pupils. To three numbers there are the special Workshop pupils. These work on the Forge for one hour per week in the Workshop.
2.15 to 3.30		4	4	4			
3.50 to 4.45	4	4		3	6		

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CARPENTERS' SHOP.

Uppingham School workshops.

Time.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	—
12 to 1.30	8	11 Advanced Class of 5. Taught by Loder.	7	14 Advanced Class of 5. Taught by Loder.	7	10	The numbers refer to the attendance of boys. Each class meets on two occasions a week. Teachers: Carpenter—D. C. C. The numbers refer to considerable voluntary attendance in addition to these numbers but they do not receive lessons except at regular times.
2.15 to 3.30	5	7	6	7	7	4	
3.50 to 4.45	1	2	1	5	1		
After Lock-Up.		7					

Appendix II.

APPENDIX II.

Ontario Agricultural College.

TO THE CHAIRMAN OF THE ROYAL COMMISSION ON TECHNICAL INSTRUCTION,
SIR BERNHARD SAMUELSON, M.P.

SIR,

In the course of a visit to Canada and the United States in the past summer, I endeavoured as far as possible to become acquainted with the chief institutions for scientific education so far as the time of year and the limited time at my disposal would permit. As most of the educational establishments were in vacation, I was often unable to obtain so full an account of the work done as I should have liked. Much of the information which I did obtain was practically identical with that already communicated to the Commission in the Report made by Mr. W. Mather, and there is little or nothing to add to the account he has given of the institutions which he visited. I find, however, that there is one important college in Canada which he does not appear to have visited. A short notice of this college may perhaps serve also to supplement the Report on agricultural education already published.

THE ONTARIO AGRICULTURAL COLLEGE.

This college, which has now been ten years in existence, is situated at Guelph, Ontario, some thousand feet above the sea level and 700 feet above Lake Ontario, and consists of a farm of about 550 acres in extent, with the necessary buildings both for farm-work and for the teaching purposes of the college. The farm was bought by the Government of Ontario, who immediately on taking possession appointed a Commission to enquire and report on the best "manner of adapting the said farm and the management and control thereof to the purposes of a

"model and experimental farm." The Report of this Commission recommended that the objects of the Institution should be:—

"First, to give a thorough mastery of the practice and theory of husbandry to young men of the province engaged in agricultural or horticultural pursuits; or intending to engage in such; and, second, to conduct experiments tending to the solution of questions of material interest to the agriculturists of the province, and to publish the results from time to time."

"All permanent improvements on the farm should be carried out in such a manner as to exhibit and test the comparative values of the most approved methods of executing the several works; and to test the cost, convenience, and durability of the several appliances from time to time recommended for adoption on the farms of the province."

These suggestions have been carried out, the control of the Institution being divided between a President, who is responsible for the "college" portion of the instruction, and a farm superintendent, who is responsible for the management and practical work of the farm. Each is required to work in harmony with the other, but both are directly responsible to the Commissioner of Agriculture for the province. The instruction is embraced under two heads, called the course of study and the course of apprenticeship. The course of study extends over two years, and embraces the following subjects:—

FIRST YEAR.

Subjects :

Agriculture.	Structural and Physiological Botany.
Live Stock.	Geology and Physical Geography.
Inorganic Chemistry.	English Literature.
Organic Chemistry.	English Composition.
Veterinary Anatomy.	Book-keeping.
Veterinary Materia Medica.	Arithmetic.
Zoology.	Mensuration.

SECOND YEAR.

Subjects :

Agriculture.	Entomology.
Arboriculture.	Meteorology.
Live Stock.	English Literature.
Agricultural Chemistry.	Political Economy.
Veterinary Pathology.	Book Keeping.
Veterinary Surgery and Practice.	Mechanics.
Systematic and Economic Botany.	Levelling and Surveying.

In the apprenticeship course the students are daily distributed among the following departments:—

1. Live Stock Department.
2. Field Department.
3. Horticultural Department.
4. Mechanical Department.
5. Experimental Department.

The students are taught the proper manner of performing the various operations in each department, and are sent in rotation to each, so that at the end of two years they may have served a thorough apprenticeship.

The instruction extends over nine months of the year, and the daily work averages nine or ten hours a day, arranged as follows:—

Lectures in the College	-	Three hours.
Manual labour	-	Three and a half to five hours.
Private study	-	Two hours.
Drill and Gymnastics	-	One hour (alternate weeks).

Candidates for admission must be at least 16 years of age, and must pass a simple entrance examination or produce a certificate of having passed some equivalent examination elsewhere. The boarding and tuition

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Ontario Agricultural College.

Appendix II. fees are framed on two scales, one for residents in the Province of Ontario and the other for non-residents. Payments are, however, made to each student, for his farm work, of from 4 to 10 cents an hour, according to the value of his work, so that a student of Ontario with no previous knowledge of farming would pay from 50 to 65 dollars a year for board, washing, and tuition, which might be reduced by his farm work to 40 or 55 dollars. To non-residents these charges would vary from 120 to 150 dollars. Students who attend the full course and pass a final examination receive the diploma of "Associate of the Ontario Agricultural College." Medals are also awarded for proficiency in certain subjects. The total number of students in 1883 was 202, of whom 134 were from Ontario, 35 from other parts of the Dominion, 30 from the United Kingdom, 2 from the United States, and 1 from India. Most of the students who pass through the College engage in farming in various parts of the Dominion.

The college is arranged to take sixty boarders. It contains a good lecture theatre, arranged so that animals can be readily brought in for the purposes of demonstration; a museum, to which additions illustrating the agricultural and veterinary work are constantly being made; and a library of over 4,000 volumes, on the different subjects embraced in the course of study. The live stock department contains good specimens of seven breeds of cattle, six of sheep, and three of pigs. The horticultural department consists of three greenhouses, a vinery, a thirty-acre lawn, a four-acre kitchen garden, and a large variety of fruit and ornamental trees. A portion of the farm is laid out in small plots, and a series of experiments with cereals, roots, grasses, and manures, and various modes of management, are regularly carried on from year to year. In addition to the field experiments others are made in the feeding of live stock. The results of these experiments are annually published, as are the usual weather statistics. The chief need of the college appears to be a good chemical laboratory for the proper instruction of the students in agricultural chemistry and for analysing soils, manure, food-stuffs, &c. Professor James Mills, the President of the college, to whom I am indebted for most of my information, is anxious that elementary instruction in agriculture should be made compulsory in all rural schools in Ontario instead of merely being optional, as at present, and that a course of lectures on agriculture should form part of the teaching given to all teachers in training at the Normal School.

I am,
Your obedient Servant,
(Signed) CHAS. A. BUCKMASTER.

Appendix JJ.

The Wurtemberg
Educational
System.

APPENDIX JJ.

THE WURTEMBERG EDUCATIONAL SYSTEM.

LETTERS FROM DR. VON STEINBEIS.

DEAR SIR,

Leipzig, 4th May 1882.

I RECEIVED your esteemed letter of April 18th, together with one from Sir Philip, of the 17th, on my way through Stuttgart when you had already left London some days. I wonder my friend forgot that I had given up my official duties; I did so after 53 years service, and because I could not agree with the new German-economic system, nevertheless with regard to Wurtemberg, as a superannuated government officer, I stand on the best possible footing. I regret very much indeed that I am no longer in a position to devote myself to you and to the members of your esteemed Commission, both in Stuttgart and all over Wurtemberg wherever you wish to carry on your investigations. I remember well our

former meeting with pleasure, and am full of sincere and constant thankfulness for the great and precious favours and the rich and enlightened information, which in the course of 40 years, I have received from all parts of England, and most particularly from all connected with the South Kensington Museum, and from the Society of Arts. Of this latter Society, I have been the honorary corresponding member, alas, with but few communications, since 1851, and their journal, even to-day, together with the "Economist," forms part of my regular reading.

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The Wurtemberg
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System.

Besides my regret that I cannot accompany you through Wurtemberg, I must also lament that I did not know of your intention of studying the technical instruction given in Wurtemberg and its results, upon the spot itself, some weeks earlier. Great efforts have been made during the last 30 years to bring back the country, by increased industrial activity, to a higher state of prosperity. Until the middle of the century, Wurtemberg had been nearly entirely occupied with agriculture, with the supply of articles for daily consumption, and in carrying out the repairs necessary for domestic trades. Moreover the country was much impoverished by considerable over-population. What happened in the department of education, and in the direct promotion and introduction of industrial occupations, is closely connected as a whole, and he who cannot conceive it (or review it as a whole) is still less able to judge of it in part, and to appreciate the prejudices and hindrances the movement encountered, which were very difficult to overcome; while the pecuniary means, also, were very small. In government circles even, much opposition arose, and had not the late King William upheld the policy with a clear insight and strong will, and in many ways personally contended for it, it would not have been possible to accomplish that which has now been achieved. After the King's death his son, King Charles, pronounced himself resolutely in favour of carrying on what his father had begun. That if these hindrances had not arisen, much more might have been done, and have been achieved, is clearly to be seen when the circumstances are more closely examined. No one could tell you more on the subject than I can, for during that long period the chief problems, both in the department of education, as also in that of industry, fell to me, partly personally, partly as chief of the commissions relating thereto. Meanwhile, I can assure you that a closer examination into our efforts would not be unsatisfactory for you and your Commissioners. To render this task more easy for you, I would, had I known sooner of your journey, have sent you a book in which all the above-mentioned undertakings are noticed fully in detail, and I should even now recommend you to get this book; it is entitled "The industrial development of the Kingdom of Wurtemberg" and the Work of its Central Office for Trade and Industry, by Vischer, "Stuttgart, published by Carl Grüninger, 1875." Unfortunately, I have no available copy of this work at hand to send you. You can, however, buy it within five minutes of your arrival, between the station and the Hotel Marquardt, at Wittwers, the bookseller's shop, failing this, from the publisher, Grüninger, who lives in Augusta Strasse. The table of contents at the beginning of this work, which you can read in 10 minutes, will place before you all which would come within the sphere of your intended investigations.

I must here specially remark that the requirements of a country, comprising within it a number of small towns, necessitate that the government action in connection with such a development should be more diffused than centralised, and the fact that the country counts within it a number of petty capitals and chief towns, which in the last century and earlier were centres of industry and trade, would exert a similar influence; for these towns were better starting points for industries and industrial education, than the capital town itself. I must therefore place in the first rank, as worthy of being visited, Reutlingen, Gmünd, Heidenheim, and Heilbronn, among which you should certainly visit the first three, or at the very least the first-mentioned town.

In Reutlingen you will find an apprentice-workshop, which has now been flourishing for many years, for the development of all branches of

Appendix JJ.
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 The Württemberg
 Educational
 System.

weaving, for educating foremen for machine weaving, and for all varieties of hand weaving and machine knitting. The students must, in addition to their literary studies, work regularly at the looms, and earn a part of their keep. You will find there a highly interesting school for women's work, which teaches feminine handicrafts on a scientific and artistic basis, and which has hitherto been a unique example of its kind. I sent you yesterday, in a little packet addressed to the Hotel Marquardt, and which you will doubtless receive on your arrival, the prospectus of this school.

Moreover, you will find in Reutlingen a very good trade continuation school, in which instruction in drawing and modelling, and in the departments of physics and commerce, is very well given.

There is also an excellent Realschule, which prepares the students previous to their entry upon a practical career, partly for the higher polytechnical engineering school, partly for the commercial desk or the manufactory. As all these institutions in Reutlingen are situated very near together, and sometimes are actually associated together, you will here most quickly become acquainted with the organisation of the Württemberg trade schools. In this town, too, is found an institution for the poor, founded on benevolent principles, and highly interesting to a student of State political economy. It was founded by a very noble and enterprising clergyman, who was in the beginning very little versed in matters of economy, and it grew by means of charity, pecuniary aid, and loans into large dimensions, and was, when bad times arose, very nearly becoming bankrupt, when it would have plunged many families, it had succoured, into the greatest want and misery. We placed it under a kind of sequestration, so that its really large possessions, farms, manufactories, workshops, and shops came under a strictly economic management, and as the times improved, and as no creditor pressed for payment, it gradually recovered. The administration was restored to the patriarch who had founded it, and it has now accumulated, so far as I know, a considerable fortune. Its whole future, however, depends upon Mr. Werner, as its founder is named. As a communistic, or rather a really patriarchal institution, which in a sideway came under the guardianship of the estate, which really had to help it through its troubles, it is certainly worthy of notice. Mr. Werner is the pattern of a self-denying man, relying upon God's help. He will often tell you it is through Him alone the work has succeeded, and he is right. The Almighty has, however, not only worked through the hearts of others, but also through the Treasury Department. He has ordered things here, as in other places, for it is only by benevolent efforts that such institutions can live and thrive.

I have, though, still to tell you what is to be seen in the other towns enumerated. There is in Gmünd, which lies at the foot of the Hohenstaufen, the birthplace of the old German emperors, situated on the railway to Heidenheim, a special school for jewellery, which is very well conducted, a very good continuation school and a museum for jewellery and gold and silver work which has just been begun. In Heidenheim you will find a workshop school for machine and hand weaving, and a school of design.

The other towns are more specially noticeable for their continuation schools, but you will find a tolerable number of other schools scattered about the country.

It is a pity that you did not come to Stuttgart in the middle of last summer, when you would have seen a large exhibition of native Württemberg industries, and of articles made in the Württemberg trade schools, which would have convinced you that in no country are industrial drawing and modelling more developed than in Württemberg.

You will find, in the work of these schools, and in the central trade museum, and the central institution for trade and industry (at the Legions Caserne) the index, so to say, of the trade exhibition, and in this latter, the practical use of the former, and you will be pleased with the practical and certain proof that it is possible with the powerful help of railways and telegraphs to make quite a new era in a formerly half-idle country, and that you can raise the industry of a State both by teaching

it and showing it what is good, and all this without any injury to its agriculture. Appendix JJ.

But I have omitted to thank you for the highly interesting "First Report of the Royal Commissioners on Technical Instruction," which I have read with much pleasure. Pray kindly accept my heartfelt thanks for it now. The conclusions specially delighted me; it seemed as if I had written them myself from my heart. The Wurtemberg Educational System.

That this is really, and indeed the case you will see by the little work entitled—"On trade education; seven opinions and reports," and more particularly from the first of these reports which was written by me. In these you have an account of a system, which I may venture to say has been proved *practical*; a system upon which the trade schools of Wurtemberg are conducted and managed. In this work of 24 pages, which may be quickly read, all is explained as to how these schools are or should be managed. It gave me great pleasure and relief to find that your Commission is no longer called upon to deal with technical "*education*," but with "*instruction*." These two words denote the beginning and the ending of a widely spread error, of one in which it was proposed to turn labour into play, and to substitute mere bookwork for skill, industry, and obedience. But I will not say more about it here, I have said enough in my pamphlet. Your Commission will spread a blessing over all the world if they remove this fatal mistake, both by word and deed. Once more I must beg you to draw your attention to the collection in the central institution (in the old barracks), particularly to the collection of educational apparatus, you will find many English things there, and will be convinced that we have become your grateful pupils, in that, with small means, we have tried to follow the example of your great Kensington Museum, and with our institution which was founded in 1848, but, which was greatly enriched by the 1851 exhibition, we have sought little by little to educate and improve all branches of trade. I would particularly beg you to see the trade collections of the year, 1840, and still earlier exhibited there, and, in doing so, I must beg of you to remark how very low down we had to begin. At present, the Wurtemberg Trade Department cultivates chiefly "art-trade," a new "art division" of industry which, in foreign lands will hardly be understood by such names or master, I consider this term to be most pernicious, applied as it is, for every industry can have its art associated with it, and should include art in the last and highest stages of its development, and this final stage should not despise or look down upon the preceding ones.

With this I enclose you some introductions, will you make use of them as you may want them.

To Gilbert Rodgrave, Esq.

Yours faithfully,
(Signed) Dr. STEINBECK.

LETTER 2.

DEAR SIR,

Leipzig, May 24th, 1882.

I AM in receipt of your esteemed letter of the 22nd instant, for which please accept my hearty thanks. I should only have been too pleased to learn the opinions which you and the members of the Commission have formed concerning the industrial education of Germany, and, as I might almost be inclined to dread that England, (which I honour so highly because we owe her so much) might again become somewhat enamoured of the German Schoolmaster System, I cannot resist the gratification of once again recording my views concerning education and the training for industries; seeing that I have been struggling for so many years against the existing state of things. Letter from
Dr. vonSteinbeck

My conclusions are as follow:—I can recognize no other task for education than to induce and to cultivate in the recruits of industry, from their earliest years until their full physical development, a capacity for useful activity, but in so doing to take the utmost care that, avoiding

Appendix JJ. at the same time both idleness and overwork, the intellectual and physical (mannal) training shall be so carried out, in accordance with the natural capacities of each individual, but ever in harmonious and uninterrupted combination, in order that work should be regarded as a necessity and delight,—never as a task.

The Württemberg Educational System.

How easily this may be accomplished has been taught me during a career of sixty years, in which I have passed from the lowest to the highest grade of practical industrial employment, and in the teaching of trades; by a survey of three continents; and by the results of my own very numerous experiments.

Unfortunately the tide of affairs in Germany has taken another direction, and although lately there have been demands on many sides for a return to the former condition of things, they have not as yet been productive of much effect. The system now is to shut young children up, compulsorily crowded together, both morning and afternoon, in gloomy school-rooms; to stuff them while there with theoretical knowledge, which for the most part runs to waste, as from an over-filled vessel, either neglecting entirely the development of their physical powers and manual dexterity, or doing so only to such an extent as to exclude the aspiring and assiduous youth by legal enactment from the workshop in which he will nevertheless subsequently have to earn his livelihood, and in which he might and ought to acquire, while he is young, the manual skill and muscular power which in the future will be demanded from him.

Having by this means become quite another class of man to the one needed in the workshop, the immature lad, mature only on the score of his age and in accordance with the strict letter of the law, enters the workshop and finds himself so uncomfortable and so oppressed therein that he regards his trade only as drudgery, and his labour as slavery; he becomes in fact a candidate for social democracy. Then the Legislature attempts to win him back, with provisions for old age, for sickness, for infirmity, and similar communistic institutions, and ends by making him an idler and a spendthrift!

Why, then, do they not pursue the opposite course and induce the contractor, who cannot exist without workpeople, to assist them by training the young workman from the outset, by means of half time work and half-time schooling, and by contributing to the cost of his food and clothing. Would it not be possible for the factory inspectors to see to this? Such will I hope be the policy that England will inaugurate, and the other countries will follow her example. Now, I will bring my letter to a close, and bid you farewell. The reason I have not written to you in English, will, I fear be evident from the one which went before. Let me further beg of you to keep me in your friendly remembrance and consider me always at your service.

(Signed) Dr. STEINBEIS.

Gilbert Redgrave, Esq.

LETTER 3.

Letter from
Dr. von Steinbeis

DEAR SIR,

Leipzig, May 27th, 1892.

WHEN I despatched my letter of the 24th inst. I had certainly no intention to trouble you for a reply, and still less to deal with things present, as I know how little time you have for writing while on a journey, but I feel bound to acknowledge the receipt of the friendly salutation of your Commissioners, and to thank you for the second copy of your First Report, and for your letter holding out to me the hope of a visit from you, which would give me great pleasure. I will take this opportunity of adding a few remarks upon the questions raised in your former letter, even at the risk of your thinking me tedious. You ask what is to be done in order that the school may not stifle the inclination for the carpenter's bench and the vice? Now I hold two decided opinions on the subject; first, the school must not injuriously influence the bodily, and more particularly the muscular, development of the pupils by excessive

sedentary work and brain-effort; and second, it must also aim at the production of a taste for active industry, by deriving the subjects for instruction from the affairs of daily life, as well as from history. Then, farther, instead of the unreasonable exclusion of children from the factories it would be necessary to arrange, if needs be by legislative enactment, that industrialists, in like manner that they care for their machinery and plant, should also take active part in the training of their working people, beginning indeed from their earliest years. You tell me the success of your half-time schools is doubtful; I permit myself the enquiry—Have these schools been properly organised, managed, and superintended? It is easy in the case of every business, without any considerable expense, to employ a certain number of children, in proportion to the staff of adult workers, who may, singly or collectively, be placed under the charge of trustworthy, responsible workpeople. It is then, however, not only necessary that they should not be employed for too long a time, or on work of too heavy a character; they must not be allowed to suffer hunger or thirst, and care must be taken that they are properly clad and kept clean. Is it not necessary to oil and clean the machinery at fixed intervals? In the same way the young workers should receive from time to time a slice of bread and butter and a small glass of beer or cyder. Moreover, on leaving the shop their cleanliness must be looked after, and even in case of need small articles of clothing might be given them. It is very important that the child should as far as possible receive directly the fruit of its labour, its earnings. By this means the child becomes accustomed to its work and its frame is fittingly developed, but it also learns to know the value of work and acquires a love of it. Yes, work grows into a necessity. One must not be afraid of difficulties in this respect. I have myself allowed my own son to run about the workshop from the age of six, beginning at the bottom of the ladder, and he has become a sound and scientific, but also a thoroughly practical and stalwart engineer, and with him have grown up a number of excellent and suitable workers for the factory. At this moment five of my grand-daughters, between the ages of 14 and 17, are attending the Women's Work School at Beutlingen, and are receiving at the same time instruction in the sciences and foreign languages, together with music and drawing. I was obliged to exert some pressure in order to induce them to attend this school, and now they are delighted with it. It does undoubtedly take time to establish institutions of this kind and it is acting very imprudently to start them at once with ordinary arrangements and regulations. It is necessary in the first instance to provide oneself with suitable persons and localities, to make a beginning with these, and when once favourable results have been obtained, to come forward with them: "principis docent, exempla trahunt."

I have done myself the pleasure to send you the programme of the Beutlingen Women's Work School, it was the first of its kind; now it has found imitators in some 20 towns in Württemberg and in many other places besides, and others of the same kind are continually being established, though perhaps not upon so large a scale. These schools are attended by the daughters of all classes.

Generally speaking, in these questions of industrial education much must be left to time, partly because a sufficient number of suitable teachers must be trained, and because it is necessary to follow public opinion, in order that learners may be supplied spontaneously. Exhibitions have rendered me the most excellent services in my efforts in this direction; their results have proved in the most astonishing way the truth of the above-quoted Latin proverb. Things, however, have gone much slower with respect to the education of the male workers; after ten years' exertion, I was often tempted to doubt that any practical success would ensue. But as soon as a number of good skilful workmen had secured positions in the State workshops, the young people crowded into the schools, and then the industrial results at once became completely changed. No doubt, as you observe, the trade schools deserve special study, but they must only be established for the training of apodes of industry, not for the great masses and especially not for persons who have had no previous experience in industrial occupations, and who are still too

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 The Wurttemberg Educational System.

young for this. In such cases these schools do more harm than good, as frequently the main point (money-making) is neglected in them (for, after all, the earning of money is the chief thing in trade undertakings). In your remarks that "our primary schools" and our "military service" system are of immense worth, as an incentive to higher education, I regret to say I cannot agree with you, as on the contrary I regard both of them as our chief cancers. Certainly, if in our primary schools the children were allowed to go out as soon as they had become proficient and were not (the clever and the dull ones alike) shut up for eight years in what are for the most part ill-ventilated school rooms, they might perhaps be valuable, but, as they are at present constituted, they have not elevated the intellectual position of our population and they have decidedly lowered the physical status of the people. And then, as respects the military system, which by its voluntary examination permits those who are clever to break through; it has drawn away from the technical schools, which train men for a practical industrial career, many of their students and among them some of the best. The military career, however, only teaches blind obedience and the art of destruction, but not to work and to earn one's living by means of an inventive spirit. But now I have said enough. Have a prosperous journey with your Commissioners. Do not forget your promise to come and visit me. Give my respects to my honoured friend Owen, and bear in your friendly remembrance

Yours sincerely,
 (Signed) STEINBERG.

To Gilbert Redgrave, Esq.,
 Secretary of the Technical Instruction Commission.

Appendix KK.

Technical Education for Shipbuilders.

APPENDIX KK.

TECHNICAL EDUCATION FOR SHIPBUILDERS.

LETTER FROM MR. W. DENNY, OF DUMBARTON.

Hotel des Reservoirs, Versailles,
 April 25, 1893.

DEAR MR. SAMUELSON,

I must ask you to forgive me for the delay which has occurred in sending you the enclosed printed documents referring to our attempts at technical education in our shipyard and engine-works. They consist of the following—

- a. Rules as to the admission by examination of apprentices and others into the shipyard offices.
- b. The same for our engine-works.
- c. Rules for the awards committee to guide them in recommending the workmen for inventions or improvements.

A similar scheme of awards has been begun in our engine works.

From these papers, and the private information given to you as to the awards made, you will observe that our attempts to stimulate the intelligence of our employes, have developed in two forms, corresponding to the main divisions of these employes. *First*, by examinations, we have tried to secure a supply of apprentices and others for our offices, elected for ability and steadiness, and with some knowledge suitable for the careers before them. *Second*, we attempt by rewards to stimulate the minds of our workmen directly to invention and to a continual criticism of the methods of work, tools and machines employed by them. We have not tried as yet to induce them to attend technical classes, but a few of them do attend such classes in the town, conducted under the control of the Science and Art Department.

All our draughtsmen attend such classes, and in addition have from us the use of our offices, with paper, &c. free, also of a very complete library of works on naval architecture and cognate subjects, every evening excepting Saturday and Sunday.

Technical education has most come under our notice in connection with the naval architecture classes and examinations of the Science and Art Department. Previous to last year, the instruction in this subject was very antiquated and insufficient, but it is now greatly improved and promises to be of very great utility to the country. I believe it is through the Science and Art Department, that technical education can best be forwarded. Their system of forming the standard of teaching by examination is the only one capable of wide and easy extension, and, if the returns to masters, the payments by results, were only sufficiently large to induce more first-class men to become teachers, great improvements could be made. The fees could not be raised, but the results payments might be lowered without reducing the number of students, even if a portion of the results payments were made obligatory on the districts having the classes.

Beyond such direct means of teaching, the last indirect means of raising the technical skill and intelligence of our workmen would be cheap and easily procured. In the interests of the whole country, there is no property a workman should be made to feel more real and valuable than the useful inventions of his brain. Could you obtain this result, your commission would create the spur and stimulus to great technical improvements, and you would develop a large amount of genius now latent. The workman would see possible personal advantages in his skill, instead of as at present and generally, no advantage at all. I have no great hope of your doing much through the influence of employers. The great mass of them are as little interested in technical education as their men, and with much less reason. Most of them sneer at anything out of their routine. I would place more confidence in a direct appeal, by means of amended patent laws, to the great body of the workmen. They know the meaning of personal interest when it is brought within their grasp and made tangible. Perhaps, your colleagues may think I am wandering from the text of technical education, but, it is only so apparently, for you will not interest working men in the subject till you show them a personal and immediate interest in it. Show them that clearly, and you will have no reason to complain of their want of interest in the subject that you and your colleagues have so painstakingly and generously taken in hand.

B. Samuelson, Esq., M.P.
House of Commons.

Yours very sincerely,
Wm. DENNY.

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Rider A. to Mr. DENNY'S LETTER, APPENDIX KK.

RULES for I. ADMISSION of APPRENTICES to DRAWING OFFICE. II. ADMISSION of BOYS as APPRENTICE CLERKS. III. ADMISSION of GIRLS as APPRENTICES in TRACING DEPARTMENT.

Rules for
admission to
Drawing Office

I.—APPRENTICES for the DRAWING OFFICE.

1. When an opening occurs in the Drawing Office for the admission of an apprentice from the Yard, it will be filled up in future by competitive examination, according to the following rules.
2. This examination will be conducted by Professor Lambert, of the Royal Naval College, Greenwich, who has kindly undertaken this duty; and the candidate whom he decides upon as having the highest total of marks will be the one selected for entering the Drawing Office.
3. The examination will be open to all our apprentices who shall have been not less than two years in our employment as apprentices, and who for the time they have been in our employment have not been absent during the regular working hours for more than one hour in thirty, except through ill health, certified by a medical man, or with the written consent of their foreman.

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4. Candidates must bear a good character from each foreman under whom they have been working. They must have attended the South Kensington naval architecture classes for two years, in each year for the minimum number of nights required to enable them to compete in the examinations conducted by the Department. They must also have passed the elementary stage of these examinations in naval architecture.
5. The subjects of examination will be—
 - (a.) Mathematics, including arithmetic; geometry, as far as the first two books of Euclid; algebra as far as and including simple equations, and logarithms.
 - (b.) Theoretical mechanics, as required for the elementary stage of the Science and Art Department.
 - (c.) Practical plane, and solid geometry, as required for the elementary stage of the Science and Art Department.
 - (d.) Freehand drawing.

For the first subject a maximum of 200 marks will be given; for the second subject, a maximum of 100 marks will be given; for the third subject a maximum of 100 marks will be given; and for the fourth subject, a maximum of 50 marks will be given.
6. Successful candidates, in the event of their conduct and application being satisfactory, will be retained in the Drawing Office for an apprenticeship of four years, being paid at the rates of 30*l.*, 40*l.*, 50*l.*, and 60*l.* for each successive year.

II.—ADMISSION OF BOYS TO THE COUNTING HOUSE.

Rules for
 admission to
 Counting-House.

1. When vacancies occur in the counting house for boys as apprentice clerks, these will be filled by competitive examination, according to the following rules.
2. The examination will be open to any boy, not under 14 years of age, who is able to show a good certificate as to character, and whose nearest relative has been in the employment of Messrs. Denny & Co. or ourselves, for at least two years prior to the date of examination, and who is in the above employment at that date, or who has died while in above employment, after working in it for at least two years.
3. The subjects of examination will be—
 - (a.) Arithmetic, as far as and including decimal fractions, for which a maximum of 120 marks will be given.
 - (b.) Handwriting, for which a maximum of 100 marks will be given.
 - (c.) Writing to dictation, for which a maximum of 80 marks will be given.
4. Apprentice clerks will be engaged for four years, and their wages will be 15*l.*, 20*l.*, 25*l.*, and 30*l.* for each successive year.

III.—ADMISSION OF GIRLS.

Rules for
 admission of
 Girl Tracers.

1. When vacancies occur for girls in the Tracing Department, these will be filled up by competitive examination, according to the following rules.
2. The examination will be open to any girl, not under 15 years of age, who is able to show a good certificate of character, and whose nearest relative has been in the employment of Messrs. Denny & Co. or ourselves for at least two years prior to the date of examination, and is in the above employment, or who has died while in above employment, after working in it for at least two years.
3. The subjects of examination will be—
 - (a.) Arithmetic, as far as and including decimal fractions, for which a maximum of 120 marks will be given.

- (b.) Writing to dictation, for which a maximum of 120 marks will be given. Half of these marks will be set apart as a maximum for accuracy, correct spelling, and punctuation; the other half will be set apart as a maximum for penmanship. Appendix KK.
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- (c.) Block-letter printing, as practised in our Tracing Department, for which a maximum of 120 marks will be given.
4. Apprenticeships in this department will be for four years, with wages at 6s., 8s., 10s., and 12s. per week for each successive year.

The above Rules may be revised by us from time to time, if found necessary. Notice of any alteration will be given at least twelve months before the alteration comes into operation.

Leven Ship Yard, Dumbarton,
26th August 1881.

WM. DENNY & BROS.

Rider B. to Mr. DENNY'S LETTER, APPENDIX KK.

RULES FOR I. ADMISSION OF APPRENTICES TO DRAWING OFFICE. II. ADMISSION OF BOYS as APPRENTICE CLERKS and as APPRENTICE DRAUGHTSMEN. III. ADMISSION OF GIRLS as APPRENTICES in TRACING DEPARTMENT. Rules for admission of Apprentices to Drawing Office.

I.

1. One of the apprentices employed in the works will be annually selected for admission to the drawing office.
2. The selection will be made by competitive examinations, which will be conducted under some neutral person.
3. These examinations will take place in the last week of December in each year. The successful candidate will begin in the drawing office after the new year holidays following.
4. The first examination will be held in December, 1881.
5. These examinations will be open to all our apprentices who shall have been not less than three years in our employment as apprentices on the 15th January following the date of examination, and who during that time have not been absent during the regular working hours more than one hour in forty in the aggregate, except through ill health, certified by a medical man, or with the consent of their foreman, and of whom their foreman can give a good report.
6. Subjects of examination will be freehand and mechanical drawing, arithmetic, algebra, up to and including simple equations, first two books of Euclid, and use of logarithms.
7. No apprentice can compete in these examinations oftener than twice.
8. Successful candidates, in the event of their conduct and application being satisfactory, may remain in the drawing office for at least two years, being paid at the same rates as if they were in the works until their regular time of apprenticeship has expired, when their rate of wages will be arranged by us according to their merits.
9. All intending candidates must hand in their names at the counting house not later than the 1st December of each year.

NOTE TO RULE 5.—For the first two or three years difficulties may arise regarding the amount of time lost by the apprentices up to date. Each doubtful case will be considered by us on its merits. From present time a careful record will be kept of attendance.

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II.

1. When vacancies occur in the counting house or drawing office for boys as apprentice clerks or apprentice draughtsmen, competitive examinations in elementary subjects will be held, and the successful candidates will be appointed to the vacancies.
2. These examinations will be open to any boy, not under 14 years of age, who is able to show a good certificate as to character, and whose nearest relative has been in the employment of Messrs. W. Denny & Bros. or of ourselves for at least twelve months prior to the date of examination, and is in above employment at that date, or has died while in above employment, after working in it for at least twelve months previously.
3. Apprentice clerks will be engaged for four years, and their wages will be 15*l.*, 20*l.*, 25*l.*, and 30*l.* for each successive year.
4. Apprentice draughtsmen will be engaged for five years. Their wages will be the same as other apprentices in the works.

III.

1. When vacancies occur for girls in the tracing department, they will be filled up in the same manner as for boys in the counting house and drawing office. Age must not be under 14 years; other conditions as for boys.
2. Apprenticeships in this department will be for four years, and wages will be 6*s.*, 8*s.*, 10*s.*, and 12*s.* per week for each successive year.

The above rules may be revised by us from time to time, if found necessary. Notice of any alteration will be given at least twelve months before the alteration comes into operation.

Engine Works, Dumbarton,
16th August 1881.

DENNY & Co.

Rider C. to Mr. DENNY's Letter, APPENDIX KK.

C.—RULES and REGULATIONS for the guidance of the Committee of Awards.

AWARDS COMMITTEE.

Members :

WILLIAM JARDINE, Esq., Burgh Registrar, President.
JOHN WARD, Esq., Manager, Leven Shipyard.
ROBERT B. POPE, Esq., Manager, Engine Works.

Secretary :

Mr. ALEXANDER WATT, Counting House, Leven Shipyard.

1. Any workman in our employ may claim an award from the Committee on the following grounds:—
 - (a.) That he has either invented or introduced a new machine or hand-tool into the yard.
 - (b.) That he has improved any existing machine or hand-tool.
 - (c.) That he has applied any existing machine or hand-tool to a new class of work.
 - (d.) That he has discovered or introduced any new method of carrying on or arranging work.

Rules for
guidance of
Awards Com-
mittee.

- (e.) Or, generally, that he has made any change by which the work of the yard is rendered either superior in quality or more economical in cost.
2. In the case of a workman who is unable to test the merits of his supposed invention or improvement, either through inability on his own part to make the necessary experiments or to pay for the same, the firm, on the recommendation of the Committee, may agree to bear the whole, or part, of the necessary expense; or the Committee will be at liberty to grant the free use of tools and appliances in the yard for this purpose, and if the invention should afterwards prove a practical success, an award will be granted.
3. On the establishment of a claim under the conditions above specified, the Committee are to make an award, which is not to fall below two pounds, nor to exceed ten pounds. Between these limits the award will be fixed by the Committee according to the opinion they may form of the value of the improvement or invention for which claim has been made. But in the case of an invention or improvement being considered by the Committee worthy of a greater award than 10*l.*, they shall submit a report on the same to the firm, who may sanction either (1) the granting of such greater award than 10*l.*; or (2) should the invention be considered worthy of being protected by patent, an award of 10*l.*, together with the taking out at the firm's expense of provisional protection at the Patent Office on behalf of the inventor, all with a view to enable him either to dispose of his invention during the period of protection, or to make arrangements for completing the patent at his own or his friend's expense, provided always, that the firm shall have for all time coming the use of any such invention so provisionally protected at their expense, free from the payment of any royalty or patent rights that may be chargeable on the same, should the patent be completed.
4. The Committee shall, in the case of difference of opinion, decide the matter by vote, the majority ruling.
5. After the Committee have completed their investigation of a claim, the Secretary shall intimate their decision to the claimant, and, if it is favourable, enclose an order on our firm, signed by the President, for payment of the amount awarded, and this order shall be payable on presentation to our cashier.
6. The Secretary shall, under the direction of the President, keep full minutes of the proceedings and decisions of the Committee, which must be approved by the Committee at the first meeting after that to which the minutes refer.
7. No award shall be made excepting on a clearly defined and written statement of the claim, which must be lodged with the Secretary. All statements of claims are to be engrossed in the minutes.
8. If any claimant desires such help, the Secretary will put his claim into proper form, and write it out for him. All claims, however, must be signed by the claimant.
9. The Committee will meet once during the first week of each month, when necessary, and for as many evenings following as may be required to despatch the business in hand.
10. The Committee may call before them, as evidence on the claims made to them, any person in our employ, or, if necessary, any member of the firm.
11. We reserve to ourselves the right to modify, change, or annul any, or the whole of the foregoing rules.

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 Technical
 Education for
 Shipbuilders.

(Signed) Wm. Denny & Bros.

Leven Shipyards,
 Dumbarton, 1st December 1881.

Appendix LL.

Memorandum
respecting
Designs for
Linen.

APPENDIX LL.

MEMORANDUM WITH RESPECT TO DESIGNS FOR LINEN.

Paris, March 25, 1883.

I made inquiries about the designing for the linen trade in the north of France.

It appears that these manufacturers have various ways of getting up drawings.

Some have designers attached to their works, some have them in their house of sale in Paris. One or two designers (merchants of designs) sell them now and then some ideas.

I am told, by one of these merchants of drawings, who see them now and then, that one of the two best manufacturers of this class of goods has a private studio in Paris, and scarcely ever buys a drawing.

It is the "Maison de Blanc"; another firm "La maison Casse" of Lille has a few designers in its works in that town, and buys ideas, often enough from the Parisian designers, who work for that speciality. The designing part of this trade is often artistic, but employs very few hands.

* * *

Appendix MM.

Memorandum
respecting
designing for
Lace.

APPENDIX MM.

MEMORANDUM WITH RESPECT TO DESIGNING FOR LACE AT NOTTINGHAM.

It is rather a difficult matter to go into the entire question of the relations between the School of Art, and the designing for lace. There is no doubt that the lace trade is greatly indebted to the school, inasmuch as it is there that they receive their art education. Designing for lace is not specially taught there. The greater part of the lace designs are designed by Nottingham men, but, there is no doubt that the French still beat us both in taste and imagination.

The French designers work well for a couple of years when here, but, after that time they lose all their freshness, and have to go back to Paris to get fresh ideas and inspirations. We still, however, have to buy a great many French designs, for after all Paris leads the fashions.

The great advantage our School of Art offers, is that the scholars are taught drawing thoroughly, and learn to discriminate between the true and the false in art. I think the great use of the schools of art, and art museums is that the public (that is the buyer) is learning to judge what is good in art, and consequently is constantly compelling the manufacturers to improve their designs.

* * *

APPENDIX 2.
ZÜRICH CANTONAL SCHOOL.
TIME TABLE OF GYMNASIUM.
(See Vol. I., p. 21.)

I.—LOWER GYMNASIUM.

Subject.	Number of Hours devoted to each Subject.			
	Class I.	Class II.	Class III.	Class IV.
	Religion	2	2	2
German	4	4	3	3
Latin	10	8	5	7
Greek	—	7	7	7
French	—	—	6	6
Mathematics	4	4	3	3
History	2	2	3	3
Geography and Natural Sciences	3	2	—	2
Singing	1*	1*	1*	1*
Writing	2	—	—	—
Drawing	2	2	2	—
Gymnastics	2	2	2	2†

* An additional hour of choir practice optional.

† Three hours in summer.

N.B.—Religious instruction optional; also Greek in Lower School and Hebrew. Students in Upper School who take Greek need not study English. Those students who take Hebrew may drop French.

II.—UPPER GYMNASIUM.

Subject.	Number of Hours devoted to each Subject.		
	Class I.	Class II.	Class III.
Religion	—	2	—
German	4	4	3
Latin	7	7	7
Greek	7	7	7
French	3	3	3
English	3*	—	—
Hebrew	—	4	3
Mathematics	4	4	3
History	3	3	3
Natural Sciences —			
a. Physics	2	3	1-2
b. Physical Geography	—	—	2-3
c. Chemistry	3	—	—
d. Natural History	—	2	—
Singing	1†	1†	1†
Gymnastics	2	2	2
Exercises with Arms	1‡	1‡	—

* Will subsequently be introduced in all three classes.

† Half of the time devoted to gymnastics, for rifle practice, &c., in summer.

‡ Optional.

APPENDIX 2—continued.

TIME TABLE OF THE INDUSTRIE SCHULE.

A.—PREPARATORY SCHOOL.

Subjects.	Hours of Study per week.
Religion	2
German	6
French	6
History	4
Geography	3
Natural History	3
Mathematics	3
Calligraphy	3
Freehand Drawing	4*
Singing	1†
Gymnastics	1

* Two hours in winter.
† One hour optional.

B.—TECHNICAL DIVISION.

Subjects.	Number of Hours.		
	Class 2.	Class 3.	Class 4.
Religion	2	—	—
German	4	3	3
French	5	6	3
English	5	6	4
Physics	—	4	4
Chemistry	—	3*	2
History	3	2	—
Geography	3†	—	—
Natural History	3‡	—	—
Mathematics	7	6	6
Geometrical and Technical Drawing	4	4	4
Freehand Drawing	2	4‡	2
Singing	1‡	1‡	—
Gymnastics	3	3‡	3
Mechanics	—	3	3
Practical Geometry	—	1‡	4
		3	0

NOTE B.—In the Natural Science Division the classes in German, French, English, History, Physics, Chemistry, Mathematics, Singing, and Drill are identical with the above; there are also the following added subjects:—Minerology 3 hours in winter only. Laboratory work in Chemistry 4 hours in winter; Botany 4 hours in summer, and Freehand Drawing 2 hours.

NOTE C.—In the Natural Science Division the classes in German, French, English, Physics, History, Drawing, Singing, and Gymnastics are identical with the above; there are also the following added subjects:—Chemistry 6 hours, Minerology 3 hours, Botany 3 hours, and Mathematics 3 hours. Singing is optional in all the classes, as is also the Religious Instruction.

* Four hours in winter. † One hour in winter.
‡ In winter only. § Two hours in winter.
¶ Optional.

C.—MERCANTILE DIVISION.

Subjects.	Number of Hours.	
	Class 2.	Class 3.
Religion	2	—
German	4	3
French	5	6
English	5	4*
Italian	5*	4*
History	3	3
Geography	2	2
Physics	3	—
Chemistry	3	3†
Knowledge of Merchandise	—	1‡
Algebra	1	—
Mercantile Arithmetic	4	4
Theory of Commerce	2	2
Book-keeping and Accounts	1	2
Calligraphy	2	—
Freehand Drawing	2	2*
Singing	1	1*
Gymnastics	3‡	3‡

Choral Singing not obligatory for any class. Exercises with military weapons and rifle practice on Saturday afternoons. Military drill 1 hour in winter.

* Optional. † One hour in winter.
‡ Two hours in winter.

APPENDIX 3.

Appendix 3,

EDUCATIONAL EXPENDITURE OF THE CANTON OF ZURICH.

Educational
Expenditure of
the Canton of
Zurich.

(See Vol. I, p. 21.)

The budget of the Canton of Zurich for the whole of its education, for which information we have to thank the Regierungsrath Zollinger of the Obmanant, Zurich, amounts to 1,847,490 fr. (73,900*l.*). The following are the principal items of expenditure :—

	fr.
Office expenses - - - - -	22,300
The University - - - - -	192,800
Contribution to Federal Polytechnic - - - - -	16,000
<i>Gymnasium</i> - - - - -	81,000
<i>Industrie Schule</i> - - - - -	44,000
Miscellaneous expenses on cantonal school - - - - -	12,900
Veterinary school - - - - -	25,100
Normal schools - - - - -	54,950
Technikum at Winterthur - - - - -	84,200
Libraries and collections - - - - -	50,600
Scholarships and bursaries to teachers and students - - - - -	59,000
Gas, water, and coals - - - - -	17,000
Primary schools - - - - -	1,010,700
Pensions, &c. - - - - -	108,550
Military drill - - - - -	2,500
Sundry subventions, Winterthur, &c. - - - - -	65,890
Total - - - - -	1,847,490

The estimated expenditure of the canton under all heads being, for 1882, 5,845,144 francs, it follows that the education vote absorbs nearly 32 per cent. of the total expenses of the canton. In addition to the cantonal expenditure on education, each commune pays for its own primary schools. Thus, for example, the estimated outlay of the town of Zurich for 1881 for education purposes amounts to 437,900 fr. (17,513*l.*). Of this total, elementary schools take 119,448 fr., 183,710 are allotted to higher elementary schools, 15,290 fr. for the *Real Gymnasium*, 30,075 fr. for the higher girls' school and the normal schools for female teachers, 96,724 fr. for miscellaneous expenses, and 105,000 fr. for interest on loans for the erection of school buildings.

Appendix 5.

Educational
statistics of the
Kingdom of
Saxony.

APPENDIX 5.

EDUCATIONAL STATISTICS OF THE KINGDOM OF SAXONY.

See Vol. I., p. 23.

STATISTICS of the ELEMENTARY SCHOOLS, PRIVATE SCHOOLS, &c., of SAXONY,
for the year ending December, 1880.

	Number of Schools.	Number of Pupils.	Number of Classes.	Number of Teachers Places.*	Number of actual Teachers (active).†		
					Male.	Female.	Total.
Public Elementary Schools.	2,146	471,918	10,061	5,909	5,736	1,678 (1,534)	7,406
Continuation Schools	7,978	67,776	2,936				
Sp. School Bodenbach	1	84	3	Included in the Seminaries.			
Sp. Seminary Exercise Schools.	18	2,069	75				
Deaf and Dumb Schools.	2	354	30	36	41 (6)	7 (7)	46
Private Elementary Schools with State Sanction.	96	6,854	419	—	244	291	535
Private continuation Schools.	20	1,979	30				
Private Teachers and Governesses giving lessons at home.	—	—	—	—	30	94	124
Totals - - -	4,161	551,621	13,233	5,945	6,041 (5)	2,070 (1,542)	8,111

* Excluding places for Needlework Teachers (female) and teachers of manual work.

† Including 1,462 Needlework Teachers (female) and five teachers of manual work, the numbers of these being also given in parentheses.

ELEMENTARY - OR PRIMARY - SCHOOL.

OBSERVATIONS.

- 1) *The Elementary instruction is obligatory for all children from the 6th to the 13th year of their age, unless they go to a higher school.*
 - 2) *The Students of the Humanistic Gymnasium can pass into all the faculties of the University and the Polytechnic, those from the Real Gymnasium can only enter the Polytechnic and the Philosophic faculty of the University.*
 - 3) *Students who have passed through the Industrie-Schule can likewise enter the Polytechnic.*
- Munich May 1882.*

APPENDIX 5—continued.

Appendix 5.

EDUCATIONAL STATISTICS OF THE KINGDOM OF SAXONY—continued.
 SUMMARY of all the SCHOOLS in SAXONY under the MINISTER of EDUCATION
 and CULTUS, December 1880.

Educational
 statistics of the
 Kingdom of
 Saxony.

	Number of Schools and In- stitutions.	Number of pupils and scholars.	Number of Classes.	Number of teachers	Amount of Teachers' salaries.	Total amount of expenses of Schools.	Amount of State aid.
1. University (Leip- sic.	1	3,444	-	173*	23,037	53,370†	24,905‡
2. Polytechnic (Dresden).	1	478	-	33	8,338	13,467	12,203
3. Gymnasiums	15	4,768	171	340	51,183	81,424	32,239
4. Real Schools of Class I.	19	3,183	141	244	29,640	36,646	8,735
5. Real Schools of Class II.	20	2,633	126	214	24,136	34,738	10,660
6. Seminaries	18	3,376	115	273	34,818	62,301	46,921
7. Special Seminary Exercise Schools.	12	2,069	76		included under Seminaries.		
8. Institute for training teachers of gymnastics.	1	60	-	4	383	695	458
9. Higher Girls' Schools (san- ctioned).	2	543	29	38	4,450	6,988	-
10. Pensions granted to teachers of Higher Schools, or to their orphans and widows.	-	-	-	-	-	5,737	included under 12-14
11. Higher (second- ary) Private Schools	3	829	47	103	-	-	-
12. Public Elementary Schools.	2,146	471,916	10,081				
13. Continuation Schools.	1,878	67,776	2,688	7,404	519,087	704,706‡	66,975‡
14. School at Roden- bach.	1	64	3				
15. Deaf and Dumb Institutions.	3	364	30	47	4,135	16,307	8,930
16. Private Element- ary Schools, with State sanction.	96	6,854	419	535	-	-	-
17. Private Continuation Schools, with State sanction.	20	1,979	30				
18. Private Teachers and Governesses in Houses.	-	-	-	124	-	-	-
Totals	4,539	569,213	13,961	9,560	899,317	1,004,297	213,973

* Including 54 Privat-Dozenten.

† Excluding the cost of erection, amounting to 229,941.

‡ Here are included certain pensions granted to teachers of Higher and Elementary Schools.

APPENDIX 6.

PROGRAMME of the ÉCOLE D'APPRENTISSAGE DE GARÇONS of HAVRE.
(See Vol. I., p. 49).

Course.	* Day.	6.30 to 8.0 (in Summer).	8.0 to 8.40.	8.40 to 9.30.	9.30 to 10.0.	10.0 to 12.0.	12.0 to 2.0.	2.0 to 3.40.	3.40 to 3.30.	3.30 to 4.0.	4.0 to 6.0.	6.0 to 7.0 (in Winter).	
Elementary Course (2nd Section). Prof. M. Letellier.	Monday	Drawing	Manual work.						French Arithmetic Writing	Arithmetic French	Reading Hist. & Geog. Geometry	Manual work	Drawing
	Tuesday	Do.	Do.						Arithmetic French	Reading Arithmetic	Geometry Writing	Do.	Do.
	Wednesday	Do.	Do.									Do.	Do.
	Thursday	Do.	Do.									Do.	Do.
	Friday - Saturday	Do.	Do.									Do.	Do.
Elementary Course (1st Section). Prof. M. Letellier.	Monday	Drawing	French Arithmetic Writing	Arithmetic French	Reading Hist. & Geog. Geometry	Manual work		Manual work.				Drawing	
	Tuesday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Wednesday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Thursday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Friday - Saturday	Do.	Arithmetic French	Reading Arithmetic	Geometry Writing	Do.		Do.				Do.	
Intermediate Course (2nd Section). Prof. M. Tubaut.	Monday	Drawing	Manual work.						French (Reading) French (Reading)	Comm. Arith. Arithmetic	History Geometry Geography	Manual work	Drawing
	Tuesday	Do.	Do.									Do.	Do.
	Wednesday	Do.	Do.									Do.	Do.
	Thursday	Do.	Do.									Do.	Do.
	Friday - Saturday	Do.	Do.									Do.	Do.
Intermediate Course (1st Section). Prof. M. Stoeff.	Monday	Drawing	French (Reading) French (Dictation) French (Reading)	Arithmetic	History Geometry	Manual work		Manual work.				Drawing	
	Tuesday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Wednesday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Thursday	Do.	Do.	Do.	Do.	Do.		Do.				Do.	
	Friday - Saturday	Do.	French (Comp.) French	Arithmetic Do.	Manual work. Rep. Hist. & Geo.	Do.		Do.				Do.	
Superior Course. Prof. M. Tubaut.	Monday	Drawing	8.0 to 9.0.	9.0 to 10.0.	10.0 to 12.0.			Manual work.				Drawing	
	Tuesday	Do.	French (Reading) French (Dictation)	Arithmetic Geometry	Manual work			Do.				Do.	
	Wednesday	Do.	Mechanics	Hist. & Geog.	Manual work.			Do.				Do.	
	Thursday	Do.	Do.	Do.	Do.			Do.				Do.	
	Friday	Do.	French (Style)	Geometry	Do.			Do.				Do.	

Dinner and Recreation.

APPENDIX 7.

THE ROYAL FACHSCHULE OF ISERLOHN, PRUSSIA.

Appendix 7.

Prospectus of
the Royal Fach-
schule of
Iserlohn, Prussia.

(See Vol. I., p. 51.)

The object of this Institution, as an Academy of Arts, is to impart a thoroughly sound education, at once Scientific, Technical and Manual. The subjects comprehend the manufacture of Iron, Copper, Brass, Bronze, Nickel and Silver.

To aid the students in acquiring a comprehensive, well-grounded, practical knowledge of the diverse processes and successive stages of manufacture in those metals, they have the advantage of spacious drawing halls, auditoriums, workshops replete with all necessary apparatus, instruments, tools, machinery, &c., and a steam engine of six-horse power, all within the walls of the institution.

The establishment is conducted under proper supervision in every department, and all suitable measures are adopted to maintain the students in vigorous health, both of body and mind. From time to time excursions are made to visit the picturesque scenery of the neighbourhood, as well as into Rhenish-Prussia, and visits are paid to the large industrial establishments in the district.

The terms for the Science Instruction begin after the Easter vacation, but instruction in Manual Work can be commenced at any time. No student is bound to attend all the branches of instruction specified in the Prospectus.

The school fee is 1*l.* per quarter.

PROSPECTUS.

A. Scientific Education.

FIRST YEAR.

1. Model Drawing.
2. Ornamental Drawing.
3. Geometry.
4. Geometry applied to Design.
5. The German Language.
6. General Arithmetic and Book-keeping.
7. Algebra.
8. Natural Philosophy.

SECOND YEAR.

1. Ornamental Drawing.
2. Anatomical Drawing (the human figure).
3. The Science of Shadows.
4. The Science of Perspective.

5. The German Language.
6. The Science of Projection.
7. Mechanical Calculations.
8. Natural Philosophy.
9. Technical Chemistry.
10. Mechanics.

THIRD YEAR.

1. Composition and Designing.
2. Drawing from the Antique.
3. The History of the Arts.
4. The German Language.
5. Natural Philosophy.
6. Technology.
7. Technical Chemistry (Laboratory).
8. Statistics.

Appendix

Prospectus of
the Royal Fach-
schule of
Iserscheln.

B. Manual Education Division.

FIRST YEAR.

1. Modelling in Fine Clay.
2. Carving Wood.
3. Moulding and Carving in Gypsum.
4. Moulding in Sand.
5. Chipping and Filing.

SECOND YEAR.

1. Modelling in Wax.
2. Carving in Wood.
3. Carving in Gypsum.
4. Moulding in Sand and Wax.
5. Casting in Bronze.
6. Shaping.
7. Planing.
8. Drilling.
9. Turning in Wood.

10. Turning in Metal.
11. Chasing in the Lathe.
12. Pressing, Stamping, and Coining.

THIRD YEAR

1. Forging.
2. Soldering.
3. Burnishing.
4. Embossing.
5. Chasing.
6. Engraving.
7. Etching.
8. Scouring.
9. Varuishing.
10. Galvanizing.
11. Nickel-Plating.
12. Fire-gilding.

THEODORE BEUTER, Director.

Appendix 8.

Report on
Technical
Training in
Prussia.

APPENDIX 8.

REPORT ON TECHNICAL TRAINING IN PRUSSIA by HERR VON PUTTKAMMER.

(See Vol. I., p. 82.)

The following is a resumé of a Report on the Organisation of Technical Instruction in Prussia, prepared for the Commission by Herr von Puttkammer.

No Technical
Instruction for
foremen and
workmen in
Prussia.

In the first place, it appears that no system has yet been developed for the technical instruction of foremen and workmen in Prussia. Such arrangements as exist, differ in various places, and cannot be regarded as permanent. Indeed it may be said that by far the larger proportion of skilled artisans, foremen, and operatives in Prussia have no opportunity afforded them, and, it may be added, often exhibit no desire to obtain further information than they have gained in the primary school, where the instruction in drawing, of such special importance to the future artisan, has hitherto not received the attention it deserves. An improvement in this direction is contemplated, but its execution will be tedious and costly.

Technical educa-
tion for masters
and managers.

Secondly. The technical education of the persons intending to become masters and managers of industrial establishments has been placed in Prussia on a systematic basis. This is especially the case for the subjects of mechanical and civil engineering, chemistry, and architecture, and for his purpose, technical high schools of Berlin, Hanover, and Aachen have been established, the cost of these establishments being borne solely by the State. All persons employed in the Civil Service in the branches of engineering or architecture are obliged to attend one or other of the above schools, and are required to pass examinations in the several courses of study, whilst entrance to the technical high schools is allowed only to those who can present the leaving certificate from a gymnasium, Real gymnasium, or an upper Real school, indicating the proper completion of a strict preliminary training.

Side by side with this advanced system of technical instruction in Prussia a number of "Real" and "Trade" schools exist. These perform the function of giving a training of a less advanced type available for persons in the position of sub-managers, or for students of secondary rank. The higher class of these schools are called upper real schools, and include a course of instruction spread over nine years; others, of a somewhat lower type, have courses lasting for six or seven years; these latter are termed burgher schools, and in them a general education is given. For carrying on the technical training of pupils from these, or from the primary schools, or of persons already apprenticed or engaged in trade, a class of schools known as "trade schools" (Fachschulen) exist. The number of these institutions in Prussia is but small, and efforts recently made for their increase and improvement have not been so successful as might be wished, the reason being that the locality is obliged to defray the cost of buildings, and half the annual expenses not covered by school fees. The fact that the total annual cost to the State of these schools does not exceed 18,000*l.* proves that they can neither be numerous nor of an elaborate character.

- The technical schools proper of Prussia include the following:
- (a.) Eight building schools in Berlin, Nienburg, Eikernförde, Breslau, Höxter, and Idstein.
 - (b.) One school for machine construction at Einbeck.
 - (c.) Four weaving schools at Crefeld, Mulheim, and Einbeck.
 - (d.) A training school for basket makers at Heinsberg.
 - (e.) A trade school for pottery at Höhr.
 - (f.) A trade school for workers in metal at Iserlohn and another at Remscheid.

In addition to these special schools about 10 or 12 trade drawing schools exist in various towns, as well as trade continuation-schools for apprentices and artisans under 18 years of age, who can, by local enactment, be compelled to attend these schools, their employers being bound to grant them the necessary time, and attendance at such obligatory schools is recognised by the State. In cases where the obligatory attendance is enforced, the State pays half the expenses, but the total yearly amount of State grant is not more than 8,000*l.* The most recent additions to this class of school are the artisan school in Berlin, and the Sunday and evening school at Breslau. In neither of these, however, is the attendance compulsory, and the number of pupils in the classes last winter was 700 and 400 respectively.

Other more special technical institutions are the agricultural schools, the educational workshops of the State railways, the navigation schools, and the higher mining schools. Each of these sets of schools is placed under the direction of the Departmental Ministry. Of 561 apprentices in the Government railway workshops, 277 attended the special schools established for their benefit. Of the navigation schools about 14 exist. They provide a suitable training for persons entering the merchant service, assisting them in obtaining the knowledge requisite for passing the prescribed examinations for steersmen. No schools for the education of mates or petty officers exist in Prussia. Seven mining schools proper exist in Prussia, viz., in Tarnowitz, Eisleben, Bochum, Siegen, Dillenburg, Saarbrücken, and Clausthal, whilst five preparatory or inferior schools for a lower grade of miners are established in the mining centres.

A Royal Commission on technical instruction in Prussia is now sitting for the purpose of receiving communications on the development of the opportunities for technical instruction.

Appendix 8.

Report on
Technical training
in Prussia.Technical
Schools of
Prussia.Trade drawing
schools.Number of
pupils.Other technical
schools.Royal Commission
on Technical
Instruction.

APPENDIX 9.

PROFESSIONAL AND INDUSTRIAL EVENING INSTRUCTION IN BELGIUM.

(See Vol. I., p. 55.)

	Schools established at	Date of Formation.	Subsidies granted in 1878.*	Special Instruction in each School.†	Duration of Course.	No. of Students in 1878.
			£			
1	Antwerp	1800	869	Architecture, book-keeping	3 years	149
2	Arion	1878	190	Architecture, painting, wood-carving	3 "	75
3	Air	1871	818	Architecture	3 "	116
4	Bruges	1853	360	Designing for lace-work, architecture	6 "	106
5	Brussels	1809	905	Mechanics and steam-engines, photography, drawing for working painters	3 "	619
6	(Girls)	1868	1,648	Modelling and painting industrially applied, foreign languages, needlework, dress-making and cutting out, artificial-flower making.	3 "	329
7	Charlevoix	1846	1,084	Commercial geography, mechanics and steam engine, metallurgy, mining, modelling	3 "	1,074
8	Châtelet	1879	314	Drawing, "soudeserie," mechanics, mining, metallurgy	3 "	455
9	Courtrai	1868	510	Land-surveying, mechanics, course for stokers and drivers of steam-engines	3 "	196
10	Purnee	1809	145	Drawing, architecture	3 "	89
11	Ghent	1833	1,874	Photography, ornamental drawing, spinning, and weaving	3 "	887
12	Russelt	1864	274	Architecture, drawing, painting, wood-carving	4 "	125
13	Deux-Houdong	1864	178	Special course for workmen, engine-fitters, foremen, and gangers	3 "	215
14	Huy	1838	341	Mechanics, construction	4 "	180
15	Jambouix	1868	118	Drawing	3 "	138
16	Junot	1870	313	Accounts, mechanics, commerce, Flemish language, chemistry	3 "	144
17	Lilloe	1826	604	Mechanics, chemistry, mathematics	3 "	308
18	Louvain	1876	300	Drawing, accounts, mechanics, construction	3 "	269
19	Marchienne-au-Pont	1873	350	Drawing, mechanics	3 "	100
20	Mouvaux-sur-Sambre	1873	373	Industrial drawing, metallurgy, mining	3 "	368
21	Morlanwelz	1871	454	Mechanics, land-surveying, mining	3 "	186
22	Namur	1861	378	Accounts, mechanics, construction, chemistry, masons' work	3 "	234
23	Nivelles	1878	313	Drawing, wood-carving, architecture, mechanics	4 "	147
24	Ostende	1867	318	Drawing, mechanics	3 "	168
25	Pâturages	1868	132	Mechanics, mining, drawing	3 "	117
26	Rouais (discontinued in 1879)	1868	136	Flemish, geography, mechanics, chemistry, drawing	3 "	148
27	Saint-Ghislain	1868	133	Mining, industrial mechanics	3 "	253
28	Seraing	1858	495	Mathematics, mechanics, metallurgy, commercial sciences	3 "	264
29	Seraing	1859	880	Mechanics, masons' work, modelling, architecture	3 "	146
30	Tournai	1800	301	Construction and industrial drawing, mechanics foundry-work for hosiery and boiler-making.	2 "	89
31	Verrires	1862	983	Machine construction, dyeing, weaving, woollen manufacture	3 "	393
32	Ypres	1866	143	Knowledge of materials, construction, architecture	5 "	150
	Total		£ 16,613		Total	8,387

APPENDIX 10.

TIME TABLE of the AMBACHTS SCHOOL at ROTTERDAM.
(See Vol. I, p. 66.)

DAYS.	Hour.	First Class.			Second Class.		Third Class.		Remarks.
		A (Smiths).	B.	C.	A (Smiths).	B.	A (Smiths).	B.	
MONDAY.	8	Nature of Tools	Drawing Ornament	Rectilinear Drawing	Reading	Drawings of Construction	Arithmetic	Drawing Ornament	↑ of 15 minutes per week to be spent in the morning.
	9	Linear Drawing	Writing	Drawing Ornament	Drawings of Construction	Arithmetic	Drawing Details of Construction		
	10	Drawing of Ornament	Linear Drawing Industrial Work	Mental Arithmetic Dutch Language Industrial Work	Drawing Ornament Arithmetic Industrial Work	Writing Drawing Ornament Industrial Work			
	11	Industrial Work							
TUESDAY.	8	Arithmetic	Linear Drawing	Drawing Ornament	Arithmetic	Drawings of Construction	Steam Machinery	Drawing Ornament	
	9	Linear Drawing	Drawing Ornament	Arithmetic	Nature of Tools Drawings of Construction Geometry Industrial Work	Mental Arithmetic Drawing Ornament Industrial Work	Drawing Details of Construction Industrial Work		
	10	Dutch Language	Arithmetic Industrial Work	Linear Drawing Industrial Work					
	11	Drawing Ornament			Industrial Work				
WEDNESDAY.	8	Linear Drawing	Drawing Ornament	Writing	Drawing Ornament	Drawing Details of Construction	Theory of Steam Machinery	Arithmetic Knowledge of Materials	
	9	Mental Arithmetic	Linear Drawing	Drawing Ornament	Writing				
	10	Writing	Drawing Ornament	Linear Drawing Industrial Work	Theory of Steam Machinery Drawing of Construction Industrial Work	Algebra Geometry	Industrial Work		
	11	Drawing Ornament	Arithmetic					Industrial Work	
8	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work			

APPENDIX 10—continued.

TIME TABLE of the AMBACHTS SCHOOL at ROTTERDAM—continued.
 (See Vol. I., p. 66).

Days.	Hours.	First Class.			Second Class.		Third Class.		
		A (Smiths).	B.	C.	A (Smiths).	B.	A (Smiths).	B.	
THURSDAY.	8	Linear Drawing	Arithmetic	Drawing Ornament	Algebra	Drawings of Construction	Nature of Tools		Carving and Modelling, 9-12.
	9	Arithmetic	Reading	Linear Drawing	Drawing Details of Construction	Drawing Ornament	Drawings of Construction		
	10	Drawing Ornament	Linear Drawing	Arithmetic			Arithmetic	Industrial Work	
	11	Reading		Drawing Ornament	Descriptive Geometry	Industrial Work			
12	Industrial Work	Industrial Work	Industrial Work	Industrial Work		Industrial Work	Industrial Work		
FRIDAY.	8	Arithmetic	Drawing Ornament	Linear Drawing	Drawing Details of Construction	Nature of Tools	Algebra	Drawing Ornament	Wood Turning, 1-4.
	9	Drawing Ornament	Linear Drawing	Arithmetic						Arithmetic	Drawings of Construction	Descriptive Geometry
	10	Linear Drawing	Arithmetic	Drawing Ornament	Algebra	Drawings of Construction	Industrial Work		
	11						Mental Arithmetic	Industrial Work		Industrial Work
12	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work			
SATURDAY.	8	Arithmetic	Linear Drawing	Drawing Ornament	Arithmetic	Drawings of Construction	Drawings of Construction	Drawings of Construction.	
	9	Linear Drawing	Drawing Ornament	Reading						Theory of Steam Machinery	Arithmetic	Drawing Ornament
	10	Drawing Ornament	Arithmetic	Linear Drawing	Drawings of Construction	Reading	Industrial Work		
	11	Linear Drawing	Industrial Work	Arithmetic				Drawing of Ornament		Industrial Work
12	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work	Industrial Work			

APPENDIX 10—continued.

TIME TABLE OF THE AMBACHTS SCHOOL, AMSTERDAM.
(Vol. I., p. 65.)

SUBJECTS.	MONDAY.				TUESDAY.			WEDNESDAY.				THURSDAY.			FRIDAY.			SATURDAY.			Hours weekly.				
	Class.				Class.			Class.				Class.			Class.			Class.			I.	II.	III.	IV.	
	I.	II.	III.	IV.	I.	II.	III.	I.	II.	III.	IV.	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.	IV.	
Linear and Architectural Drawing.	8-12	8-12	8-12		8-12	8-12	8-12					8-12	8-10	8-10	8-12	8-12							18	10	12
" " Afternoon													2-4	2-4	2-4					6-12					4
Details of Construction																									2
Plan Drawing														10-12	10-12										6
Ornamental Drawing								2-12	2-12	2-4	2-4														2
" " Afternoon								2-4	2-4	8-12	8-12														2
Drawing from Nature			2-4	2-4																					6
Modelling	2-4	2-4	2-4										2-4	2-4	2-4										6
Continuation of	2-4												2-4												1
Reading	2-3A				2-3	2-4							4-5			3-4	3-3								1
Writing	2-4B												5-6												1
Grammar													5-6	4-5	5-6										2
Arithmetic					2-4	2-3	2-3	4-5	5-6	4-5				4-5	5-6										2
Algebra and Geometry																									2
Physics and Mechanics																									2
Reading and Repetition																									2
Carpentry	4	—	8		4	—	8	6	—	8			6	—	8	4	—	8							16
Forging	4	—	8		4	—	8	6	—	8			6	—	8	4	—	8							16
Turning	6	—	8		6	—	8	6	—	8			6	—	8	6	—	8							16
Wood Carving	4	—	8		4	—	8	6	—	8			6	—	8	4	—	8							16
Knowledge of Materials																									2

APPENDICES, &c.

Appendix 10.
Time Table of
the Ambachts
School, Amsterdam.

Appendix 11.

APPENDIX 11.

Time Table of
the Women's
Work School,
Reutlingen.

TIME TABLES OF THE WOMEN'S WORK SCHOOL, REUTLINGEN.
(See Vol. I, p. 170.)

1a.—LITERARY SUBJECTS, taught at the HIGHER GIRLS' SCHOOL.

Subjects.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Essays	—	8-9	—	—	—	—
Literature	—	—	9-10	—	—	9-10
Arithmetic	—	—	—	9-10	—	—
Geography	10-11	—	—	—	—	—
History	—	9-10	—	—	—	10-11
Chemistry	8-9	—	—	10-11	—	—
French	9-10	10-11	10-11	—	—	8-9
English	—	—	8-9	—	—	—

1b. LITERARY and GENERAL EDUCATIONAL SUBJECTS taught at the
WOMEN'S WORK SCHOOL.

Subjects.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Book-keeping and Commercial Arithmetic	—	4-5	4-5	4-5	4-5	—
Correspondence and Business Essays	4-5	—	—	—	—	—
General Housekeeping and Domestic Economy	—	—	—	5-6	—	—
Lectures on History and Literature	5-6	—	—	—	—	—
Gymnastics, Dancing, and Deportment	—	—	5-7	—	6-7	—

2a. ARTISTIC COURSES at the WOMEN'S WORK SCHOOL.

Subjects.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Linear Drawing	2-4	—	—	—	—	—
Freehand Drawing	—	2-4	—	—	—	—
Projection and Drawing applied to pattern cutting	—	—	—	2-4	—	—
Painting and Laws of Colour	—	—	—	—	2-4	—
Style and History of Costume	—	—	2-4	—	—	—

APPENDIX 11—continued.

3. INSTRUCTION IN NEEDLEWORK, &c., DRAWING applied to SAME, and PAINTING.

Subjects.	Monday.		Tuesday.		Wednesday.		Thursday.		Friday.		Saturday.		
	Morning.	After-noon.	Morning.	After-noon.	Morning.	After-noon.	Morning.	After-noon.	Morning.	After-noon.	Morning.	After-noon.	
Knitting and Crochet	Hand work	8-12	2-6	10-12	2-6	8-12	2-6	8-12	2-6	10-12	2-6	—	—
	Applied drawing	—	—	8-10	—	—	—	—	—	8-10	—	8-12	—
Hand sewing*	Hand work	—	2-6	8-12	2-6	8-12	2-6	8-12	4-6	8-12	2-6	—	—
	Applied drawing	8-12	—	—	—	—	—	—	2-4	—	—	8-12	—
Machines ewing†	Hand work	8-12	4-6	—	2-6	8-10	2-6	8-12	2-6	8-12	2-6	8-12	—
	Applied drawing	—	2-4	8-12	—	10-12	—	—	—	—	—	—	—
Dressmaking†	Hand work	8-10	2-6	8-12	2-6	10-12	2-6	8-12	2-6	8-12	2-6	—	—
	Applied drawing and painting	10-12	—	—	—	8-10	—	—	—	—	—	—	—
Embroidery	Hand work	8-12	2-6	10-12	2-6	8-12	2-6	8-12	2-6	10-12	2-6	8-12	—
	Applied drawing and painting	—	—	8-10	—	—	—	—	—	8-10	—	—	—
Trimming and flower making	—	—	—	—	—	—	—	—	—	—	—	—	2-6
Ironing	—	—	—	—	—	—	—	—	—	—	—	—	2-6
Cutting-out and fitting-on	8-12	2-6	8-12	2-6	8-12	2-6	8-12	2-6	8-12	2-6	8-12	—	—

* Two parallel courses a and b.

† Three parallel courses a, b, and c.

APPENDICES, &c.

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Appendix 11.
 The Ministry of
 Education,
 Work School
 Birmingham.

APPENDIX 12.

TIME TABLE OF LA MARTINIÈRE SCHOOL.

(See Vol. I, p. 74.)

ARRANGEMENT of the CLASSES for BOYS, school year 1881-82.

Begin.	End.	Year.	Section.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
To March 27th 7.45	27th 9.0	3rd	A.	Drawing.	Drawing (V.D.). Mathematics.	Drawing. Mathematics.	Drawing. Mathematics.	Drawing. Mathematics.	Drawing (V.D.). Mathematics.
			B. C.	Mathematics. Mathematics.					
After March 27th 7.50	27th 8.45	1st	D.	Mathematics.	Mathematics. Mathematics.	Mathematics. Mathematics.	Mathematics. Physics.	Mathematics. Mathematics.	Physics. Mathematics. Mathematics.
			E. F.	Mathematics. Physics.					
To March 27th 9.10	27th 10.40	3rd	A.	Mathematics.	Physics. Drawing.	Chemistry. Drawing.	Physics. Drawing.	Chemistry. Drawing.	Mathematics. Drawing.
			B. C.	Drawing. Drawing.					
After March 27th 9.55	27th 10.40	1st	D.	Drawing.	Drawing. Drawing.	Drawing. Drawing.	Drawing. Drawing.	Drawing. Drawing.	Drawing. Drawing. Drawing.
			E. F.	Drawing. Drawing.					

APPENDIX 12—continued.

TIME TABLE OF LA MARTINIÈRE SCHOOL—continued.

ARRANGEMENT OF THE CLASSES FOR BOYS, school year 1881-82—continued.

Begin.	End.	Year.	Section.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.	
To March 27th 10.50	11.50	3rd 2nd 3rd	A.	Hist. and Geog.	Grammar.	English.	Grammar.	English.	Accounts.	
After March 27th 10.50	11.50		B.	English.	Hist. and Geog.	English.	Grammar.	Mathematics.	Hist. and Geog.	English.
			C.	Accounts.	English.	English.	Hist. and Geog.	Mathematics.	Hist. and Geog.	English.
After March 27th 10.50	11.50	3rd	D.	Shop-work.	Modelling.	Writing.	Shop-work.	Modelling.	Writing.	
			E.	Modelling.	Writing.	Shop-work.	Modelling.	Writing.	Shop-work.	
			F.	Writing.	Shop-work.	Modelling.	Writing.	Shop-work.	Modelling.	
11.50	2.10	Dinner -	Lessons in weaving for 2nd year students on Tuesdays, Thursdays, and Saturdays from 11.50 to 12.50, and for 3rd year students on Mondays, Wednesdays, and Fridays at the same hour. The 2nd and 3rd year students of the workshop section are engaged on the same days and at the same hour as the above, in work in the shops.							
Begin.	End.	Year.	Section.	MONDAY.	TUESDAY.	WEDNESDAY.	FRIDAY.	SATURDAY.		
2.10	3.25	3rd 2nd 1st	A.	Chemistry.	Chemistry.	Mathematics.	Grammar.	Chemistry.		
			B.	Chemistry.	Chemistry.	Chemistry.	Chemistry.	Chemistry.		
			C.	Chemistry.	Chemistry.	Chemistry.	Chemistry.	Chemistry.		
			D.	Physics.	Mathematics.	Mathematics.	Grammar.	Grammar.		
			E.	Grammar.	Hist. and Geog.	Grammar.	Mathematics.	Mathematics.		
			F.	Grammar.	Grammar.	Hist. and Geog.	Mathematics.	Mathematics.		
									Chemistry.	

APPENDIX 12—continued.

TIME TABLE OF LA MARTINIÈRE SCHOOL—continued.

ARRANGEMENT of the CLASSES for BOYS, school year 1881-82—continued.

Begin.	End.	Year.	Section.	MONDAY.	TUESDAY.	WEDNESDAY.	FRIDAY.	SATURDAY.
3.35	4.35	3rd 2nd 1st	A. B. C. D. E. F.	Mathematics. English. Grammar. Hist. and Geog. Physics. Mathematics.	Mathematics. Accounts. Hist. and Geog. Spelling. Grammar. Arithmetic.	Grammar. Accounts. English. Arithmetic. Grammar.	Mathematics. English. Mathematics. Hist. and Geog. Grammar. Arithmetic.	Mathematics. Physics. Grammar. Spelling. Writing. Morals. Spelling.
				Mathematics. English. Grammar. Physics. Grammar. Mathematics. Hist. and Geog.	Accounts. Grammar. English. Grammar. Spelling.	Comml. Geog. English. Grammar. Grammar. Mathematics. Mathematics.	Morals. Grammar. English. Mathematics. Hist. and Geog. Grammar.	English. Writing. Morals. Arithmetic. Grammar. Grammar.
5.53	7.0	Preparation work carried on under the charge of the ushers of each section.						

APPENDIX 12—continued.

TIME TABLE of LA MARTINIÈRE SCHOOL for GIRLS—continued.

ARRANGEMENT of the CLASSES, school year 1881-82—continued.

A. 1st Year's Studies. B. 2nd Year's Studies. C. 3rd Year's Studies.

1. Commercial Section. 2. Industrial Drawing Section. 3. Dress-making, &c. Section.

Begin.	End.	Year and Section.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
3.30	4.0	Recreation.						
4.0	5.30	A. 1.	English.	English.	English (Prep.)	English.	English (Prep.)	English.
		B. 1.	English (Prep.)	Needlework.	Writing.	Accounts (Prep.)	English (Prep.)	Accounts (Prep.)
		C. 1.	English (Prep.)	Accounts (Prep.)	Accounts (Prep.)	Needlework.	Accounts (Prep.)	Accounts (Prep.)
		A. 2.	Drawing.	Drawing.	Needlework.	Drawing.	Drawing.	Drawing.
		B. 2.	Drawing.	Drawing.	Drawing.	Drawing.	Drawing.	Drawing.
		C. 2.	Drawing.	Drawing.	Drawing.	Drawing.	Drawing.	Drawing.
		A. 3.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.
		B. 3.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.
		C. 3.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.	Needlework.

Appendix 13.

Budget of the
Professional
School of Rheims.

APPENDIX 13.

BUDGET OF THE PROFESSIONAL SCHOOL OF RHEIMS.
See Vol. I, p. 78.

	£
Salary of Director	200
" Teacher of French, History, Geography, and Political Economy	120
" Teacher of Mathematics	138*
" " German	68
" " English	60
" " Spinning and Weaving	138
" " Mechanics and Drawing, who is also chief of the workshops for erecting and pattern-making	138
" Teacher of physical sciences who is also entrusted with the course of evening public lectures	148
" Teacher of agriculture and natural sciences	60
" General Superintendent in charge of the classes	120
" Elementary schoolmaster	92
" Usher	80
" } also receive board and lodging	32
" Additional usher	24
Payment of Foreman for working in iron	24
" " " wood	96
" " " spinning and weaving	80
" drill instructor	20
" hall porter	40
" laboratory assistant	54
" labourer	26
Various payments for extra teaching	52
Office expenses, printing, and postage	22
Expenses of chemistry course	100
" workshops	108
Scholarships	40
Maintenance of Library	16
Prizes	28
Heating, lighting, and housekeeping expenses	140
Structural repairs, &c.	60
Total	2,414
Receipts for the year 1880, 140 students at 4l. each	560
Deficit	-1,854

As the school contained 140 pupils the cost for each pupil to the town of Rheims was 13l. 5s.

* The minimum salary of the teachers has been fixed at 120l. per annum, which is subject to an increase of 16l. every 5 years.

APPENDIX 13—*continued.*

MUNICIPAL PROFESSIONAL SCHOOL OF RHEIMS—TIME TABLE FOR 1881-82.

(See Vol. I., page 78.)

		Third Year.	Second Year.	First Year.		Preparatory Class.	
				Section A.	Section B.	Hours.	Subjects.
MONDAY	8-9	Account Keeping. German and English. Handicraft and Workshops.	Mathematics. Ditto. German and English. Preparation.	French. Ditto. Workshops.	Mathematics. Ditto. Workshops.	8-9½	Arithmetic. Preparation. French.
	9-10					9½-10½	
10½-11½	10½-12						
	11-12					1½-2½	Writing. Preparation. Geography.
	11-12	Workshops. Mechanics.	Workshops and Handicraft.	Drawing. Mathematics.	Drawing. French.	2½-3½	
	4-5½					4-5	
TUESDAY	7-8	Mathematics. Ditto. Handicraft and Workshops.	Chemistry. Ditto. Geography. Ditto.	German. Ditto. Natural History. Writing. Preparation.	Natural History. English. Preparation. Writing.	As above.	Arithmetic. Preparation. French.
	8-9					"	
	9-10					"	
	10½-11					"	
	11-12	"					
	11-12	Workshops. Mathematics.	Drawing. French.	Workshops. Chemistry.	Workshops. Chemistry.	"	Drawing. Preparation. Natural History.
	11-12					"	
	4-5½					"	

Note.—All the lessons are preceded by preparatory work.

APPENDICES, &c.

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Appendix 13.
Time table of
the Professional
School of Rheims.

APPENDIX 13—continued.

MUNICIPAL PROFESSIONAL SCHOOL OF RHEIMS—TIME TABLE FOR 1881-82—continued.

—	Third Year.	Second Year.	First Year.		Preparatory Class.		
			Section A.	Section B.	Hours.	Subjects.	
WEDNESDAY.	7-8 8-9 9-10	— Political Economy. Commerotal Geography. Handicraft and Workshops.	— Handicraft. Ditto. Drawing.	German. Ditto. Geography. Workshops.	— Geography. English. Workshops.	8-9½ 9½-10½ 10½-12	Arithmetic. Preparation. French.
	10½-12	Workshops. German and English. Accounts.	Physica. Preparation. Mathematics.	Drawing. Preparation. French.	Drawing. Preparation. Mathematics.	1½-2½ 2½-3½ 4-5	History of France. Preparation. German and English.
THURSDAY	8-9 9-10 10½-12	Mathematics. Ditto. Mechanics.	History. German and English. Natural History.	Chemistry. Ditto. Mathematics.	Chemistry. Ditto. French.	As above. " "	Arithmetic Preparation. French.

Note.—All the lessons are preceded by preparatory work.

APPENDIX 13—continued.

MUNICIPAL PROFESSIONAL SCHOOL OF BREIMS—TIME TABLE FOR 1881-82—continued.

		Third Year.	Second Year.	First Year.		Preparatory Class.	
				Section A.	Section B.	Hours.	Subjects.
FRIDAY	7-8	Law and Civic Education, Handicrafts and Workshops.	Chemistry. Ditto. Drawing.	German. Ditto. Natural History. Workshops.	Natural History. English. Workshops.	8-9½	Arithmetic. Preparation. French.
	8-9					9½-10½	
	9-10		Workshops. German and English.	Workshops. French.	Drawing. Physics.	Drawing. Physics.	10½-12
	10½-12						1½-2½	Writing. Preparation. Geography.
	1½-3					2½-3½	
	4-5½					4-5	
SATURDAY	8-9	Chemistry and Practical Work in Laboratory.	Account Keeping. German and English. Drawing.	Mathematics. Ditto. Workshops.	French. Ditto. Workshops.	As above.	Arithmetic. Preparation. French.
	9-10					As above.	
	10½-12	Gymnastics. Physics.	Workshops. Mathematics.	Drawing. French.	Drawing. Mathematics.	As above.	Writing and Gymnastics. History of France.
	1½-3					As above.	
	4-5½				As above.		

Note.—All the lessons are preceded by preparatory work.

APPENDICES, &c.

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Appendix 13.
Time Table of
Municipal Professional
School, Breims.

APPENDIX 14—*continued.*

Appendix 14.

Technicum,
Winterthur.TECNICUM AT WINTERTHUR—*continued.*SUMMER SESSION, 1882.—PLAN SHOWING ARRANGEMENT OF STUDIES IN
EACH CLASS—*continued.*

CLASS III. B.		CLASS III. C.	
	Hours.		Hours.
Physics	3	Physics	3
Mathematics	3	Mineralogy and Petrography	2
Descriptive Geometry	3	Outlines of Geology	1
Practical Geometry	2	Inorganic Chemistry (Technic)	8
Architectural Drawing	3	Organic Chemistry, Volumetric and Quantitative Analysis	9
Building Materials	3	Introduction to Organic Chemistry	3
Building Construction	5	Laboratory work	18
Mineralogy and Petrography	2	Agricultural Chemistry	3
Ornamental Drawing	4		
Modelling	4		

CLASS III. H.		CLASS III. M.	
	Hours.		Hours.
German	3	Physics	3
French	4	General Mechanics	6
English	4	Algebra	4
Italian	4	Trigonometry	3
Mercantile Arithmetic	4	Descriptive Geometry	2
Algebra	2	Theory of Construction	4
Mercantile Geography	4	Machine Drawing	12
Theory of Exchange	2		
Book-keeping	2		
Political Economy	2		
Knowledge of Merchandise	2		
Physics	3		

CLASS III. G.		CLASS III. K.	
	Hours.		Hours.
Physics	3	Descriptive Geometry	2
Algebra	4	Architectural Drawing	4
Trigonometry	4	Styles of Architecture	8
Practical Geometry	5	Freehand Drawing	-
Land Mensuration	4	Technical " " }	-
Planning	4	Modelling	-
Descriptive Geometry	2		
Mineralogy and Petrography	2		
German	3		

* In accordance with the profession adopted by the student.

APPENDIX 15.

TIME TABLE of the ÉCOLE D'ARTS et MÉTIERS at CHÂLONS-SUR-MARNE.
(See Vol. I., p. 109.)

Division.	—	Hours.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.	SUNDAY.
1	Morning	6 to 7½	Preparation	Preparation for Chemistry or Physics.	Preparation for Grammar.	Rise at 5.80 Questions in Grammar.	Preparation	Preparation for Grammar.	Rise at 6.80 Dressing, Recreation, Breakfast Review, Mass at 8.0 o'clock, From 8½ to 10½, Recreation and Library, From 10 to 12, Preparation for all the 3 Divisions, From 12 to 14, Dinner and interval for Recreation, From 14 to 2, Dressing and preparing for Walk, At 2.0, Walk or free time for Study, At 6.0, Supper, From 6.30 to 7.0, Recreation, From 7 to 8, Free time for Study, Bed (1st half year at 8.0, 2nd " at 8.30.
	Afternoon	7½ to 8	Chemistry or Physics. Workshops Drawing Religious Instruction Workshops Grammar	Breakfast and short interval for recreation for all the 3 Divisions, except on Sunday Mechanics Workshops Drawing Instruction Workshops Supper and short interval for recreation for all the 3 Divisions daily, except on Sunday Preparation for Mechanics.	Preparation Preparation Workshops Drawing Workshops Grammar	Workshops Workshops Drawing Workshops Preparation for Mechanics.	Chemistry or Physics. Workshops Drawing Workshops Preparation for Chemistry or Physics.	Mechanics Workshops Drawing Workshops Preparation for Mechanics.	
2	Morning	6 to 7½	Grammar	Preparation	Questions in Grammar, Mathematics	Preparation for Chemistry or Physics.	Grammar	Preparation	Preparation for Grammar. Account } Pre-keeping } ration. Workshops Drawing Workshops Preparation for Mathematics. Workshops Preparation for Grammar.
	Afternoon	7½ to 8	Mathematics Workshops Drawing Workshops Preparation for Mathematics.	Account } Pre-keeping } ration. Workshops Drawing Workshops Preparation for Grammar.	Workshops Drawing Religious Instruction Workshops Preparation for Mathematics.	Workshops Drawing Workshops Preparation for Chemistry or Physics.	Workshops Drawing Workshops Preparation for Mathematics.	Workshops Drawing Workshops Preparation for Grammar.	
3	Morning	6 to 7½	Preparation	Grammar	Preparation	Preparation for Grammar, Mathematics	Preparation	Questions in Grammar, Grammar	Notes—Questions are asked daily during the work time in the Shops from 9.15 to 10.45.
	Afternoon	7½ to 8	Mathematics Workshops Drawing Workshops Preparation for Grammar.	Mathematics Workshops Drawing Workshops Preparation for Mathematics.	Account } Pre-keeping } ration. Workshops Drawing Workshops Preparation for Mathematics.	Workshops Drawing Religious Instruction Workshops Preparation for Mathematics.	Prepa- } Account } ration } keeping. Workshops Drawing Workshops Preparation for Grammar.	Workshops Drawing Workshops Preparation for Mathematics.	

Appendix 16.

Programme of
the École
Centrale, Paris.

APPENDIX 16.

PROGRAMME OF THE ÉCOLE CENTRALE DES ARTS ET MANUFACTURES
PARIS.

(See Vol. I., p. 177.)

1st YEAR.

	No. of Lessons.
Mathematical Analysis (Differential and Integral Calculus) -	30
Kinematics and General Mechanics -	52
Descriptive Geometry -	60
General Physics (Heat, Electricity, Magnetism, Acoustics, and Optics) -	60
General Chemistry (Metalloids, Metals, and Organic Sub- stances) -	60
Mineralogy and Geology -	30
Biology (Zoology and Botany) -	35
Machine construction -	20
Architecture -	24

2nd YEAR.

Applied Mechanics (Theory) -	60
" " of Construction (Resistance appliquée) -	22
Construction and erection of machinery -	52
Industrial Physics (Heat, Gas, Ventilation) -	45
Principles of the Steam Engine -	35
Analytical Chemistry -	50
Technology (Metals, Colours and Dyes, Pottery and Glass) -	36
Mining (1st part) -	25
Civil Architecture and Construction -	54
Zootechny -	20
Phytotechny -	20
Industrial legislation -	30

3rd YEAR.

Applied Mechanics -	60
Construction and erection of machinery -	55
Industrial Chemistry -	45
General Metallurgy and the Metallurgy of Iron -	52 to 55
Mining (2nd part) -	15
Public Works -	60
Railways -	60
Rural Economy -	40

Note.—During each year the pupils have to prepare designs and drawings, and to work in the laboratory under the guidance of the professors.

APPENDIX 17.

PROGRAMME OF THE ZÜRICH POLYTECHNIC SCHOOL.
(See Vol. I., p. 188.)

Appendix 17.

Programme of
the Zürich
Polytechnic
School.

I.—SCHOOL OF ARCHITECTURE (Total Course, Seven Sessions)

School of
Architecture.

1st YEAR'S COURSE (Two Terms).

	No. of Hours per Week.
Higher Mathematics, with revision	4
Descriptive Geometry, with applications	6
Theory of Building Construction	3
Exercises in Building Construction	6
Architectural Drawing	6
Drawing of Ornament	4
History of Ancient Art	4
Modelling in Clay (4 hours, optional).	

2nd YEAR'S COURSE (Two Terms).

Theory of Style	3
Exercises in Composition	6
Theory of Building Construction	2
Exercises in Building Construction	6
Theory of Structures	2
Perspective	1
Exercises in Perspective	2
Drawing of Ornament	4
Road-making	2
Mechanics of Construction	4
Landscape Drawing	4

3rd YEAR'S COURSE (Two Terms).

Theory of Style	3
Architectural Designs	6
Ornament	3
Heating and Ventilation	2
Exercises in Building Construction	4
Theory of Structures	2
Technical Geology	2
Laws relating to Building	3
Figure Drawing	6
Modelling	4

7th TERM.

Drawing of Ornament and Coloured Decoration	4
History of Renaissance Architecture in Italy	3
Architectural Design	12
Landscape Drawing.	

In the Summer Term there are additional lectures on the Mechanics of Construction and the Chemical Technology of Building Materials in the First Year's Course, and on Petrography and General Law in the Second Year's Course.

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Appendix 17.

Programme of
the Zurich
Polytechnic
School.
School of
Engineering.

II.—SCHOOL OF ENGINEERING (Seven Sessions).

1st YEAR'S COURSE.

	No. of Hours per Week.
Differential and Integral Calculus	6
Repetition of each subject	1
The same subject in French, 6 hours, with repetition, 1 hour	7
Descriptive Geometry, with revision	4
Exercises in Descriptive Geometry	4
Technical Mechanics, Part I.	2
Revision of ditto in groups	2
Theory of Building Construction	3
Exercises in Building Construction	4
Plan Drawing in two groups, each two hours	4

2nd YEAR'S COURSE.

Theory of Ordinary Differential Equations	2
Exercises on the above	1
Theory of Differential Equations	2
Revision of same	1
Technical Mechanics, Part II.	6
Revision of the same in groups, each	1
Descriptive Geometry, with revision of same	5
Technical Geology	2
Topography	2
Theory of Machine Construction (Lectures)	3
Exercises in ditto	3
Applied Physics	1
Repetition.	1

3rd YEAR'S COURSE.

Theoretical Machine Construction, Part II. (Theory of Heat and Steam Engines)	4
Repetition.	1
Geodesy	3
Graphic Statics, Lecture	2
" Exercises	2
Earthworks—Stone Bridges and Tunnel Construction	3
Repetition, in three groups, each	1
Exercises in Engineering Construction	6
Weir Construction and Hydraulic Engineering	2
Map Drawing	3
Introduction to Astronomy	3
*The Manufacture and Testing of Building Materials, with Practical Use of the Testing Machine. (2 hours.)	
*National Economy (Fundamental Principles). (4 hours.)	
*The Principles of Applied Electricity. (2 hours.)	

7th Session.

Iron Bridges and Railway Construction	4
Revision of the same, in three groups, each	1
Weir Construction and Hydraulic Engineering	2
Exercises in Construction	6
Map Drawing	3
Laws of Property	3

* Optional.

	No. of Hours per Week.	Appendix 17. Programme of the Zurich Polytechnic School.
Mechanism of the Heavens	3	
Revision of Astronomy, in two groups, each	1	
*Selected Chapters on Subjects relating to Electric Telegraphy. (3 hours.)		

In the Summer Term there are Lectures for the School of Engineering in the Chemical Technology of Building Materials, Astronomy, Part I., Practical Work in the Observatory, Continuation of Graphic Statics, Exercises in Land Surveying and Petrography.

III.—SCHOOL OF MECHANICAL TECHNOLOGY (Six Sessions).

School of
Mechanical
Technology.

1st YEAR'S COURSE.

Differential and Integral Calculus	6
Revision of same in groups, each	1
Differential and Integral Calculus, 6, and Revision, 1 (French)	7
Descriptive Geometry	4
Exercises in Descriptive Geometry	4
Analytical Geometry	3
Revision of same in groups, each	1
Technical Mechanics, Part I.	2
Revision of same in groups, each	1
Machine Drawing	6

2nd YEAR'S COURSE.

Theory of Simple Differential Calculus	2
Exercises on the same	1
Theory of Differential Equations	2
Exercises	1
Technical Mechanics, Part II.	6
Revision of same in groups, each	1
Technical Physics	3
Revision of same	1
Theoretical Machine Construction (Introduction, Elements of Machinery)	4
Revision of same	1
Practical Machine Construction	10
Mechanical Technology (Methods of Shaping Solid Bodies)	4
Revision of same	1
*Spinning (3 hours).	
*Sewing Machines (1 hour).	

3rd YEAR'S COURSE.

Theoretical Machine Construction, Part II. (Theory of Heat and the Steam Engine)	4
Revision and Exercises on same.	
Theory of Slide-valve and Governor	2
Revision of same and Exercises.	
Turbines, Water Wheels, and Water Power Machines	4
Practical Machine Construction	10
Analytical Mechanics	3
Revision of same, in groups	1

* Optional.

Appendix 17.

Programme of
the Zurich
Polytechnic
School.No. of
Hours
per Week.

Civil Architecture and Drawing Exercises	5
*Spinning (3 hours)	
*Sewing Machines (1 hour)	
*The Principles of Electro-Technology (2 hours)	
*National Economy (Fundamental Principles) (4 hours)	
*Selected chapters on subjects relating to Electric Telegraphy (3 hours)	

In the Summer Session in the First Year's Course there will be Additional Lectures in Chemistry and Mechanical Technology. (The further Optional Instruction in Mechanical Technology embraces, distributed over a Two Years' Course, Lectures on Spinning, Weaving, Paper-making, Milling, &c.)

School of
Chemical
Technology.

IV.—SCHOOL OF CHEMICAL TECHNOLOGY.

A.—*Technical Branch* (Six Sessions).

1st YEAR'S COURSE.

Higher Mathematics, with revision of same	5
Inorganic Chemistry	6
Revision of the same	1
Analytical Chemistry, Part I.	2
Practical Chemical Analysis	12
Elements of General Botany	3
Mineralogy	4
Revision of same	1

In the Summer Session the above subjects will be continued; Lectures on Analytical Chemistry, Part II., Organic Chemistry, Practical Analysis, Chemical Physics, Petrography, and Anthropology.

2nd YEAR'S COURSE.

Metallurgy	2
Preparation of Chemical Products, Part I.	3
General Theory of Machinery	3
Technical Drawing	3
Chemistry of the Benzole Derivatives	4
Chemical Physics	4
Revision of the same	1
Practice of Chemical Technology	12

In the Summer Session the continuation of these subjects and Lectures on the Chemical Technology of Building Materials, the Preparation of Chemical Products, Part II., Mechanical Technology, Technical Agricultural Botany, Technical Drawing, Heating and Ventilation, Practical Technical Work.

3rd YEAR'S COURSE.

Vegetable and Animal Fibres, Dyeing, Bleaching Colouring	4
Matters	1
Illuminants	1
Glass and Clay Wares	1
Practical Chemical Analysis	18

* Optional.

	No. of Hours per Week	Appendix 17. Programme of the Zurich Polytechnic School.
Practical Chemical Technology	18	
Estimation of Minerals	8	
General Geology	4	

In the Summer Session the continuation of these subjects: Fibres, Dyeing, Bleaching, Food Stuffs, Paper-making, Practical and Technical Analysis. In the Third Year attendance at only one of the Laboratories is compulsory, the choice being left to the Student.

B.—*Pharmaceutical Branch* (Four Sessions).

Pharmaceutical
Branch.

1st YEAR'S COURSE.

Inorganic Chemistry	6
Revision of the same	1
Analytical Chemistry	2
Practical Chemical Analysis	12
Preparation of Chemical Products, Part I.	3
Mineralogy	4
Revision of the same	1
Experimental Physics	4
Revision of the same	1
General Botany	5

In the Summer Session the continuation of these subjects: Organic Chemistry and Analysis, Practical Analytical Work, Experimental Physics, Preparation of Chemical Products, and Pharmaceutical Zoology.

2nd YEAR'S COURSE.

Practical Technical Chemistry	12
Study of Pharmaceutical Preparations	4
Analysis of Food Stuffs	2
General Geology	4

In the Summer Session these subjects will be continued: Technical Practice, Preparation of Chemical Products, Pharmaceutical Chemistry, and Special Botany.

V.—SCHOOL OF AGRICULTURE AND FORESTRY.

School of
Forestry.

A.—*School of Forestry* (Course Five Sessions).

1st YEAR'S COURSE.

Mathematics, with revision	4
Experimental Physics, with revision	4
Inorganic Chemistry	6
Revision of the same	1
Zoology	4
Principles of General Botany	3
Principles of Forestry	3
Plan Drawing	2

In the Summer Session there will be additional teaching in Organic Chemistry, Special Botany, Petrography, Preservation of Forests, with Applied Zoology and Botanical Microscopic Work.

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Appendix 17.

2nd YEAR'S COURSE.

Programme of the Zurich Polytechnic School.	No. of Hours per Week
Plan Drawing	2
Topography	3
Road Making and Hydraulic Engineering	3
Agricultural Chemistry	2
General Geology	4
Fundamental Principles of National Economy	4
Theory of Climate as affecting Forestry	4
Adaptability of varieties of Timber Trees for Forests	2
Principles of Taxation	3
Excursions and Practical Exercises	1 day

In the Summer Session there will be Exercises in Land Surveying Vegetable Physiology with Experiments, Principles of Civil Law, Formation of Forests, the History of State Domains, and Statistics relating to the same, Business Principles, Excursions, and Practical Work.

5th TERM.

Principles of Business	2
Laws of Commerce and Valuation of Timber and Forest Trees	4
Practical Utilization of Forests	3
Excursions and Practical Exercises	1 day
Land Surveying, Use of Theodolite, &c.	3
Laws relating to Property	3

School of
Agriculture.

B.—*School of Agriculture* (Total Course, Five Sessions).

1st YEAR'S COURSE.

In this division the Professors are entitled to allot to each Student a special course of study in accordance with his requirements and capacity.

Mathematics, with revision	4
Inorganic Chemistry	6
Revision of same	1
Experimental Physics, with revision	5
Zoology, with special attention to the Animals useful and destructive to Agriculture and Forestry	4
Principles of General Botany	3
Fundamental Principles of National Economy	4
Introduction to the Study of Agriculture, Theory of General Agriculture (Farm Management), Part I.	2
Plan Drawing (3 hours, optional).	

In the Summer Session the course will embrace Organic Chemistry, Experimental Physics, Anatomy and Physiology of Domestic Mammalia, Special Botany, Vegetable Physiology, Microscopic Work, Petrography, General Agricultural Management, History and Literature of Agriculture and Plan Drawing.

2nd YEAR'S COURSE.

Agricultural Chemistry, Part I. (Nourishment of Plants)	2
General Geology	4
Financial Economy (with special reference to the Taxation of Switzerland)	2

	No. of Hours per Week	Appendix 17. Programme of the Zurich Polytechnic School.
General Agriculture	5	
Drainage and Irrigation	2	
General Theory of Cattle Breeding	2	
Theory of General Farm Management, Part II.	3	
Diseases of Cattle	2	
Agricultural Machinery and Implements	3	
Microscopic Exercises (with special reference to the Diseases of Plants)	2	
Road Making and Hydraulic Engineering (3 hours, optional).		
Topography (3 hours, optional).		

In the Summer Term there will be Agricultural Chemistry, Exercises in the Agricultural Chemistry Laboratory, Microscopic Exercises, General and Special Cultivation of Plants, Breeding of Cattle, Diseases of Cattle (especially Murrain), Horse Management, Shoeing, and Breeding of Horses, Principles of Agricultural Machinery and Implements, Road Making and Hydraulic Engineering, Topography, Surveying, General Theory of Law, and Theory of Farm Management.

5th TERM.

Estimates of Agricultural Produce, and Book-keeping	2
Sheep Farming and Pig Keeping	3
Practical Agriculture	2
Agricultural Chemical Technology (Sugar Making, Distillation of Spirits, &c.)	2
Practical work in Laboratory of Agricultural Chemistry	6
Vine Growing and Production of Wine	2
Fruit Growing and Knowledge of Fruits	1
Planning of Farm Buildings	1
General Theory of Law	3
Utilisation of Forests (3 hours, optional).	
Critical Examination of the Rotation of Crops (2 hours, optional).	

VI.—SCHOOL FOR TEACHERS OF MATHEMATICS AND NATURAL PHILOSOPHY.

School for
Teachers of
Mathematics
and Natural
Philosophy.

No special course is laid down for Students in this division, as the authorities will prepare individual plans of study adapted to the direction in which the training is required, and which plans may involve attendance at lectures in other departments.

A.—Mathematical Section.

Mathematical
Section.

A complete normal programme with a four years' course serves as the foundation of the plan of study.

Opportunities are generally given to take part in the Seminaristic practice in Physics in the Third Year, and in Mathematics in the last three terms. Notice must be given to the authorities.

FIRST YEAR'S COURSE.

Differential and Integral Calculus	6
Revision of the same	1
Differential and Integral Calculus and revision (in French)	7
Analytical Geometry	3
Revision of the same	1
Technical Mechanics, Part I.	2
Revision of the same	1
Descriptive Geometry, with revision	4
Exercises in Descriptive Geometry	4

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Appendix 17.

Programme of
the Zurich
Polytechnic
School.

	No. of Hours per Week
Technical Drawing	4
Topography	3
Spherical Trigonometry	1
" " (in French)	1

THE THREE SUCCEEDING YEARS' COURSES.

Theory of Simple Differential Equations	2
Exercises on the above	1
Theory of Differential Equations (in French)	2
Exercises on the above	1
Descriptive Geometry, with revision	5
The Invariants of Curves and Surfaces of the Second Degree	2
Algebraic Space Curves	2
Technical Mechanics, Part II.	6
Revision of the same in groups, each	1
Analytical Mechanics	3
Revision of the same	1
Plane Curves	2
Technical Physics	3
Revision of the same	1
Analytical Optics	2
The Principles of Electricity	2
Practical Physical Work (including 1 hour's Lecture)	5
Introduction to the execution of Physical Work	Daily
Seminariestic exercises in the sphere of Mathematical Physics	1
Theory of Elasticity	3
Introduction to the Theory of Analytical Functions	4
Introduction to Astronomy	3
Mechanism of the Heavens	3
Revision in two groups, each	1
Selected chapters from the History of Mathematics, Physics, and Astronomy	2
Mathematical School	2

Natural
Philosophy
Section.

B.—Natural Philosophy Section.

A normal programme with a 3 years' course forms the model on which the study-plans are based. Opportunities will be given for specialisation of the studies in the direction either of Physics and Chemistry or towards Natural History. In the last three sessions Seminariestic exercises are given in Physics and Chemistry on the one hand and in Botany, Mineralogy, and Geology on the other, applications for which must be made to the authorities.

1st YEAR'S COURSE.

Higher Mathematics, with revision	5
Inorganic Chemistry	6
Revision of same	1
Analytical Chemistry, Part I.	2
Mineralogy	4
Revision of same	1
General Botany, with revision of same	5
Zoology, Part I. (Inferior Animals)	4
Revision of same	1

THE TWO FOLLOWING YEARS' COURSES.

	No. of Hours per Week.	Appendix 17. Programme of the Zurich Polytechnic School.
Practical Chemical Analysis	12	
Practical Chemical Technology	12	
Preparation of Chemical Products	3	
Chemical Physics	4	
Revision of same	1	
Practical Work in Physics, with 1 hour of Lecture	5	
Methods of distinguishing Minerals	3	
Exercises with the Microscope	4	
Chemistry of the Benzoline Derivatives	4	
General Geology	4	
Revision of the above, with demonstrations	1	
Technical applications of Geology	1	
Zoology of Pre-historic Times	1	
Examination of Food Stuffs	2	
Examination and study of selected species of Plants	2	
Human Anatomy and Physiology	2	
Stratification of Aqueous Rocks	3	
The Gymnosperms	1	

VII.—SCHOOL OF GENERAL PHILOSOPHY AND POLITICAL ECONOMY.

OPTIONAL COURSES.

1.—Natural Science.

	No. of Hours per Week.	School of General Philosophy and Political Economy.
The Principles of Applied Electricity	2	
Experimental Physics	4	
Revision of the same	1	
Exercises with the Microscope	4	
General Botany	5	
Mineralogy	4	
Revision of the same	1	
General Geology	4	
Technical Applications of Geology	1	
Zoology, Part I. (Invertebrate Animals)	4	
Revision of the same	1	
Zoology of Pre-historic Times	1	
Chemistry of the Benzoline Derivatives	4	
Pharmaceutical Botany	3	
Volatile Oils and Camphor, from the Pharmaceutical Chemist's point of view	2	
Coal Tar Dyes	2	
Technical Botany	2	
The Gymnosperms	1	
Chemistry and Investigation of the most important Food Stuffs	2	
Revision of Organic Chemistry	2	
Examination of Food Stuffs	2	
Physical Chemistry (selected Chapters) (gratis)	1	
Vertebrata	2	
General Zoology	4	
Human Anatomy and Physiology (Part II.)	2	
General Entomology	2	
Paleontology, Gasteropoda and Cephalopoda	2	
Stratification of Aqueous Rocks	3	
History of Natural Creation	1	

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Appendix 17.

Programme of the Zurich Polytechnic School.	No. of Hours per Week.
Critical Examination of the System of Botation	2
Manures, and Theory of Food-stuffs	1
Photography	1
Starch, Fat, and Soap Manufacture (gratis)	1
General Botany	4
Exercises with the Microscope	2
Exhibition and description of selected species of Plants in the Herbarium	2
Exercises in the Laboratory for examination of Seeds	2
<i>2.—Mathematical Sciences.</i>	
Algebra	4
Trigonometry	2
Special Mathematics (to be divided up into short courses, should the interests of the Students render the same advisable)	6
Selected chapters from the History of Mathematics, Physics, and Astronomy	2
The Invariants of the Curves and Surfaces of the Second Degree	2
Algebraic Space Curves	3
Theory of Elasticity	3
Theory of Curved Surfaces	2
Method of Least Squares	2
Determinants, with applications	2
Algebraic Analysis	2
Theoretical Kinematics	2
Telephones and Electric Lighting (gratis)	2
Geographical Mathematics	3
Manufacture and Testing of Building Materials, with Demon- strations on the Testing Machine	2
Selected chapters on subjects relating to Electric Telegraphy (gratis)	2
Some new applications of Electricity (gratis)	1
The methods of Absolute Measurement	1
Linear Geometry	2
Introduction to the Theory of Analytical Functions	4
Higher Algebra, continuation (gratis)	2
Design of Engines (sketching exercises)	2
<i>3.—Languages and Literature.</i>	
French Literature and Language	-
Italian Literature and Language	-
History of German Literature in the 19th century	2
Shakespeare's Life and Works	1
Elements of English Grammar	2
Exercises in English Grammar and Composition	1
Macaulay's Biographical Essays read and explained	1
<i>4.—History and Political Economy.</i>	
History of Civilisation and Manners in the Middle Ages	2
History of the period from 1830 to 1866	3
History of Ancient Art from Egypt to Pompeii	4
History of Modern Painting (15th and 16th centuries) with reference to specimens in the Cabinet of Engravings	2
Principles of Political Economy (introduction)	4
Financial Economy, with special reference to the Taxation of Switzerland	2

	No. of Hours per Week.	Appendix 17. Programme of the Zurich Polytechnic School.
Conversations on Political Economy	3	
General Principles of Civil Law	3	
Laws relating to Exchange	2	
General Geology (gratis)	2	
Africa, as influenced by Nature and Civilisation (gratis)	2	
Public Legislation and Politics of Switzerland	2	
History of Swiss Publications in the 19th Century	1	
Main Considerations in Pedagogic Science, with reference to its Historical Development	1-2	

5.—Arts.

Exercises in Modelling, Ornament, and Stone-Carving	9
Drawing of Ornament, Study of Decoration and Colour	4
Landscape Drawing in Water-Colour, Sepia, and Pencil	4
Figure Drawing	6

6.—Military Science.

Organisation of War Material:—

(a) Army Organisation	4
(b) Defensive Operations	1
Revision of the same	2
General Theory of Weapons	2
Fortification	1
Artillery	1

APPENDIX 18.

PROGRAMME of the SPECIAL COURSE for INDUSTRIAL CHEMISTS
at the TECHNICAL HIGH SCHOOL, MUNICH.

(See Vol. I., p. 192.)

Appendix 18.

Programme of
the Special
Course for
Industrial
Students at
Munich.I.—For STUDENTS who have passed through a REAL GYMNASIUM of an
UPPER REALSCHULE.

	Hours per Week.			
	Winter Term.		Summer Term.	
	Lectures.	Exercises.	Lectures.	Exercises.
FIRST YEAR.				
General Experimental Chemistry	6	—	—	—
Experimental Physics	6	—	4	—
Analytical Chemistry, Part I.	—	—	3	—
Mineralogy	—	—	3	—
Crystallography	—	—	2	2
Higher Mathematics, Part I.	4	2	4	2
Descriptive Geometry	2	2	4	4
Practical Work in Chemical Laboratory	—	—	—	16
Linear Drawing	1	6	1	6

Appendix 18.

Programme of
the Special
Course for
Industrial
Chemists,
Munich.

	Hours per Week.			
	Winter Term.		Summer Term	
	Lectures.	Exercises.	Lectures.	Exercises.
SECOND YEAR.				
Organic Chemistry, including Theoretical Chemistry	—	—	4	—
Analytical Chemistry, Part II.	2	—	—	—
Quantitative and Volumetric Analysis	2	—	2	—
Geology and Mineralogy	5	—	—	—
Elementary Mechanics	3	—	3	—
Practical Work in Physical Laboratory	—	4	—	4
" " Mineralogical Laboratory	—	2	—	2
" " Chemical Laboratory	—	20	—	20
Optional: Botany and Zoology.	—	—	—	—
THIRD YEAR.				
Chemical Technology, with Metallurgy	4	—	5	—
Theory of Iron Manufacture	2	—	—	—
General Laws of Machine Construction*	3	—	3	—
Mechanical Technology, Part I. (Wood and Metal Working)	5	—	—	—
Practical Work in Chemical Laboratory	—	20	—	20
FOURTH YEAR.				
Materials used as Fuel, and Systems of Firing	2	Practical Work.	2	Practical Work.
Organic Colouring Matters	1	—	1	—
Theory of Building Construction, Part I.	1	2	1	2
Practical Work in Chemical Laboratory	—	30	—	30

* Will be discontinued in the Summer Session of 1882.

II.—For Students who have passed through a HUMANISTIC GYMNASIUM.

FIRST YEAR.				
Experimental Physics	6	—	4	—
Algebraical Analysis	3	—	3	—
Trigonometry	3	—	—	—
Descriptive Geometry	4	3	4	4
Linear Drawing	1	6	1	6
SECOND YEAR.				
General Experimental Chemistry	6	—	—	—
Analytical Chemistry, Part I.	—	—	2	—
Mineralogy	—	—	3	—
Crystallography	—	—	2	2
Higher Mathematics, Part I.	4	2	4	2
Practical Work in Chemical Laboratory	—	—	—	10
Linear Drawing	—	6	—	6
Optional: Botany and Zoology.	—	—	—	—

The work of the third, fourth, and fifth years will coincide respectively with the programme drawn up for the second, third, and fourth years for Students coming from a Real Gymnasium or Upper Realschule. (See Part I.)

APPENDIX 19.

Appendix 19.

PROGRAMME OF THE MUNICH INDUSTRIAL ART SCHOOL.
(See Vol. I., p. 159.)Programme of
the Munich
Industrial
Art School.

SUMMER TERM, 1882.—MALE DIVISION.

SUBJECTS IN PRELIMINARY SECTION.		Time.
1	Technical Drawing (Mechanical Drawing, Flat Washes, and Theory of Shadows)	Daily.
2	Architectural Drawing (Mouldings and Orders of Architecture)	"
3	Drawing of Ornament from Casts	"
4	Ornament painted from flat examples	"
5	Drawing of Figures, Animals and Drapery	"
6	Drawing from Flowers	"
7	Modelling from Ornament and Wood-carving	"
8	Modelling from the Figure and Wood-carving	"
9	Lecture, History of Art	Monday, 5.30 to 6.30.
10	" Styles of Ornament	Thursday, 5.30 to 6.30.
11	" Geometry and Projection	Tuesday and Friday, 6 to 8.30.
12	" Perspective and Perspective of Shadows	Thursday, 8 to 5.

SUBJECTS IN TECHNICAL SECTION.		Time.
I.	Architecture (Detail Drawings for Decoration of Buildings and Furniture)	Daily.
II.	Applied Ornament (Designing for Textiles, Carpets, &c.)	"
III.	Figure Drawing for Decoration (Vignettes, Medallions, &c.)	"
IV.	Decorative Painting (Wall and Ceiling Decoration)	"
V.	Glass Painting (Windows for Churches and secular purposes)	"
VI.	Modelling, including Carving (Internal Decoration, Furniture, &c.)	"
VII.	Metal Work (for decorative purposes, Furniture, Vessels, and Ornaments)	"
VIII.	Wood Engraving and Etching (special instruction only for Pupils of the above-mentioned technical classes)	"
IX.	Applied Art for Ceramics. General instruction, as also special exercises:— (a.) Drawing of Furniture and Vessels (b.) Flower Painting	Friday, Saturday, Wednesday and Thursday.

In addition to the above, the Students of the Art School have exercises in Time-Sketching and Time-Modelling, Studies in the Library. There are also competitions and excursions, on the results of which special designs are prepared.

SUMMER TERM, 1882.—FEMALE DIVISION.

SUBJECTS IN PRELIMINARY SECTION.		Time.
1	Technical Drawing, I. Course. Linear Drawing and Flat Washes	Wednesday and Thursday.
"	" " " Geometry and Theory of Projection	Tuesday, 8 to 11.30.
"	" " " II. Course. Theory of Projection (continuation)	Friday, 8 to 11.30.
"	" " " Perspective and Theory of Shadows	Monday, 5 to 6.30.
2	Drawing from Ornament	Daily.
3	Painting of Ornament from the Flat	"
4	Figures, Animals and Drapery	"
5	Flower Painting	Wednesday, 8 to 9.
6	History of Art	Saturday, 8 to 9.
7	Style	"

APPENDIX 20.

Appendix 20.

Programme of
Polytechnic
School, Paris.

PROGRAMME OF THE POLYTECHNIC SCHOOL, PARIS.

FIRST YEAR'S COURSE.

	Lectures.
Analysis: Differential calculus	25
Integral calculus	18
Descriptive geometry and geometrical drawing	32
Mechanics and machine construction	40
Physics: Comprising heat, electricity	30
Chemistry: The metals	30
Astronomy and geodesy	30
French composition and literature	25
History	25
German	25
Landscape and figure drawing	48

SECOND YEAR'S COURSE.

	Lectures.
Analysis: Integral calculus	32
Stereotomy: Details of construction in timber and masonry	28
Mechanics: Dynamics, hydrostatics, and machinery	40
Physics: Acoustics, optics, and heat	30
Chemistry: Continuation of metals, and Organic chemistry	30
Architecture: Construction of roads, canals, and railways	40
French composition and literature	25
History	25
German	25
Military art	20
Topography	2
Landscape and figure drawing	48

Appendix 21.

Programme of
the Entrance
Examination
to the Ecole des
Mines, Paris.

APPENDIX 21.

ÉCOLE NATIONALE DES MINES, PARIS.

(See Vol. I, p. 185.)

PROGRAMME OF THE ENTRANCE EXAMINATIONS TO THE ELEMENTARY CLASS.

Arithmetic.—Decimal notation. Division of integers. Division of prime numbers and of prime numbers by each other. Vulgar fractions. Exercises with fractions. Decimal fractions. Reduction of vulgar fractions to decimals. Weights and measures. Squares and cubes of whole numbers, and of the sum of two numbers. Squares and cubes of fractions. Concrete numbers. Simple interest. Use of logarithms.

Algebra.—Definitions. System of numeration. Multiplication. Simple equations. Compound equations with one unknown quantity. Arithmetical and geometrical ratios. The binomial theorem and its applications. General idea of the calculus.

Geometry.—Right line and plane. Triangle. Parallel right lines. On the circumference of the circle. Mensuration of angles. Use of ruler and compasses in constructing simple figures. Division of right lines and angles. Proportional parts of lines and plane figures. Relation between the perpendicular and the hypotenuse. Division of right lines into given parts or proportions. Regular polygons. Measurement of areas of plane figures. Proportion of the areas of 21 similar plane figures to each other and to the squares of similar sides.

Solid Geometry.—The plane and the right line. Definition and generation of dihedral angles. Ditto of trihedral angles. Polyhedral figures. The pyramid. Similar solids. The right cone with circular base. The sphere. The measurement of the volume of the figure generated by the rotation of a triangle on its axis and on one of its angles.

Plane Trigonometry.—Trigonometric lines. General idea of the formation of trigonometric tables. Solution of triangles. Any side and two angles of a triangle being given to find the remaining parts and the area. Applications of trigonometry to the solution of plane figures.

Analytical Geometry.—On geometrical equations and formula. Right-lined co-ordinates. Simple and compound equations with two solutions. Tangents and asymptotes to curves in general. The ellipse. The hyperbola. The parabola. Polar co-ordinates. On curves generally. On conic and cylindrical sections. Theory of projection. Rectilinear co-ordinates.

Descriptive Geometry.—Problems relating to the point, to the right line, and the plane. Problems relating to tangential planes. Intersections of curved surfaces.

Physics.—General outlines. Properties of solid bodies. Hydrostatics and hydrodynamics. The different states of matter. The thermometer. Capillary attraction. Static electricity. Magnetism. Geometrical optics.

Chemistry of the Metalloids.—General outlines. Oxygen, hydrogen, sulphur, chlorine, bromine, iodine, fluorine, phosphorus, arsenic, boron, silicon, carbon.

Appendix 23.

Programme of
the Delft
Polytechnic.

APPENDIX 23.

PROGRAMME OF THE DELFT POLYTECHNIC. (SESSION 1881-2.)
(See Vol. I., p. 203.)

MATHEMATICS.

a. Descriptive Geometry:			
IIa.	-	4 hours per week, 2 hours being devoted to drawing.	
IIb.	-	4 hours per week, 3 hours being devoted to drawing;	
		Course for beginners	- 1 hour per week.
b. Analytical Geometry:			
IIa.	-	-	- 2 hours.
IIb.	-	-	- 1 hour.
		Course for beginners	- 1 "
c. Spherical Trigonometry			
	-	-	- 1 "
d. Analysis (Calculus):			
IIa.	-	-	- 5 hours.
IIb.	-	-	- 4 "

MECHANICS.

a. General Course:			
IIa.	Kinematics	-	- 2 hours.
IIb.	Continuation	-	- "
b. Theory of Engineering Construction:			
IIa.	-	-	- 3 hours (after Easter, 2 hours.
IIb.	-	-	- 1 hour.
c. Hydraulics			
	-	-	- 1 "
			1 hour, after Christmas.
d. Elementary Course:			
IIa.	-	-	- 2 hours.
IIb.	-	-	- "

NATURAL SCIENCE.

a.	General, 2 years' course	-	- 3 hours.
b.	Special applications	-	- 2 hours.

CHEMISTRY.

a. Theoretical and Inorganic Chemistry:			
IIa.	-	-	- 2 hours.
IIb.	-	-	- 1 hour.
b. Organic Chemistry			
	-	-	- 2 hours.
c. Chemical Analysis			
	-	-	- 1 hour, after Christmas.
d. Chemistry of Building Materials			
	-	-	- 1 hour.
e. Laboratory Exercises:			
	Qualitative and Quantitative Analysis	-	- 9 hours.
	Do. for Mining Engineers	6	"
	Analysis of Building Materials	2	"

MINERALOGY.

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IIa. General Mineralogy	- 4 hours, before Christmas.	Programme of the Delft Polytechnic.
Special Mineralogy	- 4 hours, after Christmas.	
IIb. Special Mineralogy continued	- - - 2 hours.	
Geology	- - - "	
Mineralogical and Geological practical exercises	- - - "	
Introductory study of Mining	- - - "	

CHEMICAL TECHNOLOGY.

Two years' course.

IIb. Chemical Technology of Organic Substances	- 3 hours.
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MECHANICAL TECHNOLOGY.

IIIa. Metal Working	- - - 3 hours.
IIIc. Spinning, Weaving, and Paper Making	- - - "
Theory of Tools	- - - "
IIa. Motors	- - - "
Applied Mechanics	- - - "
Do.	- - - "
Exercises in connection with the foregoing subjects	- 5-6 hours.
Theory of Calorics	- 1 hour.

MACHINERY for BUILDING CONSTRUCTION and DRAWING for ditto.

a. Elementary Principles of Construction:	
IIa. Machine Tools	- 1 hour.
IIb. Building Materials and their preparation	- "
b. Projection:	
A. Use of Tools—	
IIa. Mechanical Movements	- 1 hour.
B. Theory of Tools—	
IIb. Designing of Steam Boilers	- "
c. Exercises in the study of Working Drawings:	
IVa. Locomotives	- - - "
IVb. Marine Engines	- - - "
IVc. Pumping Engines and Water Wheels	- - - "
IVd. Factory and Mining Engines	- - - "
d. Exercises in Sketching and Drawing	- 4 to 6 hours.

CIVIL ARCHITECTURE and ARCHITECTURAL DRAWING.

a. Building Materials and Principles of Construction:			
IIa. Lectures	- 2 hours.	Drawing	- 7 hours.
IIb. Lectures	- "	Drawing	- 6 hours.
b. Projection:			
		Part I.	
a. Lecture	- - -	-	- 1 hour.
b. " " in Drawing	- - -	-	- 8 hours, before Christmas.
" " " "	- - -	-	- 6 " after "

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Programme of
the Delft
Polytechnic.

Part II.

a. Lecture	-	-	-	-	-	1 hour.
b. " "	-	-	-	-	-	
Exercises in Drawing, for Architects	-	8	hours,	before	"	Christmas.
" " "	-	6	" "	after	"	"
Drawing, for Civil Engineers	-	2	hours,	before	Christmas.	
" " "	-	4	" "	after	"	"
c. Exercises in Designing, &c.	-	2	" "	after	"	"
d. History of Architecture:						
IIa. Lecture	-	-	-	-	-	1 hour.
IIb. " "	-	-	-	-	-	"
e. Architectural Decoration	-	-	-	-	-	4 hours.
f. Ornament	-	-	-	-	-	9 hours.

HYDRAULIC ARCHITECTURE and APPLIED DRAWING for same.

a. Elementary: Lecture, 1 hour; Drawing, 2 hours.	
b. Special Hydraulic Construction	2 hours lecture, before Christmas.
c. Exercises in Designing	- 4 hours, after "
d. Bridges	- 2 hours.
e. Roads	- 2 " after Christmas.
f. Exercises	- 4 "

NAVAL ARCHITECTURE and DRAWING for same.

Course B.	-	-	-	-	Lecture	1 hour.
Course C.	-	-	-	-	" "	2 hours.
Drawing Exercises for each section	-	-	-	-	" "	6 "

LAND SURVEYING and LEVELLING.

a. General course	-	-	-	-	-	2 hours.
b. Special designs	-	-	-	-	-	1 hour.
c. Practical exercises:						
Geodesy	-	-	-	-	-	1 hour.
Map Drawing and Military Sketching	-	2	hours,	from	Christmas to	Easter.
Theory of Measuring and Weighing	-	-	-	-	-	2 hours.
Practical exercises	-	-	-	-	-	4 "
Political Economy	-	-	-	-	-	1 hour.

CIVIL LAW.

a. Introduction	-	-	-	-	-	1 hour.
b. Laws relating to Water Supply and Public Works	-	-	-	-	-	2 hours.
c. Laws relating to Building.						
d. Laws relating to Factories and Workshops.						
e. Laws relating to Mining.						

COMMERCIAL LAW.

FREEHAND DRAWING.
2 hours, before Easter.
6 " after "

APPENDIX 24.

Appendix 24.

Budget of Lyons
Weaving School.

BUDGET OF LYONS WEAVING SCHOOL.

(See Vol. I, p. 123.)

EXTRACT from a LETTER from Dr. PENOT.

* * * The aim of our section for weaving at the École Supérieure de Commerce is to train future manufacturers, or directors of works, for factories engaged in the production of pure or mixed silk fabrics. The number of our pupils must thus of necessity always be very limited, amounting at the outside to 20 in each year. If we had to educate workmen or foremen, matters would be quite different. The fitting up of this department cost us 3,400L, including purchase of looms, the cost of a gas engine, and the requisite preparing machinery. Towards this outlay we received a grant of 2,000L from the Chamber of Commerce and 1,200L from Government, in three annual instalments.

Our average annual expenditure is about 600L, which includes the salaries of the masters, the payment of the foremen, purchase of silk, heating, lighting and repairs, and maintenance. As we receive no subsidy from the State nor from the Chamber of Commerce, and no subscription of any kind for this portion of our instruction, our Weaving Department has to be supported by the fees paid by the pupils, and the sale of the fabrics woven on our looms; and up to the present time this has been accomplished. Accept, Sir, the assurance of my profound regard.

G. Redgrave, Esq., Dr. Penot (Director).
Secretary of the Technical Instruction Commission.

APPENDIX 25.

Appendix 25.

SYLLABUS OF THE SCHOOL FOR SPINNING AND WEAVING, MULHOUSE.

Syllabus of
the School for
Spinning and
Weaving,
Mulhouse.

(See Vol. I, p. 133.)

WEAVING DEPARTMENT.

This department comprises two sections; the one for the theory of weaving, the other for practical work.

The first division includes the study of the science of weaving, of industrial accounts, and of the cost of production, and deals chiefly with the decomposition and analysis of fabrics of all kinds, plain, corded and embroidered silks, velvets, and gauzes, with special attention to the textiles most adapted to the requirements of local industry.

The division for the practice of weaving comprises the course of applied mechanics of weaving and loom construction, the design and theory of weaving machinery, work at the loom, the application of fabrics to the looms after they have been previously decomposed and analysed, the fitting-up of the loom, the adjustment of the same and the system of work, and the weaving of the actual stuff, with all the preliminary details of manipulation, carried out by the pupil himself, under the guidance of experienced foremen.

The course of study in each section is terminated by an investigation of the best methods of dealing with new fabrics, the preparation of plans and estimates for plant and weaving-sheds, both those of one floor and those arranged in several storeys.

Appendix 25.

Syllabus of
the School for
Spinning and
Weaving,
Mulhouse.

SPINNING DEPARTMENT.

The theoretical branch of the instruction consists essentially of the course for the study of spinning operations, and for the drawing and design of spinning machinery. The course is terminated by the investigation of the best arrangement to be given to new spinning mills, on one floor or in a building of several storeys, the preparation of plans and estimates for the same, the calculation of the cost of production, the losses on waste, and general manufacturing accounts.

The practical course consists of work at the machines, the study of spinning machinery, of cottons, and of their waste, &c.

The verbal instruction begins after the summer vacation, and it is advisable for those students who were not able to be present at that time, either to make themselves acquainted with the subject by consulting the note books of their fellow-students, or to take up in the first instance the course of practical instruction, and to wait for the verbal tuition until the commencement of the following term.

The work of the students being from its very nature almost entirely of a personal description, which fact renders it possible to arrange for the admission of students at any time during the year, the instruction and help supplementary to the class teaching is given either in French, in German, or in English, in accordance with the requirements of the individual pupil.

It is to the pupils' interest that they should employ themselves during their leisure evenings in making a fair copy of their notes on their work, in order to obtain as complete a record as possible of the course of instruction.

In addition to the regular school courses, two new subjects have been arranged for, as they had become of recognized necessity.

Course of Mechanics comprising:—

- (1) The study of the different combinations of mechanical movements, of power, and of work;
- (2) Steam and hydraulic motors;
- (3) Steam machinery, heating, fuel.

Course of Commercial Accounts comprising, besides general principles of business, the explanation of the theory of book-keeping by single and double entry.

This course is terminated by the study of banking business, such as interest, exchange, courant accounts, &c.

These classes are condensed in such a way as not to occupy too much of the student's time, and still to give him a very clear view of these subjects.

Appendix 26.

Prospectus of
the Weaving
School, Crefeld.

APPENDIX 26.

THE ROYAL WEAVING, DYEING, AND FINISHING SCHOOL AT
CREFELD.

(See Vol. I, p. 134.)

PROSPECTUS OF THE WEAVING SCHOOL under the superintendence of the
General Director, MR. EMIL LEMBECKE.

This Government school has been in existence since 1855, but has lately been completely re-organized. The aim of the school is to educate, theoretically and practically, masters, designers, and manufacturers, in

all branches of weaving; as well as to train mechanics for textile industries. Also to give to young persons who wish to become merchants an exact knowledge of the manufacture of the goods in which they deal.

The department is divided into two sections, in which the following subjects are taught:—

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—
Prospectus of
the Weaving
School, Crefeld.

A. INSTRUCTION IN DRAWING, AND ESPECIALLY IN DESIGNING.

Instruction in
Drawing.

a. First Year.

A thorough instruction in drawing and painting from copies, models, and from nature, for weaving, printing, and other branches of textile industry. Geometrical drawing and machine drawing.

b. Second Year. (Designing School.)

The drawing is continued until the student is able to invent and produce original designs for textiles. Geometrical drawing. Machine drawing. Lectures on textile art.

The aim of this course of instruction is therefore to give to designers, engravers, &c. a thorough course in designing and artistic drawing, and especially to educate designers, who will be able to invent new and artistic designs for weaving and printing.

The students, after having gone through the second year's course, will, providing they have acquired a sufficient knowledge, be admitted into the different studios, where they can draw and paint from nature, and also produce new designs for the trade, under the special direction of the drawing masters.

B. INSTRUCTION IN DECOMPOSITION, COMPOSITION, CALCULATION, AND WEAVING.

Instruction in
Decomposition.

a. First Year.

Lectures on the textile fibres and on the elements of weaving. The decomposition of fabrics. Arrangement of the loom for plain goods and for goods with simple designs. Practice in decomposing fabrics. Practical weaving of plain goods and velvets, also of goods with simple patterns on hand looms, in cotton, wool, linen, and silk. Book-keeping and calculation. Lectures on machinery.

b. Second Year.

The decomposition of fabrics. General arrangement of the loom. Composition and calculation of designed materials.

Practical weaving, on hand-looms, of velvets and fancy cloths from different materials.

Practical weaving of cotton, wool, half wool, linen, jute, and silk, also velvet, on power-looms.

Lectures on the construction, erection, and action of the different hand- and power-looms, and of other machines or apparatus used in weaving. Preparation of drawings for this purpose.

Lectures on power-producing machines, also on spinning and finishing machinery.

Unmounting and mounting of looms and allied machinery. Practical work at power-looms. Practical work at the forge, in the mechanical workshop and in the joiners' workshop.

The aim of this course of instruction is, on the one hand, to acquaint the student, both theoretically and practically, with the manufacture of textile fabrics of all kinds, in order to prepare him for the independent

Appendix 26.

Prospectus of
the Weaving
School, Osnabrück.

management of a manufactory or of a commercial business dealing in these goods; on the other hand, the course is calculated to bring up mechanical engineers, more especially for the textile industry.

Conditions of
Admission.

CONDITIONS OF ADMISSION.

Such candidates only are admitted who have gone through a regular school training, and are at least 14 years of age. Candidates who do not wish to make designing their special study should be older still.

Candidates are admitted either on the strength of former testimonials, or by an entrance examination. The time of entering is at Easter; candidates may, however, be admitted at other times, but in such cases the admission depends upon the decision of the director. The complete course is of two years' duration, and begins and ends with Easter of each year.

Students possessing the necessary preliminary knowledge, and wishing to devote their study to a special subject, can be admitted for a shorter period. A special course will be arranged for such by the director.

The fees are as follows:—

a. For Prussians.

Per semester in the first year's course	- 60 marks	- (3 <i>l.</i>)
" " second	- 90	" - (4 <i>l.</i> 10 <i>s.</i>)
" " studios	- 50	" - (2 <i>l.</i> 10 <i>s.</i>)

b. For all Germans other than Prussians.

Per semester in the first year's course	- 90 marks	- (4 <i>l.</i> 10 <i>s.</i>)
" " second	- 120	" - (6 <i>l.</i>)
" " studios	- 75	" - (3 <i>l.</i> 15 <i>s.</i>)

c. For all Foreigners.

Per semester in the first year's course	- 150 marks	- (7 <i>l.</i> 10 <i>s.</i>)
" " second	- 200	" - (10 <i>l.</i>)
" " studios	- 100	" - (5 <i>l.</i>)

All fees are payable in advance.

Students of the Weaving School who wish simultaneously to take part in the classes of the Dyeing School will have to pay the following fee:—

1. Prussians, 100 marks (5*l.*) per semester.
2. All Germans other than Prussians, 150 marks (7*l.* 10*s.*) per semester.
3. Foreigners, 250 marks (12*l.* 10*s.*) per semester.

Special fees may be arranged for with the director, in case the student wishes only to take a partial course.

The patterns for decomposition, as well as the necessary weaving materials, are furnished by the school free of charge.

The costs of the woven material are covered by the sale of the same, and thus the students have the use of the materials free of charge.

Colours and other materials necessary for working in the studios will not be furnished by the school.

All applications for admission must be accompanied with the usual testimonials, and are to be made to the director, who is ready at any time to give further information.

Students who have attended the school for not less than one year, will receive a certificate on leaving. Certificates are also issued every half-year respecting the diligence, progress, conduct, and attendance of each student. On leaving, students may receive, in special cases, either prizes or written testimonials as a mark of distinction.

Non-resident students will find suitable lodgings with respectable families.

The school possesses the following machinery for the use of the students :—

- 6 hand-loom and 6 power-loom for cotton.
- 3 hand-loom and 4 power-loom for wool.
- 3 power-loom for half-wool.
- 4 hand-loom and 2 power-loom for linen.
- 3 hand-loom for half-silk.
- 11 hand-loom and 7 power-loom for silk.
- 6 hand-loom and 1 power-loom for velvet.
- 1 power-loom for jute.
- 3 power-loom for ribbons.

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Prospectus of
the Weaving
School, Crefeld.

Altogether there are 33 hand-loom and 27 power-loom, besides a large number of other machines more or less connected with weaving.

THE MECHANICAL WORKSHOP.

The Mechanical
Workshop.

This workshop is adapted for making repairs, and for the use of such students who wish to become power-loom weavers or manufacturers of looms. It contains the following tools :—

- | | |
|--------------------|--|
| 1 smithy. | 1 emery wheel and apparatus for sharpening |
| 1 lathe. | circular saws. |
| 1 shaping machine. | 1 lathe for wood. |
| 1 boring machine. | 1 circular saw. |
| 4 vices | 3 joiner's benches. |
| 2 grindstones. | |

And besides these the necessary small tools. The work is conducted by a master joiner and a master mechanic.

The looms in the weaving-shed, the dyeing and finishing machinery, and the tools in the mechanical workshop are driven by means of a 12-horse-power compound steam-engine and a 4-horse gas-engine. The steam is produced by two Cornish boilers. Leather straps, wire rope, and cotton rope are used for transmission.

All the rooms are illuminated by means of the electric light (Edison's incandescent lamps), the current being generated by means of a 12-horse gas engine, with double cylinders (Otto & Langen's patent) and two dynamo-electrical machines in the lower part of the building.

The greater part of the building is heated by means of Körting's patent steam radiating stoves.

The school possesses a library of about 1,200 vols., a collection of German patents and a large number of journals relating to the textile industries, for the use of the teachers and the students, and on certain days of the week also for the public.

COLLECTIONS.

Collections.

Besides the spun and woven materials, apparatus, models, and machines necessary for instruction, the school possesses a large collection of modern textile fabrics and a valuable well-arranged collection of patterns, embroidery, needlework, lace, tapestry and guard books filled with specimens of different eras, countries and materials. This is of great use to designers in making new designs and to weavers in making tastefully-figured fabrics. Most of the specimens are kept under shallow glass cases, so that they may be made use of at any time by students, designers, or those engaged in business.

The collection numbers about 5,000 specimens, which are arranged in order from the 10th to the 19th century.

Appendix 26.
 ———
 Prospectus of
 the Weaving
 School, Crefeld,
 Dyeing and
 Finishing School.

PROSPECTUS of the DYEING and FINISHING SCHOOL in connection with the ROYAL WEAVING SCHOOL at CREFELD.

This department is connected with the Royal Weaving School, but is administered by a special director (Dr. Lange). It was commenced in the autumn of 1883.

The aim of the department is—

1. To give to such who wish to devote their whole time to the study of chemistry a complete education in this science and all its branches, as well as in its application to practical work.
2. To give to dyers, bleachers, calico-printers, and finishers a sound knowledge of the manufacture of dyes and mordants, to instruct them in the methods of examining and testing the value of both natural and artificial dyes, as well as other chemicals, and further to instruct them in carrying out these operations themselves; lastly, by means of practical work in dyeing, bleaching, printing, and finishing, to afford them opportunities for applying their knowledge to practice.

Besides the necessary class-rooms the department has—

1. Two chemical laboratories.
2. One large dyeing laboratory.
3. A dyeing and finishing shed, fitted up with the most recent and complete machinery.

The two chemical laboratories serve for carrying out qualitative and quantitative analyses, as well as for other practical work.

In the dyeing laboratory the dye-wares and mordants are tested, and all the operations of dyeing, bleaching, and printing by hand are here carried out on a small scale.

In the dyeing and finishing-house cotton, wool, silk, linen, jute, &c., &c. are bleached, dyed, printed and finished on a large scale.

All the laboratories are fitted up with the most recent arrangements; steam, water at high and low pressure, gas, electric light, &c.

During the course it is expected that visits will be made to some of the most important industrial establishments in Crefeld and the neighbouring towns.

The following subjects are taught:—

First Year's Course.

1st Semester.

- (a.) Lectures on inorganic chemistry (with experiments), physics (with experiments), Part I., and qualitative analysis.
- (b.) Practical work in the chemical laboratory and in the dyeing and finishing house.
- (c.) Machinery, drawing, textile fibres.

2nd Semester.

- (a.) Lectures on organic chemistry, physics (with experiments), Part II., and quantitative analysis.
- (b.) Practical work in the chemical laboratory and in the dyeing and finishing house.
- (c.) Machinery, drawing, and textile fibres.

Second Year's Course.

3rd Semester.

- (a.) Lectures on technical chemistry, including water, fuel, soap, the most important acids and salts for dyeing and printing, thickeners used in printing and finishing, artificial and natural dye wares, and the methods employed in testing them.
- (b.) Practical work in the dyeing laboratory and in the dyeing and finishing house.
- (c.) Machinery and drawing.

4th Semester.

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- (a.) Lectures on dyeing, bleaching, calico-printing, and finishing.
Chemical technology of woven tissnes.
- (b.) Practical work in the dyeing laboratory and in the dyeing and finishing house.
- (c.) Machinery and drawing.

Prospectus of
the Weaving
School, Crefeld.

CONDITIONS OF ADMISSION.

Conditions of
admission.

Students wishing to attend the school must have attained their 16th year, and must have an elementary knowledge of chemistry and physics.

As a rule no student will be admitted without having passed an entrance examination. He is however exempt from this if he can show by certificate that he has obtained the necessary knowledge at a public school.

Those who wish to give their whole time to the manufacture of dyes, dyeing, and finishing may make special arrangements with the director, and in such cases exceptions are made as to the entrance examination and the time of study.

The complete course has a duration of two years, and begins every year at Easter.

The admission of a student at any time other than the beginning of a year's course depends upon the decision of the director of the school of dyeing.

On entering, the student is obliged to remain one semester.

The fee which must be paid beforehand is per semester—

100 marks (5*L.*) for Prussians.

150 „ (7*L.*) for all Germans other than Prussians.

250 „ (12*L.*) for foreigners.

Essential reductions may be made from the scholarship funds in case of diligent students with limited means.

In the laboratory the student has the use, free of charge, of a working bench, fuel, chemicals and reagents, with the exception of silver nitrate, platinum chloride, and gold chloride.

Further, for the payment of a caution-money of 30 marks (1*L.* 10*s.*) he has the use of all the apparatus, porcelain and glass vessels, &c. which he may need, but for which he is made responsible; missing, damaged, or broken apparatus being charged for at cost price. Each student is obliged to bring his own platinum crucible and blowpipe. The preparations made from the chemicals of the laboratory are the property of the department.

The laboratory is open daily, with the exception of Saturday afternoon, from 8 to 12 and 2 to 6 o'clock.

Students who have attended the department for one year at least obtain a certificate on leaving. Certificates are also issued every half-year recording the diligence, progress, conduct, and attendances of each student. In special cases students may receive on leaving, as a mark of distinction, either prizes or written testimonials.

COLLECTIONS.

Collections.

Besides the utensils and apparatus necessary for teaching, the department possesses a well-equipped physical cabinet, extensive collections of chemical preparations and colouring matters, and a library. In the latter most of the journals relating to dyeing are kept for the use of the students.

Appendix 27.

Prospectus of
the Higher
Grade Weaving
School, Chem-
nitz.

APPENDIX 27.

PROSPECTUS OF THE HIGHER GRADE WEAVING SCHOOL, CHEMNITZ,
SAXONY.

(See Vol. I., p. 142.)

This school, which has been in operation since Easter 1857, has, thank to the powerful support of the Minister of the Interior of the Kingdom of Saxony, and of the municipal authorities of the town of Chemnitz, set up looms, together with the necessary machinery for all branches of weaving in a special building used only for this purpose, possessing ample space and with excellent lighting. It has also a special steam engine, by means of which the various power-looms used for the purpose of instruction are set in motion.

In the power-loom shed are collected specimens of the chief varieties of looms in ordinary use, driven by machinery, together with the different machines for allied processes.

The institution is conducted by experienced teachers, under the direction of a committee of the Town Council, and the endeavour is made, by means of varied and sound instruction, as also by practical exercises, to train both manufacturers and overseers for all branches of weaving; as also to impart to young persons intending to become buyers or sellers of manufactured goods a sound knowledge of the processes of manufacture and thus to enable them to form a correct judgment of quality.

Each year at Easter and Michaelmas a course of training, which extends over an entire twelvemonth, is entered upon, so that students can begin work at either period.

The programme is so arranged that it is further possible to attend only certain special courses; but the directors reserve to themselves the right to decide in every such case whether permission shall be granted to take such specialized instruction.

The training is divided into two sections, and includes—

A.—IN THE FIRST HALF-YEAR.

1. Lectures upon weaving materials.
2. Lectures upon the construction and design of the different kinds of looms and auxiliary machinery.
3. Decomposition of heald-work, and as far as possible also of jacquard fabrics. Preparation of the pattern drawings required for the same in connection with the necessary instruction in setting them in the loom and preparing the same.
4. Practical exercises in heald-work weaving.
5. Composition.
6. Lectures on principles of machinery and motors, together with drawings for instruction in power-loom weaving.
7. Instruction in sketching machinery and freehand drawing.

B.—IN THE SECOND HALF-YEAR.

1. Lectures upon power-looms, as also on their preparation, and upon the auxiliary plant for power-loom weaving.
2. Practical exercises in power-loom weaving.
3. Composition.

4. Decomposition of stuffs woven on the jacquard—velvets, figured muslins, ribbons, &c.—together with the necessary instruction in arranging and preparing the looms. Appendix 2:
5. Lectures on the construction and management of the jacquard loom and other complicated looms. Prospectus of
the Higher
Grade Weaving
School, Chem-
nitz.
6. Practical instruction in jacquard weaving, including velvets, figured muslins, ribbons, &c.
7. Freehand drawing. Arrangement of coloured patterns. Introduction to designing.

The time to be devoted to each of these subjects is as follows:—

A.—IN THE FIRST HALF-YEAR.

- 4 hours for instruction:
- a. Concerning materials used for weaving; their cultivation as respects the mode of gathering them and their preparation; and
 - b. Concerning the treatment of the same for weaving, as also respecting the construction and design of looms and the auxiliary machinery; also on the preparation of the loom.
- 16 hours for the decomposition and description of heald work, and so far as possible also of jacquard fabrics, for the preparation of the requisite pattern-drawings and computations, in combination with the necessary instruction in transferring the same to the loom, and preparation of the loom.
- 8 hours for practical exercises in heald-work patterns on the hand-loom. In addition to the requisite auxiliary machines there are seven cotton and woollen looms, eight silk looms, two linen looms, two buckskin looms, and one carpet loom. Two looms for mounting. Where there are several looms they serve for the making of different materials on each.
- 2 hours for instruction in the various methods of twisting the warp and waft, and on the formation of patterns which can be produced by these means (theory of composition) specially as applied to.
- 4 hours for instruction in the theory of the construction of machinery and prime motors, as also for the preparation of drawings for the teaching of power-loom weaving.
- 4 hours for instruction in sketching parts of machinery, and for freehand drawing.

Total 38 hours.

B.—IN THE SECOND HALF-YEAR.

- 8 hours for lectures on power-looms, as also on preparing, &c. auxiliary machines.
- 8 hours for practical exercises in the power-loom shed. For this purpose, in addition to the requisite auxiliary machines, there are at their disposal 13 power-looms, all of them differing in design and intended for the manufacture of the most varied fabrics. In addition to the above there is a mechanical hand-loom, and a loom for setting up and taking to pieces.
- 2 hours for the theory of composition with respect to jacquard weaving, velvets, muslins, ribbons, &c. in connection with the requisite instruction in.

Appendix 28.

Prospectus of the
Vienna Weaving
School.

APPENDIX 28.

PROSPECTUS OF THE VIENNA WEAVING SCHOOL.

(See Vol. I., p. 148.)

This school, which is under the direction of the Vienna Trade School Commission, will open on the 9th October 1881.

The object of the school is to enable young men, intending to become manufacturers, to obtain instruction in all branches of their business; to train designers, factory managers, and foremen; and to impart to work people and apprentices the special knowledge they are likely to require.

Plan of instruction.

PLAN OF INSTRUCTION.

The instruction is arranged under three principal groups—

I. Technical teaching in drawing and designing for manufacture and practical weaving.

II. Further instruction of a literary character.

III. Instruction in braid work and trimmings.

Group I. The technical teaching comprises:—

A. Drawing.

B. General weaving and practical work.

A. The drawing instruction is further subdivided into—

a. Drawing and painting from copies, from nature, from plaster casts, from fabrics, and preparation of designs for textiles.

b. Drawing and painting for printing on fabrics.

c. Drawing for embroidery purposes.

The principal aim of this instruction is to impart to those who intend to become designers a proper understanding of the special technical considerations imposed by the processes of printing on stuffs and weaving, and to enable them to obtain in the school-atelier the skill which is essential for their future calling. Those students who evince especial talent may enter the State art schools. There is no fixed limit to the course of instruction.

B. The department for general weaving and practical work. The course of instruction extends over two years, with ten months' work in each year.

1st year—

a. General. Special technology of fibres used in spinning, their microscopic and physical structure, chemical and physical investigation of same, also commercial examination of materials employed in weaving, explanation of the processes of spinning, system of numbering, trial of yarn as to length and number, calculations, manufacturing accounts, knowledge of machinery, machine drawing, knowledge of prime motors.

b. Theory of hand-weaving. Preparation of the warp and weft for weaving, combinations, mechanism of the simple hand-loom.

c. Practical exercises, warping, winding, weaving on common hand-looms, use of point-paper, decomposition.

2nd year—

a. Jacquard weaving for simple and mechanical weaving.

b. Special technology of the preparatory machines and looms, and of the various kinds of looms, factories for weaving, manufacturing estimates and calculations, special industrial technology of weaving.

c. Practical exercises. Setting up jacquard looms. Warping and winding for power-loom weaving. Erecting and fitting up power-looms, exercises in weaving and practical work, mounting.

pointing, pattern making, punching cards and decomposing for jacquard patterns. Appendix 28.

II. The department for literary instruction applied to trade purposes. This department is primarily intended to convey to foremen, workmen, and apprentices the theoretical knowledge needed for their occupations, and to complete their practical instruction; to render them thoroughly conversant with all mechanism connected with looms and weaving machinery; and to instruct them in freehand drawing. In addition to this the principal subjects comprised in sections A and B will be taught in so far as they apply to the degree of previous knowledge possessed by the students. The duration of this instruction is without definite limits. Prospectus of the Vienna Weaving School.

III. The technical school for the trimmings industry.

In the school for trimmings attached to the training school for textile industries, in addition to a knowledge of the principles of weaving, special instruction will be afforded in:—

a. Ribbons.

b. Trimmings.

c. In the production of braids, gimps, chenilles, &c., as also in all manipulations and calculations relative to this department; also in special drawing and designing, for which purpose separate rooms are assigned to this division.

In order to facilitate a clear insight into the operations of dyeing, bleaching, and finishing for the students of the designing school and the weaving school, the school premises adjoin those of the second section of the trade museum, in which, on two evenings in each week, lectures are given during the first year in general chemistry and the theory of colour, and during the 2nd year in the chemistry of dyestuffs, dyeing, bleaching, and finishing.

The Commission for Trade Schools is prepared, in case of need, to introduce evening courses of instruction for manufacturers, merchants, or industrialists on payment of special fees.

The instruction in practical work is carried on, during the first five days in each week, from 8 to 12 in the morning, and from 2 to 4 in the afternoon.

The literary instruction and the work in the trimming and braid department is arranged to take place on Saturdays from 9 to 12 in the morning and on Mondays from 5.30 to 8.30 p.m.

CONDITIONS UNDER WHICH STUDENTS ARE ADMITTED.

Conditions of admission.

Students who desire to be admitted to the weaving school must have passed satisfactorily through an ordinary 3-class *bürger schule*, i.e., an 8-class elementary school, or at least three classes of the *Real Schule*, or the *Real Gymnasium*.

In order to be admitted to the trade continuation school it will be sufficient for the student to show that he has complied with the State regulations affecting attendance at the public elementary school.

The same conditions apply also to the trimmings and braid department.

The school fees in the practical division amount to 7 gulden per semester for Austrian subjects, with 1½ gulden extra for materials, and these fees are payable on entrance and at the beginning of each session. In cases where the student can prove his inability to pay fees, free instruction can be obtained.

Foreigners pay 25 gulden as school fees, together with 1½ gulden for materials.

The teaching in the *Fortbildungs Schule* and in the trimmings school is free.

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Time Table of
the Vienna
Weaving School.

APPENDIX 29.

TIME TABLE OF THE VIENNA WEAVING SCHOOL.
(See Vol. I, p. 149.)

FIRST YEAR'S COURSE.

TIME.	MONDAY	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
MORNING.					
8-10	Decomposition of Twilled Fabrics.	Decomposition of Twilled Fabrics.		Theory of Composition of Fabrics.	
10-12	Machine Construction. Prime-motors.	Special Technology of Spinning Materials, Methods of Spinning and Yarns.	Drawing from Copies, Fabrics, Plaster-Casts, and from Nature.	Theory of Hand-loom Weaving. Mechanics of the Common Hand-loom.	Drawing from Copies, Fabrics, Plaster-Casts, and from Nature.
AFTERNOON.					
2-3			Drawing from Copies, Fabrics, Casts, and from Nature.		Drawing from Copies and Plaster Casts, and for Printed Patterns.
3-4	Machine Drawing.	Practical Work in the Weaving Shed.	Geometry and Theory of Construction.	Practical Work in the Weaving Shed.	
SECOND YEAR'S COURSE.					
MORNING.					
8-10	Decomposition of Jacquard Patterns.	Decomposition of Jacquard Patterns.	Drawing for Printed Patterns, Embroidery, and Woven Fabrics.	Decomposition of Jacquard Patterns.	Drawing for Printed Patterns, Embroidery, and Woven Fabrics.
10-12	Lectures on Jacquard Weaving.	Lectures on Power-loom Weaving.		Lectures on Preparing Machines.	
AFTERNOON.					
2-4	Machine Drawing.	Practical Work in the Weaving Shed.	Drawing for Printed Patterns, Embroidery, and Woven Fabrics.	Practical Work in the Weaving Shed.	Drawing for Printed Patterns, Embroidery, and Woven Fabrics.

No classes on Saturday.

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Appendix 80.

SCHEME for the ORGANIZATION of the CENTRAL INSTITUTION of
the CITY and GUILDS of LONDON INSTITUTE.Scheme for the
Organization of
the Central
Institution of
the City and
Guilds of London
Institute.

(See Vol. I, p. 405.)

GENERAL OBJECTS.

General objects.

The object of the Central Institution is to give to London a college for the higher technical education, in which advanced instruction shall be provided in those kinds of knowledge which bear upon the different branches of industry, whether manufactures or arts.

Just as the Royal School of Mines gives a technical training to mining engineers, so the Central Institution is intended to afford practical, scientific and artistic instruction which shall qualify persons to become—

1. Technical teachers.
2. Mechanical, civil and electrical engineers, architects, builders, and decorative artists.
3. Principals, superintendents and managers of chemical and other manufacturing works.

The main purpose of the instruction to be given in this Institution will be to point out the application of different branches of science to various manufacturing industries; and in this respect the teaching will differ from that given in the universities and in other institutions in which science is taught rather for its own sake than with the view to its industrial application. In order that this instruction may be efficiently carried out, the Institution, in addition to the lecture theatres and class rooms, will be fitted with laboratories, drawing offices, and workshops; and opportunities will be afforded for the prosecution of original research, with the object of the more thorough training of the students, and for the elucidation of the theory of industrial processes.

STUDENTS.

Students.

It is probable that the students seeking admission into the Central Institution will belong to one or other of the following classes:—

1. Persons who are training to become technical teachers.
These will be students entering the College by means of exhibitions under category 2 (b); or students selected at the May examinations in Technology who pass with special distinction in the Honours Grade; or teachers of the Institute, registered under the scheme of Technological Examinations, who, during certain months of the year, when they are disengaged, will receive gratuitous instruction, and will have the opportunity of using the laboratories, collections of machinery, instruments and apparatus with which the College will be provided.
2. Persons not under sixteen years of age who, having passed a matriculation or entrance examination, are prepared to take a complete course of instruction with a view to some professional or industrial occupation. These students will probably belong to two classes—
 - (a.) Persons paying full fees, who will receive in this Institution an education similar in many respects to that which they may acquire in one of the Technical High Schools of the Continent.
 - (b.) Persons will be received into the Institution from the Finsbury Technical College, or other similar Colleges in the provinces, by means of exhibitions, which will cover the whole or part of their educational and other expenses.

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Scheme for the Organization of the Central Institution of the City and Guilds of London Institute.

It is probable that many of the persons in sub-class (b) will be select pupils from the public elementary and national schools, who, having received a preliminary science training, and distinguished themselves at the Finsbury Technical College or elsewhere, will proceed to the Central Institution in the hope of qualifying themselves for some of the higher posts in engineering or manufacturing industry.

3. Persons who, having been engaged in industrial pursuits, desire to attend special courses, with the view of acquainting themselves more fully with the scientific principles underlying their work.

Conditions of entrance.

CONDITIONS OF ENTRANCE.

The matriculation or entrance examination for students intending to take the ordinary science curriculum, with the view of subsequently obtaining a diploma, will include mathematics, pure and applied; chemistry; physics; drawing, and modern languages. Whilst considerable freedom will be allowed to students entering the College as regards the courses of instruction which they desire to follow, a definite scheme of instruction will be drawn up for each of the different branches of industry, and students intending to spend two or three years in the College, and to devote their whole day to study, will be recommended to follow the scheme laid down. The fee for the courses to be pursued by a matriculated student will be about 30*l.* per annum, and a fee of about 20*l.* per annum will be charged to students wishing to take special courses and to occupy themselves for the greater part of the day with laboratory practice and research work. With the view of encouraging research work the Institution will be provided with separate laboratories, in which the students will have the opportunity of working without distraction or disturbance. The permission to use these laboratories will be reserved for the advanced students who have previously passed through the ordinary courses of the College, and for non-matriculated students under very special circumstances.

Subjects of instruction.

SUBJECTS OF INSTRUCTION.

As the object of this Institution is to train technical teachers, proprietors, and managers of chemicals manufactories and of other industrial works, as well as mechanical, civil, and electrical engineers, architects, builders, and persons engaged in art industries, the Institution will comprise five chief divisions, viz.:—(1) Chemical Technology; (2) Engineering, mechanical, civil, and electrical; (3) General manufactures; (4) Architecture and building construction; (5) Applied art; and the subjects of instruction may accordingly be grouped under the general headings of chemistry, engineering, mechanics and mathematics, physics, manufacturing technology and art. Inasmuch as the Royal School of Mines is already established as a training school for mining engineers, no provision will be made for the instruction of students in this branch of industry; and consequently the sciences of geology, mineralogy and metallurgy will not necessarily be included in the subjects of instruction at the Central Institution.

Professorial staff.

PROFESSORIAL STAFF.

Chemistry.—The main object of the instruction in this department will be to afford to students facilities for acquiring a knowledge of the highest branches of chemistry, and of its application to such industries as alkali manufacture, the manufacture of artificial colours, brewing, soap boiling, the manufacture of oils and varnishes, dyeing, &c. To provide the requisite instruction in this department, it will be necessary to have one chief professor, who shall devote the whole of his time to the work of the Institution, and who will be expected to direct and superintend the

students in his department and to train them in the methods of original research. In addition to this appointment it will be advisable to have two assistant professors, who shall respectively take charge of the research and of the technical departments. A separate laboratory will be placed under the direction of each professor, and the arrangements of the building, which provide three large laboratories, besides several smaller rooms which may be used as such, render possible this division of the work. Besides these professors, demonstrators, laboratory, and lecture assistants and attendants will be required to complete the staff in this department.

Engineering.—The instruction to be given in this subject will have for its object the practical scientific training of persons who intend to enter any branch of the engineering profession. The instruction will be adapted to those who have already spent some time in the office of a civil engineer or in engineering works, as well as to those who desire to obtain in the College a sound theoretical knowledge of the principles of science applicable to their future career, and an insight into the practice and manipulative work in which they will be subsequently engaged. The professor appointed to take charge of this department will be expected to devote the whole of his time to the work of the College, and to lecture on such subjects as the strength of constructive materials; the construction of docks, roads, bridges, and roofs, machine designing, hydraulic and other machinery, steam engines, gas engines, &c. He will also be required to give instruction in levelling and surveying, to superintend the laboratory practice of the students in the testing and engine rooms, and to direct their work in the machine shops and drawing offices. He will need the assistance of a teacher of machine drawing, and of a workshop instructor, besides one or two laboratory demonstrators, and the necessary attendants to look after the engines and machines. Later on, an additional professor will be required to take charge of some of the work of this department.

Mechanics and Mathematics.—Immediately connected with the teaching of engineering and physics is the instruction required by the students of a Technical College in mechanics and mathematics. There is little doubt that the student's progress in the several branches of engineering depends very much upon his possessing such a knowledge of pure and applied mathematics as enables him to use it as an instrument of his ordinary work, and for this purpose it is necessary that his knowledge should be in advance of such applications of it as he may at any time be required to make. The professor appointed to this post will be expected to give practical instruction in the application of mathematics and mechanics to the solution of engineering and physical problems. He will be required to devote the whole of his time to the work of the College, and to give courses of instruction, illustrated by laboratory practice, on the principles of dynamics and of mechanism, on graphical statics, on descriptive geometry, and on some of the higher parts of pure and applied mathematics. He will need the services of two demonstrators to assist in the mechanical laboratory and in the drawing office.

Physics.—In view of the present and future applications of electricity to engineering problems, considerable importance attaches to the character of the instruction to be given under this heading. The teaching of practical physics has only recently been introduced into schools of applied science, and the number of students receiving laboratory instruction in this subject in our own colleges, and in foreign Polytechnic schools, is still very limited. The large number of students in attendance at the courses of electricity in the Finsbury Technical College shows that there is already a strong demand for instruction in the practical applications of this important branch of physical science. In order to supply the requisite teaching staff in this subject, it will be necessary, in the first instance, to appoint a professor, who shall devote the whole of his time to the work of the College, and who shall be responsible for the work of his department. This appointment will be supplemented by that of an additional professor, whose duties will depend very much upon the particular branch of physics to which the chief professor may devote his attention. Whilst it is highly desirable that every facility should be afforded in the Central

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Institution to students desiring to become electrical engineers, of receiving practical instruction in the theory and application of electricity to such technical subjects as telegraphy, electric lighting, and the transmission of power, for experiments in which subjects special laboratories will be set apart, it will be the duty of the chief professor or of the additional professor to give courses of lectures on heat, light, and sound; to superintend and encourage laboratory practice in these branches of physics; and to take up from time to time the consideration of other technical subjects, such as the principles of thermo-dynamics in their application to the theory and working of steam engines, gas engines, ventilation, &c. To complete the teaching staff of this department the professors will require the assistance of one or more demonstrators, according to the number of students in attendance at their laboratories.

Technology.—Under this heading is included instruction in the processes and practical details of various manufactures, some of which will be treated of by the professors of the several departments already referred to, whilst others will need the assistance of specialists, who will be engaged to give lectures on these subjects. The gentlemen appointed to give these lectures will be either the Institute's examiners in Technology, or other persons equally well acquainted with the technical details of particular manufacturing processes. They will be appointed from time to time as required, and will not necessarily form part of the permanent staff of the College.

The lectures will probably be of two kinds, according as they are delivered during the Session or during the long vacation. The one course will form part of the curriculum of the ordinary students of the College, whilst the other course will be especially arranged for the instruction of teachers of the Institute, registered under the scheme of Technological Examinations. The lectures given during the Session will be attended by the matriculated students towards the close of their regular course of study, those delivered during the recess by teachers of technical classes in London and the Provinces, who will be invited to hear them without payment of fee. Arrangements will also be made by which other persons seeking information on technical matters may be admitted to these lectures.

The lectures will embrace several of the subjects included in the programme of Technological Examinations, such as Alkali Manufacture, Spirit Distilling, Glass Manufacture, Pottery and Porcelain, Printing, Weaving, the Manufacture of Cotton, Wool, Linen, &c., and will treat of the technical details involved in these and other industrial processes. For the illustration of the lectures, specimens of materials in various stages of manufacture, models, and diagrams of machinery will be required; and these should be found ready for use in the Museum of Technology, a room for which has been provided in the Institution. Facilities will be afforded to the lecturers and students for carrying on experimental work in explanation of the lectures; and considering the varied character of the work which may have to be performed in connection with this department, for which it is impossible to make provision at the outset, it is very important that here and there rooms should be left available to be fitted with such arrangements and apparatus as experience may show to be desirable. These lectures will form a special and characteristic feature of the instruction to be given in the Central Institution.

Architecture and Building Construction.—To give completeness to the instruction which this Institution should afford, a department of Architecture and of Building Construction should be added to those already enumerated. The establishment of a special school for Architects and Builders would not involve any great addition to the professorial staff which it is suggested should be provided for the other departments of the College. But as the funds at the disposal of the Institute are not sufficient to enable the Council to give effect at starting to a complete scheme of higher technical instruction adapted to all the different industries of the country, it would seem advisable at first to restrict within certain limits the work to be carried on in the Institution, and to defer for some little time the organization of this special school.

Applied Art.—Under this heading instruction might be given in decorative art and in several special branches of applied art, particularly in those in which artistic effects are produced by a combination of art with processes involving applications of science, such as Chromo-Lithography, Enamelling, Photo-Engraving on Metals, Photo-Lithography, and Photography. Lectures might be delivered on these subjects, and on the scientific principles connected with them; and the processes themselves might be practically illustrated under the direction of experienced teachers in the workshops of the building. Lessons might also be given in designing for, and in the execution of Glass Painting, Mosaic Work, Wood and Ivory Inlaying, the Inlaying of Metals into various substances, Wood-engraving and Wood-carving.

Instruction of this kind would be very serviceable in creating and developing Art industries in this country, and it would be especially valuable in the training of teachers; and it is hoped that means will be found, at a very early date, for giving such instruction.

Modern Languages.—In view of the increasing importance to students of applied science of being able to read foreign scientific and trade journals, so as to understand what is being done abroad in the particular branch of industry in which they are engaged, the students will have the opportunity in the Central Institution of pursuing their studies in the French and German languages. It is true that they might obtain these lessons elsewhere, but it is found, as a fact, that students very rightly object to the loss of time involved in going from place to place in pursuit of the instruction they require, and commonly neglect the lectures which they have not the opportunity of attending in the Institution in which they pass the greater part of their day. Moreover, students are attracted to a place of learning in which they can obtain all the instruction they need. For these reasons, it is thought desirable that teachers of French and German should, as soon as possible, be appointed. At the same time it is hoped that, as the teaching of modern languages becomes so far improved that students seeking admission to the College will be able to translate with ease passages from French and German into English, the necessity of supplementing the technical instruction, which the Institution is intended to afford, by providing for this branch of education, will cease to exist.

COURSES OF INSTRUCTION.

Systematic courses of instruction will be drawn up for matriculated students, which will be obligatory upon those who seek the Diploma of the Institute. These courses will cover a period of three years, and will be varied according to the branch of engineering or of manufacturing or art industry for which students are preparing. The details of these courses will be best settled in consultation with the several professors; but it is understood that, besides the general and special lectures and class work already referred to, the instruction will consist largely of laboratory practice in chemistry, mechanics and physics; and that for students who may not previously have acquired any manipulative skill, the workshops of the Institution will be available; whilst machine drawing will form an important part of the ordinary curriculum. It is hoped, too, that the professors will have opportunities of conducting their students to some of the different factories and works in and near London.

DIPLOMAS.

It is desirable that the Institute should grant diplomas, in accordance with the power conferred upon the Council by the Articles of Association, Sec. 51. The diplomas should be of two kinds, the Associateship of the Institute, and the Fellowship of the Institute.

The Associateship should be awarded to students of the Central Institution who shall have gone through the complete course of instruction as

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laid down for them, and have satisfactorily passed their several examinations. Of these examinations, the first would be the Matriculation or Entrance Examination, and candidates unable to pass it would be recommended to spend one year, at least, in some suitable College, in preparation for it. A subsequent examination would be held at the end of each year on the College work, and the final examination, at which external examiners would be selected to assist the Professors of the Institution, would be essentially practical in character. The diploma might be granted to students educated at any other College affiliated to, or associated with, the Institute, who should pass the Matriculation and other examinations.

The Fellowship would be conferred upon persons who, having obtained the Associateship, and spent at least five years in actual practice, should produce evidence of having done some original and valuable research work, or of having otherwise contributed to the advancement of the industry in which they are engaged.

Evening
instruction.

EVENING INSTRUCTION.

Although, at the outset, the education of day students is all that can with advantage be attempted, it is desirable that, later on, the experiment shall be made of giving evening instruction in the Central Institution.

The instruction so given should consist of courses of lectures dealing with some of the applications of Science or Art to special branches of industry, and serving the double purpose of imparting information and of showing the importance of more systematic technical teaching. These lectures should be somewhat of the character of the Cantor lectures, periodically delivered at the Society of Arts, and somewhat similar to the well-attended and varied courses held at the Conservatoire des Arts et Métiers at Paris. Whilst differing from class lessons they would have a distinctly educational value; and, as distinguishing them from the Cantor lectures as well as from those given at the Paris Conservatoire, opportunities would be afforded to some of the students attending them of themselves doing laboratory work on one or more evenings of the week. It would be necessary that the evening instruction should be so arranged as not to interfere with the ordinary day courses.

Appointment of
chief professors.

APPOINTMENT OF CHIEF PROFESSORS.

Before entering further into the consideration of the details of the scheme now proposed for the organisation of the Central Institution, it is desirable that the chief professors should be appointed, not with the view of their entering immediately upon their duties, but in order that the Sub-Committee may confer with them as to the courses of instruction to be given, and as to the fittings of the several laboratories and class rooms, the preparation of which will occupy some considerable time.

It is recommended, therefore, that the Committee should at once appoint—

- A Professor of Chemistry.
- A Professor of Engineering.
- A Professor of Mechanics and Mathematics.
- A Professor of Physics.

These gentlemen having been elected, the appointment of the other professors, the demonstrators and lecturers on technology may be deferred, it being understood that some of these additional posts must be filled before the opening of the first session. Meanwhile, however, the work of preparing the fittings and of arranging the courses can be advanced.

Management.

MANAGEMENT.

The following Rules have been drawn up for the regulation of the educational and administrative work of the Central Institution:—

1. There shall be a **BOARD OF STUDIES**, composed of the Professors of the Institution, for the consideration of all matters connected with the education of the students.

2. Any lecturer holding an annual appointment, and giving a separate course of instruction, may be appointed by Sub-Committee A. as a member of the Board. Appendix 30.

3. Subject to a general scheme of instruction to be laid down by the Institute, the Board shall arrange courses of instruction for students, and shall recommend to the Institute with respect to the appointment and removal of instructors, teachers, demonstrators and attendants. Scheme for the
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Institute.

4. The Organizing Director and Secretary of the Institute shall have a branch office in the Central Institution, and shall have a right to visit its classes, laboratories and workshops, and to call for any information he may think necessary for the use of Sub-Committee A. He shall also have a right to be present at any time he may think it desirable at the meetings of the Board, and to take part in the discussions, but without a vote.

5. All communications from the Board to the Institute shall be made in writing, and shall be addressed to the Organizing Director and Secretary.

6. The Institute, at the outset, shall appoint, for a period of a year or longer, from among the Professors, a Dean, who shall preside at the meetings of the Board, and who shall attend any meeting of Sub-Committee A. at the request of the Sub-Committee or of the Board for consultation on any special business.

7. The minutes of the meetings of the Board shall be recorded, and shall be laid on the table at the meetings of Sub-Committee A.

8. The chief clerk of the Central Institution shall act as secretary to the Board, receiving in that capacity his instructions from the Dean, and shall take minutes of the proceedings.

9. The Dean shall consult with the Organizing Director and Secretary, who shall confer with the chairman of the Executive Committee, or, in his absence, with one of the honorary secretaries, with respect to any *ad interim* arrangement that may have to be made requiring the subsequent sanction of Sub-Committee A.

10. All the administrative work of the Central Institution, general questions of discipline and the superintendence of the library and museum, shall be in charge of the Organizing Director and Secretary of the Institute, who shall act under instructions from Sub-Committee A.

ESTIMATE OF ANNUAL EXPENDITURE.

Estimate of
annual expen-
diture.

For the efficient carrying out of the above scheme, it is believed that a sum of 15,000*l.* a year will be required, part of which would be provided by the students' fees. It is estimated that, as the Institution becomes known, these fees will amount to 4,000*l.* or 5,000*l.* a year, and, consequently, that an annual grant of about 10,000*l.* from the funds of the Institute will suffice, being the sum specified in the Report to the Livery Companies of 1878 as the amount per annum that should be set apart for the purposes of the Central Institution.

This estimate of the probable annual expenditure is made up of the following items:—

Salaries of Professors, Lecturers, and Demonstrators	-	8,700
Apparatus and Material	-	1,500
Clerks, Porters, Attendants, Servants, &c.	-	1,500
Printing, Advertising, Stationery, &c.	-	1,300
Repairs, Rates, Coals, Gas, Insurance, &c.	-	2,000
		<hr style="width: 100%;"/>
Less Fees (from 150 to 200 paying students) say	-	15,000
		5,000
		<hr style="width: 100%;"/>
		£10,000
		<hr style="width: 100%;"/>

Appendix 31.

Programme of
the Royal Indian
Engineering
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APPENDIX 31.

THE ROYAL INDIAN ENGINEERING COLLEGE, COOPER'S HILL.
(See Vol. I., p. 414.)

Course for
engineer
students.

COURSE OF INSTRUCTION FOR ENGINEER STUDENTS.

The following table gives the subjects taught in each year of the college course, and approximately the average number of hours allotted weekly to class instruction on each subject; all being liable to alteration from time to time:—

FIRST YEAR.

	Hours per Week.
Descriptive engineering (materials of construction)	1½
Geometrical drawing	8
Surveying (partly in the field during 1½ terms)	8
Freehand drawing	2
Chemistry	2
Chemical laboratory	3
Physics	1
Mathematics (plane analytical geometry, elements of the calculus, statics, kinematics, and the elements of dynamics)	13
Geology (during 2 terms)	2
Architecture (during 1 term)	2
French or German*	1½

The mechanical workshop is open for optional study to each student for one or more afternoons per week.

SECOND YEAR.

	Hours per Week.
Engineering and applied mechanics	10
Geometrical drawing	4
Freehand drawing	2
Surveying (for 1½ terms)	10
Chemistry (for 2 terms)	2
Physics (during 2 terms)	1
Physical laboratory	3
Mathematics	12
Geology (during 2 terms)	2
Architecture	2
French or German*	1½

The chemical laboratory, or the mechanical workshop, or the free-hand drawing class are open to each student for optional study during one or more afternoons per week.

THIRD YEAR.

	Hours per Week.
Engineering and applied mechanics	9
Accounts (during 2 terms)	2
Estimating (during 2 terms)	2
Mechanical laboratory (total 40 hours).	

* Alternative with freehand drawing.

During this year, in addition to the class instruction, the students are employed in making a complete detailed survey in the field, with plans, estimate of quantities, &c. for a project for two or three miles of railway, road, or canal. This occupies about seven weeks. The students are then employed in working out three complete and detailed designs to conditions and data supplied to them. The subjects of these designs are chosen from civil engineering, mechanical engineering, and architecture. Each design occupies about seven weeks. The chemical or physical laboratory may be taken instead of the architectural design. The students are also employed for a limited time in the mechanical laboratory in testing the mechanical properties and value of iron, steel, cement, lubricating materials, &c.

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Instruction in photography is given during the afternoons of one term to a limited number of students.

COURSE OF INSTRUCTION FOR TELEGRAPH STUDENTS.

Course for
telegraph
students.

FIRST YEAR.

Telegraph students are nominated from amongst the engineer students at the end of the first year.

SECOND YEAR.

	Hours per Week.
Applied mechanics	7
Chemical laboratory	3
Mathematics (during 1½ terms)	3
Applied mathematics	4
Mathematical physics	3
Telegraphy (in physical laboratory)	7
Telegraph construction (workshop)	10
Signalling	2
Accounts (during 2 terms)	2
Physics (lectures during 2 terms)	1

SUBJECTS OF EXAMINATION AT THE END OF EACH TERM.

Subjects of
examination.

These arrangements are liable to be modified from time to time.

AUTUMN TERM.

Third year.—Applied mechanics (construction).

Second year.—Applied mechanics (construction); applied mechanics (mechanism); applications of the calculus; dynamics; optional mathematics, surveying, geology, physics, descriptive engineering.

First year.—Conics; differential calculus; statics; optional mathematics; geometrical drawing; drawing exercise; geology; chemistry; descriptive engineering.

EASTER TERM.

Third year.—Applied mechanics (construction); optional applied mechanics (construction); applied mechanics (dynamics of machinery); optional applied mechanics (mechanism, machinery, and hydraulics); accounts.

Second year.—Applied mechanics (construction); applied mechanics (hydraulics); dynamics; application of logarithms; optional mathematics; geology; descriptive engineering; surveying; physics.

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Appendix 31. *First year.*—Differential and integral calculus; application of logarithms; hydrostatics; dynamics; optional mathematics; geology; drawing exercise; descriptive engineering; chemistry.

Programme of
the Royal Indian
Engineering
College.

SUMMER TERM.

Annual Examination.

Third year.—Applied mechanics (construction); optional applied mechanics (construction); applied mechanics (mechanism, machinery, and hydraulics); optional applied mechanics (mechanism, machinery, and hydraulics); descriptive engineering (construction); descriptive engineering (mechanical and hydraulic).

Second year.—Applied mechanics (construction); applied mechanics (hydraulics and mechanism); analytical conics; statics; hydrostatics; mensuration; trigonometry; dynamics; differential and integral calculus; optional mathematics; descriptive engineering (construction); descriptive engineering (hydraulics); architecture; drawing exercise; chemical and physical laboratories.

First year.—Differential and integral calculus; statics and hydrostatics; analytical conics; dynamics; optional mathematics; architecture; descriptive engineering (construction); surveying; descriptive geometry; chemistry; physics; drawing exercise.

Appendix 32A.

The Woodwardian
Museum,
Cambridge.

APPENDIX 32A.

THE WOODWARDIAN MUSEUM, CAMBRIDGE.

(See Vol. I., p. 421.)

The Woodwardian Museum of Geology was founded by John Woodward, M.D., F.R.S., Associate of the College of Medicine at Cambridge, Professor at Gresham College, born 1685, died 1728.

On his death he bequeathed to the University of Cambridge his two cabinets of English fossils, and the University purchased his foreign collection. This was the nucleus round which has gathered the present large museum. The oldest part is the collection of Agostino Scilla, a distinguished Sicilian painter, which was acquired by Woodward. This contains specimens figured by Scilla in his work "La vana speculazione disangannata dal senso," and the original drawings made by him for the engraver previous to the publication of his work in 1670. There are some other small collections of about the same date.

The museum has, however, been raised to its present position chiefly by the labours of Professor Sedgwick, and it was owing to his influence in a great measure that the existing museum building was erected by a subscription commenced in 1835.

The economic collections are of recent date, and were made in illustration of the courses of lectures delivered by Professor Hughes on Economic Geology, by which Professor Hughes understands the application of geological knowledge to the obtaining of products of commercial value.

Thus, technical instruction is incidentally given, which could easily be expanded, and, in conjunction with the work of other departments, made to form part of a systematic course of instruction in—

Mining and Metallurgy;
Architecture and General Engineering;
Hydraulic Engineering;
Agriculture.

In the case of mining and metallurgy, the questions of the mode of occurrence of the mineral, of its geological horizon, and the probability of its existence in any given district and at any workable depth, all belong to geology.

In illustration of this subject, collections exist showing the character and mode of occurrence of veins and lodes, and specimens of the various ores and fossil fuel. Thus, for example, there is a series from the doubtful and once wrongly classified red rocks of Whitehaven and other districts in the north of England, with enough evidence to prove that they occur below, and not above the coal. While in the general palaeontological series, there is abundant material for the identification and classification of the carboniferous and other coal-bearing deposits.

For instruction in metallurgy, the student would go to the chemical department and the department of mechanism and applied mechanics for the art of practically working in metals.

The architect or engineer has to deal with rocks and mineral products in his every-day calling, and whether for the purpose of ascertaining how and where to obtain them, or in order to know the causes of the variations which render selection necessary in a quarry or pit, he must acquire a knowledge of geology.

These points are dwelt upon in Professor Hughes lectures on economic geology, and in illustration of it, there is a small collection of slates and other building stones, often showing faces variously dressed; of marbles and other ornamental stones; and a very large series of rock specimens is available for reference in this connection.

On removal to the new museum, Professor Hughes hopes to be able to give much greater prominence to this collection than can be done in the limited space now available.

A small series of millstones, ranging from Neolithic to recent times, forms the nucleus of what will some day be a useful collection for the commercial public as well as for the archæologist.

The architect or engineer might at the same time study fine art in the Fitzwilliam Museum and the use of materials in the department of mechanism and applied mechanics.

In hydraulic engineering, which is becoming one of the most important branches of study, a knowledge of geology is essential. Whether a rock of a given character will prevail at a given depth over a given area; what is the amount of rainfall, and what proportion of that rainfall will reach a given stratum; the artesian and other springs, floods and the methods of mitigating their injurious effects, cannot be understood without a knowledge of the various conditions affecting the distribution and passage of the water, the outcrops, faults and other disturbances of the catchment basin; and these questions are all dealt upon in the lectures on Geology and Physical Geography.

Of appliances for this part of the work we have sections, diagrams, maps, and models; specimens of hydraulic and other limestones; cements; cores brought up from deep borings for water; pipes blocked and pipes coated by travertine, and the various specimens collected for teaching the principles of geology.

With regard to subjects bearing upon agriculture, the student is taught in the geological department the causes of variations of climate, of rain, floods, drought and the natural and artificial conditions which influence them—involving the questions of drainage and water supply. He learns the mode of formation of soils and the circumstances which affect their character; the association of rocks and the relative position of the limestones, freestones, clays, and drifts. Upon this naturally follows the inquiry into the sources of the mineral manures, such as lime, phosphates, &c.

Most of the material appliances for this part of the subject belong to the general collection, but there are some special series bearing upon it, as for instance, a series of phosphates from various geological horizons, limestones, &c.

The student of agriculture could at the same time learn in the chemical department, the laws of combination and assimilation of inorganic and organic matter, and in the departments of animal and vegetable morphology, the laws of development of animal and vegetable products.

Appendix 32A.

The Woodwardian Museum, Cambridge.

Appendix 82a.

APPENDIX 82a.

Letter from
Professor Stuart
on Engineering
Instruction at
Cambridge.

LETTER FROM PROFESSOR STUART, F.R.S., having reference to the OPPORTUNITIES FOR LEARNING ENGINEERING afforded in the UNIVERSITY OF CAMBRIDGE. (See Vol. I., p. 422.)

SIR, Cambridge, June 9, 1883.

THE Engineering workshops which I established here have been gradually enlarged, and the system connected with them developed, so that we now can give a complete preparatory training to an engineer. That is to say, we can, besides theoretical work, give him drawing and design and practical work in fitting, turning, pattern-making, smithing and foundry; so that, when he leaves us, he will be in a position to go on to learn the special branch of engineering which he may intend to take up. We pay particular attention to the principles of designing, as the establishment contains several competent workmen besides the demonstrators or junior assistants, and is all under the superintendence of a practical engineer, who is also a University graduate and has had varied experience in different shops.

When a pupil leaves us we advise him, if he is to be a mechanic or engineer, to go into some shop or drawing office, where he can become familiar with the class of work which he is about to pursue, and all the while he can see larger work than we do. A year spent in this way should complete his engineering education, so far as education can be said ever to be completed; and as a rule we would advise him to go in the capacity of a workman and to get what wages he can earn during the time. We can turn a man out capable of earning wages; I have two of my pupils at present working for me at 25s. a week, and they are worth the money. I aim, in fact, at paying some of my best pupils wages when they are willing to stay on an extra year, as it gets them into workmanlike habits and the keeping of regular hours. Our training is distinct from that for a mechanical engineer, but we regard that as the true foundation also for the civil and for the electrical engineer; and, if a man were to leave us for either of these pursuits, we would advise him, as far as possible, to follow the same lines, namely, to get a definite job rather than to go in a general way as a pupil, except when, as pupil, he would distinctly have the advantage of seeing varied work in a comprehensive way, and details of that work which he might not otherwise have the opportunity of seeing. For the electrical engineer there is teaching of electrical principles in the Cavendish laboratory here, and we have also good chemical and geological teaching as well as in general physics principles. Whenever a man is a good mathematician we urge him to study mathematics with a tutor as far beyond the limits of our regular course as his ability will permit him to go; and, if he aims at taking a degree, we prefer to see him take one in mathematics. There are other allied means of taking a degree for those who are not mathematicians, such as physics and chemistry; and a degree can also be taken in the applied science special examination, which includes mechanism, heat and practical work.

The courses of lectures which we provide for our pupils are three in each term, thus forming a three years curriculum as follows:

1st year.	<i>Michaelmas Term</i>	Mechanism and Applied Mechanics (General and Introductory Course).
	<i>Lent Term</i>	Elementary Mathematics (Algebra and Trigonometry).
	<i>Easter Term</i>	Statics and Hydrostatics.
2nd year.	<i>Michaelmas Term</i>	Dynamics.
	<i>Lent Term</i>	Machine Construction and Heat.
	<i>Easter Term</i>	Conics and Differential Calculus.
	" "	Surveying and Levelling (Practical Class.)
3rd year.	<i>Michaelmas Term</i>	Integral Calculus and Solid Geometry.
	<i>Lent Term</i>	Theory of Structures and Strength of Materials.
	<i>Easter Term</i>	Rigid Dynamics.

The above list of lectures will be subject to modification as the progress of our experience may suggest. There will always be a number of pupils who will take only the first or only the last year's course, or otherwise select their subjects, owing to the particular state of their information.

Each term lasts for at least eight weeks, and we add a fourth term in the Long Vacation in July and August, during which, however, there are no Lectures.

Any person may attend the shops daily from 8 to 1, and from 2 to 6, including attendance at all lectures given, for the fee (covering eight weeks in each of four terms) of forty-eight guineas. The minimum fee charged is 3*l.* 3*s.*, which permits of attendance three forenoons or three afternoons for each week during eight weeks of one term, and a larger number of attendances is charged proportionally. A pupil pays for the materials he uses, but there are no other extra charges. He takes away his own work when finished, and in some cases this reimburses him for the greater part of the fee he has paid.

As to the practical work done in the shops, and the order of that practical work, we adapt this to the condition of each pupil. They all begin for a short time on a definite job in the fitting and turning shop to familiarize them with the tools; and, in all cases, from the beginning of their course to the end, they are engaged on real practical jobs, and not on toy work, and have to turn out everything in a thorough workmanlike manner. They work from drawings made by themselves, or similar to others which they have made or are about to make. Some pupils begin by designing, others do not go to designing till they have been some while in the shops;—this depends on their capabilities. We make a point of never copying a drawing; the pupils have to think out at the drawing board the practical application of their theoretical knowledge. As we do a good deal of work for the University and for others, there is always plenty of opportunity for the pupils to make designs, and we apportion that work among them in the way we find to be most educational. In fact the place is an engineering workshop, where the work is arranged and distributed with a view to give the pupils every facility for learning. To prevent our falling into the danger of omitting the economic aspect of our work, we lay it down as a principle that the shops must clear their own way; and they do so, paying five per cent. on the capital, and 10 per cent. to provide for deterioration on the machinery. As we have a regular system of book-keeping, which the pupils, I should mention, have the opportunity of learning in detail, we are able to keep the economic aspect always in view. What in another shop would be profit is with us practically absorbed in education.

The sort of work we do in the shops will be evident from the list of the principal jobs at this moment in hand.

1. Plans for a larger foundry with core-stove and furnace for malleable cast iron.
2. Shaping machine, 12" stroke 5' bed.
3. Circular saw bench, with rising table 3' by 2'.
4. Double geared fixed headstock for a 5" centre lathe.
5. Three lathes with 5' and 6' centres.
6. Pattern makers' lathe with 9" centres.
7. Pair of small horizontal engines, 3" diameter of cylinder, 6" stroke, to drive a dynamo machine.
8. Siemens' dynamo machine to absorb five horse-power.
9. Large gun-metal heliostat driven by worm-wheel gearing.
10. Four-jawed chuck 3' diameter.

For all these the designs, patterns, and castings have been made or are being made in the shops.

We have also an instrument-making department, chiefly for electrical work, such as galvanometer making. And we have a carpentry and cabinet-making department, and some of our pupils, especially a few who intend to emigrate, learn general carpentering.

There are at present about 40 pupils, the greater number of whom are intending to enter the engineering or allied professions. A great deal of time would be saved if they knew mathematics, including trigonometry,

Appendix 32a.

Letter from
Professor Stuart
on Engineering
Instruction at
Cambridge.

Appendix 32a.

Letter from
Professor Stuart
on Engineering
Instruction at
Cambridge.

and also elementary statics and dynamics, before they came to us, also if they had got some familiarity with the use of tools while at school. I find those who have had that training get on more quickly.

As to the number of hours a pupil actually works in the shops, that is good deal regulated from term to term by the University examinations which he may have to go through and the amount of preparation requires to make for these. From the point of view of my department do not much care whether a pupil goes in for a degree or not, but general the reading for a degree gives definiteness to his work. I do not however, confine the workshop at present to those reading for a degree. A good many pupils attend the workshops for three or four forenoons afternoons per week, each attendance generally being from three to five hours, and increase this in those terms when there are no University examinations, and then stay for a few terms after taking their degree, attending then during ordinary working hours. The amount of time which would advise a pupil to devote to reading for his degree and to his department respectively, would depend partly on his state of preparation partly on the future line of life he intended to pursue, and partly whether the subject of his degree was one in which he would be more less directly helped by his work with me.

The following is a list of the departments and the principal machines which we have:

- 1st. *Drawing Office.* This is capable of accommodating about 15 pupils at a time, and is fitted up with a large stock of drawing boards and instruments. All work done in the shops is first drawn, and the drawings traced on vellum cloth, and these tracings are sent into the shops for the pupils to work from.
- 2nd. *Machine shop.* This contains a three horse-power gas engine which drives three self-acting screw-cutting lathes with a number of smaller lathes, and drilling, shaping, slotting, and planing machines.
- 3rd. *Erecting shop.* In this shop the fitting and erecting is carried on. There are a dozen vices and a cast-iron marking-off table, 6' x 6' for setting out work.
- 4th. *Smithy.* Containing a hearth fitted with water tuyere with power blast, and capable of welding a 4" shaft.
- 5th. *Foundry.* This contains a brass furnace and cupola for iron melt in which all the castings at present used in the shops are made up to 4 cwts. A new foundry is being designed, and will shortly be built, in which castings of upwards of a ton may be made and also a complete plant will be added for the conversion of castings into malleable iron.
- 6th. *Pattern and Carpenters' shop.* Circular saw, morticing machine and eight carpenters' benches, with sets of tools.
- 7th. *Instrument shop.* Containing four foot lathes, four vices, and a large assortment of small tools.
- 8th. *Office and stores.*

There is also a museum containing sectional and other models. I should not like to terminate this letter without saying that, though there may be special opportunities afforded to a pupil to learn, no one need come here with the expectation that there is afforded any royal road to engineering which he can follow without hard work. He must be willing to work hard and conscientiously, and must continually bear in mind that when he leaves he will be judged, and his success as an engineer will be determined, not by where he has been but by what he can do.

I am,

Yours faithfully,
JAMES STUART.

APPENDIX 33.

Appendix 33.

Educational
Work in
Manchester.

EDUCATIONAL WORK IN MANCHESTER, LIVERPOOL, and OLDHAM.

(See Vol. I., p. 425.)

MANCHESTER SCHOOL BOARD.

The following statement as to the working of the Manchester School Board was handed to the Commissioners by Mr. Sutton, the School Inspector and Organizing Master. Manchester School Board Statement.

The Manchester School Board District comprises only the City of Manchester. The attendance at elementary schools within the district has considerably increased since the Board was first formed in 1871, as the following table shows:

Date of Return.	Average Attendance at all Schools in the City.	Average No. present Weekly.	No. on the Books at all the Schools in the City.
Quarter ending December 30, 1881 -	43,486	50,855	58,641
Week " " 2, 1871 -	26,878	30,841	32,240
Increase - - -	16,758	20,014	19,401

In 1871 the average attendance was at the rate of 1 in every 13·17 of the population (351,361).

In 1881 the average attendance was at the rate of 1 in every 7·86 of the population (341,453)

The Board are now conducting 39 schools containing 104 departments, of which 13 schools (48 departments) were built by the Board, 1 school (3 departments) purchased by the Board from the late managers. 23* schools (26 school buildings, 52 departments) have been transferred to the Board, and 1 school (1 department) is held in temporary premises. (The Board are erecting two additional schools.)

The number of children on the books at the Board schools on July 1st, 1882 was 23,530, of which number 2,009 or 8·5 per cent. had their fees remitted by the Board on account of the poverty of their parents.

The average attendance at the Board schools is best seen by the following table:

Month of	Schools.	Departments.	Average Attendance.
May 1875	5	9	1,151
" " 1876	13	30	3,682
" " 1877	15	33	5,126
" " 1878	25	53	7,974
" " 1879	29	69	10,159
" " 1880	29	72	11,743
" " 1881	38	98	14,899
" " 1882	38	102	16,249

The 13 schools built by the Board have cost 139,653*l.*, which is equal to an expense of 12*l.* 15*s.* 9*d.* per child accommodated, and is much below the cost of school buildings in other towns (see Table in Blue Book).

* Two departments transferred on July 1st, hence average not included.

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Appendix 33. The following table shows the *per-centage* of children in each standard examined by Her Majesty's Inspector:
Manchester School Board Statement.

Year.	I.	II.	III.	IV.	V.	VI and VII.	Total.
1876 - -	47	23	16	11	2.5	0.5	100
1877 - -	45	29	15	9	8	1	100
1878 - -	27	31	24	12	5	1	100
1879 - -	32	27	21	14	4	2	100
1880 - -	26	24	22	16	8	4	100
1881 - -	23	23	21	18	10	5	100

So that of all children examined in Standards by Her Majesty's Inspector in all the Manchester Board Schools, 33 per cent. were in the higher standards in 1881 as compared with 14 per cent. in 1876. (This year: much higher per-centage is in the higher standards.)

The following table shows the results of the examination by Her Majesty's Inspector in the whole of the Board Schools.

Year.	Per-centage examined of those qualified.	Per-centage of Passes in			Average per-centage.
		Reading.	Writing.	Arithmetic.	
1874 - -	86	84	82	75	81
1875 - -	89	85	78	59	72
1876 - -	90	88	85	78	84
1877 - -	95	89	87	85	87
1878 - -	95	96	94	92	94
1879 - -	96	97	95	98	95
1880 - -	96	95	98	92	96
1881 - -	96	96	94	92	94

During last year (1881) 580 children in attendance at the Board schools were present at every meeting of their respective schools, that is, were not absent one half day during the year.

The Board schools are, as a rule, divided into four departments, viz.:—
 Infants (children under 7).
 Junior mixed (children in Standards I and II).
 Senior Boys (Standard III. and upwards).
 " Girls (" " " ").

Where several schools are close together, the Board are grading their schools. This is best noted in Hulme, where the Board have 7 schools (15 departments), with accommodation for 3,864 children. The schools are graded as follows:—

Infants departments	-	-	-	-	4
Junior	"	Standards I and II	-	-	3
Middle	"	Boys, Standards III. and IV.	-	-	3
"	"	Girls	"	"	3
"	"	Boys	"	V. and VI.	1
"	"	Girls	"	"	1

The schools are so arranged that the upper school is situated in the centre of the district. The infant schools are so situated that no child has far to go to school. The change is evidently appreciated, for the increased weekly attendance at the whole schools is 35 per cent., and this in a district where there is no building going on, as the land is already all built on.

Appendix 38.
Manchester
School Board
Statement

The Board are just about to arrange for two other sets of schools in the same way.

The Board have a central school (Peter Street School) to which school scholarships are awarded by the Board.

The scholarships are open to children in attendance at all the public elementary schools in the city. The Board have at present:—

24 children at the school holding elementary school scholarships (annual value for one year of 10*l.*)

10 children holding science and art scholarships of the annual value of 15*l.*

At the examination this year for the award of the 24 elementary school scholarships, no fewer than 212 presented themselves for examination. The examination was conducted by H. E. Oakley, Esq., H.M. Senior Inspector of Schools.

At the Peter Street School the Board have fitted up a laboratory, and have special instruction in science given to boys and girls who have passed Standard VI. (For further remarks on the Peter Street School, see special account of the school).

In addition to scholarships the Board award, at various periods, exhibitions of the annual value of 25*l.* for three years. These exhibitions are tenable at any place of higher instruction approved by the Board. These exhibitions have hitherto been held at the Grammar School and the Girls High School.

This year at the examination the exhibitions were awarded to three girls and one boy. The age of candidates for exhibition is limited:—

Boys, 11 to 13.
Girls, 11 to 14.

The fees at the various Board schools vary according to the locality.

The general fee is—

Infants, 2*s.* per week.
Junior departments, 3*s.* a week.
Senior " " 4*s.* a week.

At schools in good localities the fee is 9*d.* per week.

No child is allowed to attend a Board school without fee, unless an order for remission of fee from the Board, has been received by the teacher.

The Board have penny banks at 63 departments, and have on an average 2,500 transactions at them weekly.

Evening Schools.

In addition to the day schools, the Board each winter conduct elementary evening schools for providing instruction in reading, writing, and arithmetic, for such persons as had not the opportunity of learning when young.

This last year, 1881-82, the Board opened 19 such schools (32 separate departments), and in the second week no less than 2,690 pupils were present.

The schools meet on three evenings per week, for two hours.

In 1878-1879 37 per cent. of the pupils in attendance were in the Upper Standards.

„ 1880 70 per cent. were examined by H.M. Inspector in the Upper Standards.

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Appendix 88. In addition to the above the Board have also Science and Art and other classes as follows:—

Manchester School Board Statement.	Science and Art classes	No. of classes.
	French classes	14
	German "	5
	Latin "	2
	Spanish "	2
	Shorthand "	5
	Singing "	6

The number of pupils at the above classes for the winter season 1881-1882 is best shown by the following Table:

TOTAL NUMBER OF PUPILS attending the SCIENCE AND ART CLASSES conducted by the Board, 1881-1882.

No. of Subject.	Subject.	No. of Pupils.
I.	Geometry	118
II.	Machine construction	87
III.	Building construction	61
V.	Mathematics	640
VI.	Mechanics—Theoretical	17
VII.	" Applied	37
VIII.	Acoustics	473
IX.	Magnetism and electricity	589
X.	Chemistry (inorganic)	509
Xp.	" " practical	189
XI.	" " organic	83
XIp.	" " practical	14
XIV.	Physiology	384
XV.	Botany	47
XVI. and XVII.	Biology	10
XXII.	Steam	20
XXIII.	Physiography	81
XXIV.	Agriculture	25
	Drawing, 2nd grade	392
	" 3rd "	87
	" teachers	76
	Total	8,822
	French	229
	German	43
	Latin	29
	Spanish	33
	Shorthand	220
	Singing	254

The School Board rate of the district for the past five years has been 2d. in the s.

JOHN SUTTON.

Progress of Manual Instruction in Manchester Schools.

REPORT ON THE PROGRESS OF MANUAL INSTRUCTION in the MANCHESTER BOARD SCHOOLS.

The Board have arranged to give instruction in the use of tools in two schools.

Lancasterian Board School.
Sharp Street Board School.

For this purpose tools, &c. have been purchased to the following amounts:—

	£	s.	d.
Benches	22	0	0
Set of tools	22	16	4
Lathes	24	0	0
	<u>68</u>	<u>16</u>	<u>4</u>

Manchester
Board School,
Manual
Instruction.

Two boys work at each bench. The boys in Standard IV. and upwards work 1½ hours each per week. A lesson on timber and tools is given once a week to the boys, who work collectively. The cost of timber for the past three months has been about 2£.

A joiner, in the employ of the Board, superintends the boys at work, and a special teacher gives the lesson.

The work takes place at the latter part of each day, and takes a portion of the ordinary school time.

The boys like the work very much, and the parents appear to be interested. Cases have occurred in which boys have brought special wood to make special things for home.

The Board have also sent 140l. to Paris for the special purchase of models for the machine construction classes, and accepted a special tender for models to be made for the classes in building construction last winter.

It is proposed in September next to commence all the art classes conducted by the Board, and those in machine construction, on the plan of those in Paris.

A new art room is in process of erection at the Deansgate School, and this will, I believe, be fitted up on the model of the Parisian art schools.

The School Board, at the Science and Art Examinations now being conducted, have applied for 3,073 papers in art and science for the use of the pupils of their various classes in the town. I may also add, that in the estimates of the expenditure for the year 1883-1884 an amount was specially put down for manual instruction.

In practical chemistry the Board have 271 pupils sitting in May.

May 1883.

JOHN SURTON.

LLOYD STREET BOARD SCHOOL.

Lloyd Street
Board School.

This school is attended almost entirely by the children of the operative classes from a poor neighbourhood, but the classes are arranged exactly the same as in the Ducie Street School (described hereafter), and, in fact, in all the Manchester Board Schools.

(1) Boys' School.

Boys' school.

On a register of 397, from 25 to 30 are half timers, who are taught along with the full timers, some attending in the morning, and some in the afternoon. They only receive half tuition in a course arranged for full timers, and have to keep up with the rest as best they can. It appears that the half timers are not very seriously behind the full timers in passes, which may be partly accounted for by their greater regularity of attendance, and by the desire of parents to get them forward to the Fourth Standard by the time they reach the age of 13, so that they may then leave school altogether and become full time factory workers. It was not explained to what extent the half timers drag down the general efficiency of the school, but something may be said on this score when the very low standard of the school is considered.

Out of the whole number there are but two boys in the Sixth Standard. At the examination there were 35 in the Fifth, but only two of these had

Appendix 38. remained, as the others had reached the age beyond which compulsion was no longer applicable. There are 80 boys in the school whose fees are remitted in consequence of the poverty of their parents. It was stated by Dr. Watts, who is a member of the Board, that 9 per cent. of the entire pupils attending Board Schools have their fees remitted.

Manchester Board School, Lloyd Street.

One hour per week is given to drawing in the Fifth and Sixth Standards, including geometrical and a little freehand. At the last examination 16 passed out of 70.

Girls' school.

(2) *Girls' School.*

Out of 262 scholars 55 have their fees remitted. There are 25 girls in the Fifth and one in the Sixth Standard.

Juniors' school.

(3) *Juniors' School.*

Standards I. and II.

There are 302 children in the school, of whom the fees of 117 are remitted. The poverty of the children may be ascertained from the fact that last winter it was found necessary to present them with free breakfasts, consisting of bread and coffee, and these cost less than one halfpenny per head.

Infants' school.

(4) *Infants' School.*

There are 220 on the registers, with an average attendance of 180, of whom 50 have their fees remitted.

Ages from three to seven. Inspected lesson on form in which blocks of wood are used. There are similar lessons given on colour.

Armitage Street.

ARMITAGE STREET BOARD SCHOOL.

This school has been open five years, and is one of the largest in Manchester, containing about 1,500 scholars.

There are five departments.

- (1) Infants' school.
- (2) Lower juniors' school.
- (3) Juniors' school.
- (4) Boys' "
- (5) Girls' "

All the boys in the higher standards learn drawing.

Among the girls 14 are in Standard VI. from a total of 390, and 12 have their fees remitted. A marked improvement has been shown during the last few years in the passes, a much larger proportion being presented in the higher standards at an earlier age than formerly.

In the first year of this school, when 106 were presented, 80 were in the First Standard.

Art night classes. *Mr. Blacker*, Art master in the Board schools, exhibited to the Commissioners drawings done in the adult night classes.

In reply to the chairman, *Mr. Blacker* stated, that the time required for an elementary student, beginning with freehand drawing, to get to drawing from the model or cast varies very much with the different students. Some will take two or three years, some only one session. Dyes outlines are principally used. These are employed in the form of large charts and worked at by a whole class at once. They are found to learn much more quickly in this way, and measurement is prevented.

ST. MARY'S CHURCH OF ENGLAND SCHOOL.

Appendix 88.

This is a large denominational school, the master of which is Mr. Williams.

There are 500 names on the books, and in actual attendance on this particular afternoon there were 446. The master is aided by four pupil teachers and four assistant masters, of whom one is certificated.

A number of the scholars are extra sixths, and above half are above Standard III.

The scholars are taught mathematics, one language, and animal physiology. The work is for the special Whitehall subjects, and not for the Science and Art Department.

In answer to the chairman, Mr. Williams said: Many of the boys get scholarships at the grammar school, and others pass forward to the grammar school and pay the fees. The class-room system is preferable to teaching in general school. In a class-room, one assistant-master can take 60 to 80 boys. In a separate room the master can manage many more boys than in open school, and better results also are obtained by the class-room system. A model school building would consist of a large central room and class rooms off it, so that all could assemble for special occasions. Drawing is taught—one class on Wednesday and one on Thursday; chiefly from copies, and entirely freehand. But to do real good, drawing ought to be taken as a special subject. Now, we only get the Science and Art Department grant. If it were to be in all schools as a specific subject, it could be taught successfully, and more time and attention given to it. But now it is looked upon merely as something extra. Drawing could be begun in the Second Standard. At present drawing is often worked up before examination day, and then neglected for the rest of the year. As a matter of paying, teaching drawing in connection with South Kensington in elementary schools is not worth much. The grant varies from 12l. to 20l. in my own school. The average time given to specific subjects is (in the principal classes) six to eight hours per week. In this neighbourhood we have to teach several subjects which would not be taken account of by the authorities. Two specific subjects are allowed for under the code, whilst we have to teach three or four. The neighbourhood is rather a high class one; the parents are clerks and men of fairly high position. There is religious teaching in the morning. Quite half (almost two-thirds) of the scholars are the children of dissenters. There has not been one application for exemption this year.

Manchester
Denominational
Schools.
St. Mary's School,
Ruims.

Scholarships.

Specific subjects
under Code.Religious teach-
ing.

ST. MARGARET'S, WHALLEY RANGE, CHURCH SCHOOLS.

Infant School.

This school was visited just after examination, and 100 of the best children had been taken away and gone to higher schools.

The schoolroom was new, well lighted, and clean; and the children very tidy, and evidently well taught.

St. Margaret's
School, Whalley
Range,
Infants.

Girls' School.

There were about 200 girls in this school, and the fees paid are as follows:—

Second Standard, 6s. 6d. per quarter.

Third to Fourth Standard, 8s. 6d. per quarter.

Fifth to Seventh " 10s. 6d. "

The teacher is assisted by two assistant and two pupil teachers. Twenty-five of the girls are in Standard VII and from this school 40 to 50 went in for literature in the Upper Standard.

Girls.

Boys' School.

Strong points in the teaching here are: physical geography, physiology, and tonic sol-fa. The ordinary notation is not attempted.

Boys' school.

Appendix 88. — St. Margaret's School, Whalley Ramsay. Geography. Drawing.	A class in geography (Standard VI.) was inspected, and the boys were questioned on the river system of India, and answered well. Physical questions were also well answered. The teaching is oral; but reading books, containing similar information are used. Object lessons are not used. Drawings examined, both from the flat and from model, and considered fair average work, even when compared with continental schools. About one-third of the drawing is model drawing.
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DUCIE AVENUE BOARD SCHOOL.

Manchester
Board School,
Ducie Avenue.

This is one of the newest and most carefully arranged of the Manchester Board Schools, with accommodation for about 900 children in four departments, (1) infants, (2) juniors, (3) upper boys, (4) upper girls. The complete buildings cost about 8,000*l.*, and with playgrounds, &c., about 10,000*l.* It averages from 8*l.* to 9*l.* per head for buildings, fittings, and furniture.

The school is built on the wide system, with a large open room and two class rooms for each department. The desks are arranged lengthways down the sides of the large room, in four groups of three deep, thus forming four classes on each side, a total of eight for the room. The centre of the room lengthways is kept clear of furniture (excepting moveable black boards) so that the teachers can draw out their classes into the open space when desirable. In front of each set of desks there is a long locker for books and other school material.

The school is situated in a neighbourhood of better class houses; the fees are high for all the departments; the children are well dressed, tidy, and thoroughly disciplined. In all respects the school seemed to be well conducted, and the exercise books, the answers to the questions put to the scholars, and many other evidences of efficiency impressed the Commissioners very favourably.

Girls' school.

(1) *Girls' School.*

There is one principal teacher, one assistant, 4 pupil teachers, and 2 monitors.

There are 230 names on the books, and about 200 scholars were in actual attendance on the occasion of this visit.

90 of the girls are in Standard VI. and VII. In the Third Standard the girls are about 8. Out of 43 only 20 were above 9. The oldest girls are 16, but very few are above 14.

The Commissioners inspected the girls' drill and dumb-bell (1½ lbs. each) exercises, which were performed to music.

In this school there is a girl only 9 years of age who is in Standard VI., and there are several of 8 and 9 years of age in Standard IV.

The Commissioners inspected specimens of freehand and model drawing, and heard French reading lesson, the pronunciation being very good.

Boys' school.

Boys' School.

This department includes boys over 9 and such under 9 as are more advanced, and they pay 9*d.* per week. The lower forms pay 6*d.* and the infants 4*d.* per week. The scholars provide themselves with books.

Teachers in this and other schools expressed regret that there were not more class rooms.

Juniors' school.

Juniors' School.

Boys and girls in First and Second Standards. These have the dumb-bell (1 lb.) exercises like the others.

All Standards I. and II., taught by female teachers in the board schools. The mixed school not carried beyond Standard II. Thus a large number of female teachers are employed in the board schools.

There were good natural history diagrams on the wall, of German manufacture and with French inscriptions. This, however, is not of material disadvantage, as the teachers give the descriptions. They cost 4s. 6d. each, with 33 per cent. off.

There are 3 classes in each standard throughout all the subjects.

Appendix 33.

Manchester
School Board,
Ducie Avenue.

Infants' School.

Infants can read lessons containing some words of 2 syllables, and add up numbers which in the total do not exceed 20.

The children pass from the infant school before 7 years of age.

Infants' school.

PETER ST. HIGHER GRADE BOARD SCHOOLS.

Mr. James Scotson, the Head Master, submitted the following statement concerning the Schools to the Commission.

These Schools under the name of the Manchester New Jerusalem Schools, were established in the year 1827, for the purpose of bringing a sound elementary education within the reach of the poor of Manchester. The fees, at first, were small, amounting on the average to 4d. per week, and all books and necessary stationery were supplied to the scholars free of charge. At that early time, the education of the people received very little sympathy or attention from the religious denominations, and the public generally were disposed to regard it as rather a dangerous undertaking; yet in the midst of this general feeling of indifference and of considerable opposition, the influence of these schools soon began to make itself felt, and in a very short time they were acknowledged to be among the best of the elementary schools of Manchester. The numbers attending were limited only by the accommodation. At the outset there were but two small rooms, and in these there was an average attendance of 250. Twenty-two years passed before any aid was received from the Government, but in the year 1848 the schools were placed under inspection, and the first grant was received in 1849. The subjects of instruction at this time were those generally taught in purely elementary schools, and no attempt was made at teaching higher or scientific subjects. The money obtained from the Government grant enabled the managers to improve the methods and enlarge the basis of the education given, and so great was the success resulting from these endeavours, that it was found necessary to extend the premises devoted to the schools. In the year 1857 about 2,000l. was raised by the Swedenborgian Society, to whom the building belonged; this was expended in building two large commodious rooms in addition to those formerly used, and the career of the schools has since been one of uninterrupted success. The average attendance, which from 1827 to 1849 was about 250 boys, now advanced to 450, and a girls' school was also established with an average of more than 200. The character of the studies now began gradually to rise, the school curriculum was extended, and higher subjects taught. The teaching became so successful, and the numbers in the higher standards increased so rapidly, that the managers found it necessary to close the infant department, to make room for boys and girls in the higher standards. The gradual increase of the numbers in these standards went on, until, in the first place there was no Standard I., next year no Standard II.; and now boys are not admitted unless they have passed Standard IV., or are able to pass an equally difficult examination. The position thus gradually assumed by these schools led to their being regarded more and more as a kind of higher elementary school, and a large number of boys remained at school after passing Standard VI. The Science and Art Department in South Kensington make grants for instruction in Science, and boys and girls who have passed Standard VI. may be engaged in studying various science subjects during the ordinary school hours. The managers were thus enabled to introduce science teaching as part of the general

Manchester
School Board,
Central School.

Appendix 38.
 Manchester
 School Board,
 Central School.

work of the schools. In February 1880, the schools were handed over by the managers to the Manchester School Board, and were adopted by them as their higher grade school. One of the rooms was fitted up for science teaching, a good laboratory for 24 scholars was made, and a master engaged to devote the whole of his time to teaching science to boys who had passed Standard VI. The schools would not now, under these arrangements, accommodate more than 320 boys and 150 girls. At present they are full, and out of the 320 boys, over 200 have passed Standard VI, and are taught during the day, mathematics, physiology, chemistry (practical and theoretical), sound, light, and heat, magnetism and electricity, physical geography, and mechanics. French is taught throughout the school. The pupils are examined in physical geography, mechanics, and French by the Government inspector of schools, and in the other science subjects by the Science and Art Department at South Kensington. During the past year the following classes have been formed, and the pupils were examined May 1882:—

Mathematics, Stage II.	-	-	-	-	-	25
" " I.	A.	-	-	-	-	30
	B.	-	-	-	-	50
	C.	-	-	-	-	45
Physiology, elementary stage	-	-	-	-	-	50
" advanced stage	-	-	-	-	-	20
Chemistry, Practical, class A., advanced	-	-	-	-	-	20
" " " A., elementary	-	-	-	-	-	30
" " " B. "	-	-	-	-	-	50
" " " C. "	-	-	-	-	-	50
" Theoretical, class A., advanced	-	-	-	-	-	20
" " " A., elementary	-	-	-	-	-	30
" " " B. "	-	-	-	-	-	50
" " " C. "	-	-	-	-	-	50
Sound, light, and heat, class A., advanced	-	-	-	-	-	20
" " " A., elementary	-	-	-	-	-	30
" " " B. "	-	-	-	-	-	50
" " " C. "	-	-	-	-	-	50
Magnetism and electricity, class A., advanced	-	-	-	-	-	20
" " " A., elementary	-	-	-	-	-	30
" " " B. "	-	-	-	-	-	50
" " " C. "	-	-	-	-	-	50

The following are the results of the examination held by the Science and Art Department in May 1881:—

	1st Class.	2nd Class.
Mathematics	8	19
Physiology	11	42
Practical Inorganic Chemistry	17	49
Theoretical Inorganic Chemistry	15	44
Magnetism and Electricity	8	60
Acoustics, Light, and Heat	19	38
First Grade Freehand Drawing	11	43
" Geometrical Drawing	8	20
" Model Drawing	0	10
Second Grade Freehand Drawing	0	14
" Geometrical Drawing	2	25
" Model Drawing	0	2

The following time table, for the scholars who remain at school after passing Standard VI., shows the number of hours devoted to each subject from October 1st to the middle of May.

The school is open in the morning from 9 o'clock to 12 o'clock, and in the afternoon from 2 o'clock to 5 o'clock. The first half-hour each day is occupied with religious exercises and scripture history.

Appendix 33.
Manchester School Board, Central School.

		Each Week.		Each Week.	
1	Scripture - - -	2½ hrs.	9	French - - -	3 hrs.
2	Practical Chemistry -	1½ "	10	Geography - - -	2 "
3	Theoretical Chemistry -	1 hr.	11	Arithmetic - - -	2 "
4	Magnetism and Electricity.	1 "	12	Physical Geography -	2 "
5	Acoustics, Light, &c. -	1 "	13	Mechanics - - -	2 "
6	Physiology - - -	1½ hrs.	14	Drawing - - -	3 "
7	Mathematics - - -	3 "	15	Preparation - - -	2½ "
8	Grammar and Composition.	2 "			

The home lessons of the scholars include general and scientific subjects. Rough notes are taken at each science lecture, and these are carefully re-written at home. This home-work will take on the average one hour each night for four nights in the week, besides the half hour each day mentioned in the above table under the head of preparation.

TIME TABLE for the SCHOLARS who remain at SCHOOL after passing STANDARD VI. in use from the middle of May to October 1st.

Day.	Class.	9 to 9.30.	9.30 to 10.	10 to 11.	11 to 12.	2 to 2.10.	2.10 to 3.	3 to 4.	4 to 4.30.
Monday.	1	Open school. Singing, Prayer, Psalms, and Scripture History.	French	Arith.	Gram.	Open school. Register called and closed.	Mech.	French	Preparation.
	2		French	Math.	Mech.		Phy. Geog.	French	
	3		French	Phy. Geo.	Arith.		Gram.	French	
Tuesday.	1		Etymology	Geog.	Math.		Phy. Geo.	French	
	2		Geography	Mech.	Compos.		Reading	French	
	3		French	Mech.	Gram.		Phy. Geo.	Reading	
Wednesday.	1		French	Mech.	Gram.		Reading	French	
	2		French	Gram.	Mech.		Phy. Geo.	French	
	3		Geography	Math.	Mech.		French	Phy. Geo.	
Thursday.	1	Drawing or Etymology	Comp.	Arith.	Phy. Geo.	French			
	2	Grammar	Math.	Phy. Geog.	Mech.	French			
	3	Etymology	Math.	Mech.	French	Geog.			
Friday.	1	Geography	Comp.	Math.	Examination or Mech.	French			
	2	French	Phy. Geog.	Math.	French	Arith.			
	3	French	Math.	Comp.	Gram.	French			

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TIME-TABLE for the SCHOLARS in STANDARDS V. and VI. in use all the year.

Appendix 33.
Manchester
School Board,
Central School.

Day.	Class.	8 to 10.	10 to 11.	11 to 12.	2 to 2.10.	2.10 to 3.15.	3.15 to 4.15.	4.15 to 4.50.
Monday.	4	Open School.—Singing, Prayer, Psalter, and Scripture History. Registers closed.	Arithmetic	French	Open School.—Registers called and finally closed.	Geography	Writing	Home Lessons.
	5		Arithmetic	Geography		French	Writing	
	6		Arithmetic	Read. French		Writing	Geography	
	7		Writing	Arithmetic		Geography	French	
Tuesday.	4		Arithmetic	Writing		French	Phy. Geog.	
	5		Arithmetic	Grammar		French	Pattern Exam.	
	6		Arithmetic	Reading		Writing	Grammar	
	7		Writing	Arithmetic		Grammar	French & Read.	
Wednesday.	4		Arithmetic	Geography		Writing	French	
	5		Reading	Geography		French	Composition	
	6		Arithmetic	French & Read.		Writing	Geography	
	7		Composition	Arithmetic		Geography	French & Read.	
Thursday.	4		Drawing or			Reading	Grammar	
	5		Arithmetic	French		French	Writing	
	6		Reading	Grammar		Grammar	French	
	7		Arithmetic	Reading		Grammar	French & Read.	
Friday.	4		Arithmetic	Writing		Examination or		
	5		Arithmetic	Geography		French	Phy. Geog.	
	6		Arithmetic	Grammar		French	Composition	
	7		Composition	Arithmetic		Arithmetic	Geography	
							French & Read.	

In connection with these schools, the Manchester School Board has established elementary school scholarships, which are open for competition to all the elementary schools in the city, both board and voluntary. Various gentlemen subscribe 5*l.*, and for each subscription of 5*l.* the Science and Art Department at South Kensington, London, give another 5*l.*, provided the successful candidates attend the school regularly for 12 months, and pass in one or more of the science subjects named in the Science Directory. The sum of 10*l.* is given to the parents of the pupils to enable them to pay the school fees, and to keep their children longer at school than they would otherwise be able to do. The scholars who gain scholarships continue their education in these schools, and at the present time there are 16 boys and 7 girls who hold them. There is also another kind of scholarship, called a science and art scholarship, of the annual value of 15*l.* These are competed for by the scholars who during the previous year held a 10*l.* elementary science scholarship, the award being decided by the results of the May examination in science and art.

The following is a copy of a report received from H. E. Oakeley, Esq., H.M. Senior Inspector of Schools, this year (1882).

Peter Street Boys' School.

"This well-known school continues to maintain its reputation for first-rate teaching and organization. The results in the 4th Schedule subjects are excellent."

The Commissioners, in inspecting this school, were impressed by the high character of the teaching, and the enthusiasm which animated both teachers and scholars.

The accommodation was inefficient, several classes being crowded in one room, and the fullest concentration was required to sustain the attention of the scholars to the particular work of their own class. The head master did not consider the system of several classes being taught in one room as a serious waste of power or drawback to the general efficiency of the school, and it was also pointed out by Mr. Hughes that the Board favoured the open school system rather than a general adoption of the class-room system, on the ground that in addition to the open school enabling the head master to take a general surveillance of the work of the whole school, it also promoted a very useful discipline in inculcating a habit of concentration in the children at an early age. At any rate the school clearly illustrated the fact that a number of classes being taught in one room, under separate teachers, is not inconsistent with thorough teaching and very high results at the examinations.

All the boys in the Sixth and Extra Sixth Standards take a number of the science subjects of the Science and Art Department. A class of 20 were engaged in the second stage of mathematics, another in "sound" experimentally illustrated, and a large class in practical chemistry. Professor Roscoe questioned the boys on chemistry and other subjects, and their answers showed evidence of practical knowledge and intelligent training.

The Commissioners inspected the laboratory, which was fairly well appointed. It is extensively used by Mr. Taylor, the teacher of chemistry, for night classes.

Every boy in the school learns drawing under the South Kensington method, and French also is compulsory throughout the school. Singing is taught under the Tonic Sol-fa.

There are 20 scholarships held in the whole school by boys and girls from the primary schools. The method of obtaining these prizes is described in Mr. Scotson's report. It was explained that in nearly every instance the holders of these scholarships would have left school but for them. They do great service in enabling a number of poor boys and girls to continue their education to a higher general standard, and by placing within their reach the advanced education of the grammar school and subsequently of the university. The whole intention of the scholarship scheme is to provide a means whereby the talented boy may climb the educational ladder from the board school to the university without any cost to his parents.

The Commissioners inspected the girls' school held in the upper rooms of the same building, where under the same system as obtains among the boys, a superior elementary education is being given, supplemented by French and needlework.

Some excellent examples of freehand and model drawing were exhibited.

The singing was effectively rendered, as also were recitations by three of the girls from Act I., Scenes II. and III. of Shakespere's "As You Like It."

The Commissioners were informed that new premises for this school, with complete arrangements for secondary and scientific teaching, are about to be erected in Deansgate, one of the leading thoroughfares of Manchester.

MANCHESTER FREE SCHOOL.—STATEMENT BY MR. LEPPOC.

Manchester
Free School.

The Manchester Free School owes its origin to the National Public School Association, by which body it was commenced in August 1854. It was intended as a model for a system of free schools to be established by law in England and Wales, to be supported by local rates, and to be managed by local committees elected by the ratepayers. The instruction was to be secular, and the inculcation of doctrinal religion was to be left to parents, guardians, and religious teachers, who were to be allowed the use of the schoolrooms at stated times for the purpose of giving this

Appendix 33. doctrinal instruction. For ten years the school continued its work as the "Model Secular School," and it was most completely successful in establishing the practicability of the scheme laid down by the National Public School Association.

Manchester Free School.

Of the 20 gentlemen who had advanced the means for establishing the school, only a few remained after it had been carried on under the superintendence of the late Mr. Benjamin Templar (a very successful teacher for 10 years, when the burthen of maintaining it fell upon a very few, and the want of funds in 1864 compelled them to seek Government aid and to modify the character of the school. Its name was changed to that of the "Manchester Free School," and its object was to provide a free education for the children of poor and struggling parents not actually destitute, but whose poverty was but one remove above actual pauperism. A grant in aid of a school was, at that time, conditional upon the daily reading of the scriptures to the scholars, and the committee were obliged to introduce the scriptures into the school. Great care was taken to make a selection of narratives and passages which were as nearly as possible identical in both the authorized and the Douay versions of the Bible, and these were read without note or comment. The passing of the Elementary Education Act released the managers from the obligation to have the scriptures read in the school, and they returned to their strictly neutral secular time-table. Lessons on such subjects, as the Providence of God, obedience to parents, honesty, truthfulness, charity, sobriety, thrift, &c., have, however, been constantly given.

The children attending the school are of a very low social grade, but their attendance is very remarkable, and their attainments, as far as the sixth standard of the education code are not inferior to those of the children attending the best schools in Manchester. The following table gives the particulars of both attendance and attainments:—

Number of boys admitted since August 1854, the date of the commencement of the school	-	-	-	5,189
Number withdrawn during the same period	-	-	-	4,857
Number of boys now in school	-	-	-	331

TABLE I.

AVERAGE ATTENDANCE.

Year.	Average.	On Books.	Per-centage.
1876	291	out of 302	96.3 per cent.
1877	281	" 291	" 96.5 "
1878	304	" 310	" 98 "
1879	310	" 317	" 97.7 "
1880	326	" 331	" 98.5 "
1881	326.5	" 332	" 98.3 "
1882	329.4	" 336	" 98 "

TABLE II.

BEST ATTENDANCES.

Year.	Attendances Possible.	Boys Thrice Absent.	Boys Twice Absent.	Boys Once Absent.	Boys Never Absent.
1876	452	12	16	15	51
1877	450	12	12	21	49
1878	462	13	15	28	69
1879	451	7	12	23	92
1880	450	4	18	29	136
1881	446	11	18	26	120
1882	450	10	15	29	130

TABLE III.
RESULTS OF EXAMINATIONS.

Year.	*Qualified for Examination.	Pre-sented.	PASSES IN			Per-centage of Passes.
			Reading.	Writing.	Arithmetic.	
1876	- 259	235	221	224	203	92
1877	- 241	226	214	215	207	94
1878	- 254	240	237	233	232	97.5
1879	- 248	244	240	240	238	98
1880	- 283	274	271	269	267	98.1
1881	- 298	290	290	286	287	99.1
1882	- 315	299	289	297	298	99.6

Appendix 88.

Manchester
Free School.

TABLE IV.

Year.	GRANTS EARNED.				per head on average attendance, including infants.
	£	s.	d.	s. d.	
†1876	-	-	189 13 0	or 13 0½	
1877	-	-	244 6 0	„ 17 4	„ „ „
1878	-	-	263 14 0	„ 17 4	„ „ „
1879	-	-	270 16 0	„ 17 5	„ „ „
1880	-	-	288 19 0	„ 17 8½	„ „ „
1881	-	-	294 2 0	„ 18 0	„ „ „
1882	-	-	298 16 0	„ 17 9½	„ „ „

The last official Report (Mr. H. E. Oakeley's) received from the Education Department is as follows:—

“The results of the Examination in elementary subjects are again excellent. The number of sums given was 1,106 of which 985 were worked correctly. The 299 boys examined made only 109 mistakes in spelling altogether. Grammar and Geography were most satisfactory. Thoroughness of work, intelligence, neatness, and accuracy were conspicuous in all the classes.”

In the blue book just issued by the Educational Department, Mr. Oakeley, Her Majesty's Senior Inspector for the Northern Division, gives a list of the Manchester Schools which have passed the best examinations, and in the list the “Manchester Free School” takes the best mark (E) and ranks in the foremost place. This notice ought not to be concluded without mentioning that the success of this remarkable school and the extraordinary attendance of the scholars (not to be found in any other school in the kingdom) is mainly, if not entirely, due to the present excellent head master, Mr. George E. Mellor, whose attention to his duties is most exemplary.

Much of the management and organization is in the hands of Mr. H. J. Leppoc, to whom the school is much indebted.

Mr. Mellor stated that he was aided by four assistant masters and two assistant mistresses, but that he had no pupil teachers. Few boys stayed at the school after the age of employment, and in the case of the few who did remain they were children of better class parents who knew the value of education. In some cases, however, the boys are kept at school because they are too little to obtain employment. The proportion of boys in the upper standards (4, 5, and 6) is about 32 per cent; in the two upper Standards (5 and 6) about 13 per cent. There are only two boys in the Sixth Standard out of 300. The School Board inspection has been found to be of very considerable service.

* Children under seven excluded.
† The grant actually earned was 222. 2s. or 15s. 3d. per head; but 221. 9s. was deducted under a regulation of the committee of council, a regulation which is now abolished.

Appendix 33.

MANCHESTER GRAMMAR SCHOOL.

Manchester
Grammar School.

The Commissioners were received by Mr. Dill the High Master, who made the following statement:—

The school was founded in 1515 to give free instruction in grammar and the course of study seems to have been exclusively classical till 1844 when, by a scheme framed by the Court of Chancery, provision was made for the teaching of modern languages and science.

Another scheme of the year 1887 permitted, in addition to 250 free scholars, the admission of others at a fee of 12 guineas annually. Since then the total number of boys has risen to 900. Between 1870 and 1890 about 80,000*l.* have been spent in providing additional class-rooms, together with a gymnasium, drawing hall, library, laboratories, and dining room; the new chemical laboratory is arranged to accommodate more than 7 boys. The drawing hall admits of about 180 pupils being taught at one time. The gymnasium is large enough to allow of nearly 200 exercising together. The modern and science sides of the school have been developed within the last 10 years, and are becoming more and more popular with parents. The numbers are now—

Classical side	-	-	-	-	-	450
Modern and science side	-	-	-	-	-	428
Miscellaneous forms	-	-	-	-	-	28
Total	-	-	-	-	-	906

(*Chairman.*) Do you give any science on the classical side?—In some of the forms. We are trying to expand the teaching of science on the classical side, but there is a great difficulty in point of time to deal with all the subjects. My hope is that in the end, every boy on the classical side will have learnt some science before he leaves us. Wherever science is taught on the classical side at present it is obligatory.

What does the modern side mean, as distinct from the science side?—There is a threefold division of the school, classical, modern, and science. On the modern side the basis is French and German, to which are added mathematics, physical science, and English. In the science division of the school, science is the basis; languages, ancient or modern, are accessory. The science teaching is always combined with a training in languages. Boys on this side are usually over 16 years of age, and have been for some time either on the classical or modern side. Boys are not allowed to go on the science side unless they have had a certain discipline in classics or modern languages. This means that a boy will generally have got as high as the remove or fifth form. That is, on the classical side, he will have done some Caesar, Virgil, and Xenophon, or Euripides. In the case of a boy being transferred from the modern side to a science form (which occurs less frequently than from the classical side) the boy will usually have attained the standard of the fifth form, that is he will be tolerably advanced in French and English subjects, and less so in German. (*Professor Roscoe.*) Are classics then taught on the science side?—Yes. A boy in a purely science form must take either an ancient or modern language in the first hour of every day. The remainder of his day will be spent at mathematics, science, and drawing.

(*Chairman.*) What is the arrangement for the teaching of mathematics?—For the purpose of mathematical teaching, five or six forms are thrown together into one section and redistributed into five mathematical forms. That is, there is a separate division of the boys for mathematical teaching.

Do the boys on the modern side learn science before entering the science forms?—A certain amount of science is taught in every form on the modern side. In the lowest forms, of course the teaching is very elementary, the ages of the boys varying from 10 to 13. In these forms such books as Roscoe's primer of chemistry are used.

How much science is a boy on the classical side supposed to have learnt before joining a science form?—Boys have often passed from the classical side to a science form without having had any regular instruction in

science, because on the classical side the teaching of science has not yet been fully organised. But within the last two years, chemistry has been regularly taught in the classical fourths and removes, so as to prepare boys for entering the laboratory.

Appendix 33.

Manchester
Grammar School.

What mathematics will a boy have done before passing to the science side?—As a rule, three books of Euclid, algebra to the end of quadratic equations, and some trigonometry, an amount perhaps corresponding to the second stage of the South Kensington examinations.

Which preparation is the better of the two for a boy going into the science division, the preparation in science with modern languages or the classical training?—Does not that depend somewhat on the object the boy has before him after leaving school? If he is going to be an engineer or a practical chemist, for instance, I have no doubt that he would be better on the modern side from the beginning. But there are other lines of life and departments of work of a less technical character, for which I should certainly wish him to have more general preparation in literature on the classical side, at any rate up to the age of 16. Of course, if a boy is to be prepared for a university life, it is necessary that he should have the preliminary classical training.

Do you attach much value to the more advanced science training which a boy coming from the modern side has had as compared with a boy coming from the classical side, as a preparation for the work of the science forms?—Our experience here hardly enables us to determine that. In the highest science form, the great majority of the boys, and all the best boys, have had a classical training, and are going to the university. The boys of the modern side who are going to business, seldom stay so long as those intended for academic life. In a few instances, however, of late, boys with a purely modern training are staying with us to the age of 18, and I believe they have shown themselves not inferior in science to the classically trained boys.

The Commissioners were then conducted over the library, and next visited the chemical laboratories and heard, in the lecture-room, a portion of a chemistry lecture delivered by Mr. Francis Jones, the chemistry master.

In reply to the Chairman Mr. Jones stated that in the chemical classes there were several scholars from the elementary schools. They had lost a number recently. Some had gone to the universities, and others had gone into business. These boys compare well with the other scholars. Scholars from the elementary schools had gone to the Universities of Oxford and Cambridge through the grammar school. Three have recently gained university scholarships, and of these two have taken first classes in the final schools. Their parents were in a humble position in life, warehousemen, mechanics, &c.

Mr. Dill informed the Commissioners that the school has entrance scholarships of its own, numbering 40 every year, given 20 each at two entrance examinations. Half of these have to be offered to boys from the elementary schools. As a matter of fact, 15 to 17 out of the 20 are taken by boys out of the elementary schools, and about four from the middle-class schools. Thus, whilst half have to be offered to elementary school candidates, usually three-fourths to four-fifths are really awarded to such.

Mr. Jones stated that in teaching the boys analysis the substances for examination are given out by number, and the students' work is returned on a specially ruled and printed form. The laboratory contains accommodation for 70 students working at one time, but generally only about half that number forms a class. 185 boys at present do practical chemistry. (Chairman.) Have you any boys from the classical side who come to chemistry?—(Mr. Jones.) Yes, a few for one hour per week in elementary chemistry, and in this way those boys not getting on well in classics, but who may give promise of doing well in chemistry, may be selected to join the science side.

In your experience, are boys ever found to turn from the science to the classical side?—No.

Are we to understand that boys, say at 15, who have become utterly dull and stupid under the old classical discipline, when turned over to a new study, get fresh life?—That is so in many cases.

Appendix 33. The Commissioners next proceeded to the physical lecture room, where they heard a portion of a lecture on elementary magnetism by Mr. Angell, and thence to the drawing school, where drawing was being taught under the master, Mr. Pritchard. Drawing from the flat and from cast, and object drawing was going on.

Manchester Grammar School

(*Chairman.*) Do all the boys who learn drawing go through model drawing?—(*Mr. Pritchard.*) Yes. Every boy in the first year will do more or less model drawing.

Is designing also taught?—Yes, and boys with talent in drawing are picked out, and if they wish they may devote special time to designing.

If boys wish to come to any department specially, are they allowed to do so?—Yes, after they have passed through a certain elementary course.

What method is pursued in teaching design?—The boys take simple geometric designs, to be filled with ornamental arrangements of leaves &c., first, and then they are allowed to design for special material.

What special method do you think best in teaching design?—I would like them first to make botanical studies from nature for themselves and then make use of these conventionally.

How many designs were sent up to South Kensington last year for examination?—About 20 or 30.

Are any students professional designers?—Only one.

Can you tell what will be the future of the boys studying design?—I can hardly do so, but some certainly will not become designers.

Have any of your students distinguished themselves specially at the South Kensington examinations?—Several have gained medals and prizes and there is one evening-class student, who is about 17 years old, who got the national gold medal for applied design.

How many students have you in the evening class?—About 100 to 120. The most advanced work is done in the evening class, which largely consists of boys who have left the day school and wish to keep up the subject.

What is the class in life of the students at the evening classes?—Chiefly artisans.

How many in the evening class, then, are qualified to earn Government grant?—A large number; about 90 per cent.

Do the boys attend well?—They make many more attendances than are required for the grant, or they would not get through the necessary work.

Are the mechanical drawings which we see here exhibited from actual measurement from the machine?—Yes, and the shading is also projected geometrically.

Are there any materials for teaching that you find you require that you have not got?—Yes, we require some mechanical models.

Are there boys in the school who can give sections of parts of their drawings of machines?—Several in the evening class can do so.

Do all the boys take up the same course of drawing?—Every boy has to go through freehand, model, and geometric drawing, and the boys must take freehand and model, before taking mechanical, drawing. We make mechanical drawing a speciality. Some instruction is also given in machine construction.

With regard to fine shading, is not perfection of work what they reward at South Kensington?—Yes.

How long have the boys been engaged in the preparation of single drawing from casts?—Some have been occupied a couple of months coming once a week. Some would take perhaps four or five months. But the labour is well spent if the perfection exhibited in some of the drawings is attained. I prefer thoroughness in everything.

Do you think it then better to spend four or five months thus, rather than that they should use a piece of charcoal and execute the work in a few lessons?—I believe that the boys who have learned with the fine point could do the rough work quickly.

But is it not likely that this slow working makes the boys work slowly?—I do not think so, and it must be remembered that the boys do work with the stump also. All the boys begin with the stump.

MANCHESTER GRAMMAR SCHOOL.—APPENDIX.

Appendix 33.

Manchester
Grammar School

SCIENCE and ART EXAMINATIONS.—Results for five years, 1877-1881.

PRIZES and PASSES in SCIENCE.

Year.	Prizes.	Passes.
1877	311	799
1878	270	632
1879	310	579
1880	328	709
1881	316	720
Total	1,535	3,439

Year.	Third Grade Prizes.	Second Grade "Excellent."	Second Grade Pass.
1877	15	67	204
1878	17	81	302
1879	27	54	286
1880	34	67	313
1881	33	49	261
Total	126	318	1,366

SOUTH KENSINGTON HONOURS in SCIENCE.

Year.	First.	Second.
1877	2	3
1878	6	3
1879	3	13
1880	7	16
1881	4	18
Total	22	53

SOUTH KENSINGTON HONOURS in ART.

Year.	Gold Medal.	Silver Medal.	Bronze Medal.	National Prize.
1877	1	—	—	—
1878	—	2	1	1
1879	1	1	1	1
1880	—	1	3	4
1881	—	—	—	2
Total	2	4	5	8

MANCHESTER HIGH SCHOOL for GIRLS.

High School
for Girls.

A most excellent institution, accommodating 600 girls, housed in a fine building, with every requisite for the supplying of a superior secondary education.

Appendix 83.

Manchester
Mechanics'
Institution.

MANCHESTER MECHANICS' INSTITUTION.

The following account of the history of the institution, its present position, and of the proposals for converting it into a technical school was submitted to the Commission by Mr. J. H. Reynolds, Secretary to the Institution.

The Manchester Mechanics' Institution was established in 1824, and "is formed," so runs the preamble, "for the purpose of enabling mechanics and artisans, of whatever trade they may be, to become acquainted with such branches of science as are of practical application in the exercise of that trade, that they may possess a more thorough knowledge of their business, acquire a greater degree of skill in the practice of it, and be qualified to make improvements and even new inventions in the arts which they respectively profess."

It was proposed to accomplish this by means of lectures on the various sciences and their application to the arts; and when the principles of the more important sciences had been made known, to give more minute and detailed instruction upon particular branches of art.

In accordance with this scheme, connected courses of lectures on scientific subjects, especially in mechanics and chemistry, were organised and it was in contemplation to establish a school of design in addition to the drawing classes, in which weavers and other workmen might have an opportunity of improving their taste in the invention of patterns and the means of executing them in their respective manufactures.

The average annual number of students, day and evening, in connection with the institution since its foundation has been upwards of 1,400.

The classes in mechanical and architectural drawing have always been a very strong feature in the educational work of the Institution.

Day schools were established in the Institution on the plan of the Edinburgh Seasonal Schools, as well as evening classes in languages, music, &c., and in elementary subjects. In December 1837 was organised the first of a series of exhibitions of objects illustrative of *science, art, manufactures, and natural history*. During the thirty-five days that the first of these was open, upwards of 50,000 persons attended, and the great success of the experiment, continued through a series of years, greatly assisted the movement which culminated in the Great Exhibition of 1851.

The exigencies of these exhibitions, and the adoption of the Edinburgh Seasonal School system by other institutions in the town, led to the abandonment of the day classes in 1838.

In 1845 day classes for the higher education of females were established, and have continued until the present time; and in 1857 day classes for boys were re-commenced, in which systematic instruction in the principles of natural science under Mr. John Angell (now Science Teacher at the Manchester Grammar School) formed a most important feature.

The reports of the Institution from its foundation bear constant evidence to the desire of its promoters to devote it to the inculcation of science in its application to the arts, and not the least of the difficulties which have prevented the fulfilment of this aim satisfactorily has been the want of even a moderate amount of elementary knowledge on the part of many of the artisan students attending the institution.

The extension of the Society of Arts' scheme of Examinations to the Provinces in 1857, and the establishment of the Government science and art examinations in 1861, assisted by the payment on results which shortly accompanied the latter examinations, powerfully influenced the formation and organisation of classes in the Institution in subjects of science and art.

The growing desire for what is termed *technical knowledge*, and the stimulus afforded by the establishment of the examinations of the City and Guilds of London Institute for the advancement of technical education,

with its accompanying offer to pay upon results, led to the formation in 1880 of classes in special subjects of technology, namely:—

Mechanical Engineering	with 34 students.	Manchester Mechanics' Institution.
Iron and steel	" 9 "	
Telegraphy	" 74 "	
Fuel	" 5 "	
Cotton manufacture	" 39 "	
Carriage building	" 73 "	
Bleaching, dyeing, and printing,	58 "	
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With the view of providing efficiently for sound practical instruction in bleaching, dyeing, and calico-printing, the directors, aided by the valuable co-operation of Mr. Charles O'Neill, F.I.C., provided a specially constructed laboratory at a cost of upwards of 350*l.* and accommodating thirty-six students. In connection therewith a small museum containing the contributions of various English and foreign firms has been formed.

Though a large number of circulars were issued to various firms interested in these industries asking for co-operation and pecuniary support, the response was extremely meagre, only some 70*l.* being promised.

It is important to mention that the master carriage builders, from the firm conviction that the great want of their young workmen was a knowledge of scientific principles as applied to their particular trade, formed themselves into a committee, subscribed funds, and engaged and paid teachers to conduct classes in the Institution in connection with coach-building, and generally evinced the heartiest interest in the educational welfare of their employes.

The success, however, of the technical classes has been greatly hindered by want of money for proper equipment, the ordinary resources of the institution being quite inadequate to their efficient establishment and maintenance.

Sufficient evidence has, however, already been given that, provided these classes are thoroughly well equipped and organised, there is no question of their value and success.

At Christmas 1881 the numbers in attendance at the technical classes were as follows:—

Mechanical engineering	-	-	-	28
Iron and steel	-	-	-	18
Telegraphy	-	-	-	15
Cotton manufacture	-	-	-	47
Carriage building	-	-	-	34
Technical joinery	-	-	-	10
Bleaching, dyeing, and printing	-	-	-	53
Modelling	-	-	-	2
Design for calico printing	-	-	-	5

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Since that date some of these classes have increased, and the falling off in the telegraphy class, which numbered 74 in the previous session, and consisted chiefly of employes from the Head Telegraph Office, York Street, is to be attributed to merely temporary causes.

In addition to these there were in the evening science classes 578 students, and in the evening art classes 103, making a total of 893. Besides the laboratory of the school of dyeing, there is also a fairly equipped laboratory for the practical study of pure chemistry, accommodating 40 students.

The fees charged to students are in all cases very low. The membership fee of 5*s.* per quarter admits to a large number of elementary classes, held on four nights of the week, of two hours each, and to the library and news room. The extra fees for instruction in science average 1*s.* for each class per session of eight months, and for those in technology 2*s.* In no case are the fees adequate to the cost of maintaining the classes. The teachers are generally paid upon the results of the science examinations; in some

Appendix 33.
 ———
 Manchester
 Mechanics'
 Institution.

cases, however, the directors pay a sum varying from 8*l.* to 40*l.* per annum in addition to the grant or a portion of it. The fees in the language classes vary from 2*s.* 6*d.* to 5*s.* per quarter, and the teachers are usually paid fixed sums for tuition. Under ordinary circumstances, and without any attempt to develop the classes or add to the efficiency of the teaching by means of apparatus and models, or by extending the time given, the income of the institution, with the aid of the surplus from the day school and from honorary subscriptions and other extraneous sources, might suffice to meet its ordinary expenditure. The annual income of the institution averages upwards of 3,000*l.*

It is found that in order to get satisfactory teaching in technological subjects exceptional payments must be paid.

With the view of utilising the institution exclusively for the purposes of a technical school, the directors have under consideration a scheme embodying the following features:—

1. (a) A school of applied science, with especial reference to mechanical engineering, building construction, bleaching, dyeing, and printing, cotton manufacture, telegraphy, carriage building, &c.
- (b) A school of art and design as applied to house decoration, furniture, printed goods, &c.
- (c) A school of commerce.
2. A technical library and museum.
3. A new governing body, which shall comprise—
 - (a) Ex-officio members representing certain public bodies, such as the Owens College, the Town Council, the School Board.
 - (b) Nominated members representing certain subscribing public bodies.
 - (c) Representative members elected by annual subscribers and students of a certain standing.

It is proposed to organise the evening school with especial regard to artisan students. Rooms will be arranged and expressly fitted for technical drawing. In addition to the present laboratories for the study of pure chemistry and of chemistry as applied to bleaching, &c., one for the practical study of metallurgy will be fitted up.

With the object of giving draughtsmen and others an opportunity of closer and more practical acquaintance with mechanical details, provision will be made in connection with mechanical engineering for the practical study of pattern making, moulding, founding machine and smithy work, and so with building construction in its departments of joinery, brick-laying, plumbing, &c.

The department of textile fabrics will embrace instruction in the theory of spinning and weaving and of pattern designing as applied to figured cottons, &c. A room will be furnished with looms and a large designing board, whereby the students may obtain practical acquaintance with the construction of the loom and the methods of working, and of the application of the designs to the special fabrics.

It is proposed to give greater significance to the department of electrical engineering so far as concerns the needs of telegraphic and telephonic employes.

It is intended to extend the art room so as to give special facilities, under competent teachers and with a fuller supply of models and apparatus, for acquiring a knowledge of design as applied to printed goods, house decoration, stone and wood carving, furniture, and modelling.

The needs of so important a class of subjects as commercial studies will be met by the further development of the classes in the French, German, and Spanish languages, book-keeping, shorthand, commercial history and geography, commercial arithmetic and correspondence, and in social and political economy.

The establishment of a technical museum comprising natural products, processes of manufacture, designs, models of machines, tools, examples of fracture, corrosive action, and of a technical library available for constant reference, are also contemplated.

It is proposed to modify the organisation of the boys' school as follows:

1. A lower school having two divisions:

(a.) A primary school for boys from 8 to 11 years of age, in which will be given courses of instruction in English, freehand drawing,

vocal music, elementary science, and the French language for all those who have mastered the rudiments of English. Appendix 88.

- (b.) A secondary school for boys from 11 to 13, in which in addition to the subjects taught in the primary school, there will be taught Latin, French or German, mathematics, model and geometrical drawing, natural philosophy, elementary chemistry, physiology, and botany. Manchester Mechanics' Institution.

An upper school for boys from 13 years of age upwards, comprising—

- (a.) A commercial school in which, in addition to the ordinary subjects of instruction, there will be given special tuition in English and foreign commercial correspondence, commercial geography and history, commercial calculations, book-keeping, shorthand, social and political economy.
- (b.) A technical school in which will be given special courses of instruction in such subjects as machine construction, applied mechanics, steam, mechanical engineering, iron and steel, building construction, workshop practice, inorganic and organic chemistry, chemistry of dyeing, &c., cotton manufacture.

Plans have been prepared showing how the various rooms may be utilised in connexion with the scheme.

Mr. CHARLES O'NEILL, the teacher in bleaching, dyeing, and calico-printing, submitted the following observations with respect to the last year's working of these classes established at the Manchester Mechanics' Institution. Mr. O'Neill's Statement.

The teaching consisted, for the evening classes, of one lecture per week, illustrated by experiments, and one evening per week of practical work in the laboratory. The course ran from the first week in October to the last week in June, and averaged 32 lectures and 32 evenings of practical work. The lectures were essentially the history of a piece of calico, from its first entry into a bleach works until it was delivered as finished by the calico printer, the various styles, mordants, and colouring matters being treated of as fully as the time permitted. In the practical work of the laboratory the students followed, as well as could be done, the matter of the lecture preceding, made various experiments on bleaching, on mordants, dyed up colours, printed colours by hand, &c.

The fees for lectures alone were 2s. 6d. for a term of three months, and for the practical class 10s. per term of three months, all materials being found, together with the use of the necessary apparatus.

The laboratory was opened for day students who might work from 10 to 4; the terms were fixed the same as those at the Metallurgical Laboratory of King's College, London; on a basis of 37l. 6s. for nine months, working every day. About eight students entered at various times and for short terms in the day class.

In the evening lecture class there were, to commence with, 53 students, all adults; about 20 of this number were practically engaged in works as bleachers, dyers, and colour mixers; of the remainder all were connected with the trade, but not directly, some were makers of dyers' chemicals, some drysalters, and several were engaged in the commercial departments, and were desirous of knowing something of the manufacture of the articles they were accustomed to see and handle every day.

In the practical evening class every bench was occupied at the commencement of the session, and some applications for places had to be refused. The attendance was good, and much interest was shown by the students in the work laid out for them. It is scarcely necessary to say that in the course of two or three hours in an evening, very little can really be done in the way of experiments in dyeing; in order that anything might be done and finished in one evening much preparation was necessary, and many things had to be done beforehand for the students which, if there had been time, they should have done themselves. But still some useful illustrations were possible each evening, and the students were encouraged to pursue their experiments at home. It is to be regretted that the employers in the trade have not taken interest in these classes in the way of assisting by pecuniary help, for though the directors have provided all that was essential to work in a modest way, many things are still needed. At the same time the teacher acknowledges with pleasure

Appendix 33. that various firms have readily supplied materials for use in the laboratory, and amongst other things a nearly complete set of diagrams of the machinery used in the trade.

Manchester
Mechanics'
Institution.

Twelve of the students in the evening class sat at the examination of the City and Guilds of London in the subject of calico printing at the last examination, May 24th, the results of which are not yet known.

Manchester
School of Art.

MANCHESTER SCHOOL OF ART.

The following statement was made by *Mr. Muckley*, the head master of the school :—

The Manchester School of Design was founded in 1838, and was the first school of art established out of London, the intention being to give instruction in all branches of drawing, the use of colour, perspective, geometry, modelling, and in pattern drawing for calico-printing and weaving; also to have lectures given on various subjects, such as painting, sculpture, anatomy, zoology, botany, &c., and the formation of a museum for exhibition of casts, models, paintings, designs, &c., &c., and of a library of books and engravings. Until the completion of the new buildings in 1881 no steps were ever taken to carry out the italicized portion of the original project.

Established in the first instance in the old Institution it migrated to Brown Street, but returned to the Institution in 1854, where it remained until the completion of the new building. The head master since 1861 has been *Mr. W. J. Muckley*. The number of students rose from 141 in 1864 to 377 in 1880. The income is partly derived from fees, partly from local subscriptions, and partly from the Government grants. The subscriptions average from 26*l.* to 300*l.* per annum.

The students fees were in 1843	-	-	-	-	£	54
"	"	1844	-	-	-	165
"	"	1850	-	-	-	327
"	"	1880	-	-	-	932

The Government grants, beginning in 1842 with a donation of 250*l.* per annum, subject to a similar sum being raised locally, were increased in 1850 to 600*l.* (the salary of the head master). In 1855 the grant was reduced to 380*l.*, the teachers being no longer compelled to give all their time to the school. In 1862 payment on results commenced, and the grants earned have ranged from 60*l.* to 250*l.* per annum; in 1880 the grant was 241*l.* In 1853 the title of the school was changed from "School of Design" to "School of Art." The new school buildings were opened in April 1881 by the Earl of Derby. An excellent exhibition of works of art was held in the school, which remained open for eight weeks, but entailed a loss to the building fund of 180*l.*, though visited by upwards of 15,000 people. The total cost of the school, including land and fittings, was 28,200*l.* The school occupies an area of about 1,200 square yards, and contains, in addition to the necessary class rooms, space available for a museum.

The male and female antique rooms and exhibition hall were inspected and specimens of the students' work here exhibited examined. No work was being done, there being no classes held at the time of the Commissioners' visit.

Mr. Muckley had visited all the best schools on the continent, and the arrangements here are, in his opinion, better than in any of the continental schools.

Machine drawing is taught, and by actual measurement from the object; but the students do not make sections. No permanent collection of objects exists. These, when obtained, could be exhibited in the corridors and in the exhibition room; and, if necessary, the committee would, in all probability, build a new wing.

In reply to the chairman, *Mr. Muesley* said: The chief object for which the school was formed is the teaching of industrial art; but, inasmuch as there is in Manchester a demand for all kinds of art, the doors must be thrown open to everybody, and, as far as possible, the teaching applied to their special wants. It is a vital point that the paying classes are those who do not want design at all; they belong to the upper class, and want help in every direction. If teaching in design is required this is given. Grants from South Kensington are received on about 200 out of the 300 pupils. If the paying classes were to withdraw and the place to be filled with designers proper, the school could not be kept open. The artisans pay 10s. per quarter; the upper class 2½ guineas per quarter; and it is therefore necessary to be careful to provide such teaching as the paying classes require.

Appendix 38.
Manchester
School of Art.

OWENS COLLEGE (Victoria University).

Owens College.

The Commissioners were received by Dr. GREENWOOD, Principal of the College, who made the following statement. Dr. Greenwood's statement.

The attention of the council and senate has been for many years given to the best way of so directing the strictly scientific instruction of the college as, without impairing its thoroughness, to foster the interests of the great manufacturing industries of the district.

In the year 1868 our professor of chemistry, Dr. Roscoe, and I visited, at the request of our council, some of the principal technical schools of Germany and Switzerland, with the view of ascertaining in what directions the higher education could best promote the interests I have mentioned, and at the same time of inquiring into the form of building and the appliances which had been found most effective.

Accordingly, when our new college buildings were erected in 1870, we were able to make very complete provision for the teaching of chemistry, and less complete but still considerable provision for other branches of technical instruction, and that without, as we believe, in the least interfering with the prosperity of the teaching in arts and (pure) science which is the proper business of the college.

The details of those efforts, as well as of some further extensions which we are now contemplating, will no doubt be supplied to the Commissioners by my colleagues, the heads of the several departments concerned. I will only state here that two clear principles have been kept in view by us all along—(1) that a sound knowledge of principles ought to precede this practical application; and (2) that in teaching the applications we shall not aim at superseding that practical training which can only be gained in the manufactory or the workshop. We do not see any reason to doubt the soundness of these principles, and, so far as our experience goes, no difficulty need be found in drawing the line between those applications which may, and those which may not, be with advantage introduced into our instruction.

On the one hand we believe that, so far as the absence of endowments for this special object has allowed, we have been able to contribute important services to our district by way of sending out a number of well instructed young chemists and engineers, and on the other hand that we have not suffered from the danger, which was not unreasonably anticipated by many, that the strictly scientific character of our teaching in these branches might be sacrificed to the needs, or fancied needs, of students that came to us to study science with an eye mainly to its applications. To illustrate my meaning I will venture to say that no chemical laboratory in the kingdom has sent out a larger number than ours has sent of young chemists, qualified to take important parts in factories and chemical works, and yet it will, I think, be admitted that our laboratory has also not been unsuccessful in the contributions it has made to the progress of chemistry as a pure science—contributions, too, made not by the professor and lecturers only, but by not a few of its students of chemistry who are under training.

Appendix 33. In conclusion I can confidently assure the Commissioners that the authorities of Owens College are desirous, so far as its funds allow, of adding to the efficiency of this side of our operations.

Biological Department.

Visited the *Biological Department* (Prof. Marshall).

(*Chairman to Prof. Marshall.*) How are the evening classes in connection with your department conducted?—The evening classes in practical biology are carried on exactly in the same manner as the day classes. The practical standard of the evening work is that the men can and do get through the London University practical biology examination. But still this is rather by way of exception.

What is the social status of the evening students in your classes?—Very various indeed. Some men are of somewhat high standing; medical practitioners in the town, teachers, one or two clergymen, and young men working for their degrees. There are also one or two working men.

You would not object to have many working men because the subject is not of technical application?—Not in the least.

Engineering Department.

Visited the *Engineering Department*.

Prof. Osborne Reynolds, F.R.S., made the following statement to the Commissioners respecting the method of teaching engineering in the Owens College.

The two courses of study in engineering (day and evening) are arranged to meet the requirements of two very different types of students. The day students are for the most part between 18 and 23 years of age, and devote their whole time to the work of the college.

The evening students are generally engaged during the day in works or drawing offices.

The course of study arranged for the day students extends over three years, and includes engineering and drawing, practical surveying, mathematics, chemistry, physics, and geology, the students' time being divided nearly equally between engineering with drawing, and the other subjects. On the completion of the course, certificates of proficiency are given to those students who have passed an examination in all these subjects.

The number of students attending the day classes in engineering varies between 35 and 50, something like half those who enter remaining to complete the course.

Many of these students are very clever fellows, and come with a good preliminary education, and generally some of the engineering students are amongst the first in the mathematical and other classes.

Besides these scientific subjects, the students are encouraged to, and largely do, avail themselves of the classes in modern languages.

The course of study followed in the engineering and drawing classes has been determined by experience as that best suited to the requirements and capacity of the students, a considerable proportion of these having been in the works before they come, and the rest intending to serve their time in the works or offices after they leave. Thus no attempt has been made to provide a substitute for the workshop, and the course of study in the drawing-room is intended to fit a student to derive immediate advantage from the work he sees on entering a drawing-office, and give him a better understanding of the work, rather than to serve as a substitute for the drawing-office, great care, however, being taken to keep up the art standard of the work both in accuracy and style, as in these respects lies most of its educational value. The course in practical surveying is offered as much from its advantage as a matter of education as for its technical value, though one reason for this course is that opportunities of acquiring this knowledge systematically are very rare even to the pupils of civil engineers.

In the engineering classes a certain amount of technical information is given, but this is not the primary purpose of these classes.

The principal object is to teach the application of science to the purposes of engineering, to teach the scientific method of dealing with the problems of engineering, much after the manner of Professor Rankine's works on surveying, applied mechanics, and prime movers.

Appendix 33.
Owens College,
Engineering
Department.

The first year's course is surveying, estimating, the art of measurement, and descriptive engineering (in earthwork, masonry, and timber). The second year's course is applied mechanics (as far as the theory of simple structures, and strength of material, and the geometry of machines). The third year's work is dynamics of machinery, and hydraulics, and the steam engine. In the second and third years' subjects there is opportunity of introducing a good deal of descriptive engineering by way of illustration; but all through the effort is to give the students a thorough hold of what is brought before them, rather than to give them an imperfect acquaintance with a great deal. Thus the examples and illustrations are generally the simplest which serve. For this diagrams and illustrative models are used, but what is mainly depended upon are actual experiments made before the class. In every case, by some means or another, the calculations are verified by actual experiment; for this purpose a considerable number of instruments and testing machines have been constructed, and use is also made of the engine which works the ventilator of the college. Visits are also paid to engineering works. I consider that too much trouble cannot be taken to familiarise students with the actual circumstances of the problems, instead of depending mainly on a quantitative statement.

The teaching strength of the engineering department has not as yet been more than sufficient to deal with those branches of the subject which are important to every engineer, and thus has not admitted of the detailed study of any special branches of engineering. But plans for extending the course and introducing more technical lectures on such branches, particularly mining and metallurgical engineering, have long been under the consideration of the Council of the College.

As compared with the parallel courses given in the polytechnic schools on the continent, I consider that our course aims at a much smaller range of bookwork; that we leave the student to acquire by observation and experience much which they attempt to teach him; that our course is rather to teach him to understand what he sees, while theirs is to teach him how to produce things which he has not seen. This difference arises mainly from the fact that in England there are much greater facilities afforded for the acquirement of technical knowledge in the works. Where such facilities exist, the college training should be determined rather with a view to general education than to the acquirement of technical knowledge. Although, where the subjects are of equal educational value, it is clearly best to choose those which have the closest relation to the professional work.

The educational value of such a subject as applied mechanics, with the necessary substratum of mathematical and scientific knowledge, is as high, if not higher, than that of any scientific subject; so that whilst the student has acquired a knowledge of this subject which will in all probability be highly useful to him in after life, he has not in any way sacrificed his education in the acquirement of this knowledge. But the subject is too large to be mastered in three years, or indeed in any length of time, except by master minds, so that the question of pressing this subject beyond the point which can be attained in the time which can be spared for more general education from professional or technical training should be determined by the value of such teaching as compared with the more direct technical knowledge. It is true that there are some things for which a high general scientific knowledge is necessary; but these things are only to be accomplished by the master minds. In an ordinary way success in practical life depends on intimate familiarity with some narrow branch of knowledge, and to spend many of the years applicable for the acquirement of knowledge, on the generalities of a very large subject, must prevent or defer to a late period of life the acquirement of sufficient familiarity with any branch, in all its detail, to be useful in a practical sense.

Appendix 33. Our course in Owens College is directed rather to the education of engineers, choosing the most useful subjects, having regard to their educational value, than to the technical instruction of engineers in all branches of the subject.*

—
Owens College,
Engineering
Department.

(*Chairman.*) What is your course of evening classes?—We follow the same course as we do in the day classes, leaving out somewhat of the principle and putting in more of the application.

What is the length of the evening course?—20 lectures a year for four years.

What number of young men go in for these courses?—They average 70 to 120 during the year.

Do they attend pretty regularly?—About two-thirds attend regularly.

Have you any means of knowing the occupations of the students?—They are mostly men engaged in the profession in the town, largely as pupils, and otherwise as draughtsmen.

Do you find that the employers take any interest in the courses?—A very distinct interest. Many of the students are pupils sent and paid for by their employers.

Then we may say that a fair proportion of the employers send promising young men here?—I think it may be said that most do so.

Do you think this method of attending evening instruction the best course to pursue for a young man who is obliged to earn his living during the day, or could you suggest any other way in which he could combine practice with the acquisition of a competent amount of theory?—I think that evening classes giving him plenty of time for the acquisition of theoretical knowledge is the main means, if the students be not hurried too much.

How many evenings per week do the students take?—One evening per week, but they have the option of taking two courses simultaneously, so that the complete course may be taken in two years if the student has ability. The teaching is divided into civil and mechanical engineering, and parts of the two courses are given in the same evening.

There is also a class of mechanical and geometric drawing in the evening, but it is quite distinct from these courses. Very much the same men go to both.

Have you tried giving the engineering courses on Saturday half-holiday or the evening of Saturday?—They have been tried, but do not answer at all.

(*Prof. Roscoe.*) Do you find that the young men coming from the works have a sufficient knowledge of mathematics, or that they are willing to work up mathematics?—In the evening class lectures very little of mathematics is brought in, and the practical application of the subject is chiefly dealt with. Those who go in for examination and take prizes work up the mathematics with the text-books.

Do they understand sufficient of mathematical language to understand ordinary formulæ?—They soon get that if they have not got it. I do not use very much trigonometry, but mainly give methods and the application of the formulæ. I do not give much of the rationale of the formulæ, and content myself in these classes in pointing out where this knowledge may be got.

Then in the day classes the teaching is of an altogether different character, being theoretical, and including the higher mathematics?—Yes. The young men who come to these classes are in the first year, students who have studied mathematics as far as quadratic equations, and sometimes solutions of triangles, &c., and a great portion of the best of them are Whitworth scholars and other men who have passed through workshops.

Most of the Whitworth scholars have been students of yours?—Yes, I think so. We have had 50 or 60 altogether.

(*Chairman.*) Do they take practical mechanics and machine construction as a part of an academical course or as special subjects?—They are our most regular students, as a rule taking our three years course.

* See published syllabus of the Owens College engineering courses (Cornish, Foulds, Manchester.)

(*Mr. Slagg.*) What is the nearest approach to the artisan class that the pupils come?—Well, for example, a carpenter came to me the first year of the Owens College and has attended regularly to last year, that is 13 years successively. We have a good many men approaching to the artisan class, but I do not think as a rule that they make very much of it. They are not the class of students that one expects to lay themselves out for that, or who would benefit by the work. They have not sufficient education, and what they require is elementary education as a preliminary. A good many of the students are men already engaged in earning money.

Appendix 33.
Owens College,
Engineering
Department.

(*Chairman.*) What is the status of the Whitworth scholars in the day classes, and what was their origin?—They vary; but a majority of them are very clever boys who have by industry and evening work got on at the primary schools, and in connexion with the Science and Art Department. Very many of them have previously been boys who have been picked out by Whitworth exhibitions of 20*l.* to the Owens College. They have come here for a year or two, and have then got the scholarship. The exhibitors who have come to Owens have mostly got scholarships, and then they have come here with the scholarships.

In most cases are they boys without means?—The majority are men of slender means, and entirely of the artisan classes.

With respect to the engineering course of the Victoria University (as contained in the calendar) am I to understand that, following this course and passing the examination of each year, a man who satisfies the examiners may take the degree of Bachelor of Science?—The student has first to pass a preliminary examination, and then he may do this. The preparation for this preliminary examination is the students first years work at the University.

After he has passed the preliminary course he takes the course specified, containing no chemistry?—The preliminary contains chemistry.

The student then goes in entirely for engineering, including mathematics and some experimental physics in the first year?—Yes.

And after that only mathematics and engineering and geometrical and mechanical drawing?—Yes, that is so for the ordinary degree. For the honours degree in engineering and applied mechanics he has done with everything except engineering after having passed the preliminary. But it must not be supposed that the preliminary is an easy examination. It corresponds to matriculation in the London University.

Then is it the case that a man by alleging he is going in for honours can get rid of the other subjects?—There are two examinations, an intermediate and a final, for the ordinary degree. For the honours he must simply take the preliminary and the honours. The honours degree is intended to be of a different stamp, and is a much more comprehensive and difficult examination than the one for the ordinary degree.

Visited the *Engineering Drawing Room.*

Mr. Miller, M.E., the teacher in this subject, stated that there are three courses going on at the same time. Some models are used, but the chief thing is to get the students into the way of drawing. In the third year they design altogether. The written data simply are given, and the drawing is to be made from these numbers. Example:

"*Third Years Students.*—A non-condensing horizontal mill engine is to use steam with an initial pressure of 80 lbs. (above atmospheric pressure), to make 100 revolutions per minute, and cut off at half stroke. The size of the cylinder is to be such that the piston passes through 160 cubic feet per minute, the stroke being 174 times the diameter of the cylinder.

"I. Make working drawings of the piston, cylinder, slide-valve, eccentric, connecting-rod, and crank. Scale=4.

"II. Draw a plan and elevation of the engine in working condition."

None of the work is simply copying. Drawings are worked from in most cases, from which the men make rough sketches, and then work from the written dimensions.

There is accommodation for 45 working students.

Appendix 33.

Owens College,
Geology and
Mining Depart-
ment.Visited the *Geological Museum* (Prof. Boyd Dawkins, F.R.S.).

Prof. Dawkins made the following statement on the projected formation of a *Mining School*.

I take it that the Mining School in a place like Manchester should be for the instruction of the colliery viewiers, and also of those who have the charge of the large metal industries in Lancashire, a metal industry that extends on the one end into North Wales and on the other into Cumberland and Westmoreland. My idea is that the class of instruction should be mainly for the managers, &c., but also of such an informal nature that it might be available for the lower people employed in the mine.

(*Chairman.*) Would the same course be applicable to both?—No, not altogether. I think our system of evening classes may be applied to the one, and the day classes to the other.

Would you make a distinction between the two courses?—I think I should have two distinct courses of the same sort as the day classes compared with the evening classes in the college in chemistry and engineering.

Is the scheme already distinctly formulated and under the consideration of the college authorities?—The case is simply this, that eight or nine years ago a number of people in this district felt the desire of establishing some centre of education for the mining people, and some of them subscribed 3,500*l.*, and I believe that Lord Derby promised 1,000*l.* if any practical scheme was put before him. Up to the present time we have not been able to put any practicable scheme before the public which would satisfy the requirements of a mining school, and the matter has been in abeyance for some six or seven years. That is as things stand now, but some of us hope that, under the present conditions, we may be able to meet a want which is undoubtedly felt in this district.

When you say that you have been unable to lay any scheme before the public, has this been for want of funds?—Yes, for want of funds. But I am not able to give distinct information respecting the amount of funds. That in the nature of things would not come before me, but before the council of the college.

Could you give an approximate estimate of the amount that would be required for the maintenance of such a school?—About 500*l.* to 600*l.* a year, but this would leave a small margin.

You would distinguish the expenditure into two heads of capital and annual outlay?—We do not require capital. What is required is income.

What with regard to building and apparatus?—The condition of things is simply this. In the college we have most of the elements necessary for a mining school, but not the necessary mining instruction, and some of the existing courses would have to be adapted and enlarged to meet the establishment of a mining school.

Speaking of capital, have you what is necessary for a metallurgical laboratory?—We have the commencement of a metallurgical laboratory. We possess a large collection of metallurgical apparatus and specimens purchased by the college from the late David Forbes, and for some time the metallurgical laboratory was conducted by Dr. Roscoe and a skilled assistant, but owing to the want of union with a scheme of the kind under discussion the teaching has fallen through; metallurgy could not stand alone without the mining.

Then it is a question of income and not of capital?—It would be a matter of capital to some extent, but we are going to build, and the matter of capital would not prevent the adoption of a mining school.

Would not some portion of the outlay required be recouped by the fees?—We should require 500*l.* to 600*l.* per year extra, beyond what would be obtained in fees.

Have you communicated with the large metallurgical and mining proprietors with regard to your scheme?—The colliery proprietors about Wigan tried to get up a school of mining there, and that took away the sympathy and destroyed our enterprise.

Can you describe your scheme?—The kind of scheme I should be inclined to propose would be that all the subjects which are necessary to mining should be first of all taught to the students, and that then they should have lectures on theoretical mining from a man who is acquainted with practical

mining, that is a man who had real practical experience in mining pursuits; but this kind of instruction should not be considered to do away in the least degree with the necessity for actual experience in mines, and the provision of that practical experience we could not undertake to give. It might be arranged with the coal-owners about here, but that is the only possible solution of the difficulty of uniting theory with practice. The same difficulty has occurred in the engineering school in much the same way.

Do you think the difficulty could be got over by any kind of half time system?—I think it might be, but should not like to give a distinct opinion. I have been collecting all the information I can, and the material requires some consideration. I should be glad to give you an analysis of the information collected by me in America and England.

I should like to say that one point has been very forcibly brought before me by Mr. Warrington Smyth of Cornwall. He said that one great obstacle would be the present system of instruction of colliery viewiers and mining surveyors. The system is one of apprenticeship; they get premiums from apprentices, and at present they are the only avenues to this profession.

In my present evening classes in geology I have a good many practical coal viewiers, &c. who are aiming to get what they can, applying to practical mining, out of the evening classes.

(*Professor Roscoe.*) At the Mechanics' Institution we saw a class on geology taught by one of your pupils. Do many of your pupils afterwards become science teachers?—A certain number have, but the influence of my evening classes is felt more in the more generalised form. Philosophical and literary societies have sprung from my lectures. For instance the ones of Blackburn and Accrington.

Visited the *Physical Laboratory* under the direction of Professor Stewart, *Physical F.R.S.* *Laboratory.*

Prof. Stewart stated: We wish if possible to divide our practical classes so as to correspond with our theoretical classes. When the theoretical course is well fixed for the ordinary and honours course, we shall probably have a set of practical courses in the physical laboratory corresponding to these; a more simple course for the lower students, and a more complex course for the upper class students, the one course requiring a little and the other a fair amount of mathematics. We have simply at the present moment a course in which the student attends one or more days per week, and is treated individually, and a course in class where instruction is also given individually, but not so much so as in the former case.

Professor Schuster, F.R.S., gave the following particulars of an evening class on the technical applications of electricity, which he, with the assistance of Mr. Gee, proposes to commence next session. The class is intended to give to persons occupied during the daytime instruction in the scientific principles involved in terrestrial and submarine telegraphy, telephony, the construction and use of dynamo-machines, electric-lighting, &c. The instruction given will be partly theoretical but chiefly of a practical nature, special stress being laid on the method of exact electrical measurement. It is expected that officials employed in the telegraphic department of the post office will make use of these classes. In reply to a question, Dr. Schuster added that students entering such classes ought to be acquainted with the elements of geometry, but that a knowledge of the higher branches of mathematics is not absolutely necessary to the understanding of a large portion of the subject.

Resumé by the *Chairman* of a conversation between himself and Mr. Thoman of Paris, a student in the Chemical Laboratory in Owens College.

Mr. Thoman having finished his full course at the Ecole Centrale des Arts et Manufactures in Paris has come over to Manchester to study chemistry under

Appendix 33. Dr. Roscoe. His father is a manufacturer of wood extracts for dyeing and was anxious that his son should come over here to learn English, and avails himself of the opportunity of at the same time continuing his study of chemistry. He is not sufficiently acquainted with English to follow the courses of lectures, and is not therefore able to express an opinion on them but as far as the laboratories are concerned his opinion is that there is nothing that can be compared with them in the public institutions of Paris. I had very little laboratory practice at the Ecole Centrale, and he finds it useful to continue his practice in the laboratory here.

Owens College,
Physical
Laboratory.

Chemical
Laboratory.

Visited the *Chemical Laboratories.*

These laboratories directed by Professor Roscoe are very complete their fittings and general arrangements. They accommodate 100 working students, 60 in the junior or qualitative, and 40 in the senior or quantitative laboratory. Plans and description of these are published by Mr. Cornis Piccadilly, Manchester. The chemical department of the college is one of its most important features; organic chemistry is professed by M. Schorlemmer, F.R.S., and three demonstrators and assistant lectures supplement the instruction given by the Professors. The aim of the Director has been to impart a sound knowledge of the theory and practice of chemical science and to fit students either for a purely professional career or for the practical requirements of the trades and manufactures which have their foundation in chemical science. In order to point out most clearly the course of study which should in the latter case be pursued Professor Roscoe has drawn up a systematic course for technological students, and this scheme has been sanctioned by the senate of the college. It is arranged on a liberal basis in order to secure not only a satisfactory knowledge of chemistry but to give sufficient training in the allied sciences, in mathematics, physics, mechanical drawing, and the no less important subject of modern languages.

Professor Roscoe handed in the following prospectus of courses of technological chemistry:—

OWENS COLLEGE, MANCHESTER.

SYLLABUS OF THE COURSE OF TECHNOLOGICAL CHEMISTRY.

PROFESSORS AND DEMONSTRATORS.

Professor of Chemistry and Director of the Chemical Laboratories	-	{ Henry E. Roscoe, B.A., LL.D. Ph.D., V.P.R.S.
Professor of Organic Chemistry	-	C. Schorlemmer, F.R.S.
Demonstrators and Assistant Lecturers in Chemistry	-	{ W. Carleton Williams, F.C.S. Watson Smith, F.C.S. Harry Baker, F.C.S.
Professor of Mathematics	-	Thomas Barker, M.A.
Assistant Lecturers in Mathematics	-	{ J. E. A. Steggall, M.A. R. F. Gwyther, M.A.
Professors of Physics	-	{ Balfour Stewart, LL.D., F.R.S. T. H. Core, M.A.
Demonstrator in Physics	-	W. W. Haldane Gee.
Professor of Geology	-	W. Boyd Dawkins, M.A., F.R.S.
Lecturer in Mineralogy	-	C. A. Burgbarth, Ph.D.
Lecturer in French	-	H. Lallemand, B. ès Sc.
Lecturer in German	-	H. Hager, Ph.D.
Lecturer in Mechanical Drawing	-	J. B. Millar, M.E.

Syllabus of the
course of
Technological
Chemistry.

Persons desiring to attend this course will be required to enter the College under the ordinary conditions of studentship. See Prospectus of the Arts and Science Department, which may be obtained on application to the registrar; or the College Calendar, which may be purchased from Mr. J. E. Cornish, Piccadilly, Manchester, price 3s.

The object of this course is to offer to students intending to devote themselves more especially to applied chemistry as complete a training as the College can provide in those branches of instruction, which form the scientific foundation of the subject.

The complete course of instruction extends over four years, and embraces the following subjects:

FIRST YEAR.—Chemistry Lectures, Junior and Tutorial classes.

Preparatory Chemical Laboratory, 2 days per week, and Analytical Courses.

Chemistry Lectures class.

Mathematics class, Section I.

Experimental Mechanics.

Geology (Stratigraphical).

*French or German.

Geometrical Drawing Lectures (Evening class).

Mechanical Drawing, Practical (Evening class).

SECOND YEAR.—Chemistry Lectures, Junior†, Senior, and Tutorial classes.

Chemical Laboratory, 3 days per week.

Technological Chemistry Lectures (First Course).

Experimental Physics or Mineralogy Lectures.

*German or French.

Geometrical Drawing Lectures (Evening class).

Mechanical Drawing, Practical (Evening class).

THIRD YEAR.—Chemistry Lectures, Senior† and Tutorial classes.

Organic Chemistry Lectures.

Chemical Philosophy.

Chemical Laboratory, 3 days per week.

Technological Chemistry Lectures (Second Course).

Physical Laboratory, 1 day per week or

Practical Mineralogy and Technological Mineralogy.

Mechanical Drawing, Practical (Evening class).

FOURTH YEAR.—Organic Chemistry Lectures.†

Technological Chemistry Lectures (Third Course).

Chemical Laboratory, 4 days per week.

Chemistry of Colouring Matters, Dyeing, and Calico.

Printing (4th Evening Course).

Mechanical Drawing, Practical (Evening class).

FEEs.

	£	s.	d.
First year (including college admission and library fees)	-	29	5 0
Second year	-	27	13 0
Third year	-	23	10 6
Fourth year	-	23	19 6

The aggregate of the fees in each year will vary slightly according to the particular class selected in French or German, or to the choice made in respect of the other alternatives proposed.

When a student is excused a second attendance on any of the chemistry lecture courses the fee will be reduced accordingly.

Certificates will be granted to students on the successful completion of this course. Attendance on the full course of four years is expected of candidates for the certificate, but students may obtain exemption (on cause shown) from the first or the first and second year's course. Students so excused will nevertheless be required to undergo examination in all the subjects specified.

* It is desirable that the student should have gained a knowledge of the elements of both these languages by the end of the second year.

† Students who gain a place in the First or Second class in the annual examinations will be excused a second attendance on these classes.

Appendix 33. The certificate will state in which subjects the candidate has gained honours, and in which he has merely satisfied the examiners.

Owens College,
Course of
Technological
Chemistry.

SYLLABUS of the CLASSES.—Session 1882-3.

The Session begins on the 3rd October, 1882, and ends on the 22nd June, 1883.

The following subjects will be treated of in this course:

FIRST YEAR.

SYSTEMATIC CHEMISTRY.—*Junior Lectures*.—Laws of chemical combination. Description of the physical and chemical properties, and the mode of preparation of the non-metallic elements and of their compounds.

The *Tutorial Classes*, for recapitulation and the correction of the written exercises given out in the lectures.

ANALYTICAL AND PRACTICAL CHEMISTRY.—*Laboratory Course*.—The methods and practice of Qualitative Chemical Analysis.

Lecture Course.—On the methods of Qualitative Analysis, supplementary to the instruction in Practical Chemistry.

MATHEMATICS.—*Section I, Geometry*, Euclid I.—III., and VI., props. 1-19 and 33, and *Elementary Algebra*, as far as Progressions (inclusive).

EXPERIMENTAL MECHANICS.—The Properties of Bodies, the principal propositions in Statics, Kinetics, Hydrostatics, Geometrical Optics, and Heat; explained by the aid of models and experiments.

GEOLOGY.—The first portion of the Course, comprising—*Stratigraphical Geology*: The Physical Structure, Classification and History of the Rocks.

FRENCH or GERMAN.—The class best suited to the requirements of the student.

GEOMETRICAL AND MECHANICAL DRAWING, including Lectures and Practice (Evening Classes).

SECOND YEAR.

SYSTEMATIC CHEMISTRY.—*Junior Lectures*.—See First Year.

Senior Lectures.—Chemistry of the Metals, and of their most important compounds. Elements of Organic Chemistry, giving the composition and the relations of the best defined groups of organic bodies and the laws regulating their formation.

ANALYTICAL AND PRACTICAL CHEMISTRY.—*Laboratory Course*.—Quantitative Chemical Analysis. Monthly examinations in Qualitative Analysis. Quantitative Analysis of a prescribed series of Salts, Minerals, Alloys, &c. Volumetric Analysis.

TECHNOLOGICAL CHEMISTRY LECTURES.—Sulphuric Acid and Soda Manufactures; Bleaching Powder and Liquor; Potassium Chlorate.

Also, time permitting, Utilisation of the Burnt Cupreous Pyrites as bye-product of the Sulphuric Acid Manufacture, with Extraction of Copper and Silver, &c.

[Through the courtesy of several of the principal Manufacturers, the students will have the privilege of inspecting, with the Lecturer, extensive Works, where the processes described in the lectures will be seen in actual operation.]

EXPERIMENTAL PHYSICS.—The chief phenomena of Sound, Heat, Light, Electricity, and Magnetism, illustrated by experiment.

MINERALOGY.—Introduction to the study, the Chemical Properties of Minerals, Classification of Minerals, Descriptive Mineralogy.

GERMAN or FRENCH.—See First Year.

GEOMETRICAL AND MECHANICAL DRAWING.—See First Year.

THIRD YEAR.

SYSTEMATIC CHEMISTRY.—*Senior Lectures and Tutorial Classes*.—See Second Year.

ORGANIC CHEMISTRY.—Chemistry of the Carbon Compounds. History of the Old and New Theories, and of the most recent important discoveries in Organic Chemistry, &c.

- CHEMICAL PHILOSOPHY.—Sketch of the History of Chemistry: Development of Modern Chemistry; Chemical Laws and Theories; Relation of Chemistry to Physics. Appendix 33.
- ANALYTICAL AND PRACTICAL CHEMISTRY.—*Laboratory Course*.—Water Analysis. Organic Analysis. Vapour Densities. Gas Analysis. Coal Gas. Photometry. The preparation and analysis of various pure Chemical Substances, or series of these. The extraction of various pure Chemical Substances from certain Crude Commercial Products, their identification and analysis. Owens College, Course of Technological Chemistry.
- TECHNOLOGICAL CHEMISTRY LECTURES.—Destructive Distillation of Wood and Products derived.
- Destructive Distillation of Coal.
- Distillation of Coal Tar, and separation of the Crude Tar products.
- Ammonia and Ammonium Salts from Gas Liquor.
- Visits to Works. See Second Year.
- PHYSICAL LABORATORY.—(1) Instruction in performance of the experiments seen in the Lecture-room, and
- (2) In the use of the instruments of precision in the Physical Laboratory.
- PRACTICAL MINERALOGY.—Practical determination of Minerals by their crystalline form, measurement of the interfacial angles of their crystals with the Hand Goniometer or Reflecting Goniometer and their reactions with the Blowpipe and Reagents.
- TECHNOLOGICAL MINERALOGY.—Treatment of the Minerals used in the Arts and Manufactures (specially those treated in the foregoing courses of Technological Chemistry) with regard to occurrence, recognition, composition, and properties.
- MECHANICAL DRAWING.—See First Year.

FOURTH YEAR.

- ORGANIC CHEMISTRY LECTURES.—See Third Year.
- TECHNOLOGICAL CHEMISTRY LECTURES.—Manufacture of pure Coal Tar products, of the commercially useful intermediate derivatives, and of the Coal Tar Dyes, Colouring matters, &c.
- Visit to Works. See Second Year.
- ANALYTICAL AND PRACTICAL CHEMISTRY.—*Laboratory Course*.
- If at this stage the student evince inclination or capacity in certain special directions, this will be duly supported and encouraged in those directions of practical chemical study which he will be required to pursue.
- Preparation or extraction of pure chemical substances with their analysis.
- Original investigation and research.
- The solution of various problems arising in the processes of the Chemical Industries.
- [As an example of one branch of study may be specified:—
For *Calico Printers, Dyers, and Colour Manufacturers*.
The analysis and valuation of the entire series of Printers' and Dyers' Chemicals.
The Qualitative determination and detection of Colouring Matters.
Technical determination of the tinctorial value of Alizarins.
The Preparation of pure Coal Tar products, and Coal Tar colours and other derivatives.]
- CHEMISTRY OF COLOURING MATTERS, DYEING, and CALICO PRINTING.—(4th Evening Course). Series of Lectures illustrated by experiment.
- MECHANICAL DRAWING.—See First Year.

EXAMINATION of *Mr. Watson Smith*, demonstrator in the chemical laboratories of the Owens College. Mr. Smith's Evidence.

(*Chairman*.) What is the general character of the course on technological chemistry recently adopted by the Senate of Owens College?—It is almost analogous to that adopted in the Zurich Polytechnic School.

Appendix 33.

Owens College,
Course of
Technological
Chemistry,
Mr. Smith's
Evidence.

Have you got the necessary staff of professors, for carrying on such a course as the Zurich one, and as you would like to see carried on here?—Yes.

Are you satisfied you can give as good a course?—I see no reason why we should not be able to do so.

Have they not a more numerous staff at Zurich?—Yes, they have a more numerous staff, and there are many points of development which must be attended to. This is the first and experimental year of the technological courses with us, and it is impossible to launch out at once into the full.

Are you satisfied you have the means of doing justice to the students in the technological course you have commenced?—I am quite satisfied of this. Let me make a comparison with the Zurich course. There is there a preliminary course *i.e.* a general preparatory science course, and according to our plan this preparatory course also exists. In the next year the scientific subjects are more specific and more advanced. We do not believe in chemistry merely being studied; the course is a general scientific one, and in all respects equal to that given in the Zurich School. The object of this is to ensure that each student has the requisite knowledge, which should have been gained by the previous ordinary school education, and if they can pass an equivalent examination, they can enter at once on the first year of technical study, provided sufficient proficiency is shown.

You begin technological chemistry in your second year, which is your first year proper?—Yes, exactly as is done at Zurich.

You would take the simpler manufactures first?—Yes, those involving a knowledge of inorganic chemistry, *e.g.*, we take the Alkali manufacture, and Sulphuric acid. It is understood that these students have already passed through Professor Roscoe's systematic course of lectures on inorganic chemistry. This gives a foundation of inorganic chemistry, which should enable them to understand the more technical lectures.

It is, however, most important to mention that laboratory practice and practical work at chemical analysis is made a *sine qua non* in the first as well as in the later years.

In the third year you still continue your theoretical chemistry and also take some physics, mineralogy and mechanical drawing?—Yes, but in some of the cases the evening classes are used because we have not at present day classes for the purpose. The evening class in mechanical drawing is most suited to the requirements of students in chemical technology.

As regards technology, what do you take in the third year of the course?—We expect third year men to have some acquaintance with organic chemistry, and take therefore a course of manufactures involving a knowledge of this part of the science, but not to such an extent as is the case in the fourth year. For example, the distillation of coal tar, and the separation of the coal tar into the different crude products which afterwards are employed by the colour manufacturers and others, to be worked up into the most complex colouring matters by processes which require a still more complete acquaintance with organic chemistry, and this subject we therefore take in the fourth year. We take also wood distillation, which is a simple separation of a complex organic substance into wood-tar, wood-acid, and the separation of naphtha.

In the fourth year you dismiss all subjects except chemistry and mechanical drawing?—Yes. Mechanical drawing we keep through from beginning to end, and theoretical organic chemistry is still continued.

Would you give some example of the fourth year technological chemical studies?—In the fourth year the most important part of the student's work will be done in the laboratory, in which he is supposed to spend 24 hours per week.

Would you give an account of the way in which he employs his time?—The subject which the student takes in his fourth year will greatly depend upon the nature of the occupation to which he ultimately wishes to direct his chemical studies. Thus, for example, a young man who desires to enter a calico print works would naturally devote himself to the study of organic colouring matters such as the different artificial colouring matters known as the alizarines, or to the artificial production of indigo &c., and the application of these, such for example as ascertaining the dyeing power of commercial alizarines and the like. If on the other hand he wishes to obtain a knowledge of tar-products he would prepare a number of derivatives from the crude

materials. Again, should the young man desire to become an alkali-maker, his attention would rather be directed to the examination of problems bearing on his future industry, as for example the constitution of bleaching powder or an experimental discussion of the newer processes introduced into the alkali manufacture. In the same way the brewer, or cement-manufacturer, or manure-manufacturer, would carry out scientifically some of the processes involved in his special trade.

Appendix 33.

Owens College,
Course of
Technological
Chemistry.
Mr. Smith's
Evidence.

In these courses you include no mechanical engineering?—My belief is that in the further development of the course, the student ought to have time allowed to go more deeply into engineering than he does at present. But now we can only venture as far as mechanical drawing; one reason is the generally existing want of mathematical knowledge in our students, and that is only to be met by compelling them to go in for the preparatory course of mathematics.

In the Polytechnic course at Zurich a much higher amount of mathematics is required? As far as differential calculus?—Professor Lunge of Zurich considers this too high, too great a tax, and we have endeavoured to reduce this to what we thought would be practically sufficient, that is as far as progressions.

What is your object in including mathematics in the course?—Mathematics is absolutely necessary in such a branch as natural philosophy which again is necessary to a thorough knowledge of chemistry. But the amount required in every day life work, in the pursuits of technological chemistry never come so high as differential calculus.

Is there any further statement you wish to make?—I should like in conclusion to state that Professor Roscoe and the authorities of the college in drawing up this scheme, whilst desirous of affording every facility for the acquirement of these special branches of scientific knowledge which bear upon the great chemical industries of the county, were determined at the same time to adhere to the principles upon which they have always acted, namely, the necessity of a careful and extended purely scientific education as a basis.

OLDHAM SCHOOL OF SCIENCE AND ART.

Oldham School
of Science and
Art.

Mr. Phythian (C.E. of Glasgow University), head master of the school, submitted the following statement of the origin and rise of the school.

As far back as 1840 science and art evening classes were commenced in connexion with the Oldham Lyceum when that institution was in embryo. Superior workmen, such as draughtsmen, in the employ of Messrs. Platt, were in the habit of teaching some science subjects of importance to their trade. As a development of these classes the late John Platt, Esq., M.P., in 1865 built at his own cost the first school of science and art, adjoining the Lyceum. Mr. Platt also provided a fine set of art casts, and the firm of which he was head gratuitously supplied the internal fittings of the institution. About the same date the school was incorporated with the Science and Art Department, South Kensington, funds for its maintenance being provided by annual subscriptions, class fees, and payments on results from the department. In a few years, the desire for a chemical laboratory having arisen, Wm. Richardson, Esq., supplied the funds for apparatus and chemicals; this was followed by the furnishing of a physical laboratory for experimental work by the students in heat, steam, light, sound, magnetism, and electricity. The establishment in 1874, by the Society of Arts, of technical examinations, was taken up with successful results. Since then students of these classes have gained 17 prizes, 4 in honours with 6 medals, value 85*l.*, and several full technological certificates. Five years later the school was incorporated with the City and Guilds of London Institute for the advancement of technical education.

Introductory
statement by
head master.

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Oldham School
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Art.

The growing success of the school encouraged the president, R. S. Platt, Esq., and other sons of the late John Platt, Esq., to erect at their own expense the present handsome and commodious edifice, which contains 9 main rooms, 42 feet by 28 feet, 16 feet high, chemical and physical laboratories, with masters' rooms. The land was given by Wm. Richardson, Esq.

There are three local exhibitions of 50*l.* per annum, tenable at the Owens College, Manchester, given by Mrs. Platt and Chas. C. Lees, Esq.

The school has a small library of scientific books, presented by various publishers.

The gross total of prize money received since 1867 is 6,066*l.* This amount, being awarded to the students, forms no part of the revenue of the school. All grants, fees, and subscriptions are received by the Committee, who pay the masters fixed salaries.

There are now (1882) in attendance 678 science and 110 art students, varying from 13, the minimum age of admission, to 40 years; the average is about 19. Most are young men in training to fit themselves for their after career. Effort is made to know the subsequent position of the students, and a register is kept. The majority of them now hold responsible positions in the town and elsewhere and many join the "Old Students' Association," assisting by subscriptions and otherwise towards the support of the school.

In the classes the science subjects are as far as possible treated experimentally by the students, in accordance with the suggestions made by Dr. Roscoe, Mr. John Platt, M.P., and Mr. Wm. Richardson, as contained in the Report of the Royal Commission on Scientific Instruction, published 1872.

Literary subjects are taught in the Lyceum night classes.

The science course is chosen with special reference to the principal trades of the district, namely, machine making and cotton manufacture. The subjects are embraced in the prospectus of Sir Joseph Whitworth's scholarships for mechanical science, and are practical geometry, machine drawing, building construction, mathematics, theoretical mechanics, applied mechanics, sound light and heat, magnetism and electricity, inorganic chemistry theoretical and practical, geology, steam, freehand and model drawing, with technical classes for mechanical engineering, tools, and cotton manufacture.

In 1865 there were 114 students on the books, in 1881 there were 549 students, a progressive advance having taken place during the whole interval.

The following is a summary of the successes of the school since it was opened in 1865 :—

11 of the Whitworth scholarships, and 11 prizes	- { Total value of Whitworth grants, 4,060 <i>l.</i>
8 Whitworth exhibitions and 2 studentships	

1 Bremner exhibition.

4 gold, 7 silver, and 6 bronze medals; grant of these medals discontinued since 1876.

10 national medals for honours.

5 medals for technological examinations.

In addition to these particulars Mr. Pythian handed in a complete set of forms, showing the system of organisation.

Mechanical
Drawing Rooms.

The Commissioners inspected a collection of mechanical drawings (the work of the students) exhibited in one of the mechanical drawing rooms.

(*Chairman to Mr. Richardson, of the firm of Messrs. Platt.*) Are you satisfied with the mode in which mechanical drawing is taught in this institution?—I can answer that by saying that we carry off many prizes from South Kensington, and they say that we excel.

But are they the best judges?—Well, we can make use of the people after they have been here.

(*Professor Roscoe.*) Are the young men who come here mainly from your works?—Only about 25% from the works, the rest are young men from Oldham generally. Nearly every mechanical trade is represented, and some textile trades. Appendix 33.
Oldham School
of Science and
Art.

(*Chairman to Mr. Phythian.*) With respect to the mechanical drawings that are now on the blackboard, are these made in the presence of the students?—Yes.

What is the system you adopt in teaching?—The master has models and works sketches on the board. The students sit in front and take freehand sketches from the diagrams. From these the pupils work their sheets. Where we have no models the master makes a rough sketch on paper. From this only the corresponding freehand sketch can be worked, and from their own sketch and the necessary memoranda they work out their sheet. The blackboard and the students' sketch books are ruled with squares to facilitate the freehand sketching. (*Mr. Robertson,* assistant master.) Thus when they have no model they have a sketch and work the freehand at the same time as they work the machine drawing. (*Mr. Phythian.*) We wish particularly to combine the two.

What number of students attending these classes in mechanical drawing also attend the mechanical engineering?—The older students in mechanical drawing also attend mechanical engineering.

Do you pursue the teaching in the two systems simultaneously?—According to the advancement of the pupil. For instance Saturday afternoon is devoted to the blackboard and freehand sketch, and in the following week they work out the sketches. The blackboard is not taken so much as the freehand sketches from smaller sheets, and for this reason that a student may come on Monday say and miss Tuesday and come on Wednesday again for machine drawing, and we can keep the student going on in any state of advancement and get them on more quickly. By taking the blackboard very much, and having so many classes, a student misses one portion and his progress is thus impeded.

Do all the students work from models?—(*Mr. Robertson.*) Yes, each man in his turn, but we have not enough models. We want many more models very much.

Do you get your models from South Kensington?—Some, and others I have made myself. The models from South Kensington are very fairly satisfactory.

(*Mr. Magnus.*) Do you get a sufficient quantity from South Kensington?—We could do with a great number more, with greater variety of objects.

(*Chairman.*) What assurance have the South Kensington people that the sheets you send are not simple copies?—(*Mr. Richardson.*) I do not know that they have any assurance except the word of the teacher and committee, and the visits of the inspector.

In point of fact are your drawings liable to be put in competition with drawings which are simply copies?—(*Mr. Phythian.*) Yes, and that is one of the great difficulties with which we have to contend. I believe if we were to send ten copies pricked off and five worked sheets the ten copies would get the best grant.

(*Chairman.*) What work do the most advanced pupils of your classes take up?—They take the drawings on a small scale contained in the different weekly engineering publications and work them out as working drawings [examples shown].

Do the students merely enlarge or work out the details?—They work out the details as much as possible and insert anything that is omitted in the drawings. The drawings are not made for copying and are not always correct, and then the student has to correct the drawing and put in the details.

Do the students make sections where sections are not given?—Yes [examples shown].

Then they must be acquainted with what the construction ought to be, in order to draw the parts of which there are not indications in the drawing?—Certainly. The students are continually overlooked by the master and corrected if necessary.

Have you not some specialities in your lighting of these drawing rooms?—Yes. Each student is provided on the desk with an upright gas standard.

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which can be adjusted at pleasure to any angle to obviate cast shadows. Each standard has a reflecting tin cone and tin tube to carry away products of combustion. The tube rises to a height of 5ft. 7in. above the floor, thus being beyond the breathing level, and the cones radiate sufficient heat to warm the rooms, thus avoiding the necessity for a large amount of heating apparatus. No lights are necessary when the students are not working. These lamps have been found to be very efficient.

(*Mr. Woodall.*) Are you acquainted with any other school of a similar kind in Lancashire generally to the one we are now visiting?—I cannot say that I know any which devotes itself only to science and art, which is so fully developed.

Are there any in which mechanical and geometrical drawing is carried on to the same extent?—There are several large night schools. The Manchester Mechanics' Institute is a very good one. Then there are the Crewe Institute and the Bolton Church Institute; also the Wigan School, supported largely by the colliery proprietors of that district.

(*Chairman.*) Are there any science and art classes in Oldham besides these?—The Werneth Mechanics' Institute and the Co-operative Society's classes.

Do you find the splitting-up of the teaching in one town injurious?—We have had a continual increase. I prefer as much competition as we can get. All the assistant masters have been former pupils, and the masters at other places are all old pupils.

Is there any science taught in the board schools in Oldham?—(*Mr. Ingham, School board member.*) There are no science classes in connection with the board.

Do the children in the board schools, during their ordinary school hours, devote any time to elementary drawing?—Yes, they are taught freehand drawing in connexion with South Kensington. I cannot say definitely in what standards, as the teaching is of quite recent introduction, and is not yet systematised; but the whole of the children are not taught.

Is elementary drawing taught in the denominational schools?—Yes, in all the schools connected with the Wesleyan Methodists. I do not know in what standard, but it is about Standard three.

Have you had scholars from the elementary schools Mr. Phythian?—(*Mr. Phythian.*) The elementary schools are assisting us generally as regards drawing, as well as other subjects.

(*Professor Roscoe.*) Can you give any information respecting the action of the Co-operative Societies?—(*Mr. Richardson.*) The co-operative classes are distributed throughout the town, and they give instruction a deal nearer home. This is a very great advantage to the smaller boys. (*Mr. Ingham.*) So far as the co-operative movement is concerned, one of the societies has science classes in one of the board schools. They pay rent and teacher, and the grant comes out of the funds of the society. Another society, which pays over 1,000*l.* for educational purposes, including news-room and libraries, has no science classes, and no elementary school in connexion with it.

(*Chairman.*) Do any of the large works in Oldham have elementary schools attached to the works?—(*Mr. Richardson.*) I do not know of one.

Class on Cotton
Spinning.

The Commissioners next visited rooms in which elementary geometrical drawing was being taught by Mr. Armitage, and solid geometrical drawing by Mr. Philip, M.A., and then inspected the class on COTTON SPINNING, taught by Mr. Isherwood, Manager of the Tonge Vale Spinning Company.

Mr. Isherwood stated that almost all the students present, numbering fully 90 (say 19 out of every 20) were engaged working in factories, and the remainder working in machine shops. It was found on putting the question to the class that eight of the students were shareholders in the limited mills. One lecture per week is given.

(*Mr. Magnus to Mr. Isherwood.*) You have worked with the City Guilds, I suppose. Have you any remarks to make with respect to the questions set for last year?—They were fair and proper questions.

Do you think they were set by a practical man?—I think so.
How many of the men here this evening will be qualified for the full technological certificate?—Something over 20.

Do many of the men work at pure science; for instance applied mechanics?—About one-third to one-half. (*Mr. Pythian.*) The technological work was taken up in 1874 when inaugurated by the Society of Arts. In 1879 the City Guilds made awards, and a master of cotton was then paid by the committee. There is also a mechanical engineering class and one for tools.

(*Chairman.*) Do you draw a broad line of distinction between applied mechanics and mechanical engineering?—There are two distinct classes. Are the two classes generally followed by the same students?—Yes; and the same students take mathematics also, and most of them theoretical mechanics.

(*To Mr. Richardson.*) What do you believe to be the value of these technological classes?—The students here give attention to the practical element of the business followed by them. They have to answer practical questions. The theoretical instruction they get in the other classes is developed into practical instruction in the technological classes. This seems to me to be the great object of the technological classes, and I believe the object is attained.

Is a man who is engaged in your works in the manufacture of cotton machinery any better for knowing something which is quite at the opposite pole of machine construction, say a marine engine?—I suppose the men may come across the marine engine in a works where they are engaged in other sorts of engineering. But I think technology takes another course. It teaches a man to understand the nature of the materials with which he is going to work. For instance, a man being examined in steel, it makes him study the nature and qualities of steel. I think it is valuable for the students to learn more of the nature of the materials with which they work than they would do were they only to learn applied mechanics, engineering, chemistry, mathematics, &c.

Are the technological courses of any service to the students who are not connected with the industries to which the lectures relate?—We cannot allot minds to subjects. Thus I have been surprised that Oldham has got prizes for dyeing, a trade that is not carried on in Oldham. The attendance in the classes shows what are the special talents of the student. We may say that the influence of the technological classes may be economical or educational, or both, and in any case useful.

Visited the PHYSICAL LECTURE ROOM and LABORATORY, working at Physics in connexion with the Science and Art Department.

Physical Lecture Room and Laboratory.

Mr. Pythian stated that two students working together perform a series of experiments in chemistry similar to those of the department. The black board and students note books are divided into squares as in the other departments, and thus the quick preparation of correct drawings is facilitated. By means of this system very complicated drawings are readily copied. The instruction in the practical class is conducted by means of written sheets describing the details of the experiment, and drawings of the necessary apparatus; these are then copied by the students and used by them in the practical work. The same system is carried out in the teaching of practical chemistry.

(*Professor Roscoe.*) Is the use of this set of Professor Guthrie's experiments common in Science and Art classes?—Yes it is general, but I think it is carried out more fully here than elsewhere. We try to make the science section as practical as possible. We also take practical questions given in previous years, and these have to be worked out with the apparatus. Each student comes one hour per week, and the latter portion of the hour is spent in copying out the details of the experiment ready for the next week's working.

Inspected class in BUILDING CONSTRUCTION taught by Mr. Ashton, about 50 students being present. The ART SCHOOL, in which young men and young women were occupied in freehand drawing from copies, and in drawing from the cast, was also visited.

Building Construction. Art School.

Appendix 83.

Oldham School of Science and Art, Class on Cotton Spinning.

Appendix 33. The Commissioners next inspected the CHEMICAL LABORATORY which is excellently fitted. Each student has a swinging seat and a drawn desk fitted with ink, &c., with cupboards beneath. There is one gas chamber to every four students and this has Bunsen flames inside. There are about 28 working benches, and these are used, at different times, by 60 students. All the students work experimentally in chemistry, going through the experiments mentioned in the Science and Art Directory. The more advanced students work at qualitative and quantitative analysis. In addition to the practical work, there are chemical lectures and the students work out chemical calculations. All are evening class students.

Oldham School
of Science and
Art,
Chemical
Laboratory.

(*Chairman to Mr. Phythian.*) When the students have gone through the system here in physics and chemistry, do they understand what they are doing?—They cannot go on unless they understand.

Then the system is not rote teaching?—It is as practical as we can make it. As far as they go, they have a real amount of precise scientific information?—That is so.

Do you attribute this to practical laboratory instruction?—In a great measure.

Could you do the same thing without laboratory instruction?—(*Mr. Richardson.*) We attempted it and failed.

(*Mr. Magnus.*) You could not do it without sufficient apparatus?—No. (*Chairman.*) Do the students attend regularly?—(*Mr. Phythian.*) So regularly that I have difficulty in arranging the double numbers, because I want to give the analysis students as long as possible.

(*Professor Roscoe.*) What have you to say about the practical examinations of the Science and Art Department?—I consider them a very great improvement; we have had here the practical examination in the advanced course conducted under the supervision of the local committee.

Have you any suggestions to offer respecting the working of this system?—I can only suggest a development of it, and a change every few years so that we are not kept to one ground. I myself have worked the directory arrangements to the minimum. The system we have of teaching practical chemistry and physics has been developed from the machine drawing.

Are you satisfied with the system of questions on practical work that is in vogue in the elementary stage in chemistry, or would you like actual practical examination?—I should prefer a practical examination in the elementary stage if possible.

Would it be possible to ensure a fair and honest report of the work?—That depends upon the watchers of the examination. We have a most rigid secretary and should feel able to undertake the practical examination in this institution. There would be no possibility of collusion here. The strict letter of the instructions is followed.

(*Chairman.*) What is the influence of the establishment of these Science and Art classes on the industries of the town?—(*Mr. Jas. Taylor, of the firm of Buckley and Taylor.*) Very beneficial I think. In the case of pattern makers, for instance, they understand their work better than they did previously. It has caused the men to be more intelligent workmen and to understand better the instructions given them and the object had in view in the work performed and they understand the working better. Our foreman draughtsmen are now all taken from the institution. Before the institution existed we used to get Swiss and French and Germans principally. Now there is hardly a foreigner in the town.

(*Mr. Richardson.*) I can confirm this statement. The working mechanics are much more intelligent. Now a man can be sent out to work and can transmit his views to the firm in writing, give sketches, and reason about matters; formerly the man would have had to return to the works and get personal instructions in all cases of difficulty.

Are the suggestions that they make to remedy defects more practical than before?—There is no doubt of that. Every man is equal in intelligence to what the master was before the school was established.

What proportion of your men attend these classes?—About 25 per cent. of the students are employed in our works. Almost all the young men of the works

attend. There are also older men, who could not go to Owens College Appendix 23.
because too old.

(*Mr. Swire Smith.*) Are any special inducements offered to the young men of your works to attend these classes?—The only inducements are the South Kensington prizes and the Whitworth Scholarships. No pressure is put on the students; that is, only a moral pressure. If a man wants advancement he is asked questions bearing on his work at the science school, and the matter becomes one simply of qualification.

Mr. Ernest Raynor (manager at J. Braddock's Globe Meter works) stated that they had found since the establishment of the science school that it was a good deal easier for foremen to take charge of men than it was formerly. The men could be more readily trusted with a job and they understood what they had to do with less explanation.

Oldham School
of Science and
Art,
Chemical
Laboratory.

MESSRS. MATHER AND PLATT'S WORKSHOP SCHOOL.

Messrs. Mather
and Platt's
Workshop
School.

Under the guidance of Mr. Mather, the Commissioners inspected the school room and examined specimens of the students' drawings there exhibited.

Mr. Mather stated that there are 68 scholars in the school, which is designed to provide science teaching for the apprentices employed in the works. No strangers are admitted. The drawings are of work actually in progress in the foundry. The teacher lectures upon them and explains and makes calculations, and the lads the next day at the works see the very thing they have heard about here. They are allowed to go through the shops in all directions with the teacher from time to time.

For the purpose of practical illustrations from work in process of construction, patterns, models, and details of machines are brought into the school from the workshops. The great feature is that technical instruction is imparted by the aid of objects being actually constructed in the workshops under the observation of the apprentices, and which are manufactured for sale. The parts of machines which are brought to the school for class instruction are seen by the students afterwards in their proper places in the whole machines.

(*Chairman.*) Can you give us your opinion as to the best method of combining instruction with actual experience in the workshop?—Undoubtedly the school should be part of the workshop, and form a department in which the apprentice must be compelled to serve a portion of his time every week after the ordinary hours in the workshop as a condition of his apprenticeship. A school incorporated thus in the workshops affords facilities for the acquiring of technical knowledge which no science school of the ordinary kind, apart from workshop practice, can possibly offer. The teachers here are draughtsmen in our own works, duly qualified, who by this teaching add to their ordinary income. Schools of this character are simple and inexpensive, and such as every large employer can establish.

Chairman (to Mr. Jones, the teacher.) Do we understand that the students make sketches from the objects themselves, or that they avail themselves of diagrams?—Sometimes from the pattern, sometimes from the object itself in the works, and sometimes from diagrams which I prepare of objects which are being made in the works. Where we have the sketches we have the patterns here, and sometimes ask the students to measure the patterns and see whether there are any mistakes in the dimensions.

The diagrams are not allowed to be copied?—No. The drawings have to be made to a different scale. The drawings serve only to give the student a general idea of what the thing is like, the students have to work from the dimensions given.

Do they make sections also?—Yes, they make sections of everything. There are in the sketches two views, and they have to make a third deduced from the two.

Appendix 58. You let them make a view, either a section or elevation, which is not shown at all in the drawing, and which they have to devise from what is on the sheet?—Yes. [Mr. Jones then exhibited a pattern and stated that he considered it an advantage to make the boys work to scale from the pattern as it teaches them to understand pattern making and moulding as well.]

Messrs. Mather and Platt's Workshop School.

These are patterns of casts actually made in the works?—Yes. The use of this collection of patterns is to show how the whole objects are cast with the use of cores, and it forms a part of our course of machine construction and applied mechanics. The pattern and the finished object are here placed together, so that the student can see the mode in which the finished cylinder is to be cast from the pattern by the use of the cores.

Do you think that the South Kensington models are behind the time?—No, I think that the models for the illustration of geometry are very good. We have never had that collection. We have never made application for it. With respect to colouring and finishing, I consider this a sort of luxury, and it must not be indulged in until the scholars can draw details well and understand them. This is the reverse of the practice followed in the ordinary schools. [Examples were shown of a student's work done in the class, where he had drawn incorrectly a bolt and nut in a plummer block; by the side of this drawing was placed one of a marine engine, coloured and shaded, which he was supposed to have done three or four years previously at a high-class boarding school. Since he became a draughtsman, he had been repeatedly shown the correct method of drawing a bolt and nut.]

(Mr. Squire Smith.) How many nights a week do the students come?—Two nights. Three hours on Monday, principally for lectures on applied mechanics, steam, and engineering. [Handed in to the Secretary copies of class examination papers and other papers]. I have test examinations once a session. Out of 25 students in applied mechanics I passed at the last examination 12 first class, and 12 second class.

(Chairman.) Will you allow me to ask you what your own education has been?—I was educated at Peter Street School till 11 years of age. Then worked at the bench as a photographic instrument maker. I attended the Salford Working Mens' College, learning drawing and mathematics at night, and obtained the gold medal there for geometry. This institution is similar to the Mechanics' Institution but smaller. The Secretary asked me to attempt the teachers' examination and after I had passed the examination I was induced to take a class by the agent of the Union of Lancashire and Cheshire Institutes. I have now been teaching 17 years. I taught at various institutions about Lancashire and Cheshire, until I found that under the South Kensington system of payment by results you cannot live by teaching alone, so I had to do something else in addition.

You are now employed as a draughtsman by Messrs. Mather & Platt, and you are remunerated for the instruction given here, by the grant from the Science and Art Department and the class fees?—Yes.

It has been alleged that there is no great inducement to take the upper standards, and that to pass students in the lower stage is more remunerative than to pass advanced and honours students. What is your experience?—My experience is that the elementary stage is the only one that pays for the labour expended.

Therefore, there is a tendency on the part of teachers to cast off those who have passed in the elementary stage, and to bring forward a fresh set of students?—Yes, that is the tendency of the present system. The honours stage is purely honour, both to student and teacher, and does not pay at all. In the last year I passed two in honours in geometry.

In your case this tendency is counteracted by a sense of duty to the firm?—I confess I never felt this tendency, not from any sense of duty to the firm particularly, but from a sense of duty to the earnest student. I feel proud to teach an honours student, and am at the present time teaching about 12 such students.

What is the advantage of the students being persons employed in the works, and being trained here rather than in science classes?—The advantage is that I know what each person is working at every day, and have the opportunity of pointing out something connected with the work he is doing. I make the teaching have an actual bearing on his every day work. The students are rewarded not only for proficiency in drawing but for regular attendance, and actual proficiency in their manual work. It is also a condition of employment that they should be regular in their attendance here.

Appendix 33.

Messrs. Mather
and Platt's
Workshop
School.

(*Chairman to Mr. Mather.*) What advantage have the works derived from the establishment of these schools?—An incalculable advantage. We have to send out abroad yearly, one, two, or more, thoroughly competent men, who shall not be simply mechanics in the ordinary sense of the word, but who shall be able to turn their attention to any kind of mechanical work coming within their duties, whether they have done the work before or not. We had the greatest difficulty in finding such men, until we began to take them from this school, and since the school has been established we have been able to send boys at 20 to 21 to long distances from England, and to place in their hands work which they have not had much to do with before, and by their own intelligence they have made competent teachers of others, and given the greatest satisfaction. We have had cases of students not yet of age holding positions with wages of 4*l.* per week.

Do you apprentice your young boys?—We do not legally apprentice them. We have only their promise. They are earning wages all the time.

Do you find that they become good workmen at an earlier age because of their training in the school?—Undoubtedly. Little as I come into contact with the various individuals in the works, I have seen during the last few years a vast improvement in all the work these young fellows do, and more responsible work can be given them. Lads at 17 and 18 have work which before we would not have given to men under 25.

(*Mr. Woodall.*) Is this resented by the other mechanics?—Not in the least.

Do you employ a large number of men who are members of the Amalgamated Society of Engineers?—They are almost entirely so.

And they show no jealousy in any way of the systems you adopt, either of tuition or of giving early employment to boys when they are fit for putting on good jobs?—On the contrary, they seem to like it, and are pleased at the lads' progress.

Can you say the same with respect to the trades generally that are employed in your works?—Yes.

(*To Mr. Jones.*) Do you find that the foremen have any jealousy of you as a teacher?—There is no jealousy whatever. They are always ready to give me assistance as a teacher.

(*Professor Roscoe to Mr. Mather.*) Are you aware of any other works in the neighbourhood of Manchester, or even in Lancashire, where this teaching method is adopted?—I do not know of any.

The Commissioners were then conducted over the works by Mr. Mather, and the Chairman obtained the following statement from Mr. Thorp, general manager.

(*Chairman.*) What is the effect upon your workshop of the training which your boys receive in the school?—(*Mr. Thorp.*) Instead of requiring draughtsmen to look after every separate job, the young fellows who are growing up now, can make their own drawings, make their own patterns, and fit them together and erect them, where it used to require a separate man for each department. The men are most intelligent, and understand and can execute their work much better and at a much earlier age. We form thus our own foremen from the boys who have been in the school. We do not find any dissatisfaction or awkwardness with the trade union.

Appendix 88. MANCHESTER AND SALFORD BUILDING TRADES INSTITUTE FOR TECHNICAL EDUCATION.

Manchester
Building Trades
Institute.

The evening classes of this Institute were inspected by Professor Roscoe. The following is a concise statement of the rise and progress of the Institute, made by *Mr. Parnell* :—

During the year 1867 Professor Jevons brought forward the Scheme of Technical Education and laid it before the various trades of this country.

It was taken up by the Amalgamated Society of Carpenters and Joiners of Great Britain, and in various towns there was a strong movement made to inaugurate classes for teaching the technical portion in connexion with the various branches of the building trade.

In February 1868, the Executive Council of the Society decided to lend small sums of money to members in localities where a class could be commenced with a probability of success.

At the latter end of the month of February 1868, 12 members of the Society from the branches in the Manchester District, of whom the writer of this Report was one, formed a working Committee and canvassed the remainder of the building trades of this district for their support to the movement. The promises were such that a public meeting was called in April 1868, and was held at the Hulme Town Hall, Manchester, the mayor, Alderman Robert Mill in the Chair, supported by Mr. Jacob Bright, M.P., Mr. Scott Russell, the Rev. Page Hopps, Dr. Pankhurst, and other influential gentlemen who took part in the proceedings, at which resolutions were passed strongly approving of the step taken by the carpenters and joiners of Manchester, and promising their favour and support in carrying out the work suggested.

In the meantime a teacher had been engaged, and a class was started, which before the close of the first session, which covered a period of eighteen months, numbered 200.

In October 1869, the Institute became affiliated to the Lancashire and Cheshire Union of Institutes, which led to the classes being placed under the Inspection of the Science and Art Department at South Kensington.

The results of the first session as might be expected were not so favourable, (viz. 1869-70, 10 certificates), all the working parts of the machinery not being complete. But this did not daunt the Committee, who went to work with a thorough determination to succeed, and the results of the examination in May 1871 were more satisfactory, 60 per cent. of those presenting themselves for examination passing. The position of the members of this Institute being first in Building Construction and Drawing in this district, second in Plane and Solid Geometry, and first in 2nd Grade Practical Geometry. The results of the yearly examination held in May in each year are as follows :

1870-71, 18 certificates, 3 Queen's prizes, and 1 medal.				
1871-72, 22	"	3	"	1 honours certificate.
1872-73, 47	"	9	"	"
1873-74, 45	"	9	"	"
1874-75, 26	"	2	"	"
1875-76, 25	"	12	"	2 honours "
1876-77, 26	"	5	"	1 " "
1877-78, 19	"	3	"	"
1878-79, 21	"	4	"	"
1879-80, 10	"	1	"	"
1880-81, 14	"	2	"	"

The students of this Institute have also been four times successful in winning the special prize for Building Construction, given in connection with the Union of Institutes (viz., three first-class Advanced and one first-class Elementary).

The number of students who have joined the classes in each year are as follows: Appendix 3.3.

1868-69	-	-	200	1875-76	-	-	76	Manchester Building Trades Institute.
1869-70	-	-	100	1876-77	-	-	89	
1870-71	-	-	80	1877-78	-	-	69	
1871-72	-	-	82	1878-79	-	-	59	
1872-73	-	-	88	1879-80	-	-	79	
1873-74	-	-	107	1880-81	-	-	35	
1874-75	-	-	84	1881-82	-	-	40	

The number of those who have remained in the classes the whole of the session and were examined has been on an average one-third of those who have entered the class each session. Among many causes operating to effect this diminution of numbers is the uncertain state of the building trade at Christmas and New Year; it is also found that the interest in the class work diminishes after the first three months, many do not like to start at the bottom of the ladder and climb steadily up, forgetting that there is no royal road to learning. The name of "examination" as the time draws nigh also frightens others. This class draws all its members from the building trade solely, among which many are young men from country villages, where education has until recently been of a very poor kind, many not being able to spell or write in an ordinary way, so that it will be seen that it is an heavy up-hill task that this Institute has been doing with the limited amount of means at hand.

For the first six years the Master Builders' Association gave an annual subscription of 10*l.* which they then discontinued. Several other gentlemen gave a guinea a year for the first four years.

The Manchester Society of Architects have come forward and given prizes to be competed for yearly since the first year of its commencement. Other gentlemen have done likewise, but have dropped off one by one, and now the Society of Architects as a body, and two individual members, alone are donors of prizes.

This Institute was the first in this district to take up technical education in its entirety, by having a teacher who was practically and theoretically qualified to teach the subject of Building Construction. There have been a goodly number of students gone from this Institute who have taken up positions as foremen and clerks of works, and even become master builders.

It will be seen that this Institute has been in the field of technical education long before the City and Guilds of London, who are not only late in commencing their work, but go about it in a very clumsy way, spending more money on the students and examiners than on the teachers, who find the brains and do the work, besides unduly raising the standard without giving timely notice, and not only that, but requiring answers to questions that neither the teacher nor the workman student has heard anything about; in many cases putting an easy question in Honours and a more difficult one in the Advanced. The City Guilds profess to go on the lines of the Science and Art Department, but very soon turn the corner in their anxiety to save a little of that they make so much show of in their list of prizes, but of which they take care that those who do the work shall have a very small share for their labour.

The question may be asked why this Institute has fallen off so in the numbers attending, and in the number of certificates earned at the examinations.

The falling off takes place in the years 1877-78, when the building trades of Manchester and district had the prolonged and disastrous strike, since which the continued depression has acted to the prejudice of the Institute; nevertheless the turning point seems to have been reached, and with a steady trade this Institute will again take a leading position in this district.

When comparing the work of this Institute in its earlier days and the work it is doing now, and the competition it has to contend with, it is also to be remembered that the Science and Art Department has raised the standard year by year, and the majority of its members do not remain in

Appendix 33. the classes more than one session; this is an item which must be taken into account. It not only acts as a heavy drag on the Institute, but is a discouragement to the teachers in their efforts to impart a sound practical and technical education, yet with all these drawbacks the improvement in trade will cause an improvement in the attendance at the class, and aid the progress of the Institute.

Manchester
Building Trades
Institute.

Several of the master builders in Manchester (Mr. Edward Johnson, R. Neill and Sons, Mr. Southern, Mr. Tickle) have assisted the Institute materially since the year 1870 by sending some of the apprentices to the school and paying the fees for them. If the same course were taken by the other builders of the district the success of the Institute would be rendered certain. It is also to be regretted that although the master builders must of necessity be benefited by the education given to the students, they do not (with the exceptions above-mentioned) take more interest in the welfare of the Institute by visiting it at different times. Their presence even for a few minutes must be very useful and act as an incentive to the students, who would I feel sure feel more satisfaction if they thought their efforts to gain information were appreciated by the masters.

LIST OF MEMBERS of this INSTITUTE who have become Foremen, Clerks of Works, Science Teachers, and Master Builders.

		Trade.
W. Parnell	- Teacher and Clerk of Works	- Joiner.
W. Sharpe	- General foreman	- "
G. Burnett	- Shop	- "
J. W. Wilson	- Clerk of Works	- Mason.
A. Black	- Master Builder	- Joiner.
J. Graduki	- " "	- "
G. Barker	- " "	- "
B. Charlton	- " "	- "
J. Knight	- " "	- "
J. Wilson	- Science Teacher	- "
J. Atkinson	- " "	- "
L. Benson	- Master Builder	- "
A. Brooks	- Clerk of Works	- "
M. Marks	- Foreman Mason	- Mason.
W. Bigby	- " "	- "

In reply to questions put by Professor Roscoe, it was stated that the master builders do not patronise the Institute as well as they might do. More encouragement ought to be given to their apprentices to attend these classes, indeed the opinion was expressed that attendance should be made obligatory on the apprentices.

Out of 30 apprentices employed by one large firm, only five attend these classes, and two more attend the classes at the Mechanics' Institute. In another case, out of a total of 15 only six attend; in a third instance, four out of 10; and in a fifth case two out of six attend. Some of these are paid for by their employers, others pay the fees themselves.

Rooms of the Manchester Chamber of Commerce.

Friday, 3rd February 1882.

Mr. T. C. Horsfall's Evidence.

EXAMINATION of MR. THOS. COGLAN HORSFALL, Card Maker, Bridgewater Works, Pendleton.

(Chairman.) You are prepared to give evidence to the Commission on those branches of art which have a bearing on technical instruction?—
Yes.

We shall be glad to hear any evidence you have to give on the subject?— Appendix 33.

May I first mention the branches of trade with regard to which I desire to speak? I am thinking especially of designers for pottery, for woven and for printed textile fabrics, and for what is known as art metal work. In all these businesses recourse is constantly had by designers to organic form. We find both in ancient work and in work of our own day, that designs consist mainly of reproductions and of combinations of the lines of organic form, especially of plant form, but often also of animal form. Now, the people of our large towns who form the majority of our population are evidently living under great disadvantage, as they have no beautiful organic forms before them, in their early years when taste is formed, when intellectual habits are created also, they very rarely see any of those beautiful forms which, throughout all ages, have been reproduced in design. Of course we know that not simply the familiarity with organic forms which the eye gains by resting on them is needed for training the taste and giving the knowledge which can afterwards be used for making designs, but that the eye must also be made perceptive of beauty of form. The Art Museum, on behalf of whose committee I have asked to be allowed to give evidence, sees the immense difficulties our people labour under, and it is trying to meet them in this way: it proposes to lend to every primary school in Manchester and Salford, and to every Sunday school, collections on loan of the best representations which can be got of those natural objects which the people of towns have opportunities of seeing on their occasional visits to the country, and if they choose to cultivate plants, which they have before them in their own houses. The committee do this, because they are convinced that observation of art and observation of nature are constantly interactive; that if you train a child to look with attention and with pleasure on the representation of any flower, when it sees that flower it will look at it with far more pleasure and closer attention than it would have done if its attention had never been brought to the representation of the flower; and after seeing with interest any natural object, it will look with increased attention at the picture when it is again asked to attend to that. The committee is forming collections of representations not only of flowers and the foliage of flowering plants and trees, and of the different grasses, but also of the animals, birds, and insects which are to be found in this country. They give especial attention to the commoner plants and the commoner animals, because these are, of course, the kinds the children have the most frequent opportunities of seeing. They have found the greatest difficulty in meeting with representations at once accurate and beautiful, and they believe it is very desirable that, under Government supervision and with Government aid, collections of drawings of the kind I refer to should be formed and offered, either at cost price or less than cost price, to the promoters of art museums and picture galleries throughout the country, and, independently of these, to the managers of schools.

Have you been in communication with gentlemen holding similar views in other parts of the country?—Yes; we have communicated with Birmingham, but not in a way that I think deserves record; nothing has come of our communications. We have placed our papers in the hands of several bodies and gentlemen who are now forming art galleries elsewhere, for instance, Mr. Nicholson, who is building an art gallery at Leek.

(Mr. Woodall.) What has been the result of these communications with Mr. Nicholson?—Two of Mr. Nicholson's sons came over here with their architect and saw the collections we have formed for the Manchester Art Museum, and we have had correspondence as to the choice of objects for the museum; but these communications have not been of a very definite character. No particular class of information has been carefully sought, inasmuch as Mr. Nicholson at present is confining his work to the building of the gallery, and he looks to other people to fill it.

(Chairman.) Have you met with any general response to your communication?—We have received expressions of approval and of desire to be informed of what works we find most suitable for our purposes.

Mr. T. C. Horsfall's Evidence.

Appendix 38.

Mr. T. C. Horsfall's Evidence.

Have you held any communication with others on the subject of State aid towards the formation of these collections?—No. There is one plan that has often occurred to us, and by which we think that, in absence of State help, much good might be done, and that is, co-operation between managers of different art museums. We, for instance, have obtained some good original drawings by Mrs. Allingham and other artists, of common English wild flowers, and we should be very willing to have these copied either by chromolithography or any other process, and to exchange copies with the managers of other museums who have formed similar collections and are willing to give us similar aid.

(*Mr. Swire Smith.*) What number of these flower drawings of Mrs. Allingham's have you?—Only two by her; but we have also 181 by Miss E. Redgrave, and 20 by Miss E. G. Thompson.

Have you distributed any of these drawings in the district?—Not yet. We are much hampered for want of room, and have hardly room to turn over our collection. We are now forming collections for a few schools. I should like to mention, as an example of very useful work for our purpose, that we have a drawing by Mr. Burns Jones showing the decorative treatment of the common cherry, in which the foliage and the fruit are so arranged as beautifully to cover a paper which might represent a panel. Examples of that kind would be especially useful in schools, as showing how skilful decorative artists pass from the perfectly natural arrangement of flowers to conventional treatment.

(*Chairman.*) Can you suggest any means by which the Commission can be of service in promoting the objects you have in view?—Yes, I think you would help us greatly by suggesting that either the authorities of the British Museum or of South Kensington should be instructed to prepare large size plates containing representations of English flowers and foliage and English birds and insects.

Are you of opinion that the managers of art collections in various parts of the country would co-operate with you in laying similar views, either before the Commission or before the departments named?—I am strongly of that opinion. But this opinion is an opinion merely, and is not based upon a knowledge of the wishes of similar bodies elsewhere.

Would you undertake to correspond with them?—Yes, with pleasure.

You will readily understand that, if your views met with the approval of the managers of art galleries and of museums in various parts of the country, that these views would have more influence than representations from a single committee merely?—Certainly.

(*Mr. Woodall.*) Are you aware that collections of insects, &c. of this kind are already in preparation at South Kensington, and are being reproduced by chromolithography, for schools of art and local museums in connection with schools of art?—I was not aware of that; but, though parts of the collection would have some value for our purpose, I think they would be the least valuable, as the insects would not be selected for the beauty of their form. Our object is to train the children to perceive beauty and to delight in it.

(*Chairman.*) Would it be sufficient for your purpose if, from amongst these objects of which representation has been undertaken, and of which copies are to be prepared, a selection could be made suitable for the object you have in view?—Yes, if the collection contains suitable material for selection. But we should require to prepare a very large number of representations, as we desire that every school should be provided with a permanent collection of representations of common English flowers.

For that purpose it would be necessary that they should be reproduced in a very cheap form. Have you any suggestion as to how this could be accomplished?—Chromolithography is not a very costly process. If that were carefully done I think it would answer the purpose.

In point of fact, a selection of common and beautiful forms from amongst those which we are told are being prepared in South Kensington would answer your purpose?—Yes. Flowers and foliage would be very valuable to us.

(*Mr. Swire Smith.*) Is Mr. Horsfall aware that already, under the arrangement of the 50 per cent. grant made by the Department, a variety

of flowers can be purchased, not only as original specimens, mounted and described botanically, but also in representation, through Chapman and Hall, and probably other publishers? I know cases where certain specimens not included in the South Kensington catalogue have been granted by making special representations.—I was not aware of this.

(*Chairman.*) That would have to be in connection with local museums, and not with schools?—(*Mr. Swire Smith.*) Yes. I remember once an instance in which a grant was asked of something which had been seen at Paris. I believe one model was sent to the Department, and they accepted this and gave the grant, although the model had to be bought from a Paris publisher.

(*Chairman to Mr. Horsfall.*) In what way could the State ally itself with these committees? Would not the place of application be the Committee on Education rather than the Science and Art Department, because you want them to be for the use of the elementary schools?—That would be so.

Would you propose that the special regulations for the custody of objects furnished by the Department of Science and Art at a reduction of 50 per cent. should be so far modified as to enable you to circulate these objects amongst the primary and Sunday schools of the district?—Yes. The art museum would be willing to hold itself responsible for the custody of the materials.

Mr. Horsfall then withdrew.

VISIT TO LIVERPOOL, Monday, February 6th, 1882.

The Commissioners met at the Picton Reading-room at half-past nine.

The Commissioners were received by Sir James Picton, Mr. Edward Samuelson, and the officers of the Library Committee.

Sir J. Picton handed in the following statement:

CITY OF LIVERPOOL.

STATEMENT of the INSTITUTIONS for the promotion of LITERATURE, SCIENCE, and ART supported by the CORPORATION.

FREE LIBRARY.

This was initiated in 1850, when a committee was appointed by the Council, which reported favourably, and at a public meeting the sum of 1,650*l.* was subscribed to make a commencement. The library was opened in October 1853 in a building in Duke Street, purchased and altered by the Corporation at a cost of about 3,500*l.* In 1851, an Act of Parliament was obtained establishing the Free Public Library and the Derby Museum, and authorising the levy of a rate of 1*d.* in the pound for their support.

Sir William Brown then undertook the erection of the building, which cost about 40,000*l.*, including the fittings. The land appropriated by the Corporation for the Library, Museum, and Gallery of Art cost about 20,000*l.*

The present Library was opened in 1860.

The condition of the Reference Library is as follows:

Volumes in the Library	-	74,830
Issues during the year	-	577,772 vols.
Periodicals	-	292,944

Total issues	-	870,716
Per week, 16,744.		

Appendix 22.

Mr. T. C. Horsfall's Evidence.

Liverpool,
Sir Jas. Picton's
Statement.

200 ROYAL COMMISSION ON TECHNICAL INSTRUCTION :

Appendix 33. The accommodation being insufficient, a new reading room, called by vote of the Council the Ficton Reading Room, has been erected by the Corporation at a cost of 25,000L.
 Liverpool,
 Sir Jas. Ficton's
 Statement.

LENDING LIBRARIES.

Of these there are two, one in the north, the other in the south district of the city.

The number of volumes is 43,285.

The volumes issued during the last year were 423,051.

DERBY MUSEUM.

The natural history collection, said to have cost over 50,000L, was bequeathed by the 13th Earl of Derby, and has been very materially augmented since.

MAYER MUSEUM.

This collection of historical art, in many respects unique, was presented by Mr. Jos. Mayer, F.S.A., and is located in a building adjoining the Derby Museum.

More recently an ethnographical collection has been added, and a separate building provided attached to the Walker Art Gallery.

WALKER ART GALLERY.

This building was erected and presented to the City by Sir Andrew Barclay Walker at a cost of 36,000L.

It now contains a valuable permanent Gallery of Paintings, and is the locale of the annual exhibition of Works of Art. The amount of sales of pictures exhibited in the Autumn of 1881 was 12,210L, and the amount for admissions and catalogues 3,044L.

The profits are devoted to the purchase of works of art.

An extension of this building is now in progress, at a cost of probably 11,000L to 12,000L.

FREE LECTURES.

These have been in existence many years, and usually consist of a series of scientific lectures at the commencement of the winter, followed by a course of popular lectures on a variety of subjects.

The attendance has been so large and increasing that the Corporation have constructed, under the Ficton Reading Room, the Rotunda Lecture Room, so called from its circular form. It is calculated to hold 1,100 persons all comfortably seated, but it has frequently accommodated 2,000. Since its opening on January 4th, 1882, it has been exceedingly popular and has been crowded sometimes to excess.

There has been expended in buildings and land connected with the institution about—

	130,000
The Derby Museum - - - -	50,000
The Mayer Museum - - - -	50,000
	<u>230,000</u>
Outlay on the whole - - - -	<u>230,000</u>

The annual expenditure on the staff and purchase of books and specimens is 13,000L.

Besides the primary objects of the Institution, accommodation is provided for other kindred organisations:—

The School of Science.

The Civil Service Examinations.

The Oxford and Cambridge Examinations both Male and Female.

The Numismatic Society.

And occasional meetings for various purposes.

THE NEW UNIVERSITY COLLEGE.

The Corporation have recently voted the sum of 30,000*l.* for the purchase of land and buildings for this purpose. Appendix 33.

Liverpool,
February 6th, 1882.

J. A. PICTON,
Chairman.

Liverpool,
Sir Jas. Picton's
Statement.

The Commissioners first proceeded to inspect the Brown Museum and the Picton Reading Room.

Sir James Picton explained the system on which the library and reading-rooms are conducted. The Picton Room, which is 100 feet in diameter, of circular form, is supplied with the electric light.

They next proceeded to the Walker Art Gallery, and thence to the Rotunda Lecture Room, underneath the Picton Reading Room, which is used for popular science lectures and cognate purposes. The room is peculiar in design, having been excavated mainly out of the solid rock.

The following statement respecting the introduction of science teaching into the elementary schools in Liverpool, was made to the Commission by Mr. Edward W. Hance, clerk to the Liverpool School Board.

SCHOOL BOARD STATEMENT.

With a view to the provision in the curriculum of their schools of some subject specially calculated to awaken and exercise the observing faculties of the children, the Liverpool School Board, acting on the advice of several eminent scientific gentlemen, in March 1877, resolved to introduce the systematic teaching of elementary science into their schools. The branches of instruction were selected from the limited number of science subjects included in the fourth schedule of the New Code of that date, viz., mechanics (or, the principles of natural philosophy) for boys, and domestic economy for girls. The instruction given is necessarily based on the syllabus of each subject as set out in the schedule, in order to qualify the scholars to earn grants under the Education Department; but in each case the subject, as arranged in the code, has been modified and extended so as to enable it the more readily to be taught by experimental demonstration to large classes of children. Liverpool School Board Statement.

The method of teaching the subjects, which has been found by experience to be capable of producing very beneficial results to the scholars, is to combine ordinary lessons by the teachers of the school, with a system of experimental demonstrations given by means of specially appointed demonstrators. The apparatus required for the demonstrations is kept at a central laboratory, and is transferred from school to school as required, by means of a light hand cart. In this way each demonstrator is able to give from 18 to 20 demonstrations per week. And in order to simplify the arrangements for the demonstrations as much as possible, by providing for the same demonstration to be given in several schools in succession, the Education Department were, at the commencement of the scheme, requested to provide for the school-years of the different schools to end as nearly as possible at the same time; and this was carried out so far as to admit of the schools being arranged in two groups, the annual examinations of which fall in the autumn and spring respectively. In the case of domestic economy, the demonstrations are given only every alternate week, and the same is the case in the second stage of mechanics (taken by the Fifth Standard), but to the Fourth Standard, just commencing the subject of mechanics, one demonstration is given every week. In the intervals between the demonstrations, the teachers of the respective classes, who are required to be present at the demonstrations, are expected to go over with the children the subject of the demonstration; and in many instances their lessons are illustrated by simple experiments. And in order to enable the teachers (the larger number of whom have unfortunately had no special training for the subject) to perform their

Appendix 33.
 Liverpool School
 Board State-
 ment.

portion of the work the more satisfactorily, a simple text book has been specially prepared, containing reading lessons on the subjects of the demonstrations, and exercises to be worked by the scholars. The demonstrations have been given in several of the other elementary schools of the town, not under the Board, on payment by the managers of the schools, of a proportion of the expenses.

At the present time there is one chief demonstrator, who has also to organise the instruction, and two assistants.

The cost of the apparatus used in the school demonstrations for the five years during which the scheme has been in operation amounts to about 120*l.*, many of the articles having been provided in duplicate in consequence of the large number of classes.

That the introduction of this additional teaching into the schools has not, to say the least, been attended with an injurious effect on the ordinary subjects of instruction, is shown by the per-centage of passes in those subjects for the last few years:

In 1873-4 the per-centage of passes in reading, writing, and arithmetic, was	74.4
1874-5 " " " "	74.5
1875-6 " " " "	74.4
1876-7 (the year in which class-subjects were introduced)	79.0
1877-8 (the year in which science instruction was introduced)	85.59
1878-9 the per-centage was	87.1
1879-80 " " " "	88.4

The examinations in mechanics and domestic economy as held by H.M. Inspector consist merely in the answering in writing of three or four questions, and do not, as the inspectors themselves remark, adequately test the work actually done. This is especially the case in Standard IV., where the inability of the children to express themselves satisfactorily in writing is a great disadvantage to them in these examinations. Notwithstanding, however, these drawbacks, the per-centage of passes in the last examination in mechanics was, in Standard IV.—58.6, in Standard V.—75.2, and in Standard VI.—76.3.

Professor Stuart of Cambridge, who in December 1879 examined the scholars for the Liverpool Council of Education Scholarships remarked in his report.—“In two or three of the essays an amount of accurate scientific knowledge was manifested sufficiently considerable to attract my attention; and on further inquiry I found that the boys in question came from schools in which special scientific instruction has been given by the School Board. It seems not only to have been accurate and useful, but also to have laid hold of the boys’ imaginations and interested them.” In 1880, the School Board requested Professor G. Forbes, of Glasgow, to examine the scholars in mechanics, with a view to ascertain whether the system of instruction pursued was producing good results. Professor Forbes, after a very careful examination, reported to the Board as follows:—“In all stages a great deal has been done, and the intelligence of the boys developed by the system pursued. With some boys I was quite surprised to find so much clear intelligence and comprehension of the subject in boys so young * * * I can positively assert, that by the present system some good results have been obtained, a few being quite remarkable.” Of the first stage he says,—“The boys in these classes being very young, and having had little previous opportunity of educating their faculties, have improved their minds greatly by the study of mechanics.” Of three particular schools, by no means attended by the best class of children, he says,—“These three schools quite surprised me; if the schools could all be brought to this state of perfection, the School Board would have very much on which to congratulate themselves.” At the same time, he pointed out several details needing further attention, and gave many valuable suggestions as to the mode in which the system might be improved.

In addition to the instruction given to the scholars, special science

classes in connexion with the Science and Art Department have been arranged for the pupil teachers, so as to gradually train those to take an intelligent part in the work in the schools. About 70 male pupil teachers attend the central classes in mathematics acoustics light and heat, and electricity and magnetism; and about 100 female pupil teachers are under instruction in animal physiology. A short course of lessons in mechanics is also given each year to the male pupil teachers.

Appendix B.

Liverpool School Board Statement.

Mr. Hance was questioned in detail as to some of the arrangements of the School Board. He said: We have in Liverpool a conference of school managers, representing all kinds of elementary schools of every denomination. The conference was established in the first instance, to prevent that removing of children from school to school, which was so detrimental to their effective education and so unsatisfactory as to the condition of the schools themselves. It is quite clear that if you have a number of fluctuating children, they get no good by going from school to school, and they interfere very much with the continuous progress of those who do remain. To bring the improvement about required uniformity in hours of instruction, uniform holidays, and so on. Having secured uniformity in these various directions, other steps were taken to secure punctuality. At first, all the schools in union closed their doors at half-past nine o'clock; now it is a quarter past nine; and it is remarkable how few children are now shut out on that account. Then the conference has promoted the introduction of penny banks into many of the Liverpool schools. This is a distinctive feature of Liverpool school work. They have also introduced arrangements for instruction being given in the schools with a view to the prevention of cruelty to animals. To-day they held a meeting and passed a resolution with a view to check the spread of contagious and infectious diseases in schools, by mutual arrangement and by communicating with the medical officer of health. This, we hope, will induce some considerable improvement.

Mr. Hance's Statement.

Are you introducing uniform teaching?—We are trying to do so. For instance, last year there was a resolution brought forward in favour of introducing class subjects on the same scheme throughout the town, so that if any child went from one school to another it would drop into its place, and what had been done would not be lost.

Are the teachers included in your conference?—Representatives of the teachers' associations are included. There are three teachers' associations here and they are invited to send two teachers each. Then the collective instruction of the pupil teachers has received great assistance by means of this conference.

Are the denominational schools joining with you in the instruction of pupil teachers?—The Council of Education has established a college for the instruction of pupil teachers in voluntary schools, similar to that which the board has had in operation for some years past. The subject has been ventilated so often at the conference of school managers that the managers have got stirred up to utilizing the College which has now been provided.

Then has the board managers for each school?—All but one. They always keep one school in their own hands, the newest school, under the control of the school management committee.

For the others then they appoint managers?—Yes.

Being members of their own body?—No very few. The management and considerable powers are delegated to these managers, and they give a great deal of assistance.

What kind of powers?—The selection of teachers, for instance, that is the most important.

They select teachers although not members of the Board?—Yes sir, but the board's inspectors are always present when they make their selections, and assist them in their selection.

In fact they would have no control over the schools unless the teachers knew that they were amenable to them, but they would act on the board's recommendation?—Yes on their recommendation generally.

The Board, in fact, delegates its functions to them?—Yes.

LIVERPOOL COUNCIL OF EDUCATION.

MR. CHRISTOPHER BUSHELL, examined.

(*Chairman.*) What is the name of the institution of which you are the president?—The Liverpool Council of Education.

What are the objects of the Council of Education?—To associate the elementary schools with the secondary schools; we begin by a system of prizes and awards, which end in scholarships, by means of which we connect public elementary schools with the secondary schools.

What are the secondary schools which receive your scholars from the primary schools?—The Liverpool College and the Liverpool Institute, each of them having a girls' school.

And have you a system of prizes and exhibitions by which scholars from the elementary schools become students at the secondary schools?—Yes; first of all we begin by securing by every means in our power thoroughly general and punctual school attendance.

That was the first object we had in view, because, when we began our work—I was the first chairman of the first School Board—we felt that it would be impossible by compulsion to secure our object, because we found the system almost broke down in consequence of the number of persons we had to prosecute and therefore we established this scheme of attractive awards, which I am thankful to say has been extremely successful.

Besides this, then, you have a system of exhibitions?—We have; by competitive examination a certain number of the boys and girls are sent to the secondary schools. We have no limitation as regards the school or the number of candidates they send up for competitive examination. These are first subjected to a paper examination, and then afterwards a certain number of selected candidates to a *viâ voce* examination. The examiner, who is always a distinguished man, is always thoroughly independent, belonging either to Oxford or Cambridge. We always aim at having an independent man who knows nothing at all as to where the children come from, and they are examined by number. Sometimes we have been indebted to Manchester for this assistance.

Are your scholarships held at schools out of Liverpool?—No, they are connected simply with the secondary schools of Liverpool.

Then do you go on to the universities?—We have now two boys at Oxford, but we do nothing beyond putting them into the lower school of the Liverpool College or the Institute, and then by their own industry and ability they receive their promotion to the upper school, and thence to the universities. The authorities of New College, Oxford, were so struck by the ability which one of our boys exhibited in the Oxford and Cambridge examination—he having gained the Geography gold medal—that they presented him with an exhibition unsolicited.

But it was through your instrumentality that they passed through the secondary schools?—Yes, those boys' circumstances were such that they never would have passed beyond the elementary school but for our help.

(*Professor Roscoe.*) I think you sent one of your pupils to Owens College, Manchester?—Yes; because we had no institution in Liverpool where the boy could receive that higher instruction which it was desirable that he should have, and so we sent him to your college.

(*Professor Roscoe.*) I can report on his being a most intelligent and hard-working man.

(*Mr. Bushell.*) He was first in all England in one subject, if I remember rightly.

(*The Chairman.*) Will there be any connection between the new University College that you are now establishing and your schools?—Well, we hope that instead of having to send those boys whom we now send to the great Universities of Oxford or Cambridge, London or Manchester, they will many of them pursue their higher education at our new University College, while resident at their own homes. They will now have the choice of the higher teaching which before they were obliged to obtain elsewhere.

That will be done by means of scholarships to the secondary schools, and thence to the University College; that will all be done by your aid?—When

the boy passes; the scholarships are for three years, and at the end of those three years the Council of Education determine whether the boy has shown such ability and industry as renders it desirable that his education should be continued longer, and if so we go on until the boy is ready for the University.

Appendix 33.

Liverpool
Council of
Education.

Then do you propose to retain him at the University or the University College?—The Council itself does nothing beyond the supplying of the scholarship; but we have the means of giving further voluntary help.

There is one more question I wish to ask you, Mr. Bushell. You were the first chairman of the School Board, you say; the attendance at the board schools has increased enormously through your exertions?—No, I did not say that; I said by the united efforts of the School Board and the Council of Education, the Council of Education offering attractive awards, and the parents having the knowledge that the school board has compulsion at its back. These two things combined have had the most wonderful effect.

BUTLER STREET BOARD SCHOOLS.

MR. S. G. RATHBONE (Chairman of the Liverpool School Board) received the Commission at the School.

Butler Street
Board Schools.

(*Chairman to Mr. Rathbone.*) What is the total number of children on the books of the school?—About 850.

And to how many of these do you teach science?—We teach science in the Fourth Standard.

Throughout the school, to all the children?—To all the boys.

To the girls at all?—Only animal physiology.

The Commissioners were then conducted to a class-room where Mr. Hewitt, the science demonstrator to the School Board, was giving a lesson to boys of the Fourth Standard on the thermometer, and they listened to the mode of imparting instruction. At the conclusion of the lesson Mr. Hewitt, the science demonstrator of the school board, was examined as follows:—

(*Chairman.*) When had the boys this examination last, Mr. Hewitt?—They never had this same lesson before. We are coming to the end of their work, and revising a little. It would probably be last September or October when they had the thermometer, but it was then given only as a part of a general lesson on the expansion of liquids.

Then how have they gained the information on the thermometer which they have now exhibited?—Partly by the teacher's recapitulation of the subject of the experimental lessons, and partly by a little book-reading.

Is the teacher present during your demonstration?—Yes, as a rule.

And after your demonstration is over the teacher repeats it in your absence?—Yes, in the course of the week, and he has a little apparatus to help him.

The same as you bring here?—A little different.

This apparatus belongs to you?—Yes.

You go round to the schools giving lessons to the boys?—Yes.

How many do you give a week?—Four a day, or 18 a week.

Similar in character to those that we have heard?—Yes.

Are you satisfied with the system of tuition? Do you think that the masters are able, after seeing your demonstration and learning the way in which you bring the subject forward, to repeat it satisfactorily?—In the majority of cases.

But it requires some special education, on the part of most people, to teach in science?—We are under a disadvantage in having a number of new teachers just come from a training college, and it will be some little time before they can help us.

Do they use the science classes now being held in the town?—Some do. But it is not made compulsory by the school board?—No; but in some of the cases the head masters almost make it a condition with the assistants that they should qualify themselves.

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 Liverpool School
 Board, Butler
 Street Schools.

Will these boys be presented at the Science and Art Department examinations?—No, at the Government (Whitehall) examination of schools.

They will take science as a specific subject?—Yes.

Can you give any opinion as to the science instruction given in the training colleges?—The science instruction given in the training colleges does not correspond to what I give here.

How does it compare?—They take chemistry, physiology, and other subjects, but very seldom mechanics.

What do you call this lesson?—Natural philosophy I should call it, but it is called mechanics in the code.

Do you mean to say that mechanics is not taught in the training colleges?—In scarcely any.

Although it is a main subject in the Code regulations?—Yes.

And yet it is not taught in the colleges which have for their object the preparing of elementary teachers?—No, it was taught in the Borough Road training college for some time. They make it almost compulsory to have some science teaching.

You say that your masters generally are not well trained in science; what steps are you taking to supply that defect? I believe you are training your pupil teachers?—Yes, we are training the pupil teachers.

Will you state what is the system you pursue to secure that?—We require the pupil teachers to attend a science class one evening in each week, and the subjects we have taken so far have been physics, with a short course of special mechanics; in the case of the girls they take animal physiology; and they are as far as possible presented at the May examinations of the Science and Art Department.

Do you begin with that in the first year of their apprenticeships?—Yes, with the boys, but with the girls not until the second year.

Do you continue it with the boys throughout the course?—Throughout the course of the four years.

By whom is the instruction given?—By myself.

By yourself exclusively?—We have a class in mathematics which is taught by a master from the Liverpool College, who has been specially appointed.

To pass away from that, there is one other question I want to ask you; you are teaching science in the Fourth Standard?—Yes.

And taking it as a specific subject?—Yes.

The Commission would be glad to know what is your opinion as to the lowest standard in which science teaching can be efficiently introduced?—I should like to introduce it in the very lowest standard in the schools.

By a system of object lessons I presume?—Yes.

Leading up gradually to some specific subject?—To some specific subject, yes.

There would be no difficulty in taking the children when they left the infant school and giving them some rudimentary teaching in science?—I do not think there would be any difficulty whatever.

Is that system conducted in the Liverpool School Board?—No; but we are hoping to do it when the New Code is settled.

(*Professor Boscoe.*) Can you tell us what influence this teaching has had on the boys?—I have no hesitation in saying that it quickens them, and makes them sharper and more intelligent.

And the teachers are of that opinion?—Yes.

And as regards the teachers, is science a favourite subject or a difficult one with them?—I have never found any difficulty in any teacher taking the lessons.

Then as to the boys, do you find it a popular subject with them?—There is no doubt about that.

Is there any difficulty in finding time for the science teaching, or does it trench at all upon the literary and other subjects, so as to make it more difficult for them to advance from standard to standard?—Not with the amount of science teaching that we give; not at all.

The Commissioners were next taken to a room where boys of the Sixth Standard were examined by Mr. Hewitt on the principles of the pulley.

(*Professor Boscoe.*) How many lessons on the pulley have these boys had?—Three lessons on the pulley.

From the master here?—I have given them one lesson first; their own master has given them the others.

(*Chairman.*) When you stated before, that you gave 18 lessons a week, you meant that those were the number given by yourself, personally, not the entire number of lessons given by the central department?—No, sir; there are three of us, and I may say that we give from 40 to 50 lessons a week.

That is in addition to the tuition given by the ordinary masters of the classes?—Yes.

Your system is to give a section of the science teaching by means of the central department which supplies teaching to all the schools?—Yes, supplementing the teaching of the masters of the schools, by special experimental demonstrations.

Now as regards apparatus, what is your system? Is there apparatus at each school?—No. We have one set of apparatus which we transfer from school to school; and in the fourth standard there is a small set of apparatus for each master to use with the lesson at each school, and we have found that so valuable that we shall probably supply a little for all the standards.

Can you give us the cost of the transferable and stationary apparatus?—The stationary apparatus per school has been about 25s., the apparatus we transfer has cost, I should think, about 50l. to 60l.

Chemistry will be made one of the specific subjects in the New Code?—It cannot now be taken as a specific subject. Chemistry is not at present recognised. You cannot take it now except as a class subject; and as a class subject they propose to put elementary science in along with grammar and geography, and only one can be taken, so it might almost as well not be in at all.

But then under the proposed New Code you may take science as a specific subject in the fourth standard?—No, not as a specific subject. Under the proposed New Code we shall not be able to take it until the Fifth Standard.

Then under the present code can you?—We can take it in the Fourth Standard.

And you object to excluding it from the fourth standard?—Yes, as far as the teaching is concerned. Our difficulty is as to the examination.

How do you mean?—The inspectors inspecting the Fourth Standard children expect them to give their answers on paper almost equal to the higher standards. Although they are difficult things to explain, they expect them to explain on paper.

Your difficulty then is that the examination is written instead of oral? You contend that these boys who have answered so well should not be expected to write them down in proper language?—That is so.

Do you believe that that view has been the cause of their excluding it from the Fourth Standard?—No. I do not know what is their reason for it, but that is the difficulty according to my experience.

When are the pupil teachers taught?—On Friday evenings.

(*Professor Boscoe.*) What is the average number of your class of the Sixth Standard?—The Sixth Standard boys form a small class, but in one class we have 40 or 50.

In the Sixth Standard?—Yes, 40 to 50. In one or two cases we have less than that, but they are increasing in numbers every year.

(*Mr. Magnus.*) I should like to ask whether in any of the board schools any handicraft is taught, any carpentering or joinery, or in any way in which the hands are employed?—No, nothing whatever.

Nothing except drawing?—Nothing except in the infant schools with the Kinder Garten system, which is forgotten after they leave the infant schools.

Do you think it feasible to introduce handicraft training in the board schools, or that they should have a few hours a week in learning carpentering or joinery or other handicraft?—I do not see how we could do it until they have passed the Sixth Standard.

Appendix 33.
 Liverpool School
 Board, Butler
 Street Schools.

But apart from the regulations of the code, do you think it a good thing yourself?—No, not as part of the school course; if we could keep them at school after the sixth standard there would be ample opportunities for training of that kind.

But up to that time do you think there is time, or would it interfere with their literary studies?—I think that lessons of this kind with common objects would be more valuable.

If Standard IV. is withdrawn in the New Code, what proportion of your science teaching work will fall to the ground?—More than half of the children would be withdrawn from the instruction. We had at the beginning of this year about 3,900 children under this instruction, and of these there were 2,300, I think, in the Fourth Standard, and these children will not now receive science instruction in consequence of the alteration in the Code.

That is unless the board arrange to have it, and sacrifice the grant?—I mean that of course, we shall have no recognition from the department.

That is, no recognition will be paid to it?—No.

Then actually the New Code, so far as science instruction is concerned, is a retrograde step?—Yes, as regards Standard IV. For it will be observed that more than half of the children are in Standard IV., and will therefore by the provisions of the New Code of 1882 be excluded from the specific subjects of the code. In many of the schools the great majority of the children leave school soon after passing Standard IV., and not more than one-sixth remain until they have passed Standard VI. This new regulation of the code will have the effect of allowing many children to leave school before they have even had the opportunity of commencing to share in this systematic science instruction, and the great majority of the remainder before they have fairly started with the subject. Experience shows that the results of such teaching are eminently cumulative, that a scholar for example makes much more rapid progress in his second than in his first year.

That is so?—Yes. The object lessons are somewhat strongly emphasised in the infant schools. I think that is a decided advantage.

But will the object lesson take the place of the lessons that you have been giving?—No; that is only in the infant school.

Then the children after having passed the infant stage, and until they have passed the Fourth Standard, will not receive any science instruction?—No special science instruction, unless something is done in connexion with the physical part of their geography.

Or object lesson instruction?—The object lesson instruction is supposed to be carried through the school, but the department take no notice of object lessons in schools (except in infant schools) and then until we get to the specific subjects in the Fifth Standard, there will be no recognition of science teaching at all, unless they sacrifice grammar or geography.

Which they are not likely to do?—No. It might be possible, however, to arrange a system of science instruction which should be commenced by means of suitable object lessons in the infant school, continued either as advanced object lessons, or as simple experimental demonstrations on such subjects as evaporation, condensation, &c. in connexion with the physical geography in the lower standards, and leading up to a specific science subject in the upper standards.

Granny Street
 Schools.

GRANNY STREET SCHOOLS.

These schools are situated in the south district of Liverpool. They are the latest, and considered to be the best in general design, under the supervision of the Liverpool School Board. They have a nominal accommodation for 1,154 children and they have been built at a cost exclusive of land of less than 10*l.* per head of the accommodation stated.

PLEASANT STREET SCHOOLS.

Appendix 33.

Pleasant Street Schools, situated in a central district of the city, where the transferable scientific apparatus was ready for inspection.

Liverpool School Board,
Pleasant Street Schools.

Mr. HEWITT met the Commissioners, and was further examined.

(Chairman.) Is this your laboratory?—Yes.

Is it where you teach the teachers?—Yes, mainly pupil teachers.

What course of instruction do you go through per day or per week?—One lesson per week, on some subject of physics.

How many have you under instruction?—At the present time about 70, divided into two classes.

What length of time do they undergo instruction?—Two hours per week.

That is during the winter?—From September to May.

For two hours during what period of time?—They come during the whole of their course of four years.

So that at the end of that time they get the advanced certificate of the Science and Art Department in two or three subjects?—Three subjects, acoustics, light, and heat one subject; electricity and magnetism another.

And mathematics; mathematics including mechanics?—No; we only teach mathematics.

Have you any machinery for teaching mechanical drawing to the pupil teachers?—None whatever. There is only mathematics, except my own teaching.

Mathematics are taught by a gentleman from the Liverpool College, I understand?—Not at present; but the present teacher is a wrangler.

Do you teach acoustics, light, and heat by experiment?—Yes; the Department insists upon having a certain minimum of apparatus for experiments in connection with the lessons.

Then it is under Departmental inspection?—Yes.

PUPIL TEACHERS' COLLEGE.

Mr. S. G. RATHBONE examined by the Chairman.

Will you kindly tell us what aids you have to the instruction of pupil teachers?—With a view to give their pupil teachers, by means of collective classes, the benefits of a broader kind of instruction than they could otherwise receive, the Liverpool School Board, by the advice of H.M. Inspector, established early in the year 1876 a college for its female pupil teachers; and about two years later extended similar advantages to its male pupil teachers. The college is managed by a Council appointed by the Board. The premises for the female teachers consist of two private houses, which one of the members of the Board has placed at the Board's service free of rent; the male teachers are accommodated in rooms specially set apart at one of the Board schools. The subjects taught are arithmetic, grammar, music, history, and (for males only) Latin, mathematics, magnetism and electricity, and acoustics, light, and heat, and (for females only) the art of teaching, French, domestic economy, and animal physiology. The lecturers were at first selected without regard to their being certificated teachers, but owing to recent changes in the wording of the Education Code, they are now chosen from the certificated head teachers of the Board and other schools in the city. For music, Latin, and science subjects, however, the choice is not limited to such persons.

The classes meet for instruction as follows, viz. :—

Females.—First year pupil teachers. On Wednesday afternoons from 2 to 6.30, including 1½ hours for tea and recreation.

Others.—On Tuesday evenings from 5 to 8, including one hour for tea and recreation; and

All meet on Saturday mornings from 9.30 to 12.15.

Males.—All meet on Friday evenings from 6 to 8.45, including three-quarters of an hour for tea and recreation, and on Saturday mornings from 9 to 12.30.

Appendix 33.
 Liverpool School
 Board,
 Pupil Teachers'
 College.

For facility of their instruction the pupil teachers are divided into two groups, according as the schools to which they respectively belong are examined in the spring or the autumn, and in each group are classified according to the years of their apprenticeship. Out of private funds tea is provided at both centres for the pupil teachers, so that the inconvenience and loss of time is avoided, which would necessarily occur if the teachers had to go to their homes for this purpose before coming to the classes. Central reference libraries (including a valuable collection of scientific works presented to the Board by a local science committee) have been provided for the pupil teachers, and a small sum per head per annum is devoted by the Board to their extension. The female pupil teachers have the privilege of practising upon the pianos which are provided for the use of the teacher of vocal music. Omnibus tickets are given from a private source to those pupil teachers who come from a distance, but only on condition of their regular attendance at the classes. By means of these college classes the following advantages are secured :

1. The lessons, being each of about one hour's duration, give an opportunity of treating the subjects more broadly than is possible in the very limited time at the disposal of the ordinary teachers.
2. The emulation and interest produced by collective oral teaching.
3. The pupil teachers receive instruction from teachers specially selected for their proficiency in their respective subjects.
4. The influences of social intercourse.

The responsibility of the head teachers for the instruction of their respective pupil teachers is not removed or interfered with in any way by the college training, such training being held to be merely supplementary to the head teachers' instruction.

The results of the system, as shown by the position taken by the Board's pupil teachers in the scholarship examination, are very encouraging. Last year the proportion of the successful female candidates from all England and Wales who gained a first-class was only 29.6 per cent. In Liverpool the proportion was about the same, say 30 per cent., for the candidates who had not had the advantages of class instruction, while for those from Roman Catholic schools it was 42.8 per cent., and from the Board schools 52.3 per cent. Among the successful male candidates the contrast is still more striking; the proportion of candidates securing places in the first class being, for all England and Wales, 25 per cent.; for Liverpool voluntary schools, 28 per cent.; and for Liverpool board schools, 57 per cent.

The expense to the Board (without rent of premises) of carrying on the college is about 450*l.* per annum, being at the rate of about 2*l.* 8*s.* for each pupil teacher.

(*Mr. Woodall.*) Are any negotiations proceeding in regard to the establishment of a training college enabling you to educate your pupil teachers in Liverpool, instead of sending them to other colleges away from the town?—The Department have intimated that they would sanction the establishment of a training college here under certain conditions.

Then what do you expect to gain by having a college established here instead of sending your pupil teachers away?—Well, one reason is the difficulty as to the amount of accommodation in the other training colleges, which is not equal to the number of persons who wish to become students in them.

And, apart from that, you expect that you would keep your pupil teachers together better, and not run so much risk of losing teachers who have been trained well?—There would be that motive, no doubt; but, in the first place, the accommodation elsewhere is insufficient; in the second place, many parents would rather have the pupil teachers in a college nearer to their own homes; and, thirdly, we could have more direct supervision over the instruction given in the college. Those are the three chief motives.

(*Professor Boscoc.*) I should like to ask Mr. Rathbone, with regard to the teaching of science, is this system which you have adopted here one

which has arisen gradually in Liverpool, or by whom has it been introduced?—It was introduced by the School Board under the advice of Colonel Donnelly, I think, of the South Kensington Museum.

Are you aware of any other School Boards which have this system of itinerant lectures?—The Birmingham School Board have, I believe, commenced it.

Having had considerable experience now for several years, can you express yourself satisfied with the system as now carried out here?—We are very well satisfied with it. We had Professor Forbes recommended to us by Professor Huxley to examine the results carefully, and he has been and has given in his report, which on the whole is very favourable to the continuance of this science teaching.

Appendix 83.

Liverpool School Board.
Pupil Teachers' College.

SOUTH CORPORATION INDUSTRIAL SCHOOLS.

The Commissioners visited these schools in the course of the afternoon. These schools have been established under Lord Sandon's Education Act, with the object of providing a suitable education and training for the very lowest class of children, whom it is found impossible to make attend the ordinary Board schools. The children are admitted from 6 o'clock in the morning and are kept till 6 o'clock in the evening. They are subjected to a good course of elementary education, but a portion of their time is utilised in the teaching of some useful occupation, and they are fed plainly, but well, during their attendance in school. There are 200 children in daily attendance, about equally divided as to sex. In cases where parents have means, they are required to pay for the food and education of their children. The food costs about 1s. 6d. per week per child, and each child receives three meals per day. Many of the children have neither shoes nor stockings, and a large proportion are in rags. It would be difficult to find a similar number of children, seemingly more deprived or destitute. The children are examined each morning when they come to the school. There are warm and cold baths on the premises in which they are subjected to a cleansing process, when necessary, and their clothing frequently requires to be disinfected.

There are two skilled workmen who superintend the industrial operations, such as the making of door mats, &c., and who also seek up the children when absent. Under the discipline of the excellent matron and her staff, the children make marvellous progress in their school work, and in general civilization. They like the school as is testified by the fact that 95 per cent. of those on the register are in average attendance.

The Commissioners were shown over the building and the various departments by Mr. Oulton, Chairman of the School Management Committee of the School Board; by Mr. Hanco, clerk to the Board; and by Mrs. Parry, the matron.

LIVERPOOL INSTITUTE.

The Commissioners then proceeded to the Liverpool Institute, a large middle class institution in Mount Street, consisting of Boy's Day Schools (High and Commercial), a Girls' School, and a School of Art. They were received by the Rev. John Sephton, M.A., Head Master of the High and Commercial Schools, and by Mr. Finnie, the Master of the School of Art. They inspected some of the boys' class-rooms, and then proceeded to the school of art, where students in various classes were at work. Mr. Finnie stated that in the school of art 676 pupils are taught drawing, of whom 107 are ladies, and of these one third are training for teachers.

MR. FINNIE was questioned as follows :

(Professor Roscoe.) I believe a new school of art is being built for you? —Yes.

By whom is this school being built?—By the committee of this institution. And is the money obtained by private subscription?—The money is found by the institution.

Liverpool School of Art.

Appendix 33.

Liverpool School
of Art.

Aided by a building grant from South Kensington?—No, no building grant whatever. We did not apply for that.

All the money has been found by private subscription?—Call it private subscription.

Have you any life classes?—Yes, a life class is now at work.

How many have you attending the life class in the evening?—We have an average attendance in the evening of about 20.

Male or female?—Male.

In the life class do you have drawing or painting from the nude figure or both?—Both.

From the nude and from the draped figure?—And from the draped figure.

You say you have about 20 students attending the life class?—We have 20.

Have you any modelling?—No, no modelling.

What is the Liverpool Academy?—A very old institution. It was the Art Academy which was founded by William Roscoe, who was one of the original members, and exhibited his engravings. I have seen his name in old catalogues to his own works.

Have you any classes for design here?—We teach what can be taught design here, but we have very few students attending that class; you see we have no manufactures in Liverpool. If upholsterers or cabinet-makers wish to have instruction of that kind, we give it to them.

How do you conduct classes of that kind?—We conduct them by giving the students instruction in the general principles of design, as laid down in the authorised works; the history of ornament, and the kind of ornament in use at different times, of which we have plenty of examples; and we show them how to adapt this to their own ends.

How do you do that?—Must be done individually.

How?—I do it myself.

You show them the description of ornament applicable to cabinet-making and upholstering?—Yes.

How many pupils of that kind have you had?—We have had a good many from time to time.

How many now?—We have one now who is going in for the Plasterers' Company's prize and another, but this kind of instruction is not sought for frequently or sufficiently to form a class.

Do you think that if developed it might be sought for more?—I think not, here.

(Chairman.) You do not think that this is the kind of place for the application of art to industrial objects?—No.

But you have got a good deal of ornamental iron founding? Mr. Bennett has extensive works?—Yes, but I do not think there is much artistic work.

But there would be a very good opportunity for artistic work; there is no reason why it should not be done there?—There is no reason why it should not.

And you have extensive buildings going on in this town, and a great many iron railings and balustrades and things of that sort; if there were any attempt at that sort of thing there is nothing to prevent them getting the instruction here?—Nothing whatever, but I can tell you that the general instruction received in this school will enable youths to make these designs for themselves, without any special teaching.

That is your opinion, is it?—Yes, we have no frivolous work here, no landscape drawing; it is all severe study, drawing from the figure, and a severe course of ornament has to be passed through, so that the whole thing is a sort of preparation for design.

Do you do painting from still life?—Yes; a supply of flowers is sent down every Monday from the Botanical Gardens.

Are any drawing or painting from flowers at the present moment?—Not at the present moment.

Do you send your drawings to South Kensington?—They all go to South Kensington, I can tell you the number if you like. Last year there were 1,991, nearly all artisan's drawings. We have an average attendance

in the evening of over 100 artisans; the majority study mechanical drawing with us; we do not insist on having highly finished drawings, all that is necessary for them is to understand the subject. We show them building construction and the like. My assistant, Mr. Garland, teaches that, such as it is, from copies, but where we have advanced students they do it from actual measurements, but this is only occasionally. Geometry is taught to nearly all students of the school.

Do you teach it to the young ladies who come here for class instruction?—Yes. We try to induce them all to go in for the second grade examination of the Science and Art Department.

Do they do anything in drawing from geometrical models?—There is a group upstairs drawing from them now.

You have not much provision for that?—No, but it is one of the subjects we teach a short time before the examinations. I get to know all those who are going in for the examination, and give them perhaps a week or a fortnight's training beforehand. It is more to enable them to do the work in the time, to give them the requisite facility, because all would pass the examination well enough if they could get it in in the time.

Appendix 33.

Liverpool School
of Art

Rev. J. SEPHTON, M.A., Head Master, examined.

Mr. Sephton then stated that the Boys' Schools are divided into a high school and a commercial school. There are about 800 pupils in the commercial school and 360 in the high school. Over 200 boys enter the institute every year from the elementary schools, of whom about two-thirds have passed the fourth, fifth, or sixth standard. The bulk of them stay from six months to a year to finish (as they term it). This is one of the schools into which boys are drafted who have obtained scholarships from the Council of Education in the elementary schools. The institute has no entrance examinations; all that is required is that a boy shall be able to read and write, if so there is a class suitable for him. Only the two highest forms in the commercial school are taken to laboratory practice. In the commercial school there is elementary laboratory practice, but the highest class of the high school, numbering 12 to 15, have advanced laboratory practice. There are about 40 pupils from the commercial school and 30 from the high school who have elementary practice. Magnetism and electricity are taught as well as chemistry, and the most successful pupils are sent up for the South Kensington examinations. The best masters are found to be those who have been boys educated in the building. The institution was formerly the Mechanics' Institute and a few of the old mechanic members of that institute still remain sharing some of the privileges of the institution. Mr. McAlister, the senior wrangler in 1877, was a pupil of the institute.

Liverpool Insti-
tute, Principal's
Statement.

The principal handed in the prospectus of the institution and of the various departments. He was then questioned as follows:—

(Chairman.) What is the grade of the girls' school?—Practically the same as that of the two boys' schools. The pupils are sisters of boys who may be in the commercial school or in the high school, but I should say more likely of the boys in the high school. The fee paid is about six guineas a year, but there are one or two extras.

What class of the population are your pupils taken from?—In the commercial school the class of population is chiefly that of commercial clerks, shopkeepers, foremen, and people generally whose incomes I should say would average between 150*l.* and 300*l.* a year. Then in the high school they may be supposed to vary from about 250*l.* to 500*l.*

That is the higher grade of clerks?—Yes, and the middle-class generally; merchants, medical men, solicitors, professional gentlemen generally, clergymen and ministers.

You have about 1,100 boys in the school?—800 in the commercial or lower school, and 360 in the high school.

And you think that about 700 of those boys in the commercial school are the sons of parents engaged in commercial pursuits?—You may

Appendix 33.

Liverpool
Institute,
Principal's
Statement.

reckon even more than that. We take the two best boys every year from the commercial school and put them in the high school.

Very few of those boys go in to manage manufacturing businesses?—I should think so. Very little manufacturing is done in Liverpool. A great number of them must go into shopkeeping and commerce.

(By the Chairman). Now what about the Royal Institution?—It is a first-grade school of about 100 boys, and gives a classical education.

Have they any science teaching?—Just as in all first-grade schools; a master who lectures, but little more is done for the whole school. It is merely a lecture, and possibly the head boys try experiments.

How should you class a school now as to grade?—It seems that the difference in the grade is this—if 10 per cent. of the boys are over 16 the school is called a first-grade school; if 10 per cent. are over 14, then the school is second grade. This definition is the one of the Schools Enquiry Commission, 1864-5.

That is, it is only a definition which you adopt?—Practically speaking it is a real definition, because in every commercial school, for instance, hardly any of the boys stay until 16. They go to business, and it is no use teaching those boys the classical languages; they have no time to learn them properly.

Do you teach physical geography?—Yes; and that which the department calls physiography.

(Professor Boscoe.) As to the teaching of chemistry, what is the relative amount of science taught in your different schools?—Our standards are practically decided by the Science and Art Department.

Will you explain how that is done?—We prepare the boys to pass the first stage in chemistry, and then when they have passed the first stage we prepare them to pass the advanced. In the commercial school very few boys can be got to pass the advanced; they leave school before they are fitted for it; but in the high school, the highest form, that is the 6th form, boys stay, as I told you, from 18 to 18, and they are prepared for the advanced examinations in chemistry and the advanced laboratory examination.

What is the lowest age at which you admit them into the laboratory at all?—We never ask a boy's age when he attains the top of the school. We put a boy into the class most suitable for him when he comes to us, and if he works himself up to the top by the time he is 13 all the better.

Will you give us the science subjects you teach in the school besides chemistry?—Well, electricity and magnetism is one subject, and sound, light, and heat is another. We have theoretical mechanics also and physiology and physiography.

Are all the boys taken through all those subjects?—Yes, in the commercial school; we do not go so far in the high school, in electricity and magnetism, and in sound, light, and heat. In the commercial school no time is given to the study of languages; but in the high school much time is devoted to that, and therefore the boys do not get instructed in electricity and magnetism as they do in the commercial school.

What is the lowest class in which you teach science in the lower school?—Down to the lower division of the 4th class, nearly 400 in all; when they begin algebra and Euclid.

You still take Euclid as the text-book for geometry?—Yes.

Is your school full?—Crowded; we have too many already.

Now, about elementary physics?—As to magnetism and electricity a clever boy may begin about 18 months after he begins his mathematics. In chemistry he may begin much earlier; we begin that almost as soon as mathematics.

Are you on the whole satisfied with the system of examination in South Kensington, and with the results of that examination on your teaching?—Yes.

You have no complaint to make to us?—No, no complaints at all; I think sometimes, though that can scarcely be called a ground of complaint, that they have raised the standards rather arbitrarily, and we have fancied that that has been when they have received word from the Treasury

department that they must keep the pay down. It is the same for all the schools over the kingdom, and it is no use grumbling. Appendix 33.

But the question is whether it is good?—Yes, it is good; they ought to raise the standard from year to year as education improves, provided it is done gradually. Liverpool
Institute,
Principal's
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Does it test the knowledge of the boys fairly?—As well as any examination can; *viva voce* would do better, perhaps, but that is not perfect.

Have you sent up any of your students for the practical examination in chemistry?—Yes, we send up a certain number each year.

Do you value that?—It has only been for two years yet, but I think it is on the right lines.

(*Chairman.*) Into what class do you usually place your boys who come from the elementary schools after having passed the Sixth Standard?—About half-way up the commercial school.

Do you receive grants from South Kensington?—The masters do. The inspector comes down and goes through the list of students and marks them right and left M. C.; and we get no money for those. In the commercial school he marks a large number M. C.

(*Mr. Squire Smith.*) How does your high school differ from the modern side of the Manchester Grammar School?—We have the bifurcation principle; we do allow a boy to learn Greek, but on their modern side there is no Greek at all.

You consider that your high school takes about the same level?—As the modern side of a good public school. The commercial school contains about 800 boys whose school education will finish at the age of 15 or thereabouts. About 370 of these study mathematics, and the subject ranges from algebra and Euclid in the lower classes to trigonometry and theoretical mechanics in the first class. About 320 learn the elements of inorganic chemistry, and the highest class (consisting of 40 boys) has one lesson a week of laboratory practice. These subjects are so taught as to qualify the boys for the elementary science examinations of the Science and Art Department in chemistry, and for the three lower stages of the examination in mathematics. The two highest classes study electricity and magnetism and sound, light and heat; and the four highest classes take drawing in the School of Art, physiography, and physiology.

(*Chairman.*) Is there any science teaching, beyond that which you have described, at the Royal Institution, or at the Liverpool College?—Yes, there is a little more in the lower school of the Liverpool College, which is on a level with our lower school. They teach chemistry as an educational subject just as much as we do.

Have you an estimate of the number of boys learning science?—No, I have not. They have about 350 in their lower school.

What is done for the teaching of drawing in your commercial school?—In the lower part of the school the writing master teaches a little drawing but not much, and in the upper part of the school they go to the School of Art. Both schools go to the School of Art.

They do not go through a serious course of drawing?—Not in the lower, but they do in the upper classes.

NEW UNIVERSITY COLLEGE, LIVERPOOL.

The Commissioners next visited the buildings of the New University College in Ashton Street, originally occupied by a public institution which has been removed to other quarters. The buildings, which at the time of the Commissioners' visit were in process of alteration, occupy a very considerable space of ground, which has been transferred to the University College by the Corporation of Liverpool on exceedingly liberal terms. The Commissioners were received by Professor Rendall, the Principal of the College. Professor Rendall conducted the Commissioners through the various departments of the college. Liverpool
University
College.

Appendix 38.

—
 Liverpool
 University
 College.
 Prof. Rendall's
 Evidence.

(*The Chairman to Professor Rendall.*) I should like you to state generally what are the objects of this institution?—The first object that we put before us was to supply a higher education on the standard of the London University examinations. We undertake to teach any students who come forward for the Degree Examinations in Science or Arts, and also for the London Matriculation. Of course, at the same time, we do not insist on students going in for any examinations at all. We are ready to take any who wish to work, on the most elastic principles that we can, allowing them to attend one, two, three, or more classes, as they like. We make no restrictions. What we expect to do most effectually is the teaching of science. Other subjects are supplied at the Liverpool College and the Royal Institution, whereas there is no other institution in the town, with the exception of the popular classes in the evenings, that undertakes thorough and general science instruction.

(*Professor Roscoe.*) From what source do you expect to draw your students in science?—I hardly know; we take them from wherever they may come.

Still you must have some prospect?—Well, in chemistry we expect that we shall develop a large school. Runcorn and Widnes are very close to us. Students of the medical school require physics and biology.

But will you take students here who are positively ignorant of chemistry?—Yes, we take any students over 16.

Your regulations are very similar in that respect to Owens College?—We take none under 15; but we are not anxious to take students at 15, and we impose a preliminary examination of a tolerably high standard.

I should like to ask you whether you contemplate developing your scientific instruction in a technical direction; whether you intend to teach the applications of natural science?—No, we shall make our teaching more scientific than technical. At present we have no apparatus for technical teaching, such as workshops.

You propose to ground thoroughly in the theory, and that will be sufficient work for a long time to come?—Yes; for a long time to come.

Therefore your reply is that you are not prepared for it; not that it is of no use?—That is so.

(*Chairman.*) Now will you tell us something about the origin and foundation of the institution?—There was a general wish in Liverpool to found a college; several attempts were made, and it culminated I think about four years ago, when the medical school, unable to provide an education here in some parts of their curriculum, had to send away students to Edinburgh and other universities. They agitated amongst some leading men. Mr. W. Rathbone and others took the matter up very warmly, feeling that Liverpool ought to provide education of a university character. Towns meetings were called, which appointed committees; and large sums were promised. Among the first, Col. Brown, M.P., gave 5,000*l.*, Mr. W. Rathbone, M.P., and his two brothers 10,000*l.*, Lord Derby another 10,000*l.*, Mr. Whitley, M.P., and another gave 10,000*l.* from a certain trust fund in their hands, the Roger Lyon Jones Trust Fund, and Mrs. Grant added another 10,000*l.*, which gave substantial endowments. This was augmented from various sources, sometimes bodies of people, sometimes nationalities; the Scotchmen founding the philosophy chair, the tradesmen providing a large fund devoted to chemical laboratories, and others providing for other chairs. The art chair was taken up by Mr. Philip Rathbone and others. Several chairs have been fully endowed with 10,000*l.* each. The Roscoe art chair has been formed with another endowment of 10,000*l.* now completed, to which we shall proceed to elect almost immediately. Then there is a surplus to meet working expenses, from which comes the additional salary which I have as principal. I have an endowment as professor of classics, and a further one as principal. The whole endowment now comes to about 105,000*l.*

That includes your building fund?—I should mention the building fund separately; that includes the endowments of professorial chairs, but

when those special sums are appropriated, they leave a very small sum per annum, something under 300*l*. actually, to meet the working expenses. The working expenses, including care-takers, porters, demonstrators, laboratory maintenance, and such items as rates, taxes, coals, gas, stationery, and the like, have all to come out of this 300*l*.

But against that, you expect to get some fees?—Against that we have the fees, one-third of which goes to the college.

Then you mean that two-thirds go to the professors, and one to the college?—Yes.

You have other sources for raising funds in contemplation?—Yes.

Now about your building fund?—This plot of land was bought from the railway company for 19,000*l*. or 20,000*l*.; one of the members of the college council came forward and lent that sum of 20,000*l*., to meet the immediate need, at 4 per cent. interest, and the Corporation have now a Bill before Parliament by which they propose to take over this site, with some portion of the site adjoining, and we hope for a grant of this site.

They will purchase a portion of your site?—The whole of our site, and an additional block of houses, part or all of which is to be eventually handed over to the college. The total grant is 30,000*l*.

And do they give it you for nothing, or do you give them value for it?—They give us the land as it is, reserving certain rights, enabling them, if it ceases to be a college conducted to their satisfaction, to recall the grant.

It includes the building?—The building was charged nothing for; the building went with the land.

What do you expect to spend on the building?—About 2,000*l*. has been spent on actual structural conversion; with apparatus it will be considerably more. The structural alterations cost about 3,000*l*., which does not include the fittings of the lecture-rooms; it will run up to 6,000*l*. with the fittings of the lecture-rooms, and Mr. Muspratt has given 1,000*l*. for the apparatus of the physical laboratory, and special grants have been made for the natural history laboratory.

Then the Corporation give you the land and the buildings?—Yes, and we hope the alterations also; but that remains to be determined. It may depend on what residue there is of the 30,000*l*. after the block of houses is purchased.

Does the money come from the Corporation through the rates?—No, from the surplus fund the Corporation have, not from the rates.

(*Professor Roscoe*.) You will not have any yearly grant from the Corporation?—Not the least; I do not think there is any probability of our doing so.

(*Chairman*.) Do you propose to teach art?—Yes, we have an endowment just made for it, but of what character the chair will be I do not know; whether there will be practical teaching or critical lecturing on art I cannot say.

Physical Department.

The Commissioners then visited the physical department under the direction of Professor Lodge, who described to them the various arrangements which he was making for teaching physics, both practical and theoretical. In explaining the scope of his intended classes he said, "I have been already authorised to expend 630*l*. in apparatus, but practically I have 1,000*l*. to expend as a first grant. It is no secret that this amount has been provided through the munificence of Mr. E. K. Muspratt. The fittings of the lecture hall, the laboratory, and the demonstration rooms are furnished by the college. We can seat 150 students in the lecture room." Professor Lodge then proceeded to explain in detail the construction of the demonstration table, which embraces all the latest improvements.

(*Chairman*.) Will you be kind enough to tell us what your ideas are upon the subject of teaching the applications of physics?—I have got

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Appendix 38. already a small dynamo-electric machine, also a gas engine, and a moderate supply of electrical measuring apparatus for a course of lectures to telegraphic engineers. In addition to the methods of cable testing, and various processes of that kind I want to work at the theory of dynamo-machines, measuring the strength of currents, &c., such as are used for electric lighting.

Liverpool
University
College,
Physical
Department.

Is this of your own initiative or from representations made to you?—I had it from my own initiative. I have great ideas of its utility. I believe that a course of practical electricity is wanted very much, and I should be glad to establish such a course here.

Are you favourable to passing from pure science to its applications in schools of this kind?—Yes; but I do not think it is exactly passing from pure science, because when practical science begins to be applied, it helps the pure science itself very much. One gets much more acquaintance with the effects in many cases than if we were simply to confine ourselves to the laboratory experiments.

You think that the two things help each other?—Yes.

But what do you consider to be the essential teaching of the institution?—Pure science, certainly.

(*Professor Koscoe.*) Do you anticipate any difficulty from the small amount of pure science knowledge that your students possess? That is, what course of pure science do you anticipate to be necessary before a man can understand the course that you have marked out?—I have not considered this fully, but every pupil who understands principles tolerably well will be admitted, but unless they know the principles, and have some acquaintance with mathematics, and some acquaintance with the work, the privilege of admission to the more technical courses would have to be withdrawn. I should prefer students, in cases where they come ignorant of the subject, to go first through the theoretical course of the college and then into the physical laboratories. There is an idea of having a practical class in the evening, somewhat on the plan of Professor Ayrton's classes.

Are you proposing to have any connexion with the science instruction given in Liverpool by the School Board, and by the Science and Art classes?—Not as yet.

Do not you think it would be desirable to have some connection between the higher classes of the Board schools and the Science and Art Department, so that they should pass from one to the other?—I do certainly. There are scholarships given to the School Board children here by the Council of Education. They are sent to the College or the Institute, the higher schools. I do not know that we have any connection with either the Board schools or the science classes at present, but for my own part I should be extremely desirous to further connection; though at the same time we are anxious not to compete in any way with the science classes which are very numerous and flourishing in Liverpool.

Exactly; not to compete with these classes, but to help the students on still further?—Yes, but we have no means of doing this except through their becoming ordinary students of the college.

Shall you require any mathematics from your students before you admit them to your course?—No, not to the lower physical courses.

Shall you require a course of mathematics before you admit them to the laboratory?—That I do not know. I should have to consider each case specially by itself. I think we should grow regulations like that, rather than commence with them. My idea at present is to admit any who wish to come and who are at all painstaking; giving them easy or more difficult things to do according to their previous training and capacity.

What is in your mind as regards the necessity of mathematics for a course of physics?—The more the better; for advanced physics there are no limits. Sometimes a man wants to enter the laboratory for a short time to work up for an examination. Those are not the most satisfactory

kind of students. Still we have some of them, and they must be provided for. Appendix 33.

(*Mr. Swire Smith.*) Are you obtaining any apparatus from Germany for teaching physics?—Yes, about 400*l.* worth; half from Chemnitz and half from Leipsic. They are far superior for teaching purposes, besides being cheaper than any we can get in this country. Liverpool
University
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Physical
Department.

(*Chairman.*) In what respect are these German apparatus better than the English?—Well this little model dynamo-machine, for instance, is only about 2*l.*, and it would cost twice the money here. Besides the difference in price, however, there is the further more important difference that as a rule cheap measuring instruments are not to be obtained in England. There is nothing between rude and mainly qualitative apparatus, intended to illustrate elementary lectures (such, for instance, as the collections recommended by the Science and Art Department), and the highly finished and expensive instruments in use for technical and for research purposes. There is a great want of well-made and simple measuring instruments with which students can really perform quantitative determinations and obtain fairly accurate results. The designing of such apparatus is a matter requiring time and skill, but it has been carried out to some extent in Germany, and this is the kind that I have thence mainly obtained. Of the more highly finished instruments here many are of English make, but a good proportion come from Paris.

EVENING INSTRUCTION.

LIVERPOOL SCHOOL OF SCIENCE, FREE LIBRARY, AND MUSEUM, WILLIAM BROWN STREET.

The following statement of the origin and present condition of the evening science classes connected with the above school was given to the Commission by Mr. S. Leigh-Gregson, one of the honorary registrars. Evening
Instruction in
Liverpool,
Liverpool School
of Science.

The school owes its origin to the Free Public Library and Museum presented to the town in 1857 by the late Sir Wm. Brown. A few years later it was found that the building would not be complete until (to use the words of Sir W. Brown) "it had attached to it a school of science for the benefit of all classes, but especially the artisans. That lectures should be delivered and classes held where students could obtain, at a small charge, scientific information of the contents of the museum, and also receive technical instruction respecting the various trades in which they were respectively engaged." The school was formally inaugurated in 1861 by Earl Granville, Lord President of the Privy Council. The first enthusiasm of its founders gave way in a few years, and at one time it was contemplated to abandon the scheme; but with the exercise of patience and toil, the students slowly but gradually increased, until the numbers now reach 834, and the grant earned from the Science and Art Department, South Kensington, reached last year 704*l.* for science, 36*l.* 1*s.* 6*d.* for art; being the largest grant yet claimed for "payments on results."

The subjects of instruction are as follows:

Number of Students in the several classes:—

	1881	1882
Practical, plane, and solid geometry -	37	26
Do. advanced classes	13	9
Machine construction and drawing -	79	74
Do. advanced classes	17	15
Building construction -	43	60
Do. advanced class	10	12
Mathematics—Stages 1 to 3 -	205	248
Do. Stages 4 & 5 -	7	10
Theoretical mechanics -	22	16
Do. advanced class	9	5
Applied mechanics -	67	70
Do. advanced class	17	25

Appendix 33. Evening Instruction in Liverpool, Liverpool School of Science.	1881	1882
Sound, light, and heat	56	60
Magnetism and electricity	115	183
Do. advanced classes	18	16
Inorganic chemistry	133	180
Do. advanced classes	40	48
Do. laboratory	15	25
Geology	19	11
Mineralogy	10	14
Animal physiology	39	27
Do. advanced class	6	4
Steam	70	74
Do. advanced class	18	23
Agriculture	11	14
Phonography	24	30
Technical drawing for carpenters and joiners	68	43
Metallurgy	—	8
Alkali manufacture	—	10
	1,174	1,338

Art classes—

Freehand, geometry, perspective, and model 486 288

These numbers probably have never been equalled by any other science school in the kingdom, and the foregoing list at once shows the scope and nature of the work undertaken.

The students are drawn from all classes of the community, and are nearly all engaged in business during the day.

Their ages are as follows:—

Under 15 years	-	44
Over 15 and under 18	:	192
Advanced Apprentices } Over 18 and under 21	"	219
	"	147
	"	168
Over 25	"	29
Unknown	-	-

There are 721 males and 78 females.

A special feature of the system of instruction is that, as far as possible, the teachers are practical men, drawn from the ranks of our own students according as they display special fitness for the work. Another feature is the removal from our prospectus of the term "artizan" on account of its ascertained unpopularity. We use instead the terms "Students A" and "Students B." In former years the opinion prevailed that "artizans" referred exclusively to labouring mechanics of humble origin; but in the present day we find the youth of the better classes working in the foundries, workshops, mills, &c., side by side with, in many cases, their fathers' workmen; and these better class students join more readily to an educational institution which appeals to all classes alike, instead of appealing specially to "artizans."

Our present system of instruction appears to answer well, but could be improved by aid of specimens specially prepared for tests, such as iron or wood for strains, ductility, &c., compounds for chemical analysis, &c., and by the erection of a model workshop, with working models.

The following facts have come under our notice since the founding of the School of Science.

- (a.) Employers find that the apprentices attending to the science classes comply more faithfully to the terms of their "Indenture," and bring greater intelligence to bear upon their handicraft.
- (b.) Marine and other engineers have adopted the certificates of the Science and Art Department as a standard of theoretical knowledge for all applicants for employment.
- (c.) Some employers reduce the term of apprenticeship for youths possessed of the science certificates. For instance, a shipbuilder

informed me last week, when inquiring for a lad to enter his drawing-office, that for a lad acquainted with mathematics and mechanics he would take off two years from the usual term.

(*Professor Roscoe.*) Would you kindly give us a list of the localities in the city of Liverpool where the science classes of your school are held?

1. Free Library and Museum Building, Wm. Brown Street.
2. Liverpool College, Shaw Street.
3. Board Schools, Stanley Road.
4. Do. Granby Street.
5. Brunswick Schools, Erskine Street.
6. Collegiate School, Picton Street, Wavertree.
7. Grammar School, Garston.
8. Grammar School, Withens Lane, Liscard.
9. College of Chemistry, Duke Street.
10. Royal Institution, Colquitt Street.

Your classes are all held in the evening, I presume, and are all registered under the Science and Art Department?—Yes; sometimes we have a few courses on Saturday mornings.

Having had much experience in the working of the Science and Art examinations, have you any suggestions to make to the Commission as to improvements or additions which might with advantage be made in the system?—I do not know of any material improvement that could be made.

EVENING CLASSES HELD IN THE LIVERPOOL COLLEGE.

The Commissioners visited the evening classes conducted at this institution by Mr. Cooper, who stated that the class he was then conducting was an advanced class in electricity, but that he also took an elementary class. He believed this was the only special advanced class in the town; the others were combined, elementary and advanced.

(*Professor Roscoe.*) Do you send up any for honours?—No, this is only our second year.

How many students have you in your elementary class?—I have about 25.

Have your pupils any scientific education before they come?—As a rule none, but the engineering students have a fair mathematical training.

Where do they get that?—In the science classes, by attending the mathematical classes.

What is the occupation of these students?—Most of them are engineers; some are schoolboys. There are six engineers now present, I think.

Do you work entirely with South Kensington?—Entirely with South Kensington.

(*Mr. Woodall.*) Have any of these students passed in the elementary stage?—All have passed the elementary stage.

I believe you have a Whitworth scholar present?—Yes.

Where did he receive his education?—In the School of Science.

And he is engaged in practical engineering work during the daytime, I believe?—Yes.

The Commissioners also visited the mathematical classes, being held in the same building, and Mr. Gregson, who accompanied the Commissioners to the classes, presented them with the prospectus and other documentary information.

STANLEY ROAD SCHOOLS.

The Commissioners next proceeded to these schools, where a numerous mechanical class was being conducted by Mr. Sloan.

(*Professor Roscoe.*) Have these gentlemen passed any examination in science and art, Mr. Sloan?—Very few of them. Some few are old students.

But to understand what you have been saying, they must have had a good training in preliminary subjects?—The great bulk of them are employed in engineers' shops, and I assume a certain amount of knowledge which they necessarily possess.

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Instruction in
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College.

Stanley Road
Schools,
Evening Classes
on practical
mechanics and
steam.

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 Evening
 Instruction in
 Liverpool,
 Stanley Road
 Schools.

Where have they gained that knowledge?—In the workshops. These matters that I have been putting on the board only involve an elementary knowledge of arithmetic, and I explain it as I proceed, as far as possible.

What class of work are you yourself engaged with?—Principally marine engineering. I served my apprenticeship six years with Messrs. Laird Brothers, and then I served a certain period with Sir Joseph Whitworth, part of which was in their foundry and part in the pattern shop, and then I completed my apprenticeship with Messrs. Laird Brothers as a draughtsman, and I have been in their employ ever since.

Have you yourself passed the Science and Art examinations?—Yes, I am a Whitworth Scholar.

Did you get your knowledge for the Whitworth in the science classes?—The bulk of my knowledge I obtained in the Liverpool Institute as a day scholar, and the remainder principally myself. At that time the science classes were not so fully organised, but I obtained considerable assistance from the School of Science in some respects. I had a good mathematical training at the Institute, which stood me in very good stead.

Do you consider that the problems which you set your pupils are all the better understood because they have practical work to do in the day time of a similar character?—Yes.

So that that is really combining the workshop with the class room work, and you consider that this sort of training is a good form of technical education?—Practically it is, provided that they have the necessary practical training elsewhere.

Of course you extend the course over several years; the one course that you are giving these gentlemen now would not be sufficient, in your opinion?—Certainly not. We have an advanced course in connexion with these subjects, and I always expect the students to pass the elementary course and then to go through the advanced, though it is not always the case that they do so.

You induce them to do so with all the means in your power?—Yes, certainly.

How many classes do you teach?—Ten classes.

Do you recommend all your students to take other classes as well as this in the same year, or do they chiefly attend to you? Do you find this one course that you give them is sufficient work for them?—It depends a great deal on the students. A great many of the students join several classes.

I mean, in connexion with this particular subject, is there any other that you advise them to take along with it, on a related subject?—Yes, I advise a student, if he has not had an elementary knowledge of mathematics, to take a mathematical class.

What subjects do you teach?—Practical mechanics and steam: practical, plane and solid geometry, and mechanical drawing.

You have certificates in all those?—Yes, sir, honour certificates in all.

What are your fees?—Six shillings for each subject for the whole session.

Do you think you could do more, if you had a more complete set of models?—Yes, I could do with better models.

What models would you have if you had your own selection?—My views are rather ambitious. I should like what I might call a mechanical laboratory, in which we might have the means of extemporising models to suit our own wishes. I have got a few models in the college in Shaw Street, which I never use, because they are not sufficiently exact for my purpose. For instance, I take a model valve gearing and crank motion, which I go into in considerable detail in the advanced classes, but the model is utterly useless, because it is not sufficiently exact. If I had models of my own I should have them prepared accurately to my own drawing.

What do you think it is essential that you should have as models for an ordinary class?—For an ordinary class; it is rather difficult to make up my mind all at once. I should be happy to let you know.

Will you write a letter stating what you would consider necessary for your teaching on the subject of mechanics and so forth?—I will do so. (Mr. Redgrave.) You have not seen our circulating collection of models?—No, I have not; probably they are something superior to what I have seen.

Appendix 33.

Evening
Instruction in
Liverpool,
Stanley Road
Schools.

Letter from Mr. SLOAN, Science Teacher, on the Technical Instruction of Mechanical Engineers.

Mr. Sloan's
Letter.

PROFESSOR ROSCOE,

17, Elgin Street, Birkenhead.

March 15th, 1882.

ON the occasion of the visit of the Royal Commission on Technical Instruction to my classes in "Applied Mechanics" and "Steam" on 7th ult., you asked me to send you an account of the apparatus, diagrams, etc., which I thought necessary for teaching these subjects, and I have much pleasure in doing so.

I will first answer, at greater length than before, some of the questions which were put to me at that time.

1. Does the method of teaching evening classes in Applied Mechanics and Steam, as encouraged by the Science and Art Department, form a good system of technical instruction in Mechanical Engineering? I answer that (in the hands of a really competent and practical teacher) I think it is as good as is practicable for elementary work.

As I stated before, mechanical engineering cannot be learnt at any kind of school; it must be acquired in the shop, and the function of the school is to supplement the practical experience gained in the shop, i.e., to impart a sufficient knowledge of theoretical laws or principles, to point out their application, and to explain those things in a learner's experience which would hardly be understood without assistance.

The great bulk of the students who attend my classes are at work all day in engineering or other workshops, and therefore, the conditions I have laid down above (of practical shop experience combined with school training) are fulfilled. Of course, it must be borne in mind that these students have been at work for about nine and a half hours before coming to class; that both body and mind are wearied and unfit for any hard mental work; and that therefore very great achievements cannot be reasonably looked for, without continued study for some years. I find it quite impossible to cover the whole of the syllabus laid down by the Department in one session, either in the elementary or the advanced classes.

Nevertheless, I believe, on the whole, that the present system of evening instruction is as good as is practicable for the mass of artisans and apprentices.

2. As to the class of students, I find that nearly all of them are either apprentice engineers, or young men who have shortly before completed their apprenticeship.

Out of 115 students registered in my classes, I find—

13	whose ages lie between 16 and 19 years
88	" " " " " 19 and 23 years
10	" " " " " 23 and 30 years
and 4	" " " " " are over 30 years.

3. As regards the general education of the students, I find that the majority of them, especially the apprentices, have had a sound elementary education, and, in a good many instances, they have some knowledge of mathematics.

I find again, amongst the older students (more especially), a lack of elementary education as evidenced in their attempts at composition in their written exercises.

As I teach each class collectively, I am necessarily obliged to suit the instruction to the capacity of the most ignorant of the students, and therefore, in the elementary classes, I work all problems by purely arithmetical methods, except in very rare instances where I may introduce a simple equation. In the advanced and honours classes a considerable knowledge of mathematics is indispensable, and is therefore taken for granted.

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4. In answer to the question, "what other subjects should the students take up in conjunction with, or previous to, the course in Applied Mechanics and Steam?" I would say that a knowledge of mathematics, as far as Stage 2 of the Departments' syllabus, is most desirable, not only as giving the power of mathematical analysis, but on account of the mental discipline and methods of accuracy which it imparts. I can generally tell a student who has had no kind of scientific training, by the loose and inaccurate way in which he takes down and applies the instruction given.

In addition, a knowledge of freehand, geometrical (plane and solid), and mechanical drawing is absolutely essential to the proper education of the engineer.

A course of instruction in several other branches of science (*e.g.*, Heat, Higher Mathematics, Theoretical Mechanics, Chemistry, Metallurgy, and Electricity) would be of much service, but cannot be expected of the great bulk of artisans and apprentices, who are to receive the technical instruction.

It follows that the course of instruction is at present necessarily "self-contained," very little knowledge in other branches of science being taken for granted.

For a class of students such as above, who have had little or no scientific training, the experimental method of instruction seems the one most likely to succeed.

I have not been in the habit of using much apparatus, and have contented myself with stating clearly, and explaining with the aid of the black-board, the principles involved.

However, abstract statements, no matter how clear and vivid, fail to produce as sharp and permanent an impression (upon an unscientific mind) as a simple and striking experiment. Again, a few experiments make the lesson much more attractive, and may in many cases encourage the students to persevere to the end of the course, when otherwise they might not have done so.

I append a list of apparatus, models, and diagrams that would, I think, be suitable.

I would insist upon accuracy in the construction of these models, and as will be seen, would, where possible, have them made so as to yield quantitative results. All working surfaces should, as far as possible, be metallic and nicely fitted. The diagrams should be boldly drawn and clearly coloured, especially in section, so as to show the different materials used. They save a good deal of time otherwise used in black-board sketching.

LIST OF MODELS, APPARATUS, DIAGRAMS, etc., for teaching APPLIED MECHANICS.

1. A few levers or rigid bars, straight and bent; some small pulleys with fine cords and weights: together with a large vertical board with movable hooks, or other suitable means of support.

These would be used to illustrate the composition and resolution of forces, parallel and oblique; also, to demonstrate the principle of the lever, and the rule for its mechanical advantage. For this purpose not only should the actual weights to produce equilibrium be shown, but means should be taken to measure accurately the actual displacement of each for a small movement of the lever. This remark applies to all cases where mechanical advantage is investigated, and is intended to demonstrate to the students, that in all cases (so far as friction will permit) the principle of work is rigorously fulfilled.

The pulleys could be combined to represent any of the systems of pulley blocks in use, and their mechanical advantage determined.

2. Model of wheel and axle as a modification of the lever.

3. Toothed Gearing.—An assortment of small spur wheels of different sizes and uniform pitch (something like a screw-cutting set of change-wheels). These could be geared together into trains of any description, either to show the mechanical advantage of a train, or as examples of mechanism, such as screw cutting trains, epicyclic trains, sun and planet wheels, etc.

Models, &c.
needed for
instruction in
applied me-
chanics.

A set of four equal mitre wheels should also be provided, as some important and interesting principles and inventions can be illustrated by them. Appendix 33.

4. Large smoothly planed cast-iron hinged plate, that can be set to any inclination by means of a graduated index, and provided with some weights in the form of rollers. Evening instruction in Liverpool, Mr. Sloan's letter.

5. An arrangement of levers, known as the Stanhope levers; and also a toggle-joint, arranged to shew the variable mechanical advantage and velocity ratio.

6. Endless screw and worm wheel, combined with wheel and axle.

7. Chinese windlass, or Weston's pulley.

No experiments can be made on the mechanical advantage of screws, on account of their excessive friction, but a diagram should be provided showing the various kinds of screw threads in use.

8. Some simple apparatus for demonstrating the laws of fluid pressure and jets should be provided and should comprise, amongst other things, an air and a compressing pump, and mercurial and other pressure gauges.

9. The large hinged plate of planed cast iron, with a graduated index to show its inclination, before referred to, and provided with several heavy planed blocks of known weight, will be useful to show the laws of friction, angle of repose, effects of lubrication, advantages of large bearing surfaces, to compare rolling and sliding friction; also, in the case of a flat pivot, to deduce the mean moment of friction, etc.

10. One or two pulleys with belts or bands should be provided, in order to show the laws of coil friction. Upon these laws the whole action of belt and rope gearing depends.

11. Model to show harmonic motions and their compositions, as also the effect of a short connecting rod. A model, so arranged as to show side by side a true harmonic motion and a second motion derived by a connecting-rod from same crank pin, would have a good effect.

12. A few cams of different shapes, to show that a cam can be made to produce almost any desired motion.

13. A pair of thin wooden spur wheels, with teeth of true cycloidal shape, and of very exaggerated depth. The object of this model is to show that, in correctly shaped gears, the velocity-ratio is perfectly constant; that the teeth might be made without clearance, and that they would work without backlash. To prove this, the axes should be provided with pointers and accurately divided circles. For the sake of comparison, a similar pair of wheels, with teeth shaped according to some of the "rule-of-thumb" shop methods should be provided.

14. A model with two shafts, not parallel, carrying a pair of pulleys to be connected by a belt, either with or without the aid of guide pulleys.

15. A common, and also a conical pendulum; the latter being used to show that the angular velocity depends upon $\frac{1}{h}$ only; also, the effect of loading the pendulum, either by a spring or extraneous load.

All the preceding are representative of mechanical principles of universal application, and are therefore of primary importance.

In addition, some models of special contrivances or inventions might be provided, if circumstances will allow.

The number of such contrivances is so great that it is difficult to make a selection; however, I will name a few.

16. Model of quick-return motion (Whitworth's) as used in shaping and slotting machines.

17. Hooke's joint (single and double), each shaft being provided with indexes, to show the inclinations of shafts and the effect upon the velocity-ratio.

- Appendix 33. 18. Model of Oldham's Coupling.
 19. Model to show action of elliptic chuck and trammel.
 20. Model of friction paul, paul and half-paul, and of masked ratchet.
 21. Small model of Warren girder, so arranged that struts and ties may be interchanged, to show influence of method of loading.

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LIST OF DIAGRAMS.

- Diagrams needed for instruction in applied mechanics. 22. Pulleys for belt and rope gearing. Round of rim; section of Vee rim for cotton and for wire ropes; curved arms; speed cones.
 23. Spur-gearing. Cycloidal curves and their generation. Methods of arranging spur and bevel gearing. Rim and cogs of mortice-wheels.
 24. Quick return gearing for planing machine table.
 25. Crane or winch train.
 26. Section of lifting and plunger pumps.
 27. Centrifugal pump and blowing fan.
 28. Hydraulic accumulator; hydraulic press; hydraulic cranes.
 29. Water-wheels and turbines.

A few specimens should be provided as under.

30. Specimens to show fracture of (a) grey, (b) white, (c) mottled, and (d) chilled cast-iron; (e) good fibrous, and also (f) poor and crystalline wrought-iron; (g) mild, and (h) hard steel, tempered and untempered; (i) also a bar of wrought-iron after being pickled in acid, so as to render apparent its fibrous structure.
 (j) Specimens to show reduced area of very ductile material when drawn asunder by tensile stress.
 (k.) A series of specimens of hardened cast-steel, polished and "drawn" to various "tempers" or colours, to show the gradations from extreme hardness to softness.
 (l.) A few light wooden laths of different sections, to show laws of transverse strength of beams.

STEAM.

Models, &c. needed for instruction in steam.

For teaching "Steam" of course a great many of the articles already named would be used.

It is necessary that the students should have clear ideas of the laws of heat, so far as they affect steam or other heat engines, and sufficient apparatus should be provided to give experimental illustrations of the following:—

31. Expansion of solids; force of expansion; distortion of form produced by expansion.
 32. Expansion of liquids.
 33. Calorimetry; unit of heat; specific heat; temperature of mixtures.
 34. Latent heat; condensation of steam and formation of partial vacuum thereby.
 35. Radiation; conduction; convection of heat.
 36. Boiling temperature of water; saturated and superheated steam; boiling of salt water.
 37. Boyle's and Charles's laws.
 38. Spheroidal condition.

The apparatus would be much the same as is used in physical laboratories for a similar purpose; but as the course is strictly elementary, and only a comparatively short time can be devoted to it, no elaborate or expensive apparatus would be required, the object being rather to demonstrate *facts* than *figures*.

39. A trough to show the corrosive effects of galvanic action should be provided. In connection with marine engineering, this is a very important matter.

The following additional models would be required:—

40. Sectional, wooden, moving model of some form of condensing engine, as complete in detail, and as large in scale as possible. If large enough, most of the details would be sufficiently clearly shown not to require separate models.
41. Strap, gib, and cotter; and
42. Box-ended rod, with brasses and cotter.
43. One arm and float of feathering paddle-wheel.
44. Salinometer.
45. Apparatus to show the action of jets in inducing currents.
46. Model of link-motion slide-valve gear.

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letter.

Also the following diagrams—

47. Early pumping engines.
48. Cataract and its valve motions; Cornish and equilibrium valve.
49. Details of pistons.
50. Details of stuffing-box; section through stern-tube of screw vessel.
51. Large double, or triple-ported, balanced slide-valve.
52. Arrangement of compound engine with 2, 3, or 4 cylinders.
53. Section through surface condenser, showing also, on a smaller scale, the whole course of steam and water through engines and boilers.
54. Section through locomotive.
55. Indicator, and some typical diagrams.
56. Feathering paddle-wheel.
57. Section through a rectangular and a cylindrical boiler, showing methods of staying.
58. Boiler mountings; safety valve (spring and weight), water-gauge, &c.

Requirements for a MECHANICAL LABORATORY.

All the articles that I have enumerated in preceding pages would be required for lecture room use in elementary teaching.

Although it is not practicable nor perhaps desirable to attempt a higher scheme of technical instruction than that sketched, so far as the mass of operatives is concerned, yet I do think that in large commercial or manufacturing centres, some facilities (in some degree analogous to our colleges and universities) should be provided for a higher grade of technical instruction.

These institutions would attract advanced students of ability from surrounding districts, and would serve for the training of teachers and others who have to occupy positions of responsibility.

In such a technical school or college, a mechanical laboratory would form an important feature. The object of the laboratory would be to enable both lecturer and students to carry out experimental work, as confirming or demonstrating well-known facts and laws, or as suggested by the advance of mechanical science, so that, while its chief use would be in the routine work of technical instruction, its appliances would doubtless foster a spirit of invention and research amongst the students, that might lead to valuable results. The arrangement of such a laboratory would of course depend upon the amount of money that could be spent upon it, and on the number and nature of the students who might be expected to attend it.

(1.) The room should be thoroughly dry, well heated and ventilated, and well lighted; accurate work cannot be done in a dark room.

It should have a firm, steady floor, and should have a black board and dais.

(2.) Immediately adjoining the laboratory, there should be a class or lecture-room, properly fitted and furnished as such.

(3.) The most important work to be done would be the testing of the strengths and properties of materials used in the constructive arts, and for this purpose a testing machine is essential.

Requirements
for a mechanical
laboratory.

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For ordinary lecture demonstrations, a small machine (capacity 10 tons) as used by the Liverpool School of Science is very suitable, being small and handy, and therefore easily manipulated. But for a really systematic course of experiments, a more powerful machine is desirable, and I would suggest one with a capacity of 25 to 30 tons, worked by hydraulic pressure, either hand or power. Engineers do not place much faith on small tests.

The machine should, if possible, be capable of testing for tensile, compressive, shearing, cross-breaking, and torsional strengths.

A great deal of useful work could be done with this machine.

The ultimate strengths of all the materials in common use would be tested under different conditions, and the effects of various processes, such as annealing, hardening, hammering, forging, welding, machining, brazing, &c. could be studied.

The machine should have tools for testing cements.

Having had some practice in using the machine for tests of ultimate strength, the student might now proceed to test for elastic and permanent deformation. For this work, some delicate and accurate measuring instrument would be required.

Tests could also be made of beams of various sections,—rectangular, round, and flanged, solid, and hollow: and of solid and hollow shafting and columns.

The strength of rivetted joints is a very important branch of inquiry, and one in which there is room for investigation, but for this purpose, a heavier machine is required than any the laboratory is likely to possess, as otherwise the specimens are on a much smaller scale than occurs in practice.

The strength of cylinders and stayed plates to resist bursting and compressive stresses might also be experimented on. For this purpose, a strong force pump and a few pressure gauges of different ranges would be required. The latter would be of use for many other purposes. In conjunction with above, a small hydraulic press would be generally useful.

(4.) A small smith's hearth and bellows, with anvil and set of tools would be required; its principal use being, as indicated above, the treatment of specimens for testing. It would be advisable to have it in a separate room.

(5.) A 6" Whitworth screw cutting lathe. This is required for turning specimens, and is in fact indispensable where constructive work in metal is carried on. Overhead motion, dividing plate, and wheel-cutting gear would increase its general usefulness.

This could be driven quite well by foot, but if a gas engine could be provided to drive it and the testing machine, and any other machines requiring power, so much the better.

(6.) A small shaping machine, driven by hand or foot. This, in conjunction with the forge, lathe, and hand-tools, would place it within the power of the lecturer and students to make or alter special apparatus as required.

(7.) A set of hand tools (vice, hammers, chisels, files, &c.), as used by an engine-fitter, are of course necessary; as also a set of pattern-maker's or joiner's hand tools.

(8.) A true cast-iron surface plate or table about 6' 0" x 4' 0", and of the height of an ordinary table, set firmly and truly level. It need not be scraped to a true surface, but left from the planing machine. This table is used for lining out dimensions that do not lie in one plane, and affords a true base upon which models or machines can be arranged or built. Along with the table there would be an assortment of marking blocks or scribers, right-angled and vee-blocks, a square and straight edges, standard steel rule, and spirit level and plumb rule.

(9.) A $\frac{1}{100000}$ measuring machine would be a valuable addition to the furniture of the laboratory. Accurate measurement is the basis of science, and it is in the highest degree desirable that the students should be familiar with the most accurate methods of lineal measurement.

The machine would be of use in the following way.—Say we have a truly turned shaft of steel 4" diameter, and it is desired to bore a hole to receive it. The fit may be (1) a clearance fit; (2) a working fit free from shake; (3) a driving fit, and (4) a shrinking fit.

Now it is easy enough to make two dimensions *identical* by means of callipers, but when we have to make two dimensions to *differ* by a small but exact difference, the comparison by callipers becomes uncertain, and a proper fit can only be made by a turner of great experience, and then not with positive certainty. By means of the measuring machine a series of experiments could be made, by ascertaining exactly in ten thousandths of an inch, how much difference is required to produce any kind of "fit" desired.

By this systematic method, a turner could acquire more ability and confidence in such work than he could in a comparatively long time at a lathe in the ordinary way.

It is in view of its employment in this way that I have specified a "Whitworth" lathe. A lathe of equal size might be obtained of some other maker for perhaps $\frac{1}{2}$ the cost, and for some purposes it would serve almost as well, but for accurate gauging, such as I have just referred to, the very best obtainable tool is necessary. It is of little use trying to gauge to $\frac{1}{1000}$ " the diameter of a shaft that is not truly cylindrical.

10. Amongst the apparatus there should be a model of slide-valve gear. This model should be thoroughly well made, and capable of ready and accurate adjustment; otherwise it is useless for quantitative experiments. It should have four independent eccentrics on the one shaft, each provided with a lineal and angular index, so that it can be set to any required throw and angular advance. Each eccentric rod should be adjustable in length, and links of appropriate size and shape could be fitted as required.

By this model the action of all kinds of slide and expansion valve gears could be studied; as *e.g.*, the effects of opening or crossing the eccentric rods; various ways of suspending the link; unequal lead or lap; angularity of connecting rod, etc.

11. In the investigation of friction, there is scope for useful and instructive work; as for instance, in comparing the value of different kinds of lubricants, and in experimenting on the friction of slide valves exposed to steam pressure.

12. There should be provided an assortment of links, bolts, and nuts, pins, brackets, &c., by means of which models of parallel motions and link work in general could be built to prescribed dimensions, and the resulting motion accurately observed and measured.

13. Much of the apparatus and models which I have before specified for elementary instruction would be advantageously transferred from the lecture room to the laboratory, if such were provided, and the apparatus might be of a more refined description.

14. The students would not be altogether dependent upon the articles already in the laboratory. Being possessed of mechanical ability and the necessary tools, they might employ themselves in designing and making the necessary apparatus to suit their purpose.

For example, a student might design and make, or get made, a compound cam and arrangement of link-work similar to that shown in Goodeve's "Elements of Mechanism," which would write the letters R. The exact methods necessary to achieve such a result would be far better training than could be afforded by a mere perusal of a general method.

It will be observed that in connection with this scheme of higher instruction, I have throughout laid particular stress upon the value of precise and definite information, for when knowledge comes to be applied to actual work, it is of little value unless it is accurate and definite.

In elementary teaching it is frequently quite sufficient to tell a student that a certain effect is produced by a certain cause. For example, it is a good thing to know that "a difference of diameter of one or two thousandths of an inch makes all the difference between a good and a

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"bad fit," but it is of far greater value (when we come to a case of actual work) to know *exactly how much* difference in tightness is produced by a difference in diameter of say *exactly 1/1000*."

Again, although it is a useful thing to know that tempering steel in oil increases its elasticity very much, yet it is of much greater value to be able to say *how much* the elasticity is increased by a certain degree of tempering.

I think that the want of exact quantitative information runs through a good deal of science teaching, and detracts very much from its usefulness (at least when considered as a *technical* subject).

To take an example from electricity—many students know perfectly well that a galvanic battery yields a current, which, when sent through the coils of an electro-magnet, gives it the power of lifting iron, but how many of them, if required to make an electro-magnet to lift a certain weight at a certain distance, would know how to determine the particulars of battery, or the size of cores and the size and length of wire?

In passing, I might say that electricity promises to take a prominent part in the mechanical engineering of the future, and the mechanical appliances of the laboratory might be used in making experiments on some of the more purely mechanical portions of electrical engineering.

In conclusion I may say that I have had no experience of a laboratory such as I have just described, and I know that I have by no means exhausted the matter, either as regards the appliances required or the nature of the work to be carried on.

In the course of the work new pathways would be continually opening up, and would of course suggest any necessary additions to the laboratory.

If any of the preceding remarks are not quite plain I shall be happy to give any further explanation or information in my power.

I am, Sir,

Your obedient Servant,
ROBERT A. SLOAX.

LIVERPOOL SCIENCE AND ART CLASSES.—WILLIAM HENRY STREET SCHOOLS.

Liverpool
Science and Art
Classes.

The Commissioners visited the art classes conducted in these schools, which are under a Committee of Management separate from that of the Liverpool School of Science. There were some 75 pupils present. They examined the geometrical and frechand drawing, all of which was of an elementary character. The drawings were neatly done, but there had been no drawing from the cast or models, except from plain geometrical blocks. No figure or ornamental cast of any description. This class, however, is considered to be quite above the average of evening classes, and some of the students consider it to be the best evening class in the town.

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APPENDIX 34.

SCIENCE TEACHING UNDER THE BIRMINGHAM SCHOOL BOARD.

(See Vol. I., p. 458.)

Science
Teaching at
Birmingham.

DEAR SIR,

I HAVE much pleasure in sending you the following replies to the questions asked in Professor Roscoe's letter:—

I. There is no doubt that the School Board of Birmingham does consider it desirable that the teaching of elementary science should be more widely introduced into primary schools than at present. It is difficult, however, to see how we can accomplish much more than we do at present.

with children who have not passed Standard VI; while the special education of those who are beyond that standard is at the present moment under the consideration of the Board.

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Birmingham
School Board.

II. The teaching of science in our ordinary elementary schools to children in Standards V. and VI. involves three lessons per fortnight. The first of each set of three is a lesson given by an itinerant science demonstrator, or by one of his assistants, which lesson is amply illustrated by experiments. The second consists of the substance of the same lesson repeated, but without the experiments, by one of the ordinary teachers of the school; the third is a composition exercise, in which the lesson is reproduced by the pupils.

This teaching is given to all the children in Standards V. and VI. and the subjects hitherto taken have been elementary mechanics, including general physics, and also, in a few cases, elementary chemistry with the boys, and those parts of the subjects of chemistry and physiology which bear upon the subject of domestic economy for the girls. It is quite clear that no more time than is now given could be spared by the girls, and it seems equally clear that no other subjects could be taken which would be so practically useful. The boys cannot spare more time either, but it will, of course, be possible to vary the subject. Up to this point, i.e., to the time of passing the 6th Standard, all the other subjects required by the Government Code have been taken, and will continue to be taught. Coming, however, to the question of those who have passed Standard VI., I have to state that the Board is very seriously considering the possibility of extending the means for teaching science to such boys, and of making their school time at this stage more practically useful than it has been hitherto.

The number of boys remaining in our elementary schools after passing Standard VI. is certainly increasing, owing to the fact of the ordinary standards being passed at earlier ages than formerly, but it is nevertheless true, and must continue to be so for some years to come, that the number in any one school is far too small to engage the special attention of a separate teacher, or to be taught to any great extent separately from the boys in Standard VI. Hence, it has occurred to the Chairman, and to some other members of the Board, that it would be desirable to collect the boys who are at this stage into one or more central schools into which no children should be admitted who have not passed the previous standards. If this idea should be carried out, the time which is now spent in the elementary subjects of reading, writing, and arithmetic will be devoted to technical scientific instruction, calculated to prepare the boys for the Birmingham workshops, and for this purpose such subjects as chemistry, metallurgy, mechanics, machine construction and drawing, geometry, &c., would receive a considerable share of attention.

If such a seventh standard school should be established, the subjects which would be omitted from the time-table would be what are technically known under the Code as class subjects, and we should also be careful to select, as specific subjects, such branches as would assist our main object. Thus, while in the seventh standard a boy might learn the amount of mathematics required as a specific subject, and in the following year, if he should still remain in the school, he might work for Stage I. of the Science and Art Department.

The Chairman of the Board, who takes a great interest in this particular question, has recently made a proposal which the Education Committee has resolved to recommend the Board gratefully to accept. This proposal is to place at the service of the Board an extensive set of premises, nearly in the centre of the town, rent free for five years, and the Chairman not only offers to forego the five years' rent, but to make all the necessary structural alterations (which will be very considerable), and to supply heating apparatus, &c. at his own expense. These premises will provide an excellent chemical laboratory, a workshop in which the boys may be taught the use of tools, a lecture room for scientific lessons to be illustrated by experiments, a room to be lighted from the roof for teaching drawing, and four other class rooms for immediate use, besides teacher's

Appendix 34.
Birmingham
School Board.

room, cloak room, &c., and a large dining room for the use of the scholars who, in consequence of their being collected in the centre of the town from somewhat distant homes, will require to stay on the premises during the mid-day recess. The premises are also of such a character that further accommodation can be provided if it should hereafter be found necessary. This school will provide ample accommodation for 300 boys. There is very little doubt that the Board will be only too glad to accept this offer of the Chairman, and that the school will be opened about the end of May.

III. The present position of science teaching has been fully stated in my previous answers. I have only to add that a very large proportion of the children taught pass in the several subjects under the specific subjects schedule, and that several boys hold elementary school scholarships from the Science and Art Department, and receive additional instruction from the Science Demonstrator with the pupil teachers, and also at the laboratory.

IV. We have one small laboratory at our Birmingham Icknield Street Board School, which is fitted up in accordance with the Science Directory of 1882, and in which a few of the more advanced scholars are taught practical chemistry. It is almost certain that further laboratory accommodation will be provided.

V. I am not well able to compare the condition of the science teaching in our Board schools with that of the schools in other towns, or with the country at large. To do so satisfactorily would require both statistics and an actual knowledge of what other towns are doing. So far as I am able to judge personally, Liverpool appears to be doing similar work, and I am not aware that any other town is doing so much. I know that at Sheffield there is a central school in which there are a number of boys who have passed all the standards, who are learning several sciences, including both theoretical and practical chemistry, but I am not aware that any towns except Liverpool and Birmingham have attempted the teaching of science in the ordinary public elementary schools in the way in which Liverpool and Birmingham are doing so by their itinerant demonstrators and circulating apparatus.

If I have omitted any points upon which you require information, I shall be only too happy to supply them, and if the Board should desire to carry out the idea to which I have alluded in reference to the boys who are beyond the 6th Standard, I will send you an early intimation of it.

I am, dear Sir,

Yours truly,

GEORGE B. DAVIS,

Clerk of the Board.

Birmingham,
February 1st, 1884.

G. B. Redgrave, Esq.,
Secretary to the Royal Commission on
Technical Instruction,
South Kensington Museum, S.W.

APPENDIX 35.

BEDFORD GRAMMAR SCHOOL.

(See Vol. I., p. 481.)

Appendix 35.

Bedford Grammar School,
Laboratory and Workshop Instruction.

LABORATORY AND WORKSHOP INSTRUCTION.

Besides the classical forms there is a Civil and Military Department, in which Modern Languages, Mathematics, and Science mainly take the place of Latin and Greek.

There are chemical and physical laboratories. The chemical laboratory is well equipped, contains 13 working places and accommodates 26. Boys are here taught qualitative and quantitative analysis; the quantitative is taken up by those only who are working for scholarships and other high examinations. There is a good lecture room, in which lectures, illustrated by experiments, are given. In the physical laboratory the junior classes have lectures, illustrated by experiments, and the seniors are introduced to physical measurements, chiefly in heat and electricity. All who take electricity and magnetism are sent in for the South Kensington examination, and during the past two years, out of the 50 sent in, seven-ninths of those taking the advanced paper and eight-ninths of those taking the elementary passed. There are workshops for carpentering and engineering. In the carpenter's shop, special attention is paid to the use of tools and to plain work. In the engineering shops there are wood lathe, sliding and screw cutting gap lathe, planing machine, two vices, forge, and anvils. Instruction is here given in the use of the various tools connected with brass and iron work. At the end of every year prizes are competed for, and the competition includes the following:—Forge.—Forging round one inch bar square, and square, round, welding round and square, chain of four links, nut and bolt. Lathe.—Knowledge of parts of screw-cutting lathe and tools, centering, turning iron parallel, spindle with collar, pin and collar, right and left hand screws, all worked to gauge. Filing.—Squaring and finishing, carpentering, planing, squaring, dove-tailing, morticing. Geometrical and Machine Drawing is taught to those in the engineering workshop, and great stress is laid upon drawing to scale.

Having temporary workshops only, much inconvenience is felt; at the same time much good and lasting work is done in the small space allowed. Many boys after leaving school for the Colonies and railways and other workshops have written of the immense value the knowledge which they have gained in these workshops has been to them, one having made the whole of his furniture for his home in the Colonies.

The following may be mentioned as having been made in the workshops: model engines in brass and iron, screws of various kinds, physical apparatus, book cases, chests of drawers, sofas, tables, fishing punts, body of a pony carriage in birch, ratchet presses, tool chests, &c., &c.

Every boy in the school (except the highest divisions) is taught drawing.

APPENDIX 36.

ANDERSON'S COLLEGE, GLASGOW.

(See Vol. I., p. 490.)

Appendix 36.

Anderson's College, Glasgow.
The Chair of Chemistry.

MEMORANDUM by Professor DITTMAR.

The laboratory is the most important part of my establishment, not only in the obvious sense in which a similar remark would hold for any other school of chemistry, but also on this account, that it is it which

Appendix 86. substantially brings me my income, partly through students' fees, but
 ——— principally through fees for analytical and other chemical work done by
 Anderson's me for the public.
 College, Glasgow.

Without it all the rest could have no existence. The organization of this branch, in its educational aspect, is sufficiently explained by my syllabus, of which I beg to enclose a copy.

The attendance at my laboratory, when I came in 1874, was but small, and remained small until Autumn 1879, when it all at once, ran up to 23, to remain pretty steady at this figure for the winter sessions; during the summer months the attendance generally falls to about 15.

The laboratory at present is attended by 23 students, all working full time. (I admit no day students to the laboratory on other terms.)

It is needless to add that the majority do not come for the sake of a general education, but to be prepared for professional positions as chemists. In addition to the day laboratory, I am conducting the following courses of instruction :—

2. *The Day Course of Lectures,*

regarding which, see Syllabus.

Attendance this session 34, of whom 21 are medical students. Last year I had an attendance of 50, the balance consists of medical students, who, this year, instead of coming to me, have gone to the Infirmary School.

3. *The Freeland Course of Popular Evening Lectures on Chemistry.*

A course of 25 lectures given on Fridays, from 8 to 9 p.m. For this course I receive a fee of 100*l.* out of the Freeland Fund.

Attendance this session about 150.

The Committee keep the register.

4. *The Three Months Course of Practical Chemistry,*

conducted specially for medical students in summer, and (if a sufficient number of such students present themselves) also in spring. With these classes I have completed the list of my duties as occupant of this chair. But, in addition to these courses, I have organized, of my own accord, the following courses for the benefit of clerks in offices, working men, &c. who cannot afford to come to me during the day :—

I.—*An Elementary and an Advanced Tutorial,*

for members of the "Freeland" Lecture course (restricted to such students as bind themselves to come forward at the Government examinations in May), conducted by Mr. Joseph Sayers. (Mondays from 7.30 to 8.30, and from 8.30 to 9.30 respectively.)

II.—*Two Courses of Instruction in Practical Chemistry,*

meeting on Tuesdays from 7.30 to 9.30; the elementary, under Mr. John McArthur, in the lower laboratory; the advanced, under Mr. James B. McArthur, in the upper laboratory. The attendance at these classes this session is as follows :—

Elementary Tutorial	-	-	-	13
Advanced	"	"	"	10
Elementary Practical	-	-	-	17
Advanced	"	"	"	7

THE CHAIR OF CHEMISTRY.

Appendix 36.

Professor, W. DITTMAR, F.R.S., F.R.S.E.

Anderson's
College, Glasgow.
Chair of
Chemistry.

A course of 100 experimental lectures on Chemistry.* Daily (Saturdays excepted), from 10 to 11, commencing on Wednesday, 1st of November.

The lectures, up to the end of the year, are devoted to the elements of Chemical Philosophy, and to the Chemistry of the Non-metallic Elements. After New Year the course divides into two branches, viz., the Chemistry of the *Metals* (on the Mondays and Tuesdays), and *Organic Chemistry*, select chapters (on the Wednesdays, Thursdays, and Fridays). Six written examinations are held during the session, which all the members of the class are required to attend.

Fee, 2*l.* 2*s.*

The following prizes are awarded to students who take the highest positions at the class examinations:—

- | | |
|---|--|
| (1st) <i>The Laboratory Scholarship</i> , consisting of a free ticket of admission to the laboratory for a winter and summer session—obtainable only by such as bind themselves to attend the laboratory regularly. | } Money prizes of 2 <i>l.</i> 10 <i>s.</i> each. |
| (2nd) <i>The Arts Students' Prize</i> . | |
| (3rd) <i>The Medical Students' Prize</i> . | |

A course of tutorial lectures, in connection with the above lectures, will be given by the class tutor. Saturdays from 10 to 11.

The laboratory is open daily (Saturdays excepted) during the winter session from 10 to 5; during summer from 9.30 to 5. Advanced students may obtain permission to work privately on Saturdays also until 1 p.m.

Of the several duties which the *prestige* and traditions of this chair impose upon its occupant, the first and foremost is to offer to young men, of even limited means, the opportunity of receiving a training in Chemistry sufficient to prepare them fully for positions in chemical works, or as professional chemists.

Such training is possible only within the walls of a completely-furnished and well-organised Chemical Laboratory, which enables the student, under the eyes of an expert, to actually *practise* the various methods of experimental Chemistry, and more especially those of analysis, and its applications in Assaying.

Hence Mr. Dittmar has from the first always looked upon his laboratory as forming, so to say, the pivot of his establishment, and has laboured hard and spared no expense to bring it up to the requisite standard of efficiency.

The teaching is conducted on the tutorial system, each student working by himself, at a separate place, and on his own subject. Hence students of any grade of advancement may enter at any time, and the courses of instruction can be adapted to the special requirements of the individual. The usual programme, for those who attend the laboratory with the view of preparing for a professional position, is as follows:—

1st Stage.—A series of laboratory exercises, constituting a *preparatory* course of qualitative analysis. Text-book, Dittmar's *Analytical Chemistry*, W. & E. Chambers, Edinburgh. During this stage the student is expected to acquire, by lectures or private study, a sufficient knowledge of scientific Chemistry, inorganic and organic, to be qualified in the

2nd Stage to enter upon a systematic and more exhaustive study of the *qualitative methods* for the Analysis of *Salts* and for the ultimate analysis of substances generally. Text-book, Dittmar's *Manual of Analysis and Tables*, Douglas & Foulis, Edinburgh.

3rd Stage.—A course of exercises in *quantitative methods* of analysis and synthesis; combined with exercises in the preparation of pure chemical substances. Gas Analysis.

Text-book.—A manuscript book, compiled by the Professor, supplemented by Fresenius' and by Rosa's Handbooks, of which copies are kept in the laboratory for the students' use.

4th Stage.—Applications of qualitative and quantitative analysis to the investigation of substances of all kinds. Examination of articles of

Appendix 36. food, &c. Examination of vegetable and animal juices, urine, &c. Assaying of Ores, &c. Original researches.
 Anderson's College, Glasgow. As Mr. Dittmar has for many years made a specialty of laboratory teaching, and is in the habit of working in his laboratory beside his pupils throughout the day, the laboratory offers exceptional opportunities for obtaining a thorough training in all branches of practical Chemistry. Special advantages are offered to *advanced students*.

Fee for the month, 2*l.* 2*s.*

Fee for the winter session (middle of October to middle of April), 10*l.* 10*s.*

Fee for the summer session (May, June, and July), 6*l.* 6*s.*

Fee for the two sessions, if paid together in advance, 15*l.* 15*s.*

The laboratory is open for students throughout the year, except during August.

The fees include the use of all the ordinary reagents, and of the resources of the laboratory generally; but the student has to find his own small apparatus (test tubes, beakers, &c.), and also a few of the more expensive reagents—*e.g.*, chloride of platinum, nitrate of silver, molybdate of ammonia.

A special practical class for medical students, meeting twice a week, for two hours each time, is conducted during the *summer session*. In this course the students work together as a class, under the immediate direction of tutors, who are superintended by the Professor.

ATTENDANCE DURING 1881-82.

	Winter.	Summer.
Lectures - - - - -	51	—
Laboratory - - - - -	25	15
Practical Medical - - - - -	24	

Evening Department.

EVENING DEPARTMENT.

The FREELAND POPULAR LECTURES, on Friday evenings, at eight o'clock, commencing 29th September.

These lectures will be amply illustrated by experiments, and so arranged as to adapt themselves to the wants of a *popular audience*. They will comprise the histories of the non-metallic and of a selection of the metallic elements, and the rudiments of Chemical Philosophy.

When taken conjointly with one or other of the two *tutorials* referred to below, they will be found to fully cover the programme of the Government Department of Science and Art from the "elementary" and "advanced" stage respectively. Students wishing to prepare for the corresponding Government examinations are recommended (though not bound) to join the respective tutorials.

Special Courses.

SPECIAL COURSES FOR SCIENCE STUDENTS.

Notice.—Students wishing to join these courses as "science students" must bind themselves to attend with absolute regularity, to take part in the work of their classes, and to present themselves as candidates at the examinations to be held by the Government Department of Science and Art in May, 1883.

MONDAYS (commencing October 2nd).

1. Elementary Tutorial, 7.30 to 8.30.
2. Advanced Tutorial, 8.30 to 9.30.

Only open to science students who have enrolled themselves for the Appendix 36.
 "Freeland" lectures.
 Fee for either course, 10s. 6d.

Anderson's
 College, Glasgow.

TUESDAYS (commencing October 3rd).

1. A course of Elementary Practical Chemistry—meeting the requirements of the Government Department for the "elementary stage." Class meets in the lower laboratory from 7.30 to 9.30.

Only science students admitted.

Fee (including expenses), 1l. 10s.

2. A course of instruction in Qualitative Analysis—adapted to the requirements of the Government Department for the "advanced stage." Class meets in the upper laboratory from 7.30 to 9.30.

Fee (including expenses) to science students, 2l. 2s.; to others, 3l. 3s.

3. A systematic course of exercises in Quantitative Analysis—as employed for the determination of the value of ores, commercial products, etc. In the upper laboratory from 7.30 to 9.30.

In this class each student receives a set of apparatus for his own use and a press to preserve it, but has to pay for what he may break or damage.

Fee, 3l. 3s.

At the examinations held by the Science and Art Department, in May, 1882, 99 papers were wrought by students of Mr. Dittmar's classes—32 gaining first-class, and 42 second-class certificates.

YOUNG CHAIR OF TECHNICAL CHEMISTRY.

Young Chair of
 Technical
 Chemistry,
 Glasgow.

MEMORANDUM by Professor E. J. MILLS.

The Young Chair was founded in 1870 by Mr. James Young, LL.D., F.R.S., of Kelly, one of the earliest advocates of technical education, for the promotion of all branches of technical chemistry. It was the first of its kind in Great Britain. During the last twelve years its object has been diligently pursued, and many students trained in the laboratory now occupy important situations in works and elsewhere, several of these students having received the advantages of the institution through the aid of bursaries hereafter referred to.

All the more important industries in connection with Glasgow and the district have been made the subject of special courses of lectures.

During the last session sufficient success has been obtained in connection with special subjects to warrant the formation of a dyeing school and an iron and steel school; both of which are in active operation, and well attended.

The work in the day laboratory has led to the publication of an extended series of investigations, about 26 in number, connected with chemical industry in various departments.

Private laboratories, for the prosecution chiefly of patent and other private industrial research, have also been arranged and occupied.

The entries during the present session amount to 139, mostly for evening instruction.

At an early stage of the history of the Chair it was proposed by parties interested in the practical study of chemistry to provide bursaries for the instruction of young men of limited means and whose wish it was to follow some branch of manufacturing chemistry. The bursaries are of the amount of 50l. each per annum, tenable for three years, during which the bursars are required to give their whole time and attention to the lectures

Appendix 35. and laboratory duties of the Chair, paying the ordinary fees. The sum subscribed to the present date has been 2,795*l.*, and through this instrumentality 17 students have passed through the full curriculum of study, and four others to a partial extent. No other extraneous assistance has been provided for the Chair.

Anderson's
College, Glasgow.

The following is a schedule, necessarily very incomplete, of students who have taken day instruction at the laboratory, and have obtained the positions indicated.

—	Name.	Destination or Appointment.
1871-2	John Miller - -	Glasgow Smelting Company.
	Andrew Richardson - -	St. Rollox Chemical Works.
	Ralph Melvor - -	Lecturer on Agricultural Chemistry, Balarat.
	R. H. Steedman - -	Connah's Quay Chemical Works, Flintshire.
	Wm. McCowan - -	City Analyst, Greenock.
	George McCowan - -	Student in Germany.
1872-3	Robert Ritchie - -	Chrome Works, Rutherglen.
	A. C. Thomson - -	Dalmeny Oil Works.
1875-6	J. J. Hood - -	Queen's Scholar, South Kensington.
	George Thomson - -	Eglinton Chemical Works, Glasgow.
	J. W. Pratt - -	Annfield Chemical Works, Glasgow.
	D. Stewart - -	Messrs. Bailey & Co., Wolverhampton.
	J. McNab - -	Duncan's Sugar Refinery, London.
	Lewis Campbell - -	Private technical research.
	James Hogarth - -	Annfield Chemical Works, Glasgow.
1876-7	T. U. Watson - -	Scott's Sugar Refinery, Greenock.
	J. B. Robb - -	Calico Print Works, Busby.
	— Shiry - -	Japan.
	J. J. Smith - -	Younger's Brewery, Edinburgh.
	John Kerr - -	Glasgow University.
1877-8	J. Stevenson, M.A. - -	Broxburn Oil Works.
	J. M. Reid - -	Dawholm Gas Works.
	C. Siebert - -	Tar, &c. work, Glasgow.
	H. B. Conbrough - -	Calico print work.
	D. Wilson - -	Landed proprietor.
1878-9	Wm. Mackey - -	Iron Works, Maryport.
	C. W. Meauwell - -	Messrs. De La Rue, London.
	George Donald - -	Gray's Distillery, Glasgow.
1879-80	J. Pettigrew - -	Clippens Oil Company.
	— Gardiner - -	Civil Engineer, Glasgow.
	— Tullis - -	Leather Factory, Glasgow.
	W. McFarlane - -	Monckbridge Iron Works, Leeds.
	E. Chester - -	Chili Gold Mining Company, Venezuela.
	J. Takamine, of Japan - -	Student, St. Rollox Chemical Works.
1880-1	W. Mellon - -	Mannre Works, Howdendyke.
	A. G. Perkin - -	Leeds Dyeing School.
	R. Scott - -	Monckbridge Iron Works, Leeds.
	N. McInnes - -	Orr Ewing & Co., Alexandria.

EDMUND J. MILLA.

Glasgow, March 15th, 1883.

APPENDIX 37.

LIST of PERSONS employed in the CHEMICAL DEPARTMENT of ST. ROLLOX CHEMICAL WORKS from 1870, showing the Institutions in which they were trained.

(See Vol. I., p. 492.)

Names.	Where Chemical Education was obtained.	St. Rollox, Highest Position.	Present Employment.	Remarks.
D. McCalman	Andersonian University & Mechanics Institution	Chemist	Chemical Manufacturer	Evening Classes.
A. Campbell	Do. do. do.	Do. do. do.	Do. do. do.	Do. do.
W. Boyd	Do. do. do.	Manager	In St. Rollox	Do. do.
W. Donald	Do. do. do.	Assistant Chemist	Manager in Dynamite Works	Do. do.
C. Hope	City Analysts' Laboratory	Chemist	Chemical Manufacturer	Regular Student.
W. Rennoldson	Newcastle College of Science and Arts	Do. do.	Manager of Chemical Works	Do. do.
A. Richardson	Andersonian University	Assistant Chemist	Do. do.	Do. do.
D. Playfair	Glasgow University	Do. do.	Do. do.	Do. do.
W. Obeirne	Mechanics Institution*	Do. do.	North British Chemical Co.	Evening Classes.
J. Park	Glasgow University	Do. do.	Chemist in Print Works	Regular Student.
A. Carmichael	Dr. Milne, Andersonian & University Mechanics Institution.	Do. do.	In St. Rollox	Evening Classes.
P. Hamill	Andersonian University & Mechanics Institution	Do. do.	Do. do.	Do. do.
N. McKelvie	Andersonian University	Chemist	Do. do.	Regular Student.
W. Brown	Mechanics Institution	Assistant Chemist.	Do. do.	Evening Classes.
S. Elliot	Andersonian University & Mechanics Institution	Do. do.	Do. do.	Do. do.
A. Dodds	Mechanics Institution	Do. do.	Do. do.	Do. do.
F. McCrae	Do. do.	Do. do.	Do. do.	Do. do.
A. McQueen	Do. do.	Boy	Do. do.	Do. do.
B. Fullarton	Andersonian University	Assistant Chemist.	Chemical Manager, Manure Works	Regular Student.

* Mechanics Institution now goes under the name of "College of Science and Arts, Glasgow," having been changed a little over 2 years ago.

APPENDICES, &c.

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Vol. I.

Appendix 37.

EDUCATIONAL WORK OF CO-OPERATIVE SOCIETIES.

(See Vol. I., p. 513.)

ROCHDALE EQUITABLE PIONEERS' SOCIETY.

The co-operative societies of the North of England, originally established for the economical distribution of provisions among their members, have in some cases added educational work to their functions, and not only possess libraries, lecture theatres, and reading-rooms, but also conduct classes in science, art, and literature for the benefit of their constituents, and place within their reach numerous facilities for scientific and technical training. As an example of the work of this character, undertaken by one of the most celebrated societies of Lancashire, we give a short sketch of the work of this nature carried on in connection with the Rochdale Equitable Pioneers' Society, Limited, established in 1844, which has a fully organised educational department. This section is under the management of a committee, who, in presenting their eleventh annual report in 1883, are able to speak of a great increase in the number of pupils, the art classes having increased 34·5 per cent., and the science classes 18 per cent., while in the technological classes, only established in 1882, there were 92 pupils. The total number of pupils in the science classes were 222, in the art classes 78, and in the French classes 119. The classes are open to both male and female students. The entrance fee for the classes is 5s. for members of the society, and 6s. for non-members, payable in advance. The students of one class wishing to join another may do so on payment of one-half the fees in addition for each class. Money prizes are given by the society to the two most successful pupils in each stage of each subject; 10s. to the best and 5s. to the second best. The classes are maintained at a very small expense to the society. The teachers have half the fees and all the Government grant. As there is no grant for the language classes the teacher receives 20l. from the society for the session of six months. The annexed time-table will show the subjects taught in the various classes, as also the hours of study. Another feature of the educational work is the library with its numerous branches, 18 in all, distributed about the town and suburbs. The circulating library consists of 13,591 volumes; the reference library and branches contain 1,924 volumes; total 15,515 volumes, with a circulation of about 40,000 volumes annually. The public lectures formerly provided have been discontinued, as they were not much appreciated after the science classes were instituted.

A somewhat peculiar feature of the educational department is a collection of scientific instruments, which can be hired out at very small charges. Thus, telescopes, 4d. per diem or 1s. per week; field glasses, 2d. per day or 9d. per week; microscopes, with four dozen slides of objects, 2d. per day, and 1d. per day extra for each additional four dozen slides; stereoscopes, galvanic batteries, zoetropes, &c. are lent at equally low charges.

SCIENCE, ART, TECHNOLOGY, AND FRENCH CLASSES.

Time of Meeting.	Subjects taught.	Place of Meeting.
Monday, 6.45 p.m.	Practical Plane and Solid Geometry; Machine Drawing, Building Construction, and Applied Mechanics. Teacher - Mr. J. E. E. GREAVES.	Over Oldham Road Store.
Monday, 7.30 p.m.	Cotton Manufacture. Teacher - Mr. ISHERWOOD.	Assembly Room, Toad Lane.
Tuesday, 7 p.m.	French, Elementary and Advanced. Teacher - Mr. A. BRATF.	Assembly Room, Toad Lane.

Time of Meeting.	Subjects taught.	Place of Meeting.
Tuesday, 7 p.m.	Practical and Inorganic Chemistry. Teachers - Messrs. C. TOPPER and W. H. PENNINGTON.	Under the New Tailor's Shop, Toad Lane.
Wednesday, 7 p.m.	Physiology, Magnetism, and Electricity. Teacher - Mr. JOHN WILD.	No. 2 Board Room, Toad Lane.
Thursday, 8.45 p.m.	Practical, Plane, and Solid Geometry, Machine Drawing, Building Construction, Steam. Teacher - Mr. J. E. E. GRAVES.	Over Oldham Road Store.
Thursday, 7 p.m.	Mathematics. Teacher - Mr. E. R. GREY.	Corn Mill Meeting Room, Weir Street.
Thursday and Friday, 7.50 p.m.	Freehand, Model, Geometrical, and Perspective Drawing. Teacher - Mr. THOMAS WAUGH.	Assembly Room, Toad Lane.
Friday, 7 p.m.	Botany and Biology. Teacher - Mr. JOHN WILD.	No. 2 Board Room, Toad Lane.
Saturday, 2.15 p.m.	Mechanical Engineering and Tools; Principles of Agriculture; Sound, Light, and Heat. Teacher - Mr. J. E. E. GRAVES.	Over Oldham Road Store.
Saturday, 7 p.m.	Geology and Physiography. Teacher - Mr. B. LAW.	Assembly Room, Toad Lane.

Appendix 38.

Classes in con-
nection with
Rochdale Co-
operative Society.

APPENDIX 39.

SUGGESTIONS ON ART EDUCATION by M. WILLMS.
(See Vol. I., p. 521.)

Appendix 39.

Suggestions on
Art Education
by M. Willms.

DEAR SIR,

WHEN I saw you, in London, a short time ago, you asked me to put the few suggestions I had to make touching fine art education into writing. I should have done so much earlier, but pressure of business has prevented me.

I will now take the liberty—de vous parler à cœur ouvert—and will tell you what I think to be the truth in reference to the important subject of art education in England, and what, in my opinion, are the impediments in the way of progress.

As, I believe, you know, in France, for a long time past, industrial artists have accorded to them a social position and respect which their talents and acquirements deserve, and no expense is spared in providing museums, schools, libraries, &c. to assist them in their studies.

But in England this is not so.

Your Kensington Museum is in many things superior to anything of the kind in Paris, and your art schools are working moderately well, and have already produced some very good men. But I think your object should not be to form good and clever artists, and then, as soon as they are formed, to abandon them; particularly as good practical industrial artists being so few in England, are, in proportion much more valuable than in France.

For this reason, something should be done to enable the few good men you have to acquire a position, for, as it is, there is neither encouragement nor security for them.

Appendix 39.
 ———
 Suggestions on
 Art Education
 by M. Williams.

I, therefore, in the interest of English industrial art, say, that as you have now a certain limited number of English artists, clever and practical you should give that body the importance it deserves by its usefulness—that is to say, that these men, many of whom have acquired a thorough practical knowledge of the requirements of the country—for it is on them that you must rely to make a design for a piece of work, which may look well on paper but it is a very different thing to make a design which, in addition to looking well on paper, shall be thoroughly practical and capable of execution, and this is a knowledge which very few of your art teachers possess—these men, therefore, I say should be appointed to the first positions connected with decorative and industrial art, and as teachers both at Kensington and in the art schools of the country; and these also are the men most fitted to be the jurors to award prizes in the various art competitions.

In reference to competitions, as it is at present, if a prize is offered for a design or a work in silver, or indeed any material, as a centre-piece for the table, or a candelabrum, chandelier, &c., as in the Goldsmiths' annual competition, an Academician is most generally selected to judge the work. Now, a Royal Academician may be an excellent judge for a picture, a statue, or a work of architecture, and yet know little or nothing of the merits of a design for a piece of metal work, and, perhaps carried away by a pleasing drawing, will award the first prize to a design, which it is absolutely impossible to carry out in metal. Why even, Mr. ——— who has acquired some reputation as an industrial artist, having had some experience by the side of ———, and also at ———, I say that even he is not in the spirit of the art movement of the present day; and I say again, with all respect, that these men are not fit guides in the art education of the day. Of course, architects, sculptors, and even painters may judge a competition for a public monument, or a piece of plate of great sculptural disposition, but they are not able to judge the merits of a design for a work of manufacture, which should have the quality of originality combined with practicability; and this is what only the class of industrial artists I have mentioned do understand.

As a proof of what I advance we have only to notice the awards of the prizes in the Goldsmiths' competition made during the last three or four years by a Royal Academician. I may say that these awards have been in my opinion, most extraordinary, really good designs having been returned to their owners, and prizes awarded to works entirely devoid of merit, the natural result being that artist-student competitors are puzzled to know what is considered to be the standard of merit, and the more experienced have discontinued competing from sheer disgust.

I think the South Kensington people also are somewhat to blame in this matter, exhibiting the prize works and sending them to provincial towns without first ascertaining, more carefully, the grounds on which the selections have been made, and the character of the rejected works.

Again, if you could see the programme for the present year, made principally, I presume, by ———, you would, I think, agree with me that it is altogether a mistake.

The subject for the casting prize is a plaster head of Ariadne, which, now it is cast, weighs nearly 70 ounces of silver, and required the melting of 100 oz. to ensure a good cast, and when done the most successful casting will not be worth one shilling over and above the value of the metal. Again, the subject for repoussé chasing—two children singing, by Donatello. The work is quite unsuitable for execution by repoussé, and one which would never be executed by that mode of work. There is an utterly useless difficulty of manipulation of the metal, which would be in the way of the most clever chaser, and, like the casting prize, is useless for any purpose when finished.

This uselessness of itself renders it impossible for a large number of people to compete, as they cannot afford to purchase so large a quantity of silver as is necessary to execute the work, particularly the casting, and then, when all is done, to have to melt it again.

While upon this subject, I may just glance at another fact which has frequently come under my notice, viz., that frequently important compe-

titions have been decided by, perhaps, two, and sometimes only one, person; the other members of the committee, I suppose, not having thought it worth while to attend. This has happened several times when I have been a juror myself. Appendix 39.

There is another great impediment in the way of art progress in England, and that is, the extreme apathy of the great majority of those who will ultimately profit most by it, viz., the manufacturers. Very few of these will pay a reasonable amount for a design or model or for good chasing. A manufacturer seems to think that every pound he pays for designing or modelling is so much money lost, and, as a rule, he prefers to go to Paris, or elsewhere, to buy a few fresh articles in plate, bronze, or any other line of business in which he may be engaged, to bring them home, cut them up, and ring the changes on them, or else to copy them in their entirety. And here stands out boldly a great difference between an English and French manufacturer, the one spending large sums in his endeavour to procure good and original designs, and the other grudging every penny so spent.

I know, for a fact, that several very talented artists have abandoned the fine arts, and turned their attention to other sources of income, entirely on account of the difficulty of obtaining a respectable living. So long as this is the case, an English manufacturer cannot expect to compete with the Continental manufacturer in any branch in which fine art is an essential. This might to some extent be remedied, if in the art schools good practical art masters were to teach the workmen, who will be, perhaps, masters themselves in time, and who largely attend these schools, and whose number would increase if they felt that the teacher knew something of the practical as well as the theoretical, for, as I have said before, a designer is nothing if not practical.

The above remarks represent the spirit of an article I prepared some little time ago, intending to publish it in the form of a pamphlet, but I think the subject will derive more benefit in your hands; and so I think it will be best to leave it. In conclusion permit me to urge the desirability of placing in the art schools of manufacturing towns, as teachers, those clever and practical artists of whom I have spoken before, without troubling them about the Kensington art masters' certificate, which is of very little real value, and, I think, you will then have more sound useful teaching and valuable results than you have ever before had, or than can be hoped for under the present system.

Sir,

I have the honour to remain,
Faithfully yours,

B. Samuelson, Esq., M.P., F.R.S.,
Chairman of the Royal Commission on
Technical Instruction.

A. WELLS.

APPENDIX 40.

REPORT OF THE FRENCH COMMISSION ON ART MUSEUMS FOR SCHOOLS
TO THE MINISTER OF PUBLIC INSTRUCTION AND THE FINE ARTS.

(See Vol. I., p. 523.)

Appendix 40.

Report on Art
Museums for
Schools.

Sir,

By a decree dated July 20th, 1882, you appointed a Permanent Commission, empowered to consider the questions relating to the establishment of small museums of works of art in schools, colleges and lycées, which, as you pointed out in 1880, would not fail to contribute to the intellectual culture of the pupils, familiarising them from the outset with the appreciation of choice examples, and with the knowledge of refined forms.

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This Special Commission had not to examine afresh the principles which must govern the formation of these scholastic museums, and the selection of the specimens required to constitute these simple collections. The operations were determined beforehand, for it could but avail itself of the deliberations already come to by the General Commission charged, by virtue of the decree of May 27th, 1890, to examine in what way art might best be introduced into the school, without interfering with the daily requirements of instruction, and without following to the extreme limits the chimerical results which would tend to convert the students into actual artists. This is not the aim; but sound thinkers have concluded that the intelligence of the child may be aroused and stimulated by the beauty of the examples placed before his eyes; that the ugliness and the vulgarity of the objects, by which he is frequently surrounded constitute bad guides for his taste; and that the moral advantages would be certain if it were possible to add to the instruction given by the master to attractive and fruitful lessons conveyed by the contemplation of works of art. Out of this consideration arise three classes of ideas, the realisation of which ought to be coincident, in that they have been conceived in view of the same ultimate object. In the first place the school building, instead of being as dreary as a prison, may be decorated in a simple fashion; secondly, it is easy to give to the child, in the shape of prizes, art objects which may appeal to his intelligence; and lastly, it is not impossible to find places in the school, the college, or the lycée for fitting up small museums, which, although economy has to be studied, would serve to initiate the pupils and to lead them onwards towards the beauties of art.

The questions respecting the decoration of the school building and the necessary ornaments having been made the subject of a special report, I have only, Sir, to bring under your notice the labours of the Commission charged with the organisation of School Museums. Faithful to the programme with which it was entrusted, the Commission has drawn up a preliminary list of original works, reproductions of which in the form of casts, engravings, or photographs appear to possess undeniable advantages for the instruction of the pupils. This list comprises the most beautiful and characteristic conceptions of the sculptor, the medallist, the painter, the engraver, and the etcher. In conformity with the wish expressed by the former Commission, we have included in the list a selection of portraits of eminent personages, and the representation, by means of photographs or engravings, of a few monuments of architecture. The catalogue also comprises a small number of works of decorative art, which are inserted by way of specimens.

It is not necessary that I should add that this list is not a final one. Although it contains the chief masterpieces of all periods and all styles it would be easy to add to it further. This is a task which the Commission will not fail to attend to in its future meetings. The Commission is a permanent one, and nothing shall be neglected to render its work complete. But for the present it has been desirous to bear in mind the smallness of the means at the disposal of the school authorities, and it has been considered that the works of art included in the schedules which have been prepared would amply suffice for a preliminary experiment. Indeed, among the examples selected, there is not a single one which does not commend itself, either by the beauty of its form, the thought it expresses, or the charm of skilful or intelligent execution. Moreover, as these works have a value historically, and from this point of view the choice has been made in such a way that if a college were able to acquire the whole of the examples named, the teacher would find in this little museum the materials for, and a brief epitome of, the history of art, from the period of Ancient Egypt down to modern times.

Valuable opportunities were offered to the Commission to complete as far as possible the collection, the specimens comprising which, have been deemed worthy to be included in school museums. Sculpture and drawing only being capable of being represented by means of casts, we found at the *École des Beaux-Arts* and in the atelier of the Louvre very satisfactory reproductions of nearly all the works that we should be ambitious to include in our collections. As respects painting, it could only take

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History intervenes, to a very incomplete extent, doubtless, but not without significance. Together with the casts from the antique are several examples borrowed from the middle ages and from modern art. As respects painting, represented by engravings and photographs, the choice has been made in such a way that the student may become acquainted with the special character of all the great schools. In another direction it has been deemed necessary to add to the collection a view of certain famous monuments which are, as it were, a *résumé* of the history of architecture in its various phases. Lastly, the normal school museum is completed by a selection of portraits of eminent personages. These likewise, being for the most part produced by famous painters, are at the same time works of fine art, as well as possessed of iconographic value. It is well that the masters-in-training should be familiarised with the physiognomy of the celebrated men about whom their teachers are daily discoursing. We have considered in choosing these portraits that the principal portion should be from French examples.

It was at the request of the Director of Secondary Instruction (at the meeting of 14th March 1881) that the General Commission recognised the necessity for the organisation of museums of art works in colleges and lycées. Here the area is wider. Schedule D. contains the list of reproductions which it has appeared to us advisable to place in these establishments. Without losing sight of the question of art taste, we have been desirous, and moreover it was necessitated by the programme adopted two years ago, to allow history to take its due place. We have admitted works of the archaic style, and even works of those periods which are regarded by purists as belonging to the decadence of art. As respects sculpture the catalogue opens with the statue of Rameses II and closes with the works of modern sculptors. In painting the list includes the names of the principal masters from Giotto to Delacroix. In fact, Sir, there are here names and works which ought to be known and glorified in secondary schools. As do the poets, the politicians and the captains, so also do the architects, the painters and the sculptors give excellent lessons, and youths will lose nothing by a knowledge of the history of the ideal.

The President of the Commission for School Museums,
PAUL MARYZ.

SCHOOL MUSEUMS.

SCHEDULE A.

Primary Schools for Boys.

SCULPTURE.

Statues (reduced in size)	{ Sophocles } { Aristides }	École des Beaux-Arts.
Busts	{ Hermes of Praxiteles } { Venus of Arles } { Plato }	École des Beaux-Arts.
Bas-reliefs	{ The Thinker, by Michael Angelo } { The Horsemen from the Parthenon } { The Lion, by Barye (Bastille Column) }	
Capitals	{ A Corinthian capital } { A Composite }	
Medallions	{ The medal of Syracuse } { Henry IV., by Dupré }	
Photographs	{ Juno (Athens) } { Augustus (Louvre) }	Ravaisson (Hachette).

PAINTING AND ENGRAVING.

Leonardo da Vinci. Young man with laurel wreath. Photograph by Ravaisson.
Lorenzo di Credi. Head of a young man. Louvre.

Titian { Old man with black beard } Photographs by Ravaisson.
 " { " " white " }
 Holbein { Lord Vaux } Photographs by Ravaisson.
 " { Thomas Elliot }
 Van Dyck. Two portraits, etchings } A. Durand.
 Paul Potter. The Cow-herd, etching }
 Claude Lorrain { The Neat-herd } Etchings by A. Durand.
 " { The Rising Sun }
 Four portraits of French Celebrities.

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SCHEDULE B.

Primary Schools for Girls.

SCULPTURE.

Busts { Joan of Arc, by Rude (Louvre). } Ecole des Beaux-Arts.
 " { Bust of Child. Donatello } " "
 " { Head of an Angel. Nanna di Banco } " "
 Bas-relief. St. John. Mino da Fiesole.
 Photographs { Peace (Munich) } Photographs by Ravaisson.
 " { Young Girl (Naples) }

PAINTING AND ENGRAVING.

Leonardo da Vinci. Portrait of a Woman. Chalcographie.
 Raphael { The Holy Family, Francois I. } " "
 " { The Virgin with a Veil } " "
 Prud'hon { Four Muses } Photographs by Ravaisson.
 " { Head of a Young Girl }
 Four portraits of French Celebrities.
 A lace book of the XVI. Century.

SCHEDULE C.

Normal Schools.

The Museum of the Normal School comprises or may comprise:—

- (1.) The works of art which form part of the museum of the primary school.
- (2.) The following works which ought as far as possible to be arranged in historical order.

SCULPTURE.

Demosthenes } Statues reduced in size. Ecole des Beaux-Arts.
 Achilles* }
 Germanicus* }
 Augustus } Busts
 Lucius Verus }
 Alexander }
 Hadrian } Medallions
 Trajan }
 Marcus Aurelius }
 Head of an Apostle (XIII. Century). Louvre cast.
 Two mediæval seals { A Chevalier } Ecole des Beaux-Arts.
 " { A Prince }
 Virgin in Ivory (Timbal collection)
 Filippo Strozzi. Bust by Benedetto da Maiano. Louvre cast.

* In Female Normal Schools one of these Statues is to be replaced by the Amazon.

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Bust of Michael Angelo.	
Leo Battista Alberti	} Medallions. École des Beaux-Arts.
Sigismond Malatesta (Pisanello)	
Ludovic le More (Caradosso)	
Lorenzo de Medicis (Pollaiuolo)	
Milo of Croton. Bust (Puget).	Louvre cast.
Mary de Medicis. Medallion (Dupré)	} École des Beaux-Arts.
Anne of Austria. " (Warin)	
Rotrou. Bust by Caffieri.	Comédie-Française.
Franklin. " "	Houdon. Louvre cast.
Marceau. " "	Dumont. Terra cotta. Louvre cast (to be made).
Condorcet	} Medallions by David d'Angers.
Goethe	
Madame Roland	
Kléber	

PAINTING AND ENGRAVING.

Italian School.

Leonardo da Vinci	{ The Virgin among the Rocks. The Last Supper.
Michael Angelo	{ The Creation of Man. Woman.
Raphael	{ The Belle Jardinière. Poetry. The Vision of Ezekiel. The Departure from the Ark.
Titian.	The Martyrdom of St. Peter (Verona).

German School.

Durer.	Melancholia. Heliotype by Armand Durand.
Holbein	{ Virgin at Darmstadt. Two portraits (photographs by Ravaisson).

Dutch School.

Rembrandt	{ Raising of Lazarus Death of the Virgin Abraham's Sacrifice Christ healing the Sick } Etchings by Armand Durand.
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Flemish School.

Rubens	{ The Descent from the Cross. The Wild Boar Hunt.
Lebrun.	André Chenier, after Suvée.
Puget, engraved by Jeausat, after F. Puget.	Hoche. General Buonaparte, after Gros.
Mignard.	Napoleon I.
Montesquien, engraved by Ficquet.	Chateaubriand.
Voltaire.	Lamartine, after Gérard.
Buffon.	David, after Langlois.
J. J. Rousseau, after La Tour.	Ingres.
Bameau.	Gros.
Turgot.	Géricault.
Gluck, engraved by Miger, after Duplessis.	Cuvier.
Mozart.	François Arago.
Van Dyck	{ Four Portraits. Etchings by Armand Durand. Bentivoglio, engraved by Morin.

Spanish School.

Velasquez.	The Surrender of Breda.
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French School.

Poussin { The Will of Endamidas.
Triumph of Truth.
Lesueur. Death of St. Bruno.
Watteau. Embarkation for Cythera.
David. Death of Socrates.
Gros. Plague of Jaffa.
Prud'hon. Justice pursuing Crime. (Drawing from Louvre).
Géricault. Shipwreck of the Medusa.
Ingres. Apotheosis of Homer.
Delacroix. Dante's Boat.

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ARCHITECTURE.

An Egyptian Temple (Philæ).
The Parthenon.
The Coliseum.
The Arch of Titus.
The Cathedral of Notre Dame, Paris.
" " Chartres.
The Court-yard of the Louvre.

COLLECTION OF PORTRAITS.

The museum of the Normal School comprises a series of portraits of eminent personages, selected from the following list:—

Francis I.	Villars.
Catherine de Médecis.	Bossuet, engraved by Drevet, after Rigaud.
Coligny.	Cornelle, engraved by Ficquet.
L'Hospital.	La Fontaine.
Henry IV.	Boileau.
Sully.	Molière.
Shakespeare.	Racine.
Galileo.	La Bruyère.
Descartes.	Madame de Sévigné.
Richelieu.	Colbert.
Mazarin.	Louvois.
Le Grand Condé.	Louis XIV.
Turenne.	Poussin, engraved by Pesne.
Vauban.	

SCHEDULE D.

LYCÉES and COLLEGES.

Egyptian Art.

Portrait of Rameses II. Published by École des Beaux-Arts.

Greek and Roman Art.

Statue of Demosthenes (Reduced).	Published by École des Beaux-Arts.
" Sophocles.	" " "
" Aristides.	" " "
" Achilles.	" " "
" Germanicus.	" " "
Amazon, by Phidias.	" " "
Wingless Victory (Bas-relief).	" " "

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Bust of Hermes, by Praxiteles.	Published by	École des Beaux-Arts.
" Venus of Arles.	" "	" "
" Plato.	" "	" "
The Minerva of Turin.	" "	" "
Cup from the Hildesheim Treasure.	" "	" "
Bust of Wreathed Augustus.	" "	" "
" Antonius.	" "	" "
" Lucius Verus.	" "	" "
A Corinthian Capital.	" "	" "
Two Composite Capitals.	" "	" "
Juno (Athens, photograph).	"	Hachette.
Mercury (photograph).	"	"
Peace, type of face (photograph).	"	"
Young girl, Greek marble (photograph).	"	"
Augustus (photograph).	"	"
Tetradrachma of Syracuse, with the Victory on a quadriga and reverse.	Published by	École des Beaux-Arts.
Alexander the Great (Trésor de Numismatique Greek Kings, plate XXII.)	}	" " "
Demetrius Poliorcetes (Trésor de Numismatique Greek Kings, plate XXIII.)		
Achilles (Trésor de Numismatique, Greek Kings, plate XXII.)	}	" " "
Augustus (Fröhner, plate II, the front only)		
Trajan (Fröhner, plate XXI, the front only)	}	" " "
Hadrian (Fröhner, plate XXI, the front only)		
Marcus Aurelius	"	"
Constantine	"	"
Ivory of the Symnaques	"	"

MIDDLE AGES.

Seal of a Knight	"	"	"
" Prince	"	"	"
Virgin of the Timal Collection (Ivory)	"	"	"
Statue from Rheims	"	"	Trocadéro Museum.

RENAISSANCE.

I.—Italy.

A. SCULPTURE.

Artist.	Description of Work.	Published by
—	Medallion of Leo-Battista Alberti	École des Beaux Arts.
Ghiberti	Shrine of S. Zenobio	" " "
Donatello	Bust of a Child	" " "
"	St. George. (Bas-relief)	" " "
Mino da Fiesole	St. John	" " "
Lucca della Robbia	The Singers	" " "
Nanni di Banco	Head of an Angel	" " "
"	Head in Wax (Museum of Lille)	" " "
"	Bust of female unknown (Florentine School, X.V. Century)	Louvre.
Benedetto de Maiano	Bust of Sirozzi	École des Beaux Arts.
Michael Angelo	" the Thinker	" " "
"	Michael Angelo	" " "
"	The Flagellation (Bas-relief)	Louvre.
Pisanello	Alfonso of Aragon	" " "
"	Bisizmund Malatesta	" " "
Caradoso	Ludovic le More	" " "
"	Galassa Visconti	Medals
Pollainolo	Lorenzo de Medicis	École des Beaux Arts.
Bevenuto Cellini	Francis I.	" " "
"	Clement VII.	" " "

I.—Italy—continued.
B. PAINTING AND ENGRAVING.

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Artist	Description of Work	Published by
Giotto	Entombment (Padua)	Photograph, Nava.
	Portrait of Dante (Florence)	" Alinari.
Mantegna	Entombment	Amand Durand.
"	The Virgin and Child	"
"	The Resurrection of Our Lord	"
Fra Angelico	The Coronation of the Virgin (Engraving by François).	Louvre.
Botticelli	Calumny of Apelles (Florence)	Photograph, Brogi.
Ghirlandajo	The Visitation	Louvre.
Bellini	Venetian Noble (Drawing)	Hachette.
Luca della Robbia	Head of a Young Man (Drawing, engraved by Butavand).	Louvre.
Leonardo da Vinci	The Virgin, among the Rocks	"
"	Portrait of a Woman	"
"	Head with a Wreath (photograph by Ravaisson).	Hachette.
"	of an Old Man	"
" (after the drawing of Gaillard).	The Last Supper	École des Beaux Arts.
Michael Angelo	Creation of Man	Louvre.
Raphael	Alexander causing the Works of Homer to be locked up (Engraving by Marc Antonio)	Amand Durand.
"	God ordering Noah to quit the Ark (Engraving by Marc Antonio).	"
"	The Sleep of Jesus	Engravings by } Louvre.
"	The Virgin with Veil	Desoyere
"	The Belle Jardinière	"
"	The Holy Family of Francis I. (Engraving by Edelinck).	"
"	Study for the same Picture (Drawing)	"
"	The Dead Christ (Drawing, engraved by Alph. Leroy).	"
"	Psyche (Drawing, engraved by Butavand)	"
"	Allegorical Figures (eleven figures)	Hermet.
"	The Vision of Ezekiel	Hachette.
"	The Virgin with Book (Photograph by Ravaisson from Drawing in the Louvre).	Amand Durand.
"	Lucretia (Engraving by Marc Antonio)	"
"	Poetry	"
"	Maddalena Doni (photographed by Ravaisson from Drawing in the Louvre).	Hachette.
"	St. Paul at Athens	Amand Durand.
"	The Massacre of the Innocents	"
"	St. Catherine (photographed by Ravaisson from Drawing in the Louvre).	Hachette.
Andrea del Sarto	The Madonna with Bag	Braun.
Correggio	Saint Jerome	Hermet.
Titian	The Assumption	Louvre.
"	Old Man with White Beard (Photograph by Ravaisson from Drawing in Louvre).	Hachette.
"	Black	"
"	The Entombment	Louvre.
"	The Martyrdom of St. Peter of Verona	Hermet.
"	Portrait of Titian	Amand Durand.
F. Veronese	The Wedding at Cana of Galilee	Goupil.
"	Portrait of Galileo (Florence)	"

II.—Germany and the Low Countries.

Martin Schoen	Three Engravings (Nos. 27, 53, and 108)	Amand Durand.
Memling	St. Ursula arriving at Rome (Shrine of St. Ursula).	"
Lucas von Leyden	Portrait of Maximilian	"
Durer	Four Engravings, Nos. 41, 53, 70, and 85	"
Holbein	Portrait of Erasmus (Engraving by Bruegel)	Louvre.
"	The Darnestadt Virgin	"
"	George of Cornwall (Ravaisson's Photograph).	Hachette.
"	Lord Vaux (Ravaisson's photograph)	"
"	Thomas Elliot	"
"	Individual unknown	"

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III.—France, Renaissance.

SCULPTURE.

Artist.	Description of Work.	Published by
—	Portrait of Commynes	Louvre.
—	Statue of Chabot	"
Jean Goujon	Bas-relief from the Fontaine des Innocents	École des Beaux Arts.
Dupré	Dish of Briot	"
"	Medal of Henry IV.	"

PAINTING AND ENGRAVING.

Jean Morin	Portrait of Francis I.	Rapilly.
"	Bayard	"
Thomas de Leu	Catherine de Médicis	Louvre.
"	Henry IV.	Bernard.
"	Coligny	"
"	Chancellor de l'Hospital	Louvre.

XVII., XVIII., AND XIX. CENTURIES.

I.—France.

A. SCULPTURE.

Dupré	Mary de Medicis (Medallion)	École des Beaux Arts.
Puget	Milo of Croton (bust)	"
Warin	Anne of Austria and Louis XIV. (Medallion).	"
Caillier	Bust of Rotrou	Théâtre de Comédie-Française (to be cast).
Pigalle	Mercury fastening on the Wings to his heels.	Louvre.
Houdon	Bust of Franklin	"
"	Diderot	"
"	Mirabeau	"
"	Pilaster decorated with Laurel	École des Beaux Arts.
Dumont	Bust of Marceau (terra cotta)	Louvre.
Rude	Joan of Arc (bust)	"
David d'Angers	Medallion of Elber	"
"	Bouquet de l'Isle	"
"	Goethe	"
"	Condorcet	"
"	Madame Roland	"
Barye	The Lion (bas-relief).	"
Guillemme	The Gracchi (Luxembourg).	"
Chapu	Youth (Engraving by J. Jacquet)	Louvre.
Mercié	Gloria Victis	"
Paul Dubois	Charity (Engraving by Bellay)	"
"	Military Heroism (Engraving by J. Jacquet)	"

B.—PAINTING AND ENGRAVING.

Poussin	The Triumph of Truth (Engraving by G. Audran).	Louvre.
"	The Oath of Eudamidas (Engraving by Fessel).	"
"	The Plague (Engraving by Etienne Picart)	"
Claude Lorrain	Diogenes	Amand Durand.
"	The Nest Herd (Etching)	"
"	The Rising Sun	"
"	The Tiber (Photograph by Ravaisson from Drawing in the Louvre).	Hachette.
Leueur	The Death of St. Bruno	Brun.
"	Portrait of Sully	Louvre.
Lebrun	The Defeat of Porus (Engraving by G. Audran).	"
Nanteuil	Portrait of Richelieu.	"
"	Mazarin	Bernard.

Artist.	Description of Work.	Published by
Nanteuil	Portrait of the Grand Condé.	
"	" Turenne.	
Rigaud	" Vauban.	
"	" Villars (engraved by Drevet).	Bernard.
Piequet	" Bossuet (" P. Drevet).	"
Edelinck	" Corneille	Braun.
"	" La Fontaine	"
Mignard	" Boileau	"
Edelinck	" Molière	"
"	" Racine	"
Nanteuil	" La Bruyère	"
"	" Madame de Sévigné	"
"	" Colbert	"
"	" Louvois	"
"	" Louis XIV.	"
Poussin	" Poussin (engraved by Pesne)	Amand Durand.
Edelinck	" Lebrun	Louvre.
François Pujet	" Pierre Pujet (engraved by Joubert).	"
Mignard	" Mignard (engraved by Schmidt)	"
Watteau	The Embarkation for Cythera	"
Picquet	Portrait of Montesquieu	"
"	" Voltaire	"
"	" Buffon	"
Latour	" J. J. Rousseau	Braun.
Saint-Aubin	" Rameau	"
Suvée	" André Chénier	"
"	" Turgot	"
Gérard	" Hoche	"
Duplessis	" Gluck (engraved by Miger)	"
"	" Mozart	"
David	The Horatius	Bernard.
"	The Death of Socrates	Braun.
Gros	The Plague of Jaffa (engraved by Langier)	Hermes.
Prud'hon	Justice pursuing Crime (drawing)	"
"	Head of a Young Girl (drawing)	Hachette.
"	Four Nudes (drawing)	"
Géricault	The Shipwreck of the Medusa	Braun.
Ingres	Marcellus	"
"	The Apotheosis of Homer (engraved by Marinic).	Louvre.
Delacroix	Dante's Boat	Braun.
"	The Entry of the Crusaders into Constantinople.	"
P. Delaroche	The Death of the Duc de Guise	"
Gros	Portrait of General Buonaparte	Louvre (to be executed),
"	" Napoleon I.	"
Girardot	" Chateaubriand	Braun.
Gérard	" Larmartine	"
Langlois	" David	"
François	" Ingres.	"
"	" Gros jeune.	"
Cognot or Colin	" Géricault.	"
"	" Cuvier.	"
"	" François Arago.	"

II.—Low Countries and England.

Franz Hals	Portrait of Descartes	Louvre.
Rembrandt	The Annunciation to the Shepherds (etching).	Amand Durand.
"	" The Death of the Virgin (etching)	"
"	" Abraham's Sacrifice	"
"	" The Raising of Lazarus	"
"	" The Man with a Hat (drawing)	Louvre.
"	" Blind Tobit (etching)	Amand Durand.
"	" Dr. Faustus	"
"	" Portrait of Rembrandt's Mother (etching)	"
"	" Christ healing the Sick (etching)	"
Paul Potter	The Cow-herd (etching)	"
Rubens	The Descent from the Cross	Hermes.
"	The Wild Boar Hunt (engraved by Paul Pontius).	"
Van Dyck	Portrait of Bentivoglio (engraved by Morin).	"
"	" Van Dyck	Amand Durand.
"	" Philippe le Roy	"
"	" Adam van Noort	"
"	" Paul Pontius	"
"	" John Spillius	"
"	" F. Snyders	"

Appendix 40.
Report on Art
Museums for
Schools.

Artist.	Description of Work.	Published by
Van Dyck	Portrait of Lucas Vosterman	Amand Durand.
"	" Paul de Vos	"
"	" John de Wael	"
"	" John Breughel	"
"	" Peter	"
"	" Justus Suttermans	"
"	" William de Vos	"
"	" Antony Cornelissen	"
"	" Francis Francken	"
"	" Josse de Momper	"
"	" John de Waverius	"
"	" Shakespeare	"

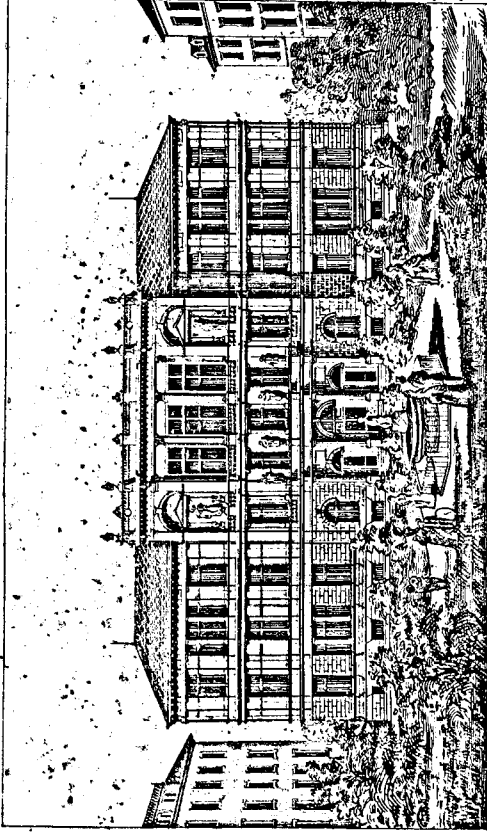
III.—Spain.

Murillo	St. Antony of Padua.	
Velasquez	The Lances (Surrender of Breda)	Braun.

ARCHITECTURE.

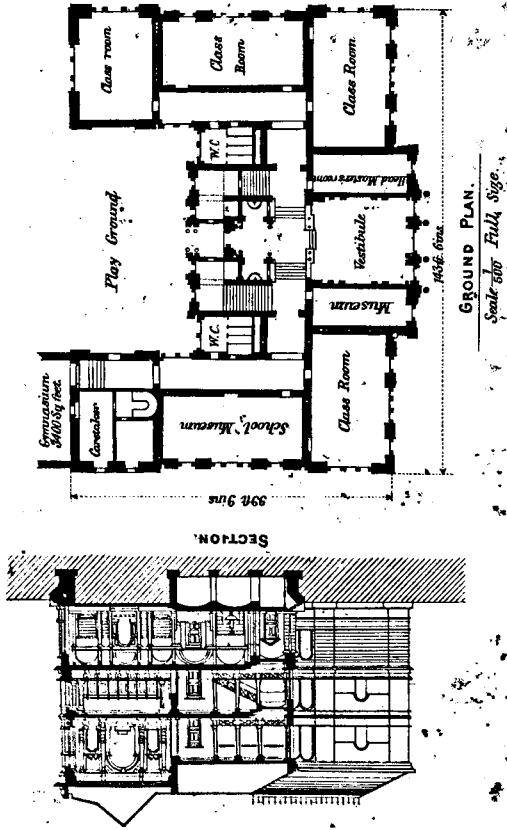
An Egyptian Temple (Phils).
The Parthenon.
The Coliseum.
The Arch of Titus.
The Cathedral of Chartres.
" " Notre Dame, Paris.
The Courtyard of the Louvre.

LONDON: Printed by **EXRE and SPOTTISWOODS,**
Printers to the Queen's most Excellent Majesty,
For Her Majesty's Stationery Office.



ELEVATION OF PUBLIC ELEMENTARY SCHOOL AT ZURICH.

GROUND PLAN AND SECTION OF ELEMENTARY SCHOOL, ZÜRICH.

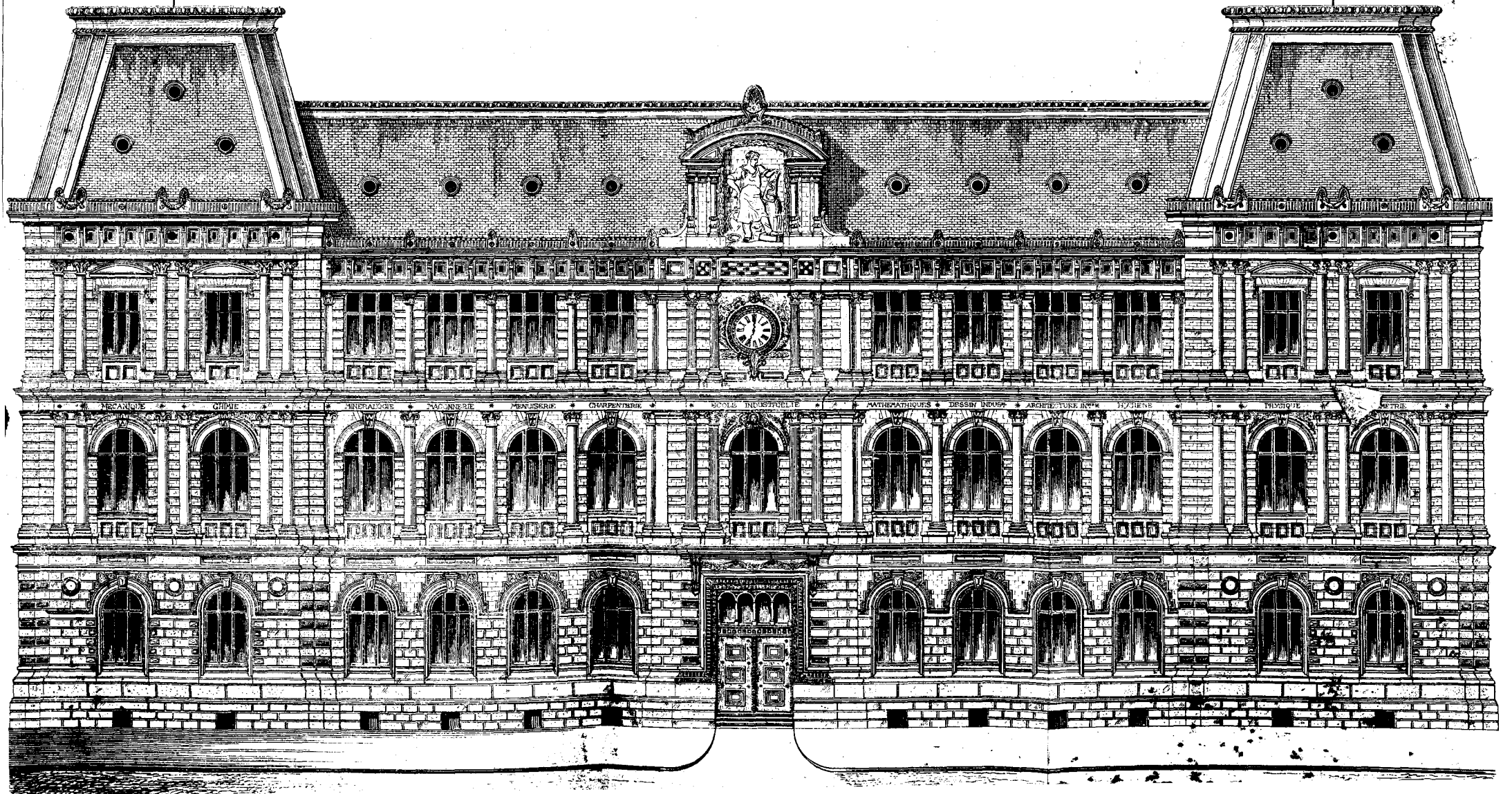


See Vol. I, P. 20.

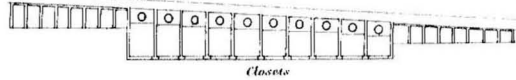
DAUERHAFT, LITH. 22, BEFORS ST. COVER GAUDEL. 12675. 10/05.

INDUSTRIAL SCHOOL BUILT BY THE MUNICIPALITY OF THE CITY OF LIEGE.

PRINCIPAL FACADE.

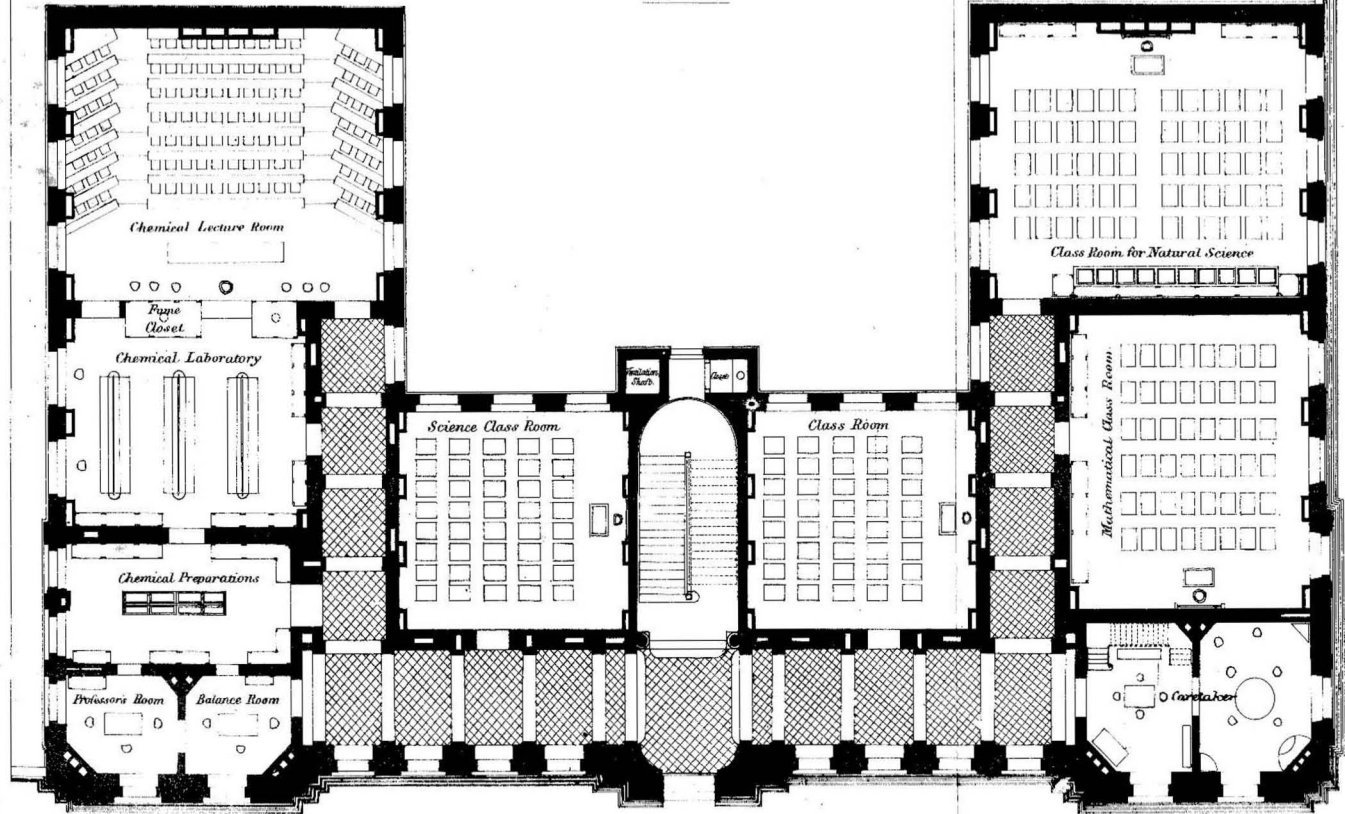


INDUSTRIAL SCHOOL, BUILT BY THE MUNICIPALITY OF THE CITY OF LIEGE.



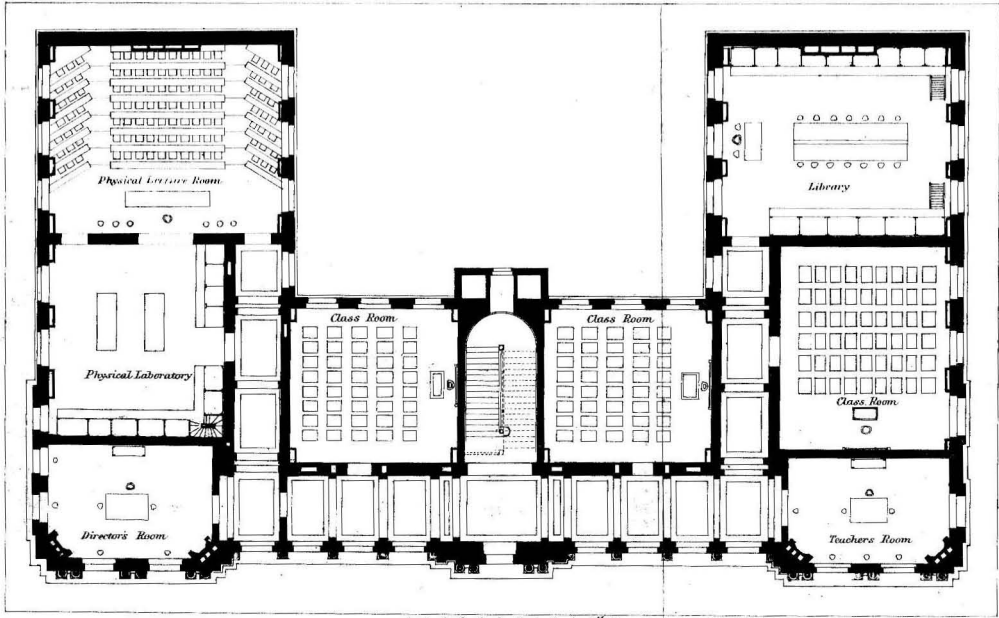
Clasets

PLAN OF GROUND FLOOR.

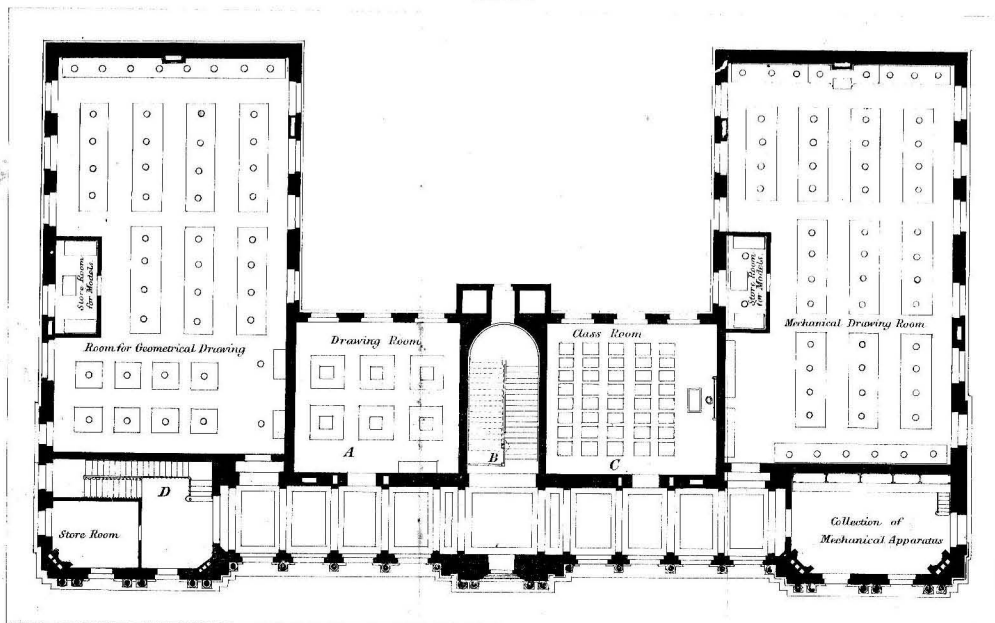


INDUSTRIAL SCHOOL, BUILT BY THE MUNICIPALITY OF THE CITY OF LIEGE.

PLAN OF THE 1ST FLOOR.



INDUSTRIAL SCHOOL, BUILT BY THE MUNICIPALITY OF THE CITY OF LIEGE.
PLAN OF THE 2ND FLOOR.

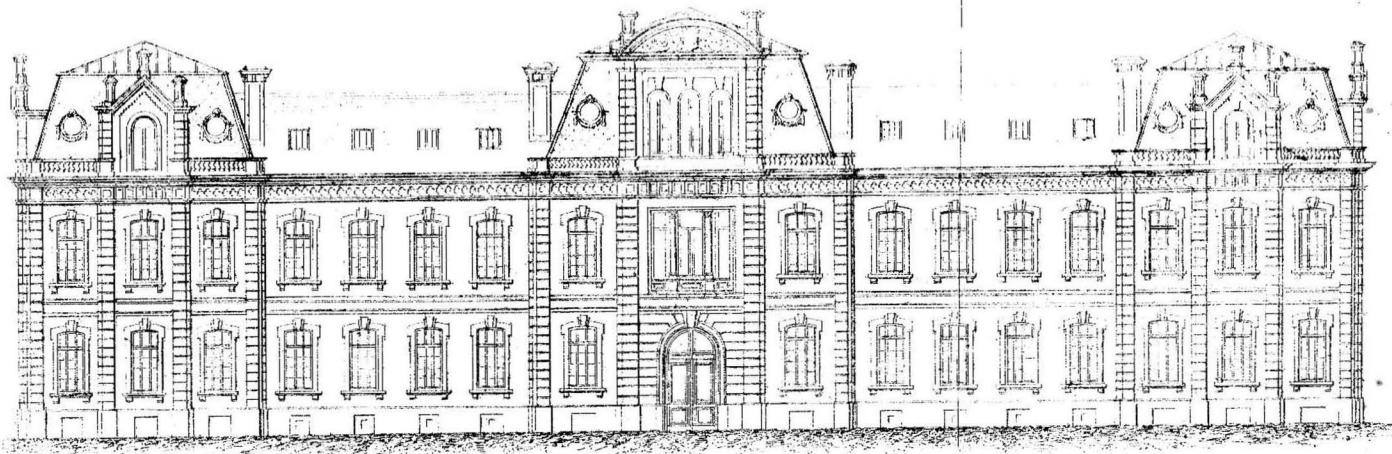


NOTE. The Staircase D gives access to the 3rd Floor which contains the rooms for Freshhand Drawing situated over the rooms marked A B C with a total area of about 1935 sq feet

ELEVATION OF THE INSTITUT INDUSTRIEL AT LILLE, FRANCE.

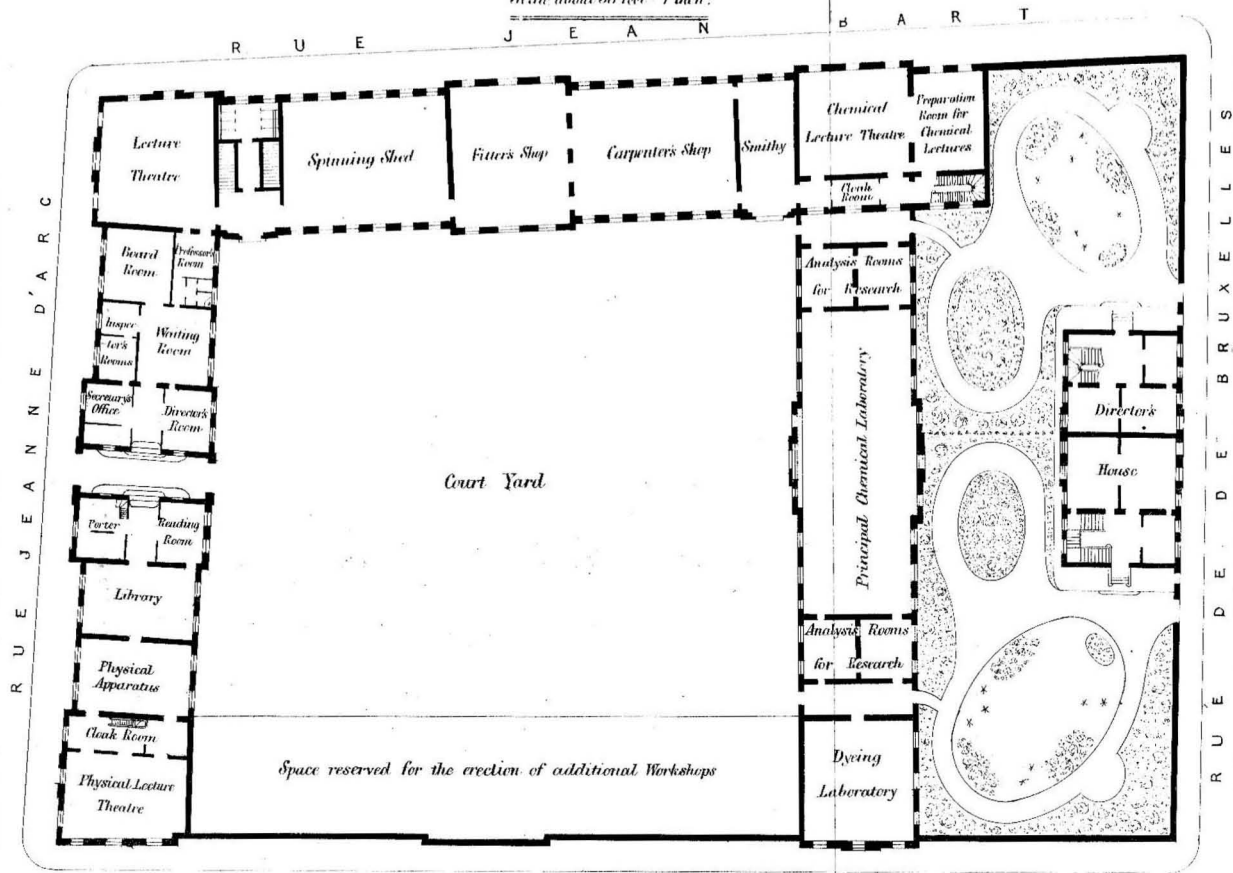
PRINCIPAL FRONT TOWARDS THE RUE JEANNE D'ARC.

Scale about 30 feet = 1 inch.



INSTITUT INDUSTRIEL, AT LILLE, FRANCE.

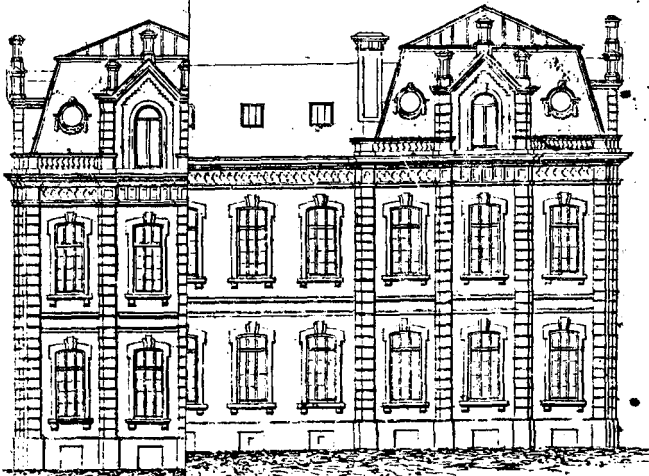
Scale about 55 feet = 1 inch.



The first floor contains the Lecture Halls, Class Rooms, Preparation Rooms, and a large Workshop for Weaving. On the upper floor the Industrial Museum is arranged in excellent lighted rooms.

FRANCE.

ARC.



INDUSTRIAL SCHOOL BUILT BY THE MUNICIPALITY OF THE CITY OF LIEGE.

PRINCIPAL FACADE.

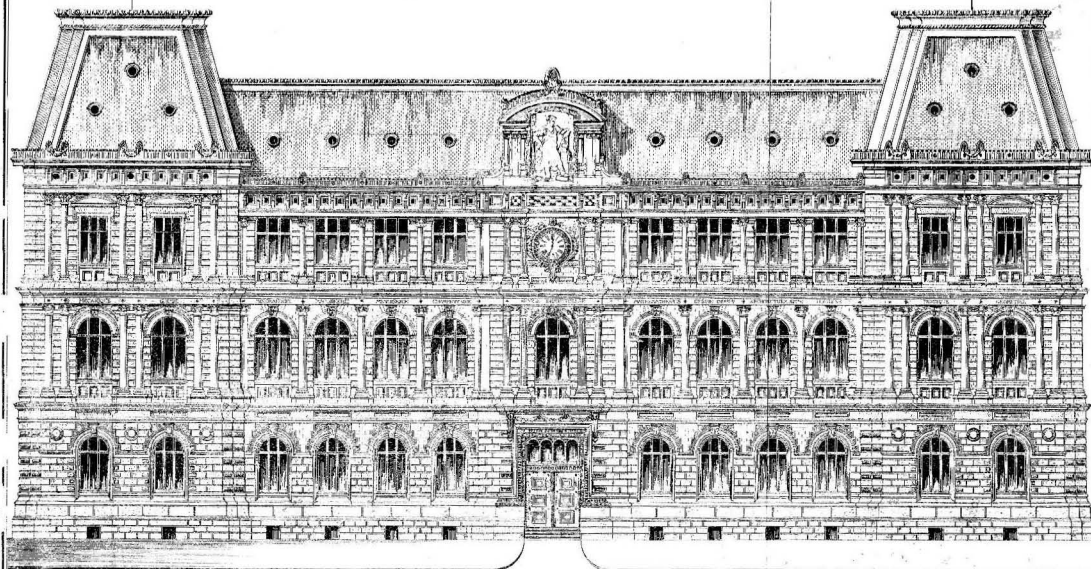
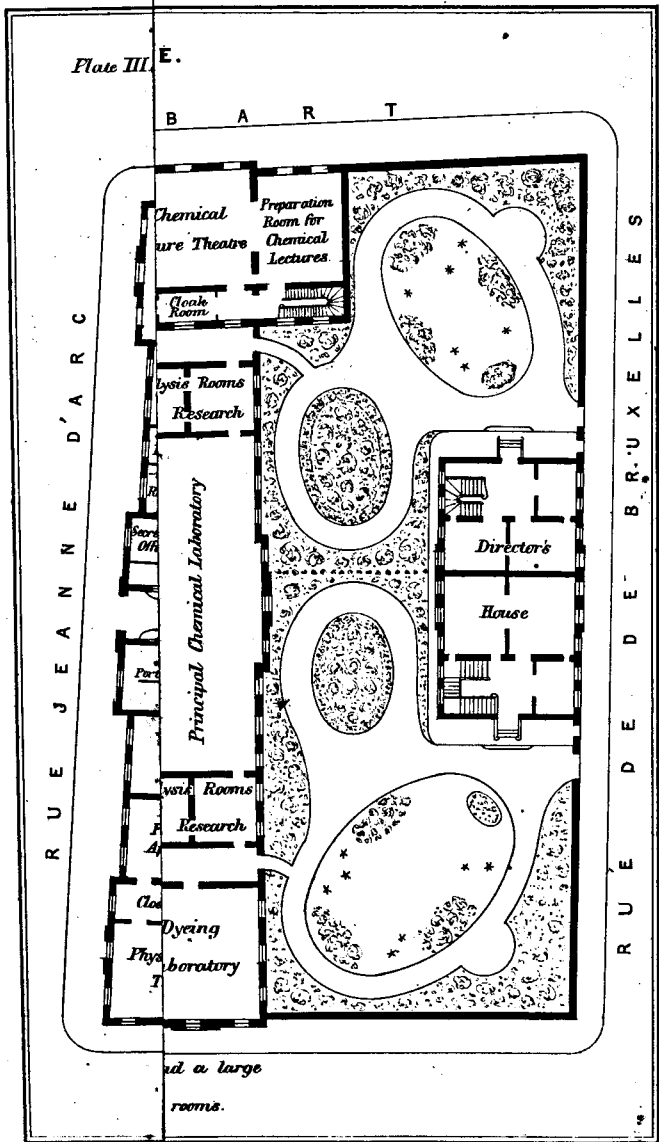


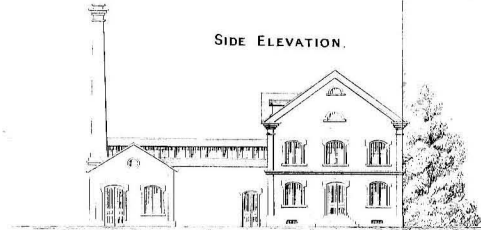
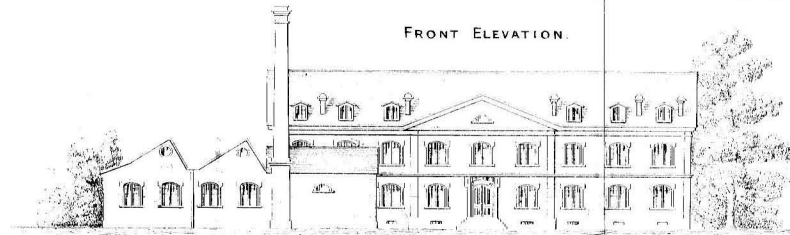
Plate III. E.



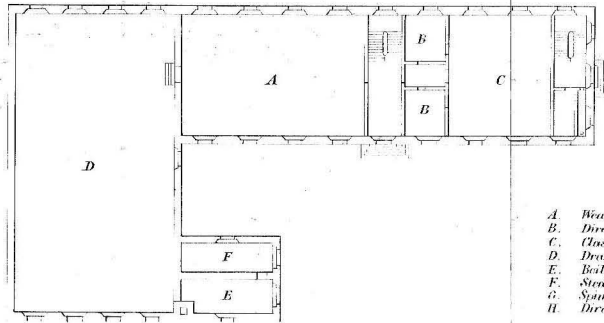
and a large
rooms.

SCHOOL FOR SPINNING AND WEAVING, AT MULHOUSE, (ALSACE.)

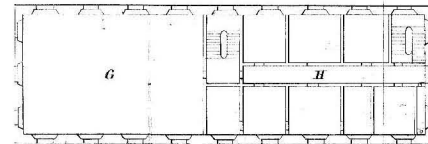
Scale 3 Millimetres = 1 Metre.



GROUND PLAN.



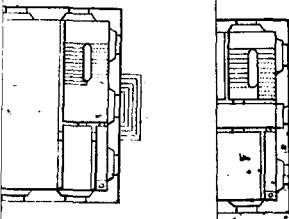
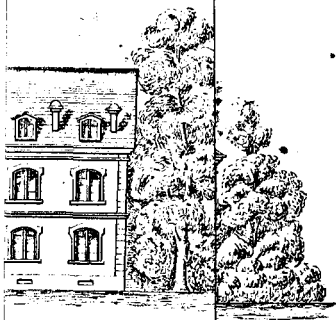
1ST FLOOR PLAN.



- A. Weaving Shed.
- B. Director's Rooms.
- C. Class Room.
- D. Drawing Office and Machine Shop.
- E. Boiler House.
- F. Steam Engine.
- G. Spinning Shed.
- H. Director's Residence.

SPINNING AND
LOOM HOUSE, (AL)

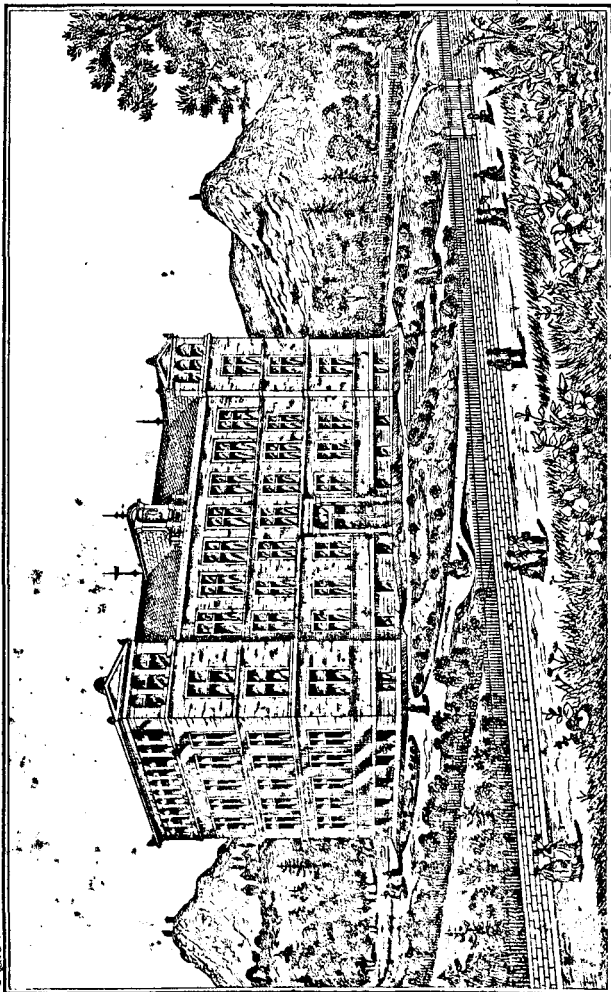
3 Millimetres - 1



- A. Weaving Shed
- B. Director's Room
- C. Class Room
- D. Drawing Office
- E. Boiler House
- F. Steam Engine
- G. Spinning Shed
- H. Director's Res

AT REUTLINGEN.

PLATE V

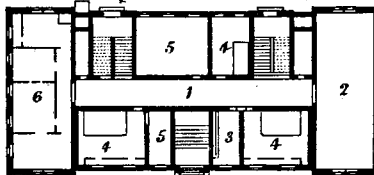


(See Vol. I, p. 69.)

WALTERS, ENGR. & REPROD. ST. GEORGE'S GARDEN, 7, 88, 7802

PLANS OF THE WOMEN'S WORK SCHOOL.
AT REUTLINGEN.

BASEMENT.



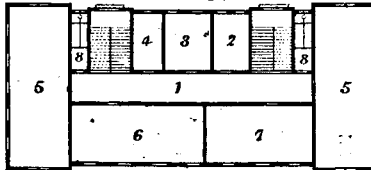
1. Corridor
2. Ironing Room.
3. Ironing Stoves.
4. Heating Apparatus.
5. Wood and Coals.
6. Caretaker's Rooms.

GROUND FLOOR.



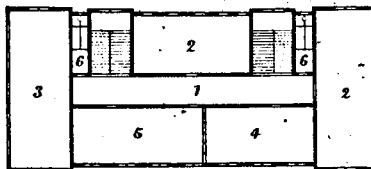
1. Corridor.
2. Director's Room.
3. Library
4. a & b. Drawing Room
5. Sewing Machines
7. Closets.

1ST FLOOR.



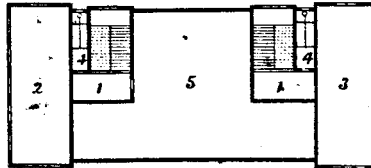
1. Corridor.
2. Head Mistress's Room.
3. Teachers Room.
4. Ironing Room.
5. Dressmaking Rooms.
6. Sewing Machines.
7. Embroidery Room.
8. Closets.

2ND FLOOR



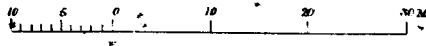
1. Corridor.
2. Plain Sewing
3. Knitting.
4. Crochet etc.
5. Trying on Room for Customers.
6. Closets.

ATTICS



1. Corridor
2. Exhibition Room.
3. Lecture Hall
4. Closets.
5. Storage space in roof.

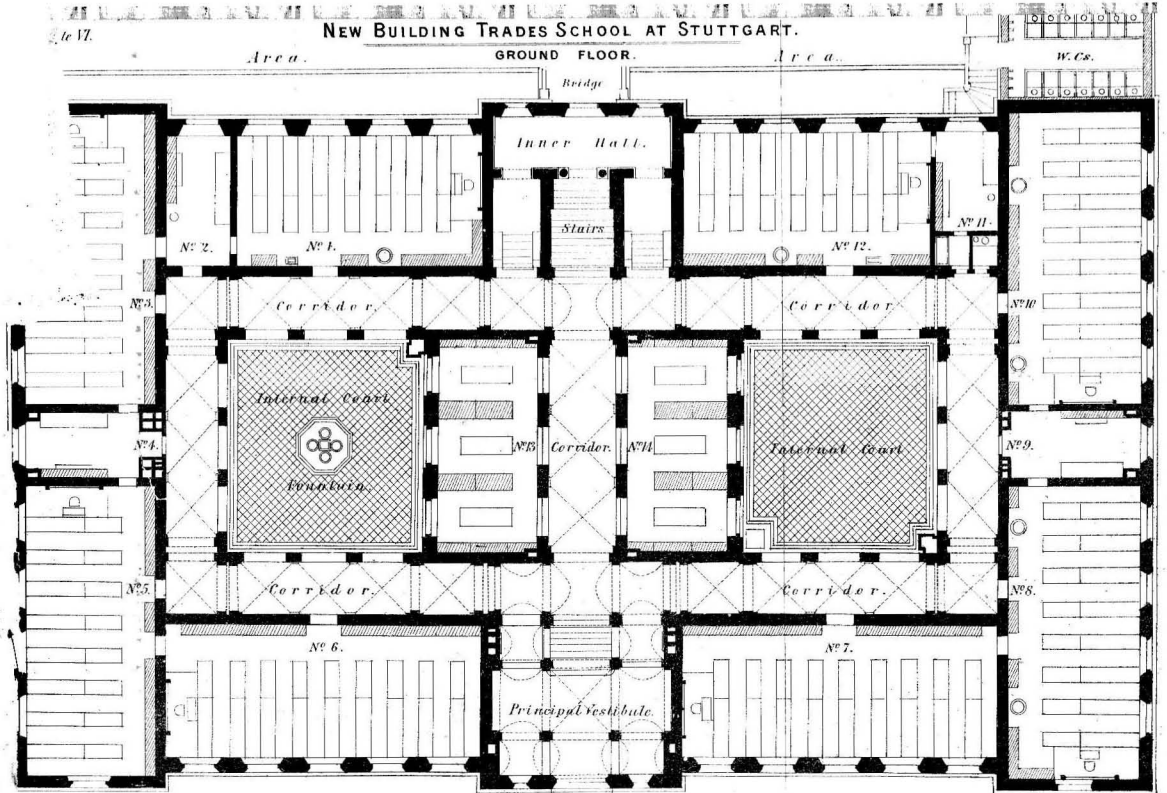
Scale of Metres.



le 17.

NEW BUILDING TRADES SCHOOL AT STUTTART.

GROUND FLOOR.



N^{os} 1, 3, and 12 Lecture Halls and Drawing rooms for the 3 Divisions of Class I.

N^{os} 5, 6, 7, 8, and 10 Lecture Rooms and Drawing Rooms for the 3 Divisions of Class II.

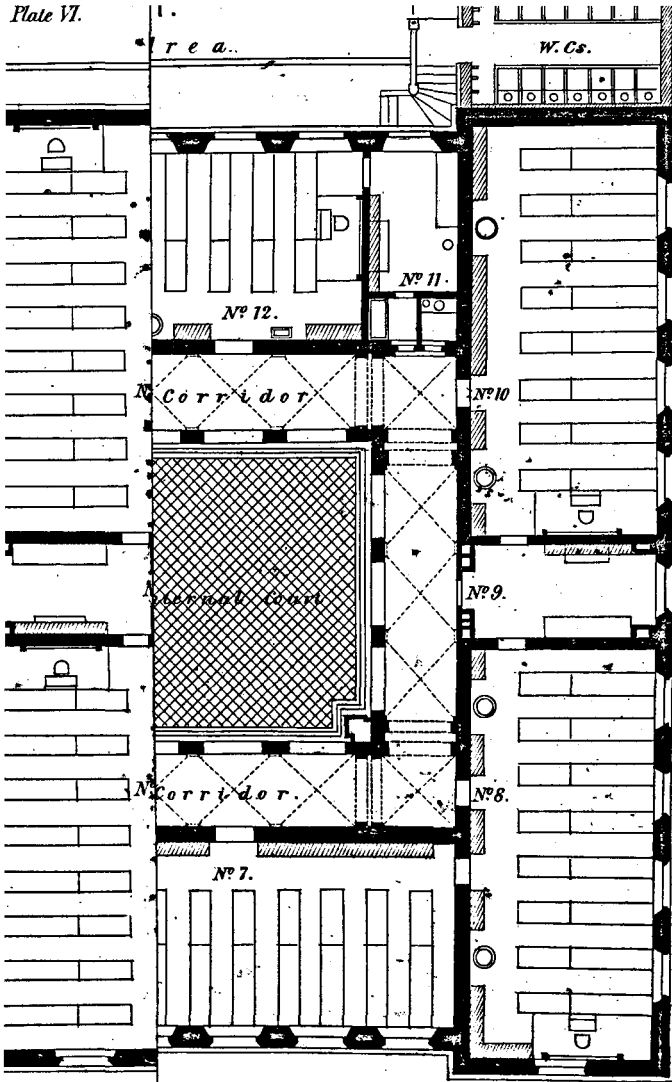
N^{os} 13, and 11, Rooms for the Collection of Models for teaching.

N^{os} 2, 4, 9 and 11 Rooms for Teachers Stoves, etc.

Scale of Feet

Scale of Feet

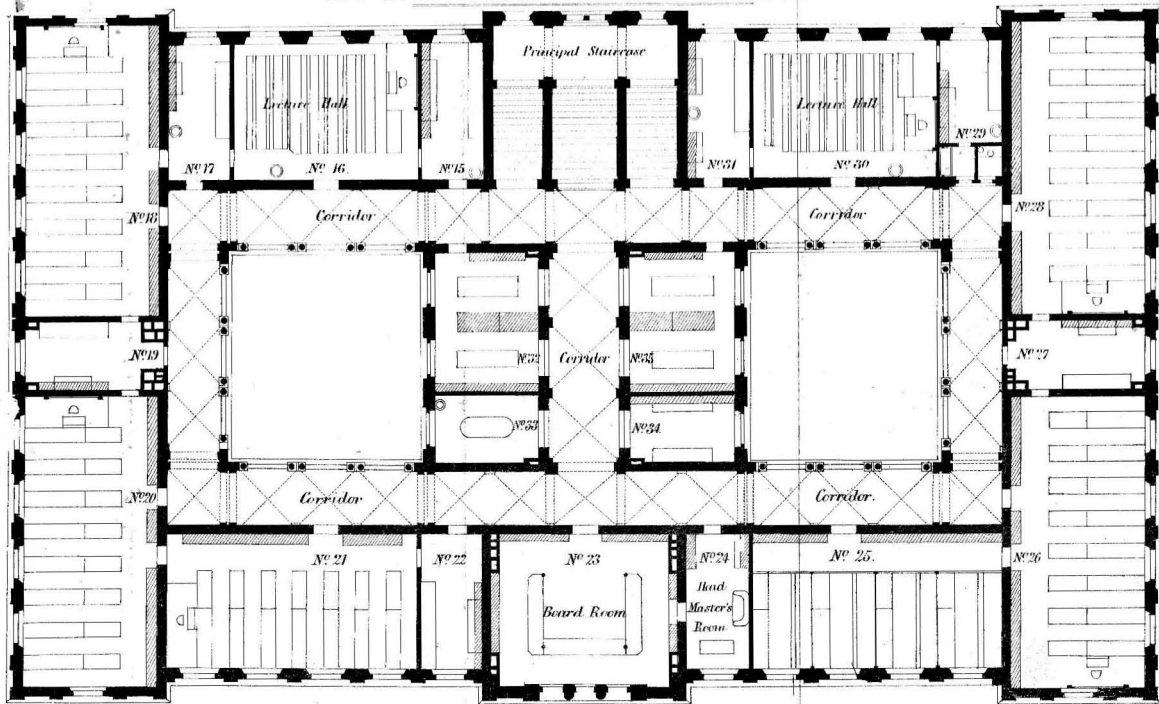
Plate VI.



for the Nº 2, 4, 9 and 11 Rooms
teaching. for Teachers Stores, etc.

Metres

NEW BUILDING TRADES SCHOOL AT STUTTART.



1ST FLOOR.

Nos 16 and 30 Lecture rooms
for Natural Sciences etc.

Nos 18, 20, 26, and 28 Lecture Halls
and Drawing rooms for the A

divisions of Class III.

No 21 Lecture Hall and Drawing room

for the IV class in Land Surveying.

No 25 Model Drawing room.

Nos 15 and 29 Rooms for apparatus
for the teaching of Natural History.

No 22 Teacher's room and apparatus for
instruction in practical Geometry.

Nos 17, 19, 27, and 31 Rooms for Teachers
and for Teaching Apparatus.

Nos 32 and 33 Rooms for Models and
for Collection of Building Materials.

Scale of meters 1 2 3 4 5 6 7 8 9 10

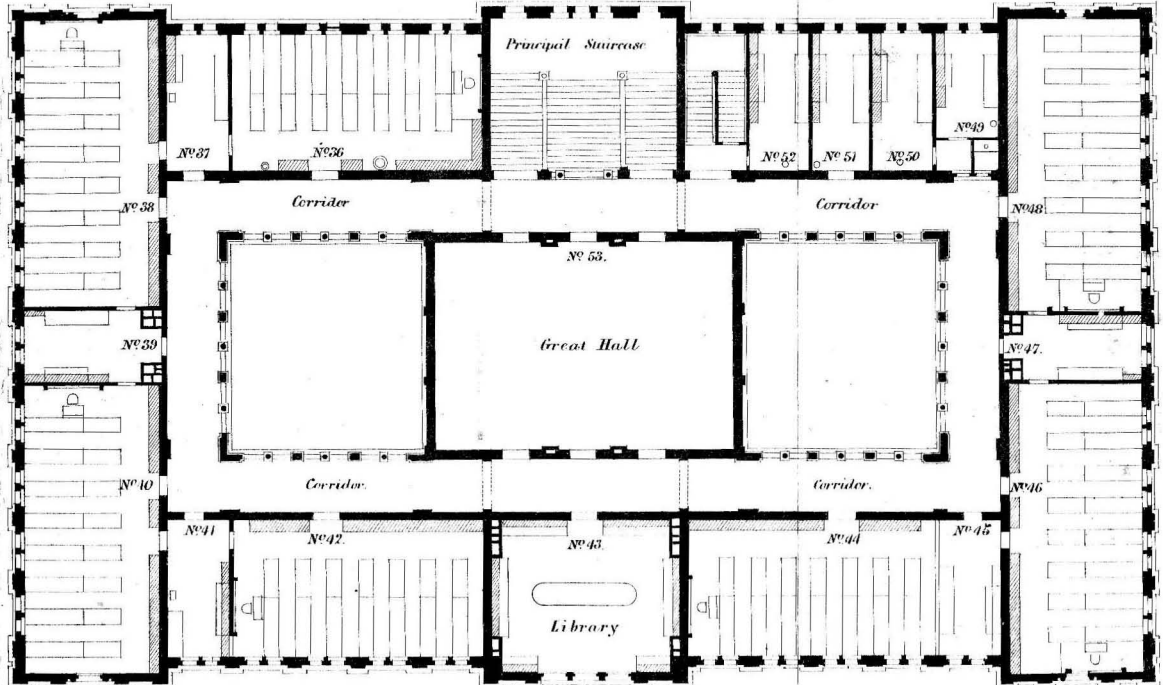
30'

30'

30' METERS

(See Vol. I. Pl. 103.)

Plate II. b.



NEW BUILDING TRADES' SCHOOL AT STUTTGART.

2ND FLOOR.

No. 36 Lecture Hall, and Drawing Room, for the 4th and 5th Classes of the Machine Construction Section.

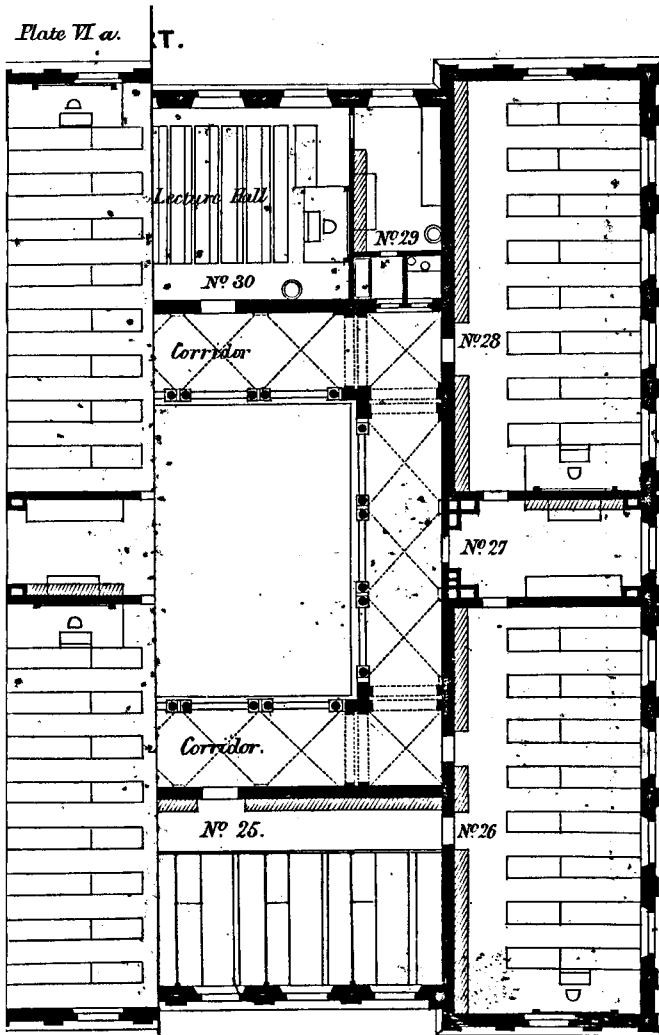
Nos. 38, 40, and 42, Lecture Hall, and Drawing Rooms for the 3 divisions of the 7th Class of the Building Trades School.

Nos. 44, and 46, Lecture Hall, and Drawing Room, for the 2 divisions of the 5th Class of the Building Trades School.

Nos. 37, 39, 41, 45, 47, 49, 50, 51, and 52, Lectern for Teachers and Teaching Apparatus.

Scale of 1:100

in Metres



N^{os} 16 and 30
 for Natural Sci.
 N^{os} 18, 20, 26, 27
 and Drawing r

N^{os} 17, 19, 27, and 31 Rooms for Teachers
 and for Teaching Apparatus.

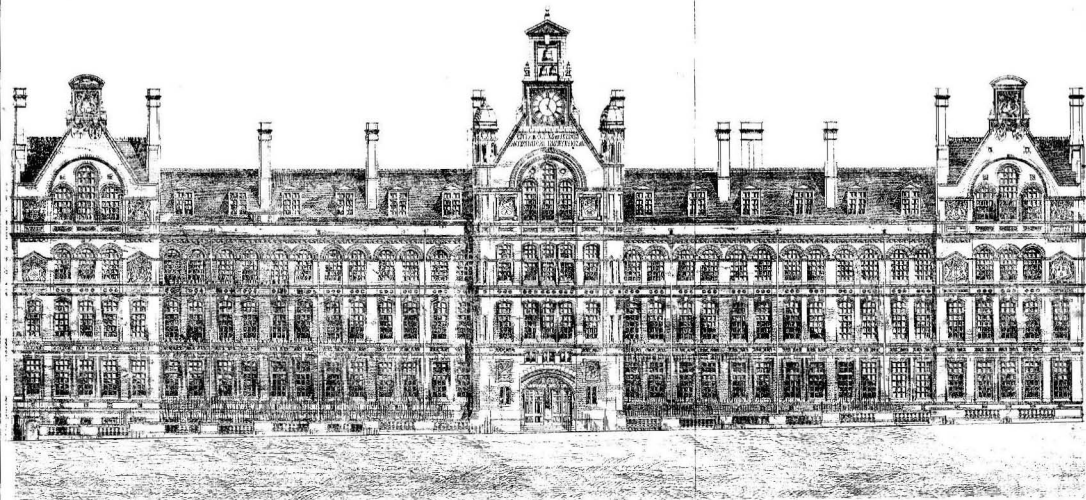
N^{os} 32, and 35 Rooms for Models and
 for Collection of Building Materials.

40 Metres

(See Vol. I. P. 103.)

THE CITY AND GUILDS OF LONDON TECHNICAL INSTITUTION .

FRONT ELEVATION .



THE CITY AND GUILDS OF LONDON TECHNICAL INSTITUTION.

GROUND FLOOR PLAN.

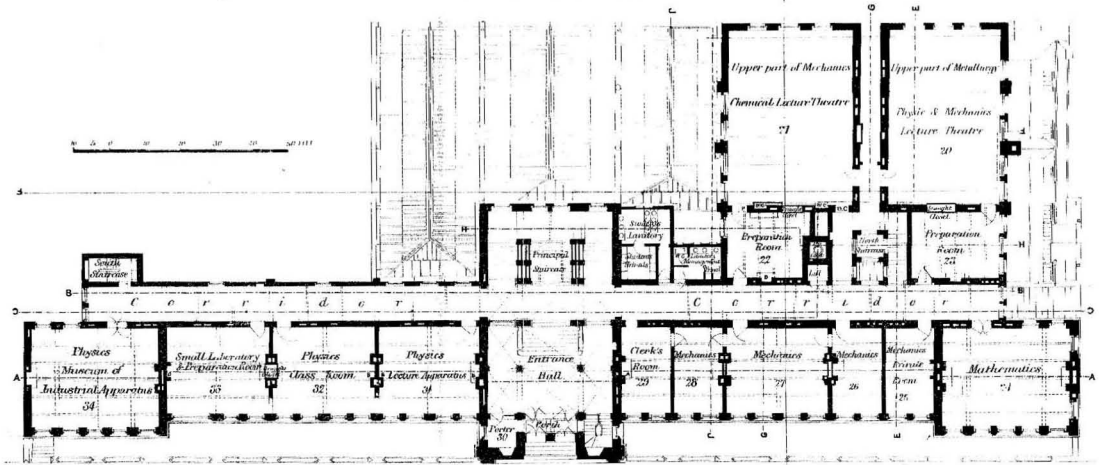
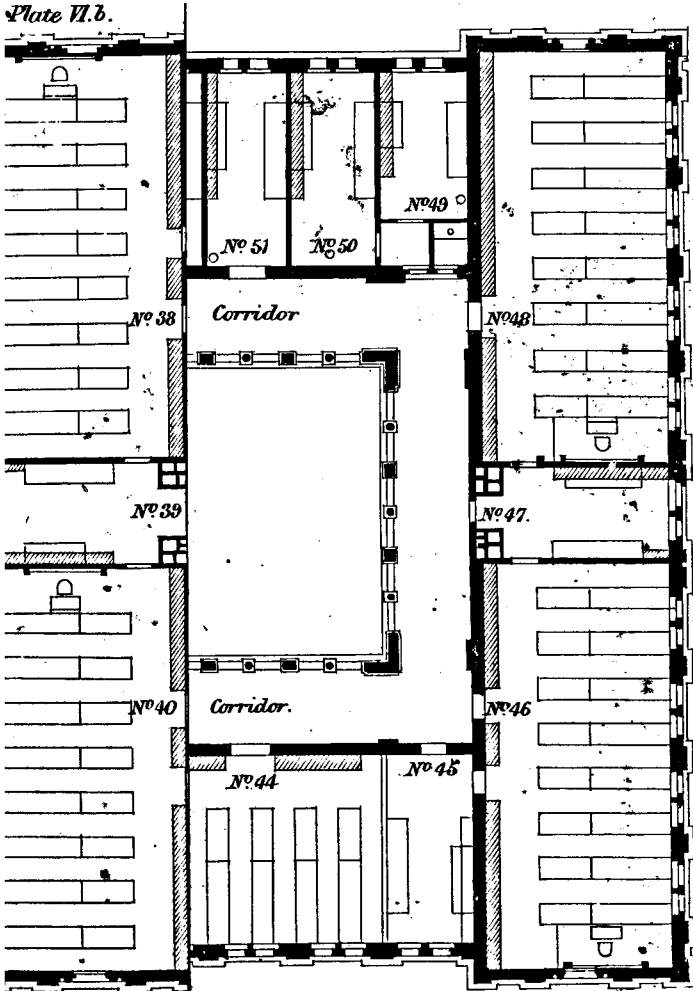


Plate VII. b.



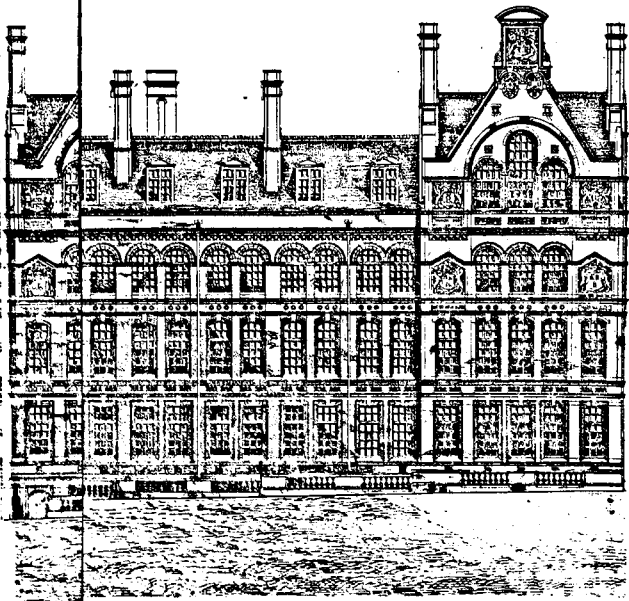
RT.

Nº 36 Lecture Hall Drawing Nºs 37, 39, 41, 45, 47, 49, 50, 51, and 52
 for the 4th and 5th Class of Rooms for Teachers and Teaching
 Construction Section Apparatus.

Scale 1:100 Metres

Plate VII.

L INSTITUTION .



(See Vol. I.)

DANERFIELD LITH. 22, BEDFORD ST. COVENT GARDEN. No. 13222.

