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Fields, Factories and Workshops

OR

INDUSTRY COMBINED WITH AGRICULTURE
AND BRAIN WORK WITH MANUAL WORK

BY

P. KROPOTKIN



NEW, REVISED, AND ENLARGED EDITION

THOMAS NELSON & SONS
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PREFACE.

FOURTEEN years have passed since the first edition of this book was published, and in revising it for this new edition I found at my disposal an immense mass of new materials, statistical and descriptive, and a great number of new works dealing with the different subjects that are treated in this book. I have thus had an excellent opportunity to verify how far the previsions that I had formulated when I first wrote this book have been confirmed by the subsequent economical evolution of the different nations.

This verification permits me to affirm that the economical tendencies that I had ventured to foreshadow then have only become more and more definite since. Everywhere we see the same decentralisation of industries going on, new nations continually entering the ranks of those which manufacture for the world market. Each of these new-comers endeavours to develop, and succeeds in developing, on its own territory the principal industries, and thus frees itself from being exploited by other nations, more advanced in their technical evolution. All nations have made a remarkable progress in this direction, as will be seen from the new data that are given in this book.

On the other hand, one sees, with all the great industrial nations, the growing tendency and need of

developing at home a more intensive agricultural productivity, either by improving the now existing methods of extensive agriculture, by means of small holdings, "inner colonisation," agricultural education, and co-operative work, or by introducing different new branches of intensive agriculture. This country is especially offering us at this moment a most instructive example of a movement in the said direction. And this movement will certainly result, not only in a much-needed increase of the productive forces of the nation, which will contribute to free it from the international speculators in food produce, but also in awakening in the nation a fuller appreciation of the immense value of its soil, and the desire of repairing the error that has been committed in leaving it in the hands of great land-owners and of those who find it now more advantageous to rent the land to be turned into shooting preserves. The different steps that are being taken now for raising English agriculture and for obtaining from the land a much greater amount of produce are briefly indicated in Chapter V.

It is especially in revising the chapters dealing with the small industries that I had to incorporate the results of a great number of new researches. In so doing I was enabled to show that the growth of an infinite variety of small enterprises by the side of the very great centralised concerns is not showing any signs of abatement. On the contrary, the distribution of electrical motive power has given them a new impulse. In those places where water power was utilised for distributing electric power in the villages, and in those cities where the machinery used for producing electric light during the night hours was utilised for supplying motive power during the day, the small industries are taking a new development.

In this domain I am enabled to add to the present edition the interesting results of a work about the small industries in the United Kingdom that I made in 1900. Such a work was only possible when the British Factory Inspectors had published (in 1898, in virtue of the Factories Act of 1895) their first reports, from which I could determine the hitherto unknown numerical relations between the great and the small industries in the United Kingdom.

Until then no figures whatever as regards the distribution of operatives in the large and small factories and workshops of Great Britain were available; so that when economists spoke of the "unavoidable" death of the small industries they merely expressed hypotheses based upon a limited number of observations, which were chiefly made upon part of the textile industry and metallurgy. Only after Mr. Whitelegge had published the first figures from which reliable conclusions could be drawn was it possible to see how little such wide-reaching conclusions were confirmed by realities. In this country, as everywhere, the small industries continue to exist, and new ones continue to appear as a necessary growth, in many important branches of national production, by the side of the very great factories and huge centralised works. So I add to the chapter on small industries a summary of the work that I had published in the *Nineteenth Century* upon this subject.

As regards France, the most interesting observations made by M. Ardouin Dumazet during his many years' travels all over the country give me the possibility of showing the remarkable development of rural industries, and the advantages which were taken from them for recent developments in agriculture and horticulture. Besides, the publication of the

statistical results of the French industrial census of 1896 permits me to give now, for France, most remarkable numerical data, showing the real relative importance of the great and the small industries.

And finally, the recent publication of the results of the third industrial census made in Germany in 1907 gives me the data for showing how the German small industries have been keeping their ground for the last twenty-five years—a subject which I could touch only in a general way in the first editions. The results of this census, compared with the two preceding ones, as also some of the conclusions arrived at by competent German writers, are indicated in the Appendix. So also the results recently arrived at in Switzerland concerning its home industries.

As to the need, generally felt at this moment, of an education which would combine a wide scientific instruction with a sound knowledge of manual work—a question which I treat in the last chapter—it can be said that this cause has already been won in this country during the last twenty years. The *principle* is generally recognised by this time, although most nations, impoverished as they are by their armaments, are much too slow in applying the principle in life.

P. KROPOTKIN.

BRIGHTON, *October*, 1912.

PREFACE TO FIRST EDITION.

UNDER the name of profits, rent, interest upon capital, surplus value, and the like, economists have eagerly discussed the benefits which the owners of land or capital, or some privileged nations, can derive, either from the under-paid work of the wage-labourer, or from the inferior position of one class of the community towards another class, or from the inferior economical development of one nation towards another nation. These profits being shared in a very unequal proportion between the different individuals, classes and nations engaged in production, considerable pains were taken to study the present apportionment of the benefits, and its economical and moral consequences, as well as the changes in the present economical organisation of society which might bring about a more equitable distribution of a rapidly accumulating wealth. It is upon questions relating to the right to that increment of wealth that the hottest battles are now fought between economists of different schools.

In the meantime the great question—"What have we to produce, and how?" necessarily remained in the background. Political economy, as it gradually emerges from its semi-scientific stage, tends more and more to become a science devoted to the study of the needs of men and of the means of satisfying them with the least possible waste of energy,—that is, a sort of physiology of society. But few economists, as yet,

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have recognised that this is the proper domain of economics, and have attempted to treat their science from this point of view. The main subject of social economy—that is, the *economy of energy required for the satisfaction of human needs*—is consequently the last subject which one expects to find treated in a concrete form in economical treatises.

The following pages are a contribution to a portion of this vast subject. They contain a discussion of the advantages which civilised societies could derive from a combination of industrial pursuits with intensive agriculture, and of brain work with manual work.

The importance of such a combination has not escaped the attention of a number of students of social science. It was eagerly discussed some fifty years ago under the names of "harmonised labour," "integral education," and so on. It was pointed out at that time that the greatest sum total of well-being can be obtained when a variety of agricultural, industrial and intellectual pursuits are combined in each community; and that man shows his best when he is in a position to apply his usually-varied capacities to several pursuits in the farm, the workshop, the factory, the study or the studio, instead of being riveted for life to one of these pursuits only.

At a much more recent date, in the 'seventies, Herbert Spencer's theory of evolution gave origin in Russia to a remarkable work, *The Theory of Progress*, by M. M. Mikhailovsky. The part which belongs in progressive evolution to *differentiation*, and the part which belongs in it to an *integration* of aptitudes and activities, were discussed by the Russian author with depth of thought, and Spencer's differentiation-formula was accordingly completed.

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And, finally, out of a number of smaller monographs, I must mention a suggestive little book by J. R. Dodge, the United States statistician (*Farm and Factory: Aids derived by Agriculture from Industries*, New York, 1886). The same question was discussed in it from a practical American point of view.

Half a century ago a harmonious union between agricultural and industrial pursuits, as also between brain work and manual work, could only be a remote desideratum. The conditions under which the factory system asserted itself, as well as the obsolete forms of agriculture which prevailed at that time, prevented such a union from being feasible. Synthetic production was impossible. However, the wonderful simplification of the technical processes in both industry and agriculture, partly due to an ever-increasing division of labour—in analogy with what we see in biology—has rendered the synthesis possible; and a distinct tendency towards a synthesis of human activities becomes now apparent in modern economical evolution. This tendency is analysed in the subsequent chapters—a special weight being laid upon the present possibilities of agriculture, which are illustrated by a number of examples borrowed from different countries, and upon the small industries to which a new impetus is being given by the new methods of transmission of motive power.

The substance of these essays was published in 1888-1890 in the *Nineteenth Century*, and of one of them in the *Forum*. However, the tendencies indicated therein have been confirmed during the last ten years by such a mass of evidence that a very considerable amount of new matter had to be introduced, while the chapters on agriculture and the small trades had to be written anew.

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I take advantage of this opportunity to address my best thanks to the editors of the *Nineteenth Century* and the *Forum* for their kind permission of reproducing these essays in a new form, as also to those friends and correspondents who have aided me in collecting information about agriculture and the petty trades.

P. KROPOTKIN.

BROMLEY, KENT, 1898.

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APPENDIX.

A.—BRITISH INVESTMENTS ABROAD.

THE important question as to the amount of British capital invested in the colonies and in other countries has only quite lately received due attention. For the last ten years or so one could find in the "Reports of the Commissioner of Inland Revenue" a mention of the revenue derived from British capital invested in foreign loans to States and Municipalities and in railway companies; but these returns were still incomplete. Consequently, Mr. George Paish made in 1909 and 1911 an attempt at determining these figures with more accuracy in two papers which he read before the Statistical Society.*

Mr. Paish based his researches on the Income Tax, completing these data by special researches about private investments, which do not appear in the Income Tax returns. He has not yet got to the end of his investigation; but, all taken, he estimates that the yearly income received by this country from abroad from different sources reaches £300,000,000 every year.

* "Great Britain's Capital Investments in Other Lands" (*Journal of the Statistical Society*, September 1909, vol. lxxii., pp. 475-495), followed by a most interesting discussion; and "Great Britain's Capital Investments in India, Colonial and Foreign Countries," same journal, January 1911, vol. lxxiv., pp. 167-200.

B.—FRENCH IMPORTS.

About one-tenth part of the cereals consumed in France is still imported; but, as will be seen in a subsequent chapter, the progress in agriculture has lately been so rapid that even without Algeria France will soon have a surplus of cereals. Wine is imported, but nearly as much is exported. So that coffee and oil-seeds remain the only food articles of durable importance for import. For coal and coke France is still tributary to Belgium, to this country, and to Germany; but it is chiefly the inferiority of organisation of coal extraction which stands in the way of the home supply. The other important items of imports are: raw cotton (from £12,440,000 to £18,040,000 in 1903–1910), raw wool (from £15,160,000 to £23,200,000), and raw silk (from £10,680,000 to £17,640,000), as well as hides and furs, oil-seeds, and machinery (about £10,000,000). The exports of manufactured goods were £80,000,000 in 1890, and in subsequent years from £119,000,000 to £137,000,000. Exports of textiles, exclusive of yarn and linen, £29,800,000 in 1890, and £34,440,000 in 1908–1910; while the imports of all textiles are insignificant (from £5,000,000 to £7,000,000).

C.—GROWTH OF INDUSTRY IN RUSSIA.

The growth of industry in Russia will be best seen from the following:—

	1880-81. Cwts.	1893-94. Cwts.	1910. Cwts.
Cast iron	8,810,000	25,450,000	61,867,000
Iron	5,770,000	9,700,000	61,540,700
Steel	6,030,000	9,610,000	

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	1880-81. Cwts.	1893-94. Cwts.	1910. Cwts.
Railway rails	3,960,000	4,400,000	10,408,300
Coal	64,770,000	160,000,000	530,570,000
(Imports of Coal)		from 80,000,000 to	100,000,000
Naphtha	6,900,000	108,700,000	189,267,000
Sugar	5,030,000	11,470,000	28,732,000
Raw cotton, home grown	293,000	1,225,000	3,736,000
Cottons, grey, and yarn	23,640,000	42,045,000	86,950,000
Cottons, printed	6,160,000	7,720,000	37,680,000
		1900.	1908.
All cottons		£56,156,000	£94,233,000
All woollens		19,064,000	25,388,000
Linen		7,076,600	9,969,000
Silk		3,335,000	3,969,000

The recent growth of the coal and iron industries in South Russia (with the aid of Belgian capital) was very well illustrated at the Turin Exhibition of 1911. From less than 100,000 tons in 1860, the extraction of coal and anthracite rose to 16,840,460 metric tons in 1910. The extraction of iron ore rose from 377,000 tons in 1890 to 3,760,000 tons in 1909. The production of cast iron, which was only 29,270 tons in 1882, reached 2,067,000 tons in 1910, and the amount of refined iron and steel and their produce rose from 27,830 tons in 1882 to 1,641,960 tons in 1910. In short, South Russia is becoming an exporting centre for the iron industry. (P. Palcinsky, in *Russian Mining Journal*, 1911, Nos. 8 and 12.)

D.—IRON INDUSTRY IN GERMANY.

The following tables will give some idea of the growth of mining and metallurgy in Germany.

The extraction of minerals in the German Empire, in metric tons, which are very little smaller than the English ton (0·984), was :—

	1883. Tons.	1893. Tons.	1910. Tons.
Coal	55,943,000	76,773,000	152,881,500
Lignite	14,481,000	22,103,000	69,104,900
Iron ore	8,616,000	12,404,000	28,709,700
Zinc ore	678,000	729,000	718,300
Mineral salts (chiefly potash)	1,526,000	2,379,000	9,735,700

Since 1894 the iron industry has taken a formidable development, the production of pig-iron reaching 12,644,900 metric tons in 1909 (14,793,600 in 1910), and that of half-finished and finished iron and steel, 14,186,900 tons; while the exports of raw iron, which were valued at £1,195,000 in 1903, doubled in seven years, reaching £2,250,000 in 1910.

E.—MACHINERY IN GERMANY.

The rapid progress in the fabrication of machinery in Germany is best seen from the growth of the German exports as shown by the following table:—

	1890.	1895.	1907.
Machines and parts thereof	£2,450,000	£3,215,000	£17,482,500
Sewing-machines and parts thereof	315,000	430,000	1,202,500
Locomotives and loco- mobiles	280,000	420,000	1,820,000

Three years later the first of these items had already reached £25,000,000, and the export of bicycles, motor-cars, and motor-buses, and parts thereof, was valued at £2,904,000.

Everyone knows that German sewing-machines, motor-bus frames, and a considerable amount of tools find their way even into this country, and that German tools are plainly recommended in English books.

F.—COTTON INDUSTRY IN GERMANY.

Dr. G. Schulze-Gaewernitz, in his excellent work, *The Cotton Trade in England and on the Continent* (English translation by Oscar S. Hall, London, 1895), called attention to the fact that Germany had certainly not yet attained, in her cotton industry, the high technical level of development attained by England; but he showed also the progress realised. The cost of each yard of plain cotton, notwithstanding low wages and long hours, was still greater in Germany than in England, as seen from the following tables. Taking a certain quality of plain cotton in both countries, he gave (p. 151, German edition) the following comparative figures:—

Hours of labour	England. 9 hours	Germany. 12 hours
Average weekly earnings of the operatives	16s. 3d.	11s. 8d.
Yards woven per week per operative	706 yards	466 yards
Cost per yard of cotton	0·275d.	0·303d.

But he remarked also that in all sorts of printed cottons, in which fancy, colours and invention play a predominant part, *the advantages were entirely on the side of the smaller German factories.*

In the spinning mills the advantages, on the contrary, continued to remain entirely on the side of England, the number of operatives per 1,000 spindles being in various countries as follows (p. 91, English edition):—

	Per 1000 spindles. 25 operatives.
Bombay	13
Italy	9½
Alsace	7½
Mulhouse	7½

	Per 1000 spindles.
Germany, 1861	20 operatives.
„ 1882	8 to 9 „
England, 1837	7 „
„ 1887	3 „

Considerable improvements had taken place already in the ten years 1884–1894. “India shows us, since 1884, extraordinary developments,” Schulze-Gaewernitz remarked, and “there is no doubt that Germany also has reduced the number of operatives per 1,000 spindles since the last Inquest.” “From a great quantity of materials lying before me, I cull,” he wrote, “the following, which, however, refers solely to leading and technically distinguished spinning mills:—

	Per 1000 spindles.
Switzerland	6.2 operatives.
Mulhouse	5.8 „
Baden and Württemberg	6.2 „
Bavaria	6.8 „
Saxony (new and splendid mills)	7.2 „
Vosges, France (old spinning mills)	8.9 „
Russia	16.6 „

The average counts of yarn for all these were between twenties and thirties.”

It is evident that considerable progress has been realised since Schulze-Gaewernitz wrote these lines. As an exporