



Government of Bombay
EDUCATION AND INDUSTRIES DEPARTMENT

Report of the Industrial and
Technical Secondary Education
Committee, Bombay Province



BOMBAY

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1949

Sir,

We beg to submit to the Government of Bombay the enclosed Report of the Industrial and Technical Secondary Education Committee, which we have prepared as a result of the investigations and enquiries which we made during the period June 1947 to March 1949.

We remain,
Sir,
Yours faithfully.

P. N. JOSHI, — *Chairman.*

V. D. GHATE, — *Member.*

R. U. PATEL, — „

G. R. PARANJPE, — „

S. S. DESNAVI, — „

G. S. PARAMASIVAYYA, — „

S. P. OGALE, — „

C. E. KRISHNAMURTI—
Secretary.

To

The Joint Secretary to the Government of Bombay,
Education and Industries Department,
Bombay Castle, BOMBAY.

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Institute, Bombay.
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Deputy Director of Public
Instruction, Poona.
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Director of Industries,
Bombay.
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The Arvind Mills Ltd.,
Ahmedabad.
9. C. E. Krishnamurti, Esq. B.A., T.D., L.M.E., Lecturer, *Secretary.*
V. J. Tech. Institute,
Bombay.

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APPENDIX A.

No. I-C/

From

Dated

THE CHAIRMAN,
 INDUSTRIAL AND TECHNICAL SECONDARY EDUCATION COMMITTEE,
 C/o, V. J. TECHNICAL INSTITUTE,
 BOMBAY 19.

To

Sir,

I am forwarding herewith a copy of the general questionnaire of the Industrial and Technical Secondary Education Committee, appointed by Government as per Resolution No. 7653 dated 1st May, 1947, for favour of reply at an early date and not later than 25th August, 1947.

The terms of reference of the Committee are as follows:—

To examine and make recommendations on—

1. the pace and nature of progress in technical, industrial and vocational training in the Province below the collegiate stage, bearing in mind particularly,
 - (a) the prospective needs of the Province,
 - (b) the increasing requirements of industrial and technical education consequent on the expansion of primary education,
2. the locations of the institutions that may be necessary and the courses of study suitable at each,
3. the extent and method of financing the scheme of industrial and technical education and in particular the field for Government and private efforts and the methods of grant-in-aid to private institutions.
4. methods of recruitment and terms of remuneration of the staff for the institutions,
5. desirability of carrying out surveys to determine the needs of industries in the way of technical personnel, and
6. establishment of Local Advisory Committees.

The Committee will welcome any statements of views or suggestions within the field of enquiry referred to it. While replying to the questionnaire you may cover the whole of the field or any particular part of it which lies within your special knowledge. The Committee will, however, feel specially grateful if you will give detailed answers to those questions in which you are particularly interested or with which you are specially well acquainted.

Your obedient servant,

Chairman.

APPENDIX A.

Industrial and Technical Secondary Education Committee,
Bombay Province.

QUESTIONNAIRE--'A'.

I GENERAL ORGANISATION.

1. Is it desirable that the various Government and private institutions which are imparting technical and vocational training, should be co-ordinated and developed on the basis of a Provincial programme, which in turn, may be based on a National programme.

2. Is it desirable that this programme should take into account:—

(a) the development of general education, vocational selection and guidance, changes in technique and organisation, the existing and future needs of the industry for technical personnel ?

(b) the occupational, cultural and moral interests of the industrial workers, the personnel requirements of the employers, the economic and social interests of the community and the economic policy of the country ?

3. In order to promote this co-ordination and facilitate this development should there be a Technical Education Council in the Province ?

4. If so, would it be adequate to include representatives of:—

(i) General education ?

(ii) Vocational guidance ?

(iii) Technical education ?

(iv) Planning and Economic Policy ?

(v) Organisations of employers and workers ?

II. VOCATIONAL AND TECHNICAL EDUCATION.

5. Is it desirable to provide for all children, on reaching a specified age, an initiation into the occupational life, within the compulsory educational system by developing the idea of and the taste for manual work, so as to facilitate their future vocational guidance ?

6. If so, what should be:—

(a) the importance of manual work in the school curriculum ?

(b) the nature of such work ?

(c) the age of commencement of the preparatory course ?

(d) the duration of the course ?

7. (a) Is it desirable in drawing up programmes to avoid any vocational specialisation and that practical work should nevertheless take into account the nature of the principal occupations and industries of the district ?

(b) Do you consider that this preparation may be wholly included in the period of compulsory school attendance ?

(i) if the school leaving age is 14 years.

(ii) if the school leaving age is above 14 years.

(c) What should be the nature of the preparation, specially as regards:—

(i) the relation between the theoretical courses and practical work ?

(ii) the degree of specialisation ?

(iii) the relation between the preparation and the duration of subsequent vocational training ?

8. (a) Is it desirable that young workers should receive a full-time vocational education before they enter employment ? (Please indicate for which classes of workers such education appears desirable to you.)

(b) Is it preferable that young workers who are already in employment should receive a part-time vocational education ? (Please indicate in which branches of activity and for which classes of workers such education appears desirable to you.)

(For purposes of this question, young workers may be taken to include semi-skilled and skilled workers, charge hands, and foremen.)

9. Where vocational training is given before employment, do you consider that :—
- (a) performance of practical work should take place under conditions as similar as possible to those of an actual industrial establishment and under the supervision of persons with practical experience of the trade ?
 - (b) periods of training in the schools should be continued with periods of practical work in an industrial establishment ?
 - (c) some economic assistance should be granted to young and meritorious persons attending the courses of training ?
10. Where vocational training is given during employment, do you consider that :—
- (a) co-ordination should be ensured between workshop and school? If so, what means would appear the best suited to ensure the co-operation.
 - (b) separate workshops specially adapted for the purposes of giving training should be set up in such industrial establishments as would find it feasible ?
11. Is it desirable to recommend the establishment in each region of a network of vocational and technical schools, adjusted to meet the industrial requirements of each region ?
12. In order to make attendance at vocational schools possible for young people, who would not otherwise afford it, is it desirable :—
- (a) to effect admission without fees ?
 - (b) to grant scholarships ?
13. Among the three categories of workers, [viz. (i) skilled workmen and craftsmen (ii) staff in intermediate grades, and (iii) managerial staff] needed by your firm :—
- (a) What is the manner in which the three classes of workers are at present recruited ?
 - (b) What is the approximate number of each category of workers required ?
 - (c) Do you think that the present system of recruitment could be improved ? If yes, in what way ?
14. Should there be courses organised in several grades for the training of :—
- (a) skilled workers and craftsmen ?
 - (b) staff in intermediate grades ?
 - (c) managerial grades ?
15. In the interest of industrial workers, is it desirable that facilities should be given for transfer from one school or grade, to another, including access to higher technical education at a University or equivalent institution ?
16. Do you consider that measures should be taken to protect future vocational adaptability of industrial workers ?
- If so, should these measures in particular :—
- (a) aim at developing theoretical knowledge ?
 - (b) avoid excessive or premature specialisation ?
17. (a) Do you consider that subjects of general and social educational value should be included in all curricula for vocational and technical education of all grades ?
- (b) Do you consider that questions connected with domestic science should be included in the curricula for vocational education particularly for women ?
18. With regard to supplementary education do you consider it desirable that :—
- (a) the educational establishments should be sufficiently near to the industrial establishments, to be accessible to workers in employment ?
 - (b) should the attendance of workers at school, be included in their normal working hours in the works, especially :—
 - (i) of apprentices ?
 - (ii) of young workers who enter industry at an early stage, to enable them, to obtain better posts later ?
 - (iii) of adult workers who wish to acquire a definite technical qualification or to extend or improve their technical knowledge ?

III. VOCATIONAL EDUCATION FOR WOMEN.

19. (a) Is it desirable that a sufficient number of vocational schools including schools for domestic science, should be established for the occupations in which women and girls are mainly employed ?
- (b) what are the main occupations in which women and girls could be employed ?

(c) should the workers of both sexes have equal rights of admission to all other vocational and technical schools, provided that women and girls are not required to undertake work prohibited by law ?

IV. CERTIFICATES AND EXCHANGE OF STUDENTS.

20. (a) Is it desirable that certificates issued after examination should be co-ordinated and recognised on a National basis ?

(b) Should there be representation of employers in the organisation of examinations ?

21. (a) Should there be a regional and National exchange of students and apprentices on completing their training, to enable them to acquire wider knowledge or experience ?

(b) Do you consider that the organisation of employers and workers should collaborate in such exchanges ?

V. RECRUITMENT AND EXCHANGE OF TEACHERS.

22. (a) With regard to the teachers responsible for theoretical or practical training what should be the method of recruitment :—

(i) for theoretical subjects ?

(ii) for practical subjects ?

(b) What qualifications should be required, particularly in respect of industrial experience and teaching ability, for the various types of service ?

(c) What methods should be used for training teachers, recruited for teaching in technical institutions ?

(d) Among methods of improving qualifications of teachers and of keeping their knowledge upto date, should the following be included ?

(i) establishment of contacts between industrial establishments and teachers,

(ii) courses in educational institutions for individual teachers,

(iii) travel and research,

(iv) short vacation courses for groups of teachers.

(e) Is it desirable to extend financial assistance and other facilities for teachers with a view to improving their qualifications ?

(f) If so what measures would you suggest :—

(i) grant of special leave at regular intervals ?

(ii) stipends ?

(g) Do you consider that regional and National exchange of teachers should be organised.

(i) to improve the standards of instruction in different regions ?

(ii) to afford opportunities for the staff to work under different environments and to acquire wider knowledge and experience ?

23. Do you consider that persons normally engaged in industry and commerce should be appointed to part-time positions of teachers ?

VI. REGIONAL ADVISORY COMMITTEES.

24. (a) Is it desirable that collaboration between the competent administrative departments, vocational and technical educational institutions, and organisations of employers and workers, should be ensured through local or regional advisory committees ?

(b) Do you consider that the duties of these committees should be :—

(i) to promote and co-ordinate official and private efforts in regard to vocational training, selection and guidance, in the locality or region ?

(ii) to supervise the curricula and to ensure that they are adjusted to the changes in practical requirements ?

(iii) to supervise the conditions of work of young persons in vocational schools and to ensure that the work done by them is not intended for commercial profit ?

(iv) to supervise the conditions of work of young persons who spend part-time in school and part-time in works and to ensure that the work is suitably restricted and is essentially educative in character ?

(v) to organise regional employment bureaux to supply technical personnel to local industries.

25. Should there be propaganda to direct the largest possible number of pupils towards technical or vocational education ?

If so would you indicate what forms such propaganda should take ?

APPENDIX B.

Industrial and Technical Secondary Education Committee,
Bombay Province.

QUESTIONNAIRE—'B'.

1. What other courses in addition to the existing ones do you consider necessary to be introduced in your institution ?
2. Do the existing courses satisfy the needs of industry, trade or profession in the District, served by the institution ?
3. Will the new courses meet the requirements ?
4. What is the scope of employment of candidates passing out of your institution ?
5. What are the main industries or vocations of people in the District ?
6. *A Tabulated Statement* (for the years 1943 to 1947) with the following particulars may please be furnished.
 - (a) Existing courses.
 - (b) Number of students admitted to each course.
 - (c) Number of successful candidates.
 - (d) The nature of the job or positions held by the past students.
 - (e) The names of the teaching staff, including workmen, with grades of pay.
 - (f) *Finance*.—Income from—
 - (i) Municipality,
 - (ii) Local Body or District Board,
 - (iii) Private Body,
 - (iv) Grant-in-aid from Government,
 - (v) Fees and other sources.
 - (g) *Expenditure*.—
 - (i) Salaries and Provident Fund,
 - (ii) Administration,
 - (iii) Rent, Municipal Taxes, Insurance, Repairs, Gas, Electricity, Consumable stores, Miscellaneous.
7. Have you any suggestions to make regarding the mode of assessment of grant-in-aid to recognised institutions through Government and the extent of such grant-in-aid ?

Name of institution.

Postal Delivery District.

Head of institution.

APPENDIX C.

List of Individuals and other bodies who sent in written replies to
Questionnaire 'A'.

*MEANS THAT ORAL EVIDENCE WAS ALSO OBTAINED.

GROUP A—EDUCATIONISTS.

1. * Mr. B. Sengupto, Head, Mech. Eng. Dept., V. J. T. Institute, Bombay.
2. * Dr. P. K. Kelkar, Head, Elec. Eng. Dept., V. J. T. Institute, Bombay.
3. * Mr. P. W. Dharap, Deputy Head, Elec. Eng. Dept., V. J. T. Institute, Bombay.
4. * Mr. G. R. Bhide, Gen. Senior Lecturer, Mech. Eng. Dept., V. J. T. Institute.
5. * Mr. P. E. Chichgur, Superintendent, Saboo Siddik Tech. Institute, Bombay,
6. * Principal, Saboo Siddik Institution, Bombay.
7. * Mr. R. D. Sathe, Head Master, Elphinstone Tech. High School, Bombay.
8. Mr. C. L. Parmar, Head Master, Northcote Tech. High School, Sholapur.
9. Mr. V. K. Kelkar, Prof. of Mech. Eng., College of Engineering, Poona.
10. Mr. C. A. Christie, Principal, Robert Money High School, Bombay.
11. Mr. S. R. Tawde, Educational Inspector, Central Division, Poona.
12. * Mr. D. G. Dhavle, Superintendent, D. E. Society's Tech. Institute, Poona.
13. * Mr. M. K. Paranjpe, Superintendent, School of Radio Physics, Poona.
14. Mr. V. L. Sawant, Superintendent, King Ed. VII Tech. School, Dhulia.
15. Mr. K. Kardile, New Engineering, College, Sangli.
16. Mr. M. R. Bhise, Inspector of Tech. and Ind. Schools, B. P. Bombay.
17. Mr. V. R. Kamath, Dept. of Chemical Technology, University of Bombay.
18. Mr. A. G. Bhate, Director, A. F. Tech. Institute, Bombay.
19. Mr. S. Raja, Superintendent, Government Tanning Institute, Bandra.
20. * Mr. R. M. Desai, Principal, F. S. Parekh Technical Institute, Surat.
21. Mr. A. L. Saigal, Principal, Kalbahavan Technical Institute, Baroda.
22. * Mr. T. A. Desai, Principal, R. C. Technical Institute, Ahmedabad.
23. Mr. L. A. Dave, Retd. Head Master, R. C. C. High School, Ahmedabad.
24. Mr. S. O. Chakravarty, Principal, Morvi Technical Institute, Morvi.
25. Rev. S. Bonet, St. Xavier's High School, Bombay.
26. * Mr. K. M. Patil, Superintendent, School of Industry, Ratnagiri.
27. Mr. A. A. Mackay, Scottish Orphanage, High School, Mahim.
28. * Mr. S. R. Bhise, A. R. Sonavala High School, Bordi.
29. * Mr. V. K. Joag, Principal, Nowrosjee Wadia College, Poona.
30. * Dr. D. D. Karve, D. E. Society, Poona.

31. Secretary to Government, Educational and Judicial Dept., Kolhapur.
32. Hon'ble Minister for Education, Baroda State.

GROUP B.—ENGINEERING AND OTHER ASSOCIATIONS.

33. The Institution of Engineers (India), Bombay Centre.
34. The Textile Association (India) Bombay.
35. The Association of Electrical Undertakings, B. P., Bombay.
36. The Indian Merchants Chamber, Bombay.
37. The Millowners Association, Ahmedabad.

GROUP C.—INDIVIDUALS AND OTHERS CONNECTED WITH INDUSTRY.

38. Mr. Foster Guthrie, Century Spg. and Manufacturing Co., Ltd., Bombay.
39. Mr. B. M. Borkar, Ramnarsin Sons, Bombay.
40. Mr. Chaturbhujdas Chimanlal, Baroda.
41. Mr. T. G. Choudhari, Madhowji Dharamsey Mills, Ltd., Bombay.
42. Mr. N. V. Ullal, Khatau Mills Ltd., Bombay.
43. Mr. M. P. Kanga, Director of Industries, Bombay.
44. Mr. D. M. Khatau, Khatau Mills Ltd., Bombay.
45. Mr. M. V. Pant Viadya, Bombay.
46. Mr. V. V. Gupte, Central Cotton Committee's Technological Lab., Bombay.
47. Mr. V. A. Ajagaonkar, Bombay.
48. Mr. J. S. Malik, Municipal Engineer, Ahmedabad.
49. Mr. M. A. Babyoon, Arvind Mills, Ltd., Ahmedabad.
50. Mr. M. M. Vyas, Rajnagar Mills Ltd., Ahmedabad.
51. Mr. S. K. Patil, Bombay P. C. C., Bombay.
52. Mr. S. B. Datta, Lakshmi Cotton Mills, Ltd., Sholapur.
53. Mr. J. B. Sane, Khatau Mills Ltd., Bombay.
54. Mr. B. D. Kulkarni, Modern Mills Ltd., Bombay.
55. Mr. D. T. Mama, Scindia Steam Navigation Co. Ltd., Bombay.
56. Mr. S. C. Banerjee, Hindustan Construction Co., Ltd., Bombay.
57. Mr. D. B. Katrak, Khatau Mills Ltd., Bombay.
58. Mr. N. M. Dave, New Standard Engineering Co., Bombay.
59. Dr. D. B. Kirtikar, Bombay.
60. Mr. A. L. Guilford, B. E. S. and T. Co., Ltd., Bombay.

GROUP—D. ENGINEERING AND INDUSTRIAL ESTABLISHMENTS.

61. * Calico Mills Ltd., Ahmedabad.

62. Godrej and Boyce Manufacturing Co., Ltd., Bombay.
 63. Autogenous Welding and Repairing Co., Bombay.
 64. Imperial Chemical Industries, Bombay.
 65. Investa Machine Tools and Engineering Co., Bombay.
 66. The Kohinoor Mills Ltd., Bombay.
 67. Volkart Brothers, Bombay.
 68. The Parasuram Pottery Works, Morvi.
 69. Alcock and Ashdown Co., Ltd., Bombay.
 70. * Paisa Fund Glass Works, Talegaon.
 71. Ama Ltd., Bombay.
 72. Mather and Platt Ltd., Bombay.
 73. Sholapur Spinning and Weaving Co., Ltd., Sholapur.
 74. The Swastik Oil Mills Ltd., Bombay.
 75. * The Indian Institute of Art in Industry, Bombay.
 76. Burma Shell, Bombay.
 77. Firestone Tyre and Rubber Co., Ltd., Bombay.
 78. Babcock and Wilcox (India) Ltd., Bombay.
- VOCATIONAL INSTITUTIONS WHICH RESPONDED TO QUESTIONNAIRE A AND/OR B.
79. King Ed. VII Technical School, Dhulia.
 80. The New Rex Tailoring Class, Bombay.
 81. P. K. V. S. Mahila Kala Niketan, Bombay.
 82. Kumarika and Stree Mandal, Vile Parle.
 83. K. E.S. Topiwala Industrial School, Alibag.
 84. Talimi Kendra Jyoti Sangh, Ahmedabad.
 85. Jain Mahila Samaj, Bombay.
 86. K. P. Stree Udyogshala, Ahmedabad.
 87. Instituto Indo Portuguese, Bombay.
 88. Mahila Shivan Kala Mandir, Malwan.
 89. Dawoodbhoy Fazalbhoy Muslim Women's Handicraft Institute, Bombay.
 90. Gujerati Hindu Stree Mandal, Bombay.
 91. The Morvi Technical Institute, Morvi.
 92. Government Leather Working School, Bandra.
 93. Yeravda Industrial School, Poona.
 94. D. M. Petit Industrial School, Sirur.

95. Primary Handicraft Classes, Bombay.
96. Ladies Industrial Home, Khar.
97. School of Industry, Satara.
98. Bharatiya Kala Vikas, Khar.
99. * Nowrosjee Wadia College, Poona.
100. Government Power Weaving Instructional Institute, Sholapur.
101. Gujerati Hindu Stree Mandal, Santa Cruz.
102. Robert Money School, Bombay.
103. * Maharashtra Mudran Shala, Poona.
104. * S. N. P. P. Polytechnic Institute, Surat.
105. Abdulla Fazalbhoy Technical Institute, St. Xavier's College, Bombay.
106. C. N. Industrial School, Ahmedabad.
107. K. E. S. V. K. Printing Press, Panvel.
108. Vocational Training School, Ankleswar.
109. Khalsa College Technical Institute, Bombay.
110. * Private High School, Rajapur.
111. I. P. Mission Industrial School, Borsad.
112. * School of Radio Physics and Electronics, S. P. College, Poona.
113. Radio School, Poona.
114. R. H. Patuck Industrial School, Andheri.
115. Government Tanning Institute, Bandra.
116. Ideal Tailor and Cutter Institute, Ahmedabad.
117. J. N. Petit Parsee Orphanage, Bombay.
118. S. A. Boys Industrial School, Ahmednagar.
119. The Poona School and Home for the Blind.
120. David Sassoon Industrial School, Bombay.
121. Textile Technical School, Bombay.
122. * Deccan Education Society's Technical Institute, Poona.
123. * R. C. Technical Institute, Ahmedabad.
124. * F. S. Parekh Technical Institute, Surat.
125. Northcote Technical High School, Sholapur.
126. * School of Industry, Ratnagiri.
127. Mahomed Haji Saboo Siddik Institution, Bombay.
128. * V. J. Municipal Technical School, Poona.

APPENDIX D.

Centres Visited and Meetings Held, With Dates.

Centres.	Date.	Meeting with.	Witnesses Examined.
Bombay	.. 3rd July 1947	.. Committee meeting.	Mr. R. D. Satho, Head Master, Elphinstone Technical High School, Bombay.
Bombay	.. 8th August 1947	.. Committee meeting.	Mr. P. W. Dharap, Deputy Head, Electrical Engineering Department, Victoria Jubilee Technical Institute, Bombay. Mr. G. R. Bhide, General Senior Lecturer, Mechanical Engineering Department, Victoria Jubilee Technical Institute, Bombay.
Bombay	.. 9th August 1947	.. Committee meeting.	Mr. B. Sengupta, Head, Mechanical Engineering Department, Victoria Jubilee Technical Institute, Bombay. Dr. P. K. Kelkar, Head, Electrical Engineering Department, Victoria Jubilee Technical Institute, Bombay. Mr. V. H. Acharya, Head, Sanitary Engineering Department, Victoria Jubilee Technical Institute, Bombay.
Poona	14th October 1947	.. Principal and staff.	Principal V. K. Joag and staff of Sir Cusrow Wadia College, Poona.
Poona	.. 14th October 1947	.. Superintendent and staff.	Dr. G. S. Mahajani, Fergusson College, Poona. Mr. V. G. Dhavle and staff, D. E. Society's Technical Institute, Poona.
Poona	.. 14th October 1947	Principal and staff. ..	Dr. Khair, Principal, Poona Anath Vidyarthi Griha. Mr. Gangal, Superintendent, Maharashtra Mudran Shala, Poona.
Poona	.. 15th October 1947	.. Superintendent and School Committee.	Mr. R. T. Satho, Superintendent and the Chairman and members of the Municipal Technical School Committee, Poona.
Poona	.. 15th October 1947	.. Principal and staff.	Mr. J. A. Taraporevala, Principal. Professor B. B. Sarkar, Professor T. N. Tolani, and Professor Chandrasekaraya, College of Engineering, Poona.

APPENDIX D—*contd.*

Centres.	Date.	Meeting with.	Witnesses Examined.
Poona	.. 16th October 1947	Principal and staff.	Principal Dandekar, S. P. College, Poona. Professor Paranjpe, Superintendent and staff of School of Radio Physics and Electronics, Poona.
Poona	.. 16th October 1947 ..	Head Masters ..	Mr. V. K. Koparkar, Modern High School. Mr. V. N. Virkar, New English High School. Mr. S. R. Godbole, M. H. S. Sathe High School. Mr. N. V. Kinkar, Deccan Gymkhana High School. Mr. B. V. Bapat, Nutan Marathi High School. Mr. S. R. Kanetkar, Progressive Education Society's High School. Dr. Khair, Anath Vidyarthi Griha. Rev. D'Souza, Ornell High School. Rev. P. Rilkein, St. Vincent's High School. Mr. Lunn, Bishop's High School. Dr. D. D. Karve, Fergusson College. Mr. G. P. Sohoni, Raja Janarasingh High School.
Talegaon	.. 17th October 1947 ..	Manager and staff.	Manager and staff of Paisa Fund Glass Works, Talegaon.
Ahmedabad	20th October 1947 ..	Local representatives.	Mr. S. L. Handa, Superintendent, Industrial Training Workshop. Mr. R. M. Nayak, Principal, Saraswati High School. Mr. N. K. Patel, Manager, New India Engineering Works. Mr. S. G. Karandikar, Engineer, Jubilee Mills. Mr. Jinabhai Desai, C. N. High School.
Ahmedabad	20th October 1947 ..	Superintendent and staff.	Mr. B. L. Handa, Superintendent, and staff of Government Industrial Training Workshop.

APPENDIX D—*contd.*

Centres.	Date.	Meeting with.	Witnesses examined.
Ahmedabad .	20th October 1947 ..	Local Textile Representatives	Mr. Ambalal Sarabhai, Calico Mills. Mr. Gautam Sarabhai, Calico Mills. Mr. S. A. Kher, Manager, Calico Mills. Mr. B. K. Muzumdar, Arvind Mills Ltd. Mr. C. H. Desai, Manager, Arvind Mills Ltd. Mr. Babycon, Engineer, Arvind Mills Ltd. Mr. Wilson, Spinning Master, Arvind Mills Ltd. Mr. Desai, Sizing Master, Arvind Mills Ltd. Mr. Jhaveri, Dyeing and Printing Master, Arvind Mills Ltd.
Ahmedabad .	21st October 1947 ..	Local Representatives.	Mr. Dube, Chief Engineer, Jehangir Vakil Mills.
Ahmedabad .	21st October 1947 ..	Principal and staff.	Principal T. A. Desai and staff of R. C. Technical Institute.
Ahmedabad .	21st October 1947 ..	Members of the Millowners' Association.	President, eight members and Secretary of the Millowners' Association.
Ahmedabad .	21st October 1947 ..	Members of the Textile Labour Association.	President and six members
Surat	... 22nd October 1947 ...	Members of the Surat Chamber of Commerce.	Vice-president and 15 members
Surat	... 22nd October 1947 ...	Representatives of S. N. P. P. Polytechnic.	President, Parsi Panchayat. Mr. F. E. Bharucha. Mr. B. B. Pradhan, Principal, S. N. P. P. Polytechnic.
Surat	... 22nd October 1947 ...	Principal and staff.	Principal R. M. Desai and staff. F. S. Parekh Technical Institute.
Surat	... 23rd October 1947 ...	Representatives of Surat Borough Municipality.	President, other Officers, and members of the Surat Borough Municipality.
Surat	... 23rd October 1947 ...	Representatives of local industries	Representatives of the Jari Industry. Representatives of the Wire Drawing Industry. Representatives of the Textile Industry. Representatives of the Engineering Workshops.

APPENDIX D—contd.

Centres.	Date	Meeting with.	Witnesses examined.
Surat	... 23rd October 1947 ...	Local representatives.	Mr. Brown, Surat Electricity Co. Mr. B. J. G. Shastri, Industrialist. Mr. R. J. Popawala, Industrialist. Mr. K. C. Kapadia, Industrialist. Mr. N. H. Kharwar, Industrialist. Mr. R. M. Desai, Principal, F. S. Parekh Technical Institute.
Surat	... 23rd October 1947 ...	Local Philanthropist.	Dr. Saresh S. Gandhi.
Bordi	... 24th October 1947 ...	Principal and staff.	Principal and staff of Gokhale Education Society's High School.
Bangalore	... 3rd January 1948 ...	Superintendent and staff.	Mr. D. S. Venkanna and staff of the Sri Jayachamarajendra Occupational Institute, Bangalore.
Hubli	... 5th January 1948 ...	Members of the B. V. Bhoomraddi Polytechnic and local businessmen.	Mr. L. Y. Tonannavar, Director, B. V. Bhoomraddi Polytechnic, Principal Mahajan, Prof. Kankaraddi and Mr. H. F. Kathimani, Life Member, K. L. E. Society. Mr. R. V. Shirur and G. S. Yelemati,—Cotton merchants
Hubli	... 5th January 1948 ...	Members of the Head-Masters Association.	Mr. B. B. Mundapur, G. A. High School. Mr. G. B. Koppal, City High School, Hubli. Mr. S. G. Shenolikar, Karnatak High School, Dharwar. Mr. N. L. Bapat, K. E. B's. High School, Dharwar. Mr. L. K. Muzumdar, Vidyananya High School, Dharwar. Mr. R. R. Kupsad, M. H. High School, Haveri. Mr. B. P. Kaliwal, Middle School, Haveri.
Hubli	... 5th January 1948 ...	Members of the Head Master's Association.	Mr. S. V. Kalmath, M. H. High School, Gadag. Mr. S. Y. Gungol and Mr. V. S. Kollop, R. L. S. High School, Dharwar.

APPENDIX D—*contd.*

Centres.	Date.	Meeting with.	Witnesses Examined.
Belgaum ...	6th January 1948 ...	Principal and staff,	Principal G. S. Paramasivayya, and staff Lingaraj College, Belgaum.
Belgaum ...	6th January 1948 ...	Members of the Head Master's Association.	Mr. B. B. Mumdapur, Chairman of the Head Master's Association. Mr. C. V. Shirol, G. A. High School. Mr. S. B. Potdar, B. K. M. High School. Mrs. Banubai Aho, Mahila Vidyalaya. Mr. A. R. Pandit, Tallakwadi High School. Mr. Yadav, M. M. High School. Mr. Koppikar, Sardar High School. Mr. B. A. Mundas, Gokak High School. Mr. S. V. Jogalekar, Mahila Vidyalaya. Mr. C. S. Bagi, Vice-President, Lingaraj College. Mr. V. V. Jatti, Head, Science Department, Lingaraj College Mr. M. R. Molya, Secretary, Board of Headmasters.
Belgaum ..	6th January 1948 ..	Members of the K. L. E. Society	Dr. B. S. Jirge, Chairman, Board of Management, K. L. E. Society. Mr. M. S. Bagali. Mr. B. V. Jakati. Mr. R. S. Mahantahatti. Rao Sahib M. P. Wali. Mr. S. B. Kubsad. Mr. V. M. Uppin. Mr. M. R. Patil. Mr. M. B. Inamati. Dr. K. G. Mundagnur. Mr. Niyappa Auna Hattarki. Mr. V. V. Jatti. Mr. B. S. Hanchinal. Principal G. S. Paramasivayya, Secretary.
Kirloskarwadi.	7th January 1948 ..	General Manager	Mr. Shankarrao Kirloskar, General Manager and other representatives of Messrs. Kirloskar Bros. Ltd.
Kirloskarwadi.	8th January 1948 ..	Staff of Kirloskar Works.	The Managerial and Supervisory staff of Messrs. Kirloskar Bros. Ltd.
	8th January 1948 ..	Local Agriculturists.	The Agriculturists in and around Kirloskarwadi.
Ogalewadi ..	9th January 1948 ..	Managing Agent.	Mr. S. P. Ogale, Mr. V. P. Ogale, Mr. N. P. Ogale, Mr. A. P. Ogale, and Mr. S. G. Padhye,

APPENDIX D—concl'd.

Centres.	Date.	Meeting with.	Witnesses examined.
Ogalewadi ..	11th January 1948..	Head-masters of Karad and Ogalewadi.	Mr. G. S. Altekar, Chairman, Shikshan Mandal, Karad. Mr. P. N. Valavade, Tilak High School. Mr. D. P. Phatak, Kanya Shala. Mr. S. S. Vaidya, Maharashtra High School. Mr. M. S. Deshpande, M. S. High School. Mr. V. R. Joshi, Bala Vidyalaya.
Kolhapur ..	12th January 1948..	Staff of O'brien Technical Institute, Kolhapur.	Mr. J. M. Badhe, Superintendent and staff of O'brien Technical Institute.
Kolhapur ..	12th January 1948..	Hon'ble Chief Minister and Officers of Kolhapur State.	Hon'ble Mr. V. K. Bagal, Mr. M. R. Desai, Shikshana-dhikari. Mr. B. B. Latte, Secretary, Education Department. Mr. J. M. Badhe, Superintendent, O'brien Technical Institute.
Rajapur ..	13th January 1948..	Principal and staff of Private High School, Rajapur.	Principal, S. B. Kulkarni, Mr. D. J. Sardeshpande.
Ratnagiri ..	14th January 1948..	Collector and members of the Committee of Management, School of Industry, Ratnagiri.	Mr. S. P. Mohite, Collector. Mr. Y. G. H. Munshi. Mr. A. V. Modak. Mr. M. D. Joshi. Rao Bahadur R. B. Shirke. Mr. R. N. Shinde. Rao Bahadur S. N. Surve. Mr. S. L. Raje. Mr. S. S. Rajadvhaksha. Mr. S. M. Subhodar. Mr. G. G. Patankar. Mr. Y. B. Shinde. Mr. A. S. Anand. Mr. K. M. Patil.
Ratnagiri ..	14th January 1948..	Superintendent and staff of the School of Industry, Ratnagiri.	Mr. K. M. Patil and staff.
Bombay ..	8th and 9th November 1948	Committee Meeting.	
Bombay ..	31st December 1948	First editing Committee Meeting.	
Bombay ..	17th, 18th, 19th and 20th February 1949.	Second Editing Committee Meeting.	
Bombay ..	18th March 1949	Final Committee Meeting.	

APPENDIX E.

Part-time Trade or Industrial courses for Men and Women.

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|--|--|
| 1. Carpenter. | 36. Armature Winder. |
| 2. Wood carving. | 37. Radio Maintenance. |
| 3. Furniture & Cabinet Making. | 38. Wireless Operator. |
| 4. Wood-turning & Lacquering. | 39. Telephony. |
| 5. Motor Body Building & Upholstery. | 40. Motor Mechanic. |
| 6. Smith (Black, Tin & Copper). | 41. Engine Artificer. |
| 7. Foundryman. | 42. Air-conditioning & Refrigerator
Mechanic. |
| 8. Draughtsman. | 43. Masons & Bricklayers. |
| 9. Turner. | 44. Plumbers. |
| 10. Fitter. | 45. Surveyors. |
| 11. Grinders. | 46. Aircraft Operation. |
| 12. Machinist. | 47. Aircraft construction & Repair. |
| 13. Tool Maker. | 48. Watch Repair. |
| 14. Vulcaniser. | 49. Horology. |
| 15. Welder (Gas & Electric). | 50. Optician. |
| 16. Boiler Maker. | 51. Glass Blower. |
| 17. Boiler attendant. | 51. Ornamental Glassware Design. |
| 18. Boiler Inspection. | 52. Cine Projection. |
| 19. Ship Building. | 53. Painting & Interior Decorating. |
| 20. Wiremen. | 54. Laundrywork. |
| 21. Electrician. | 55. Typist, Steno and Clerk. |
| 22. Spinner. | 56. Hair Dressers. |
| 23. Weaver. | 57. Boot Maker, & Leather Goods. |
| 24. Dying & Calico Printing. | 58. Bakery. |
| 25. Textile Designer. | 59. Canteen Worker. |
| 26. Book Binder. | 60. Nursing. |
| 27. Compositor. | 61. Midwifery. |
| 28. Printing Machine Operator. | 62. Knitting. |
| 29. Colour Printing. | 63. Embroidery & Fancy Work. |
| 30. Lithography. | 64. Domestic Science. |
| 31. Block Maker. | 65. Costume Tailoring. |
| 32. Colour Photography. | 66. Animal Husbandry. |
| 33. Cable Jointer. | 67. Horticulture. |
| 34. Overhead Linemen & Faultmen. | 68. Sericulture. |
| 35. Instrument Mechanic. (Mechanical,
Electrical & Scientific). | |

APPENDIX-F—contd.

Occupations in which women could replace men...	Business Training for Girls & Women.
1. Book-binding, gilding & decorating	1. Salesmanship.
2. Envelope manufacture.	2. Religious, Charity & Welfare workers
3. Tag manufacture.	3. Librarians.
4. Paper industries.	4. Teachers.
5. Paper bag or box manufacture.	5. Decorators & Designers.
6. Cardboard box manufacture.	6. Draftsmen & Tracers.
7. Candy Factories.	7. Dressmakers.
8. Clothing industries.	8. Upholsterers.
9. Knitting mills.	9. Photographers.
10. Lace & Embroidery Mills.	10. Compositors.
11. Linen & Silk Mills.	11. Block makers.
12. Paint, Varnish & Colour manufacture.	12. Commercial Artists & Sign Writers.
13. Food (Tinned & Preserved) Industries.	13. Mat & Carpet Weavers.
14. Pharmaceutical Industries.	14. Watch Repairers.
15. Ferrous & Non-ferrous metal Industries.	15. Compounders.
16. Automotive & Electrical Industries.	16. Launderers.
17. Dyeing, Bleaching & Calico printing.	17. Nursing & allied Medical Occupations.
18. Tanning & Leather industries.	18. Insurance agents.
19. Plaster & Clay industries.	19. Estate agents.
20. Wireless apparatus industries.	20. Stock & Share brokers.
21. Refrigerator & Air Conditioning Factories.	21. Laboratory attendants.
22. Toys manufacture.	22. Surveyors & Estimators.
23. Mat, Carpet, Hat & Cap industries.	23. Cooking, Catering & Speciality Service.
24. Litho & Power Printing Machine Industries.	24. Textile Designers.
25. Match Industries.	25. Cosmetology & Beauty Parlour Practice.
26. Oil & Soap Industries.	26. Millinery & Flower making.

APPENDIX F.

Art and Industries Centre.

ESTIMATED COSTS OF UNITS.

Industrial Art.	Articles likely to be made.	Equipment.	Staff.	Approximate Expenditure Per Annum.
1. Carpentry (20 pupils)	Simple joints, wedge, paper, weight, door, handles, foot-rule, round ruler, name board, hat and coat rack, key board, letter file, wall bracket, book rack, stool, ping pong bats, book rest sitting plank (pats), roti pat and roller, tea tray, towel rail.	10 Work benches, 10 Bench vises, 20 sets of hand tools 1 Power saw, 1 power planer, 5 water grinding stones, 10 Oil stones, 5 Cupboards, 5 racks, 10 rip saws, 10 tennon saws, 10 keyhole saws, 20 mallets, 20 joiner's hammer 10 G Cramps, 5 joiner's cramps 5 glue pots.	1 Instructor 1 Hammal	Raw Material— Rs. 4050 Staff salary— Rs. 1452 Equipment— Rs. 10,220
2. Wood Carving. (10 pupils)	Chip carving and other decorative carving in relief. Making wooden animals and human forms.	10 sets of hand tools, 1 water stone, 4 oil stones, 2 cupboards, 2 racks, 10 mallets, 10 hammers— $\frac{1}{2}$ lb.	1 Instructor 1 Hammal	Raw material—Rs.1350 Staff—Rs. 1452 Equipment— Rs. 2450
3. Fret-Work (20 pupils)	Picture and photo frames, animal and bird forms, jig saw puzzles, pen rack, paper rack, trinket boxes, toys and models.	10 treadle fret saws, 20 hand fret saws, 1 gross saw blades, 20 bench clamps, 10 work benches, 3 cupboards, 5 racks, 20 braces with bits, 5 glue pots.	1 Instructor 1 Hammal	Raw material— Rs. 2700. Staff—Rs. 1452 Equipment— Rs. 4280
4. Metal platework. (10 pupils)	Cutting, punching, pressing, bending, beading, soldering, brazing, etc., in the making of square, rectangular and round tin boxes of various sizes for boot polish, biscuits.	5 Hand screw presses, 1 power shear, 5 hand punching machines, 20 soldering irons, 20 sets of hand tools such as— shears, hammers, mallets compasses, punch foot rule.	1 Instructor 1 Hammal	Raw material— Rs. 1080. Staff—Rs.1812 Equipment— Rs. 19,520.

APPENDIX F—*contd.*

Industrial Art.	Articles likely to be made.	Equipment.	Staff.	Approximate Expenditure. Per Annum.
	cigarettes, etc.	try square, etc., 5 work benches, 2 cupboards, 2 racks, 5 gas stoves.		
5. Art Metal Work. (10 pupils)	Carving and etching on brass and copper sheets and vessels, and filling them with coloured lacquer and enamels.	10 sets of hand tools, 5 work benches, 5 hand lathes, 2 cupboards, 2 racks, 5 buffing and polishing machines.	1 Instructor, 1 Hammal	Raw Material— Rs. 810. Staff—Rs.1452 Equipment— Rs. 3720.
6. Black Smithy. (20 Pupils)	Nails, flat spoons, knives, sickles, khurpies, chisels, tongs, door handles, window hooks, chains, segree, cocoanut scraper racks and stands for household utensils.	1 power hacksaw, 1 power blower, 10 smith's hearths, 20 sets of hand tools, 2 swage blocks, 20 anvils (1 owt.) 5 lb. sledge hammers (10 nos.) 20 sets of fullers, top and bottom swages, tongs, hammers, cold chisels, drifts, punches, etc. 3 cupboards, 5 racks.	1 Instructor, 2 Hammals	Raw Material— Rs. 4050. Staff—Rs.1700. Equipment— Rs. 12,000.
7 House Wiring and Jointing. (20 Pupils)	Simple joints, soldering joints, attaching lugs to wires. Rinding wires on to insulators. Simple house wiring for single, two and three point controls, pendant fixings, tests for faults.	6 doz. single and two-way switches and intermediate switches. 3 doz. Twinnobs 6 doz. different types of lamp holders, 5 gross, two, three and four wire cleats, 2 gross, round wooden blocks, 1 gross rectangular blocks, 6 coils, 1/18 V. I. R. wire, 2 coils, 3/32 C. T. S. wire, 2 gross wood screws of 1 1/2", 1 1/4", and 2", No.6.	1 Instructor, 1 Hammal.	Raw Material— Rs. 2160. Staff—Rs.1812. Equipment— Rs.7220.

APPENDIX F—*contd.*

Industrial Art.	Articles likely to be made.	Equipment.	Staff.	Approximate Expenditure Per Annum.
		20 sets of hand tools, 20 soldering irons, 10 gas stoves, 5 cupboards, 5 racks, 20 4'x4' wall boards, (Deal) 20 brace with bits, 2 Meggers, 5 bell and battery testers, 1 gross carbon filament lamps, 6 doz. metal filament lamps (40 w), 1 black board.		
8. Cardboard Modelling (10 Pupils)	Greeting cards, file covers, calendar cards, soap boxes, rectangular boxes for shoes, sweets, pharmaceuticals, etc., photoframes and mounts, letter case, blotting pad, stencil cutting, templet making, toy houses and furniture, presses card trays of different sizes and shapes, lamp shades in coloured cards.	1 Hand shearing machine, 10 sets of hand tools, 5 glue pots, 10 wooden vises, and Cramps, 5 screw hand presses of different sizes, 1 black board, 4 work benches, 10 stools.	1. Instructor 1 Hammal	Raw Material—Rs. 500. Staff—Rs. 1452. Equipment—Rs. 7820.
9. Book-binding (10 Pupils)	Close and open binding, section binding, finishing with flexible and stiff covers, pasting on different coloured marbled paper, calico and leather, decorative and artistic binding, etching and ornamenting on leather and calico.	10 sets of book-binding tools and accessories, 1 hand shearing machine, 5 hand cutting machines, 2 screw presses, 5 work benches, 10 stools, 2 cupboards, 2 racks, 3 glue pots.	1 Instructor 1 Hammal	Raw Material—Rs. 500. Staff—Rs. 1452. Equipment—Rs. 7,000.
10 Artistic Leather Work (10 Pupils)	Transferring designs on leather and colouring them with different stains making of purses, handbags, valet cases, portfolios etc., with	10 sets of leather working tools and accessories 2 sewing machines 2 cupboards, 2 racks, 3 work benches.	1 Instructor 1 Hammal.	Raw Material—Rs. 1080. Staff—Rs. 1452. Equipment—Rs. 2730.

APPENDIX F—contd.

Industrial Art.	Articles likely to be made.	Equipment.	Staff.	Approximate Expenditure Per Annum.
	ZIP fastening according to requirements.	10 stools, Spirit stains and colours according to requirements.		
11 Calico Printing (10 Pupils).	Printing with Rapi-dogen and rapid fast colours and with indigosols colour, and white discharges.	5 working tables, 50 sets of hand printing blocks and accessories, 2 cupboards.	1 Instructor 1 Hammal	Raw Material— Rs. 1350. Staff—Rs. 1452. Equipment— Rs. 2000.
12. Clay and Plaster Modelling. (10 Pupils)	Different kinds of vegetables, fruits, animals and human busts.	10 sets of hand tools, 20 plaster moulds 2 racks, 1 cupboard, 3 work beaches, 10 stools, 20 clay moulds.	1 Instruc-tor 1 Hammal	Raw Material— Rs. 270. Staff—Rs. 1452. Equipment— Rs. 5000.
13. Pottery Decoration (10 Pupils)	Transferring designs on pottery and colouring them. Painting on flower vases, water pots, etc.	10 sets of hand tools and accessories, 3 work benches, 10 stools, 2 cupboards, 2 racks, 1 black board.	1 Instruc-tor 1 Hammal	Raw Material— Rs. 500. Staff—Rs. 1452. Equipment— Rs. 1730.
14. Drawing and painting (20 Pupils)	Freehand and scale drawing and colour work. Commercial art and sign board painting. Poster painting.	20 Drawing boards and T squares, 20 sets of scales and set squares, 20 instrument boxes, 20 colour boxes, 1 gross assorted colour tubes, brushes, dishes, water pots, etc, 1 gross drawing board pins, 5 drawing tables and benches, 3 cupboards, 3 racks, 1 black board.	1 Instructor 1 Hammal	Raw Material— Rs. 540. Staff—Rs. 1452. Equipment— Rs. 4600
15. Mat and Carpet Weaving (10 Pupils)	Straw and willow weaving. Carpet weaving according to set patterns and designs.	10 pit looms, 10 carpet looms, scissors, shears, sticks, shuttles, and accessories. 2 cupboards, 2 racks.	1 Instruc-tor Hammal	Raw Material— Rs. 1080. Staff—Rs. 1452. Equipment— Rs. 5600.
16 Embroidery and Fancy work	Hand embroidery, Different types of stitches used. Transfer of	20 embroidery frames and accessories. 2 cupboards.	1 Instruc-tor 1 Hammal	Raw Material— Rs. 1080. Staff—Rs. 1452.

APPENDIX F—concl'd.

Industrial Art.	Articles likely to be made.	Equipment.	Staff.	Approximate Expenditure Per Annum.
(20 pupils)	designs on cloth. Preparation of table cloth, tea-poy cover, cushion cover, pillow cases, and other useful articles. Patch work, Applique, with different cut pieces of coloured cloth. Fancy stitching. Drawn thread work.	1 black board		Equipment— Rs. 1000.
17. Knitting (10 pupils)	Crotchet, shuttle and needle work in the making of laces, blouse pieces, sleeves, etc. Making Socks, pullovers, caps, etc.	10 sets of knitting needles and accessories. 2 cupboards.	1 Instructor 1 Hammal	Raw material— Rs. 500. Staff—Rs. 1452. Equipment— Rs. 800.
18. Simple Tailoring (20 pupils)	Different stitches. The sewing machine—its care and operation. Cutting paper patterns for chaddi, jabla, sailor suit, umbrella, frook, blouses, pyjama, etc. Making any or all of the above items according to ability and taste, of the pupils.	10 sewing machines, 20 sets of Scissors and tailor's accessories, 5 Drafting tables, 10 stools, 3 cupboards, 2 racks, 1 black board.	1 Instructor 1 Hammal	Raw Material— Rs. 1620. Staff—Rs. 1452. Equipment— Rs. 7000.

Note.

- Each unit will accommodate at a time the number of pupils given under each craft. Each centre is expected to work for 6 hours a day for three shifts, at two hours per shift.
- The head of the centre, the supervisory and other staff required, will depend upon the size and capacity of each centre.
- Cost of land and buildings will depend upon the accommodation required for offering instruction in a stipulated number of crafts. Approximate floor areas for different kinds of shops are given in APPENDIX—K.
- The salaries of staff do not include dearness and other allowances and contribution to the Provident Fund. The recurring expenditure has not been computed to include conservancy charges, pay of watchmen, electricity charges and office contingencies.
- Each centre will have one central stores section from which all the necessary tools and raw material will be drawn for purposes of instruction and the finished products and tools returned to the stores at the end of the day's work.

APPENDIX G.

Technical High School.

(Estimates of costs. Recurring and non-recurring) (40 pupils in each standard.)

I CAPITAL EXPENDITURE.

1. (a) <i>Building.</i>		sq. ft.
4 class rooms (Standards IV to VII) ..	20' × 20' × 4 =	1600
1 Physics and Chemistry Lab. ..	45' × 30' × 1 =	1350
1 Science lecture room ..	25' × 20' × 1 =	500
1 Applied Mechanics Lab. ..	40' × 20' × 1 =	800
1 Applied electricity Lab. ..	45' × 25' × 1 =	1125
1 Drawing Office ..	30' × 20' × 1 =	600
1 Carpentry shop ..	45' × 25' × 1 =	1125
1 Machine and Fitting shop ..	108' × 40' × 1 =	4320
1 Smithy and Foundry shop ..	60' × 40' × 1 =	2400
		<hr/> 13,820 sq. ft.
(b) Principal's office, Office rooms, staff room, library, museum, store room, sanitary accommodation, etc. ..		According to standard sizes for academic high schools.
		Approximate area = 6,180 sq. ft.
(c) Hostel, conservancy, bathrooms, mess, etc. (according to size and capacity)		Approximate area = 5,000 sq. ft.
		<hr/> Total area = 25,000 sq. ft.
		Rs.
2. (a) Class rooms, laboratories, workshops and office buildings. (20,000 × Rs. 10/- per sq. ft.) ..		2,00,000
(b) Hostel, mess, bath, etc. (5,000 × Rs. 10/- per sq. ft.) ..		50,000
(c) Furniture and fittings for class rooms, laboratories and Workshop,		Rs.
4 class rooms ..		8,000
1 Physics and Chemistry Lab. ..		4,000
1 Science lecture room ..		1,200
1 Applied mechanics Lab. ..		2,000
1 Applied electricity Lab. ..		2,000
1 Drawing office ..		2,000
1 Carpentry shop ..		2,500
1 Machine shop ..		800
1 Fitting shop ..		1,500
	Rs. ..	<hr/> 24,000
		Rs.
(d) (i) Furniture for Principal's office, office rooms, library, and staff rooms ..		15,000
(ii) Museum, store room, etc. with fittings ..		7,000
(e) Hostel furniture, utensils, etc. ..		7,000
(f) Gymkhana room ..		1,200
		<hr/> 30,200

APPENDIX G—contd.

WORKSHOP AND LABORATORY EQUIPMENT.

3. (a) Carpentry shop	Rs.
Set of carpentry tools for 20 pupils	2,000
Miscellaneous equipment	500
(b) Fitting shop	4,000
(c) Machine Shop	Rs.
1 small shaper	5,000
2 Sliding, surfacing and screw cutting lathes, 8' .. bed with individual electric drive	10,000
8 Sliding, surfacing and screw cutting lathes, 3½' .. bed with individual electric drive	24,000
1 Pillar drilling machine	1,500
1 small drill press	500
1 Hacksaw machine	1,000
1 Tool grinder	1,000
Tools and instruments	5,000
(d) Smithy and Foundry	
5 Hearths	2,000
Blower, pipes, vales, etc.	2,000
10 Anvils	2,000
Smithy tools	1,500
1 small cupola with blower, pipes etc.	6,000
Moulding boxes, ladles, tools, etc.	1,000
(e) Physics and Chemistry laboratory apparatus and chemicals	8,000
(f) Applied mechanics laboratory apparatus	8,000
(g) Electric wiring and erection charges	5,000
(h) Miscellaneous stores	800
	<hr/>
Total (3-a to h)	90,800

APPLIED ELECTRICAL LABORATORY.

4. 2 A.C.-D.C. motor generator sets complete with starter, etc.	Rs.
1 Battery charging set	5,400
1 A.C.-D.C. motor generator set	1,700
1 A.C.-D.C. motor generator set	2,500
1 D.C. series motor, 2 B. H. P.	800
5 Transformers	1,000
4 Post office boxes	1,000
Ammeters, voltmeters, Megger, and other meters and measuring instruments and resistances	6,600
Miscellaneous stores	1,000
Wiring and erection charges	3,000
	<hr/>
Total	23,000

Grant total—(Items-1, 2, 3 and 4 above) Rs. 418,000

II RECURRING EXPENDITURE.

(a) Teaching Staff.	Rs.
1 Head Master (Rs. 435x12)	5,220
1 Technical Superintendent (Rs. 310x12)	3,720
6 Graduate Teachers (Trained) (Rs. 140x6x12)	10,080

APPENDIX G—*contd.*

	Rs.
1 Technical Draughtsman (Rs. 140 x 12) ...	1,680
1 Assistant Engineering Superintendent (Rs. 140 x 12) ...	1,680
Total Rs.	22,380

(b) Office Staff.

2 Office clerks (Rs. 81x 2 x 12) ...	1,944
1 Accountant (Rs. 81 x 12) ...	972
1 Store-keeper (Rs. 81 x 12) ...	972
2 Peons (Rs. 40 x 2 x 12) ...	960
Rs.	4,848

(c) Workshop and Laboratory staff.

1 Foreman ... (Rs. 90x12) ...	1,080
1 Turner ... (Rs. 81x12) ...	972
1 Fitter ... (Rs. 81x12) ...	972
1 Black-smith ... (Rs. 81x12) ...	972
1 Carpenter (Pattern maker) ... (Rs. 81x12) ...	972
1 Moulder ... (Rs. 81x12) ...	972
1 Electrician ... (Rs. 81x12) ...	972
1 Wireman ... (Rs. 81x12) ...	972
1 Laboratory Assistant ... (Rs. 81x12) ...	972
6 Workshop Assistants (Rs. 50x6x12) ...	3,600
2 Hammals ... (Rs. 40x2x12) ...	960
Rs.	13,416

(d) Provident fund contribution on salaries under II (a), (b) and (c) above at 8½ per cent ...	3,379
(e) Scholarships and Prizes ...	3,000
(f) Material for workshop and miscellaneous stores ...	6,850
(g) Office contingencies ...	1,000
(h) Rents and Taxes ...	3,700
(i) Electricity ...	627
(j) Games and Sports ...	1,400
Rs.	19,956

Grant total Items-II (a), (b), (c),
(d), (e), (f), (g), (h), (i),
and (j) above ...

Rs. 60,800

Notes.—

(i) Average pay in the scales recommended in Table No. 14 has been taken for computing the salaries of staff.

(ii) The recurring expenditure does not include conservancy charges, dearness and other allowances, which will be admissible as per rules of Government in force from time to time.

APPENDIX G—concl'd.

Summary of Capital Cost and Recurring Expenditure for a Tech. High School.

I. CAPITAL EXPENDITURE.		II. RECURRING EXPENDITURE.	
1. <i>Land</i>			Rs.
A minimum of 2 acres of land would be required to house the school buildings, workshops, hostel and a playground.	The cost is not worked out as the price of land varies according to locality.	(a) Teaching staff ..	22,380.
		(b) Office Staff ..	4,848.
		(c) Workshop and Laboratory Staff. ...	13,416.
2. <i>Buildings.</i>			
	Rs.	(d) Provident Fund ..	3,379.
(a) Class rooms, Laboratories, workshop and offices.	2,00,000.	(e) Scholarships and Prizes	3,000.
(b) Hostel, mess, etc. ..	50,000.	(f) Material for workshops and miscellaneous stores	6,850.
(c) Furniture and Fittings.	24,000.		
(d) (e) and (f) Do. ..	30,200.		
3. <i>Workshop and Lab. Equipment.</i>			
(a) Carpentry shop,		(g) Office contingencies	1,000.
(b) Fitting shop,			
(c) Machine shop,		(h) Rents and Taxes ..	3,700.
(d) Smithy and Foundry,			
(e) Physics and Chemistry Laboratory,		(i) Electricity ..	627
(f) Applied Mechanics Laboratory,			
(g) Wiring and Erection charges, and		(j) Games and Sports ..	1,400.
(h) Miscellaneous stores ..	90,800.		
4. Applied Electrical Laboratory.			
Equipment ..	23,000.		

Grant Total ..	Rs. 4,18,000.	Grant Total ..	Rs. 80,600
	_____		_____

APPENDIX H.

List of Equipment for a Mechanical Engineering Workshop and Allied Trades.

(For a class of 20 students)

Pattern making, Carpentry, Woodwork.

Description	Nos. reqd.	Rate Rs.	Total cost Rs.
Work benches, 8'x3'x2' high	12	100	1,200
Grinding wheel, with stand. size: 4"x18" dia. (water)	1	100	100
Sharpening Stone. (Emery)	2	5	10
Oil stone, smooth or blue hone. 8"x2"x1"	1	6	6
Wood turning lathe, max. capacity 6" dia. x 4'-0" bed. Complete with self-driven motor to suit 3 phase A.C. supply, 400 volts, 50 cycles	2	1,600	3,200
Set of turning tools, for wood turning (12 Tools)	2 sets	24	48
Circular Bench Saw. Dia. of Saw—12", complete with motor drive to suit 3 phase A. C. supply, 400 volts, 50 cycles. (one spare Circular-saw)	1	2,500	2,500
Wood working vices 9"	20	40	800
Set of carpentry tools. Chisels $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", 1". Pairing chisels and gouges. $\frac{1}{4}$ ", $\frac{1}{2}$ ". Box-wood four fold foot-rule. 24" Marking gauge, Saw, 12" Wooden Mallet, Wooden plane. 9" Dividers, Joiners hammer	22 sets	40	880
Files, rasp for wood filing. 10"	20	3	60
File, Triangular 6" long	20	2	40
Hand Saws. 24", 18", 12"	1 set	10	40
Cross Axes. 3" width	2	8	16
Jack-iron Planes Stanley's 14" x 1 $\frac{1}{2}$ "	2	40	80

FOUNDRY AND SMITHY.

Anvil 2 Cwt. each	10	150	1,500
Forge, complete with stand	10	250	2,500
Sledge hammers. 8 lbs. with handles	10	8	80
Ball pene, Hammer 1 lb. with handle	10	3	30
Ball pene Hammer 1 $\frac{1}{2}$ lbs. with handle	20	4	80
Swage block C. I.	1	200	200
Chisels Cold	22	3	66
Smith's tools	22 sets	100	2,200
Try Squares, 6" long	22	4	88
Inside and Outside Calipers. 12"	22 pairs	4	88
Water Tanks (C.I.)	12	100	1,200
Moulding Boxes various types and sizes	30	900	900
Moulding tools	22 sets	100	2,200
Showels with handles	5	5	25
Buckets, Galvanised	4	5	20
Kodalies with handles	2	5	10
Watering can	2	6	12
Pick-axe	1	8	8
Pressed Steel Pans (Ghamelas)	10	3	30
Mallets, Wooden	5	1	5
Motor Blower (Centrifugal) complete	1	1,500	1,500
Mason's Trowels (small size)	3	2	6
Moulding sand	15 Cwts.	15	225
Hand sieves, 18" Dia. medium and fine mesh	20	5	100
Materials for preparation of sand	50
Pit Furnace 1 cwt. capacity	500

APPENDIX H—contd.

DRAWING OFFICE EQUIPMENT.

Description.	Nos. Reqd.	Rate	Total amount.
Drawing Boards 24"x15". (½ Imp. size)	20	10	200
'T' Square to match	20	4	80
Set Squares Celluloid			
45°—8" or 6"	20 sets	4	80
60°—8" or 6"			
Draughtman's scales			
12" long. (wooden)	20	3	60
Steel rule 6" marked in inches and millimetres	10	3	30
Set of card scales	20	2	40
Drawing office tables with Stools.	20	150	3,000
Drawing instrument Boxes	22	50	1,100
Cartridge or Drawing Paper.			
Drawing Pins. Brass.	2 gross	3	6
Drawing Pencils, HB			
Drawing Pencils H	20 sets	18	90
Drawing Pencils 2H			
Indian Ink bottle (black)	3	1	3
Pencils Erasers	2 Doz.	3	6
Brushes, Camel hair, No. 3	6 Nos.	2	12
Water colour boxes	2	3	6
Blue-Printing frame	2	75	150
Drawing Paper, Printing Paper, Tracing Paper, Indian Ink, etc. to be procured according to demand.			

MECHANICAL ENGINEERING WORKSHOP

Lathes, sliding, surfacing and screw cutting, 6½" centre, 4 feet gap bed, complete with accessories such as faceplate, chuck, centres, tool holder, counter-shaft speeds and motor drive for 3 phase A.C. supply.	6	3,500	21,000
Planing machines small 4 feet table, 2'-0" feet width of table, complete with tool holder, motor drive for 3 phase A. C. supply	1	5,000	5,000
Drilling machine, Pillar or radial type. Max. capacity 1" to 1½", with motor drive for 3 phase A. C. supply.	1	2,500	2,500
Small pillar drilling machine, capacity ½" to 1/32" with motor drive	1	600	600
Shaping machine 1 foot stroke, complete with table and accessories and motor drive	4	3,000	12,000
Universal milling machine complete with access- ories and motor drive.	1	6,000	6,000
Tool grinder, Double wheel with stand and motor drive	1	2,000	2,000
Micrometer screw gauge Capacity 0 to 1"	2	80	160
Drill sockets for Morse taper shanks ¼" to 1½"	1 set	200	200
High speed steel tools	30	15	450
Plain carbon steel tools ¼" or ⅜" sq.	60	5	300
Twist drills with Morse taper shanks 3/16" to 1½" and parallel shanks 1/32" to ¼"	2 sets	100	200
Steel rules 6" long with inches 1/96, 1/64, 1/32, 1/16, 1/8, 1/10, 1/100 and in millimeters	25	2	50
Steel rules 12" long	3	4	12
Steel rules 18" or 24" long	1	5	5
Machine Saw (Hack Saw machine)	1	500	500
Calipers, outside and inside 9" long	20 sets	5	100

APPENDIX H—concl.

Description.	Nos. Reqd.	Rate Rs.	Total Cost.
Scribing block	5	40	200
Slide Caliper with vernier scale to measure dia. up to 4"	2	20	40
B. S. Whit. Dies and stocks 1/16" to 1 1/2" complete set	1 set	500	500
Taps with handles complete set Whit. 1/16" to 1 1/2"	1 set	150	150
One set B. A. taps and dies	1 set	120	120
Pipe Threads—Dies and taps 1/2" to 1 1/2" complete	1 set	900	900
Fitters benches. 6 ft. x 2'-6" x 2 ft.	10	100	1,000
Parallel vices 6" quick opening	10	60	600
Steel straight edge 4 ft. long.	1	10	10
Double ended spanners to suit B.S.W. Nuts 1/2" to 1 1/2"	4 sets	50	200
Feeler gauges .0015" to .050"	2 sets	10	20
Girder spanner 9" long	4	5	20
Girder spanner 4 1/2" long	2	5	10
Box spanners, complete set for B. S. W. nuts 1/2" to 1 1/2"	2 sets	40	80
Spirit level 12"	1	10	10
Screw Driver. 6", 12" and 18"	3 sets	3	27
Knurling tool	1	20	20
Ball pene hammers 1 1/2 lbs.	10	4	40
Ball pene hammers 1 lb.	2	4	8
Try squares 10"	1	4	4
Try squares 6"	10	4	40
Bevel protractor	1	10	10
Fitters tools, chisels etc.	24	2	48
Centre punches, steel	10	2	20
Hack saw frames different sizes	20	3	60
Hack saw blades assorted	1 gross	20	240
Bastard cut, smooth and rough files, flat, square, round, halfround, triangular and one or two with one edge smooth, without any cut (20 Nos.) each	3 sets	80	240
Handles for files wooden	6 Doz.	5	30
Emery grinding wheel 9"	1	100	100
Tinman's Hand shears, small 9"	2	15	30
Tinman's Hand shears for plates 1/2" thick	1	100	100
Milling cutters. Plain surface mills, Side mills, and gear cutters 14 D. P. one set complete	1 set	500	500
Slitting saws 1 1/2" and 1"	2	25	50
Tachometer, Dial type	1	50	50
Stop Watch	1	100	100
Wooden cupboards with shelves 6' x 3' x 18"	5	150	750
Cupboards for students	4	200	800
Superintendent's table with revolving chair, book rack and side table. Complete set	1 set	500	500
Office tables for clerks, staff, etc.	42	75	900
Chairs for office, library, visitors room, etc.	20	20	400
Stools for Laboratory, etc.	12	10	120
Benches for students	24	30	720
Desks for students	24	100	2,400
Workshop cupboards and students lockers	10	100	1,000
Office equipment (minor items)	...	500	500
Office steel safe	1	400	400
Show case cupboards	4	200	800
Visitors table and library table	2	400	800
Students dining tables	2	50	100
Steel filing cabinet	1	200	200
Steel or wooden rack	4	75	300

APPENDIX I.

Cost of Equipment for Automobile Course.

Description.	No.	Approx. Cost
		Rs.
Motor Car	1	5,000
Stationary Motor Car engine complete with transmission arrangements. (Chassis) Four different makes.	1 set	20,000
Sectioned model of complete chassis with engine and transmission arrangements.	1	8,000
Different types of Carburettors, distributors, fuel pumps, ignition systems, lighting systems, etc. (complete set).		3,000
Motor Compressor set and servicing appliances ...		6,000
Valve grinding cutters, pressure guage, Boring machine, Honning tools, etc.		2,500
Hand tools and accessories, other tools, etc.	6 sets	1,200
Hydraulic hoists.		2,000
Books		500
Charts showing different makes of Cars and commercial vehicles with their particular systems of ignition, fuel, brake, etc.		300
Total ...		48,500

APPENDIX J.

List of Equipments for a few Courses.

1. AUTOMOBILE REPAIR :	Charts depicting different :-
10 STUDENTS.	(a) Makes of Cars.
Pair of Pliers. Combination type 10	(b) Ignition Systems.
Hammer. Ball pene 1½ lbs ... 10	(c) Brakes.
Screw Driver. 10" long, ¼" and ⅜" blade 20	(d) Fuel Systems.
Flat Chisel ⅜" 10	(e) Wiring Diagrams etc.
Box Spanner 3/16" to ¼" with a tomy 2 sets.	Work Benches with lockers. (8' x 3' x 2') 5
Double Ended Spanners 3/16" to ¼" 2 sets.	Universal Valve Grinder ... 1
Adjustable spanners. 10" ... 4	Oil Injector 1
Feeler Gauges 2, 3, 4, 6, 8, 10, 12 and 15 thousands of an inch 1	Honning Machine (With electric drill) 1
Steel rule 12" with inches and millimeters 10	Cylinder Gauge 1
Calipers 6" inside 10	Valve Cutters 1 set
Calipers 6" outside... .. 10	Magneto Tester 1
Dividers 6" 10	Battery Tester 1
Hermaphrodite calipers ... 10	Tyre and Rim service Wrenches 2 sets
Thread pitch gauges. Whitworth & Auto 2 sets	Grease Guns 2
Ring Spanners from ¼" to ¾" ... 2 sets	Compression Tester 1
Cross-cut Chisel ⅜" ... 10	Hydrometers 2
Vernier Calipers 6" ... 4	Foot Pump 1
Micrometer 0" to 1" ... 2	Hand Pump 1
Hackshaw 12" adjustable ... 4	Motor Compressor set 220 V. A. C., S. P. output about 10 c. ft./mt. (with reservoir) ... 1
Combination square with Bevel Protractor 1	Hydraulic Jack (lift) for Servicing 1
Dial Tachometer 1	Condenser 1
Motor Car. (Ford or any other model) 1	Universal Wheel Puller ... 1
Stationary Petrol Engine with all accessories 1	Tyre Pressure Guage ... 2
Section Models of :	Soldering iron, (ordinary) ... 1
(a) Engine	Soldering iron, (electric) ... 1
(b) Transmission Gear.	Bench Vices. (Fitters) ... 10
(c) Clutch.	Bench Drilling Machine ½" capacity 1
Cylinder Reborer. (Motor driven) 2	Cupboards 6' x 3' x 1½' ... 2
Carburettors :-	
(a) Zenith,	
Claudel, Hobson and other makes.	

APPENDIX J—*contd.*

MOTOR BODY BUILDING AND UPHOLSTERY : 10 STUDENTS.		Magnetic Hammer for Upholstery 1 or 1½ lbs.	4
Work Benches with lockers. (8'X3'X2')	5	Leather Sewing Machine. (Medium Type).	1
Bench Vices 8" Jaws.	3	Oil Cans.	2
Trestles.	2	Hand Bench Grinder 6" or 8" Wheel.	1
Brace with Bits and Centre Bit.	2	Oil Stones 6"X2"	2
Joiners Cramp 8 ft.	2	Screw Drivers ¼" blade.	5
G. Gramps 8"	2 pairs	Screw Drivers ½" blade.	5
Adzes.	2	Screw Drivers ¾" blade.	5
Light Bench Axes.	4	Double Ended Spanners ½" to 1¼".	2 sets.
Hand Saws 2'—0"	5	Box Spanners ¼" to 1"	2 sets
Compass Saw 18".	3	Lucas Girder (minor) spanners.	2
Key Hole Saw 9".	5	Lucas Girder. (major)	2
Mallets.	10	Tin Shear 12"	2
Jack Plane 1¼" blade.	10	Soldering iron 1 lb.	1
Smoothing plane 1½" blade.	10	Soldering iron (electric) 500 Watts.	1
Round Sole plane 1½" blade.	10	Cupbeards. 6'X3'X1¼'	2
Rabbit plane, Bevel, Crooving, Tongue, Round.	1 of each.		
Firmer Chisels ¼", ½", ¾", and 1"	10 sets.		
Firmer gouges. 1" and ½"	4 sets.		
Joiners hammers 1 lb. (with nail pillar).	10	SPRAY PAINTING : 10 STUDENTS.	
Light Hammers 8 ozs.	10	Motor Compressor set with air receiver, 2 H. P. motor 220V.	
Bradawls.	10	A. C., S. P. Complete.	1
Gimlets ½", ¾", 1", 1½"	2 sets	Spray Cans.	10
Augers ¼", ½", ¾"	2 sets	Sets Nozzles,	5
Spoke Shaves.	4	Colour (Paint) Containers.	5
2'—0" Box Wood four fold foot rule.	10	Exhaust fan. Motor driven.	
Pair of Dividers 6"	10	1 H. P. 220 V. A. C., S. P.	1
Glue Pots.	2	Dow Files 10" smooth.	5
Try Squares 6"	10	Stones for removing colour and for Scraping body.	10
Masons Square 2'—0" blade.	1	Cupboard. 4'X2'X1¼'.	1
Marking Gauge	10		
Primus Stove (Etna Burner.)	1		

APPENDIX J—contd.

VULCANISING: 10 STUDENTS.

Motor Compressor set with Reservoir (220 V. A. C., S. P.) 1/2 H.P.	1
Buffing Machine with Motor.	1
Portable Electric Wire Brush.	1
Tube Plate. (4 Clamps.)	1
Spot Patchers.	5
Tyre Vulcanising Moulds of different standard sizes with air pads.	5
Air Bags of 6 different sizes.	2 of each
Rollers 2" x 2".	2
Tyre Spreader.	1
Corrugated Ball Bearing Stitcher.	2
Smooth B. B. Stitchers.	2
Valve Nut Wrenches.	2
Round Noze Rasps.	2
Small Emery Wheels.	2
Rex File (Rat tail rasp.)	2
Flexible Rule 3'—0".	2
Goggles.	4 pairs.
Sand-Stone 6" x 1".	2
Buffing Brush.	4
Rubber Cutting Shears.	2
Tyre Probe.	2
Flexible Knife.	1
Pointed Knife.	1
Notched Knife.	1
Hollow Ground Rubber Knife.	1
Pair of Pliers.	1
Valve Punch.	1
Pricking Awl.	1
Cementing Brush 3".	1
Round Cement Brush.	6
Cupboard 5' x 2 1/2' x 1 1/2'.	1

BOAT BUILDING: 10 STUDENTS.

Accessories for a steaming Kiln.	
Midship and Fore Body Moulds of various Shapes.	
Trestles.	2
Work Benches with lockers. (5' x 2 1/2').	5
Brace with bits and Centre bit.	2
Metal Clamps 6", 7", 8", and 9" Adzes.	2 of each. 5
Rip Saw, Coarse; 2 1/2'—6"	10
Panel Saws.	10
Compass Saw 18"	2
Jack Plane 1 1/2" blade.	10
Smoothing plane 1 1/2" blade	10
Round sole plane 1 1/2" blade.	2
Rabbit plane, Bevel, Grooving, Tongue, Round.	1 of each.
Mach planes.	5
Firmer Chisels 1/4", 1/2", 3/4", 1".	10 sets
Firmer Gouges 1" and 1 1/2".	5 sets
Mallets.	10
Carpenters Hammers 1 lb.	10
Light Hammers 8 ozs.	5
Bradawls. (fine).	5
Light Bench Axes.	5
Gimlets 1 1/4", 5/8", 3/4", 1", and 1 1/2" 1 set	
Augers. 1/2", 3/8", 1/4".	2 sets
Spoke Shaves.	2
Draw Knives.	2
Electric Hand Drill 1/2" capacity. (Portable).	1
Bench Vices 8" Jaws.	10
2 ft. foot rule four fold (wooden.)	10
Pair of Dividers 6".	10
Straight Edge Steel 4'—0".	2
Cupboard 5' x 2 1/2' x 1 1/2'.	1

APPENDIX J—*contd.*

CARPENTRY: 10 STUDENTS.	AGRICULTURAL CARPENTRY And Smithy: 10 STUDENTS.
Work Benches with lockers (6'X2½'X2')	5
Hand Saws 18"	10
Tennon Saws.	10
Jack Planes 1½" blade	10
Smoothing planes 1½" blade.	10
Round Sole planes 1½" blade.	5
Rabbit plane, tongue, grooving Bevel and Round.	1 of each.
Firmer Gouge. ½", ¾"	5 of each.
Firmer chisels ½", ¾", 1", 1"	10 sets
Mallets.	10
Carpenter's hammers 1 lb.	10
Light bench axes.	5
Gimlets ¼", ½", ¾", 1", and 1½"	2 sets
Augers ½", ¾", 1"	1 set.
Bradawls.	5
Spoke Shaves.	3
Draw Knives.	3
Rip Saw	2
Adzes.	3
Brace with set of bits.	2
Cramps. 6"—0"	2
G. Cramps 9"	2 Pairs
Trestle.	1
Mortice Chisels ¾"	5
Mortice Gouges.	2
Carpenter's Vices 8" Jaws.	5
Oil Sotne 9"X3"	2
2'-0" Rule, four fold, Box wood	10
Steel foot rules 12"	10
Pair of Dividers. 6"	10
Compass Saw 18"	1
Key Hole Saw 9"	5
Marking Gauges.	10
Cupboards: (5'X2½'X1½')	2
	Smiths Hearths complete with Tuyeres, Hoods, Chimneys and Water Tanks.
	5
	Anvils 2 cwts.
	5
	Motor-blower 220 V. S. P., A.C. giving out about 20 c. ft. of air per minute.
	1
	Sledge hammers, 10 lbs. with handles.
	5
	Swage Block 14"X14"X6"
	1
	Hammers 2 lbs. (with handles)
	5
	Flatteners [with handles (2"X2")]
	5
	Set hammers.
	2
	Fullers ½"X1"
	6 pairs.
	Swages tops and bottom ½", ¾", 1", and 1"
	10 pairs. 2 of each
	<i>Tongs</i> :—
	Flat Nose.
	10
	Round Nose.
	5
	Square Nose.
	5
	Bent Nose.
	5
	<hr/>
	WOOD TURNING AND
	Lacquering: 10 STUDENTS.
	Hand Turning Lathes 4" centres. 5
	Wood turning lathes 4" to 6" Centres Complete with counter shafts, stepped Cone Pulley, and belt shifting gears.
	5
	A. C. Motor 220 V. S. P., 3 H. P. with Starter etc., complete.
	1
	Bench Vices 6" Jaws.
	10
	Work Benches with lockers. (6'X2½'X2')
	5
	Wood Turning Tools of different types.
	5 sets.
	Painting Brushes Nos. 3 and 4 (Windsor and Newton).
	10 of each
	Colour Pots ½ lb. capacity.
	10
	Cupboard. (6'X3'X1½')
	1

APPENDIX J—*concl.*

<p>ELECTROPLATING AND BATTERY CHARGING 10 STUDENTS.</p>	<p>A pair of buffing machines with motor drive 220 V. A. C., S. P. 1/2 or 1 H. P. motor with 1½" shafting with buffs, pulleys and belt shifting arrangements. ... 2</p>
<p>Electroplating Vats 3' × 2' × 1½' 3 Nos.</p>	<p>Hydrometers ... 2</p>
<p>Electroplating Vats 15" × 12" × 9" 2</p>	<p>Caustic Soda Bath ... 1</p>
<p>Battery Charging Unit for 6, 12 and 24 Volts from 220 Volts A. C., S. P. supply and Vacuum Tube Type. ... 1 each.</p>	<p>Water Bath 3' × 2' × 1½' ... 1</p> <p>Acid Bath. 3' × 2' × 1½' ... 1</p>
<p>(Voltmeter-Charge-discharge type. Knife switch, D. P. D. T. Pilot Lamp on switch board. Amme- ter same as voltmeter) ...</p>	<p>Set of smooth files 6" flat, half- round and round. ... 2 sets.</p>
<p>Motor Generator set from 220 volts A. C., S. P. to 6 V, 250 amps. 1 D. C. with starter, switch board etc.</p>	<p>Cupboard 5' × 2½' × 1¼' ... 1 (Teakwood)</p> <p>Emery Papers Nos. 0 & 1 ... 20</p>

APPENDIX K.

Suggested Floor Area for different types of Shops.

Type of shop	Area in Square Feet.	
	Minimum	Adequate
Automobile	2,000	4,500
Cabinet	1,200	3,500
Carpentry	1,200	3,500
Drafting	1,000	2,000
Electrical	1,200	3,500
Industrial Arts (Unit)	1,000	1,500
Interior Decorating	1,200	3,500
Machine	1,200	3,500
Pattern	1,200	3,500
Print	1,200	2,500
Sheet Metal	1,000	2,000
Trowel Trades	1,500	3,500
Welding	1,200	2,500
Motor body building and Upholstery	3,000	5,000
Smith. (Tin, Copper, Black-smith)	2,000	3,500
Vulcanizing	1,000	3,000
Armature Winder	1,500	3,500
Radio maintenance	1,200	3,000
Motor mechanic	1,500	3,500
Instrument mechanic	2,000	3,500
Watch repair	1,000	2,500
Book binder	1,000	2,500
Block maker	1,200	3,500
Costume Tailoring	1,000	2,500
Boot maker	2,000	3,500
Barbering	1,000	2,500
Catering	2,000	3,500

APPENDIX L.

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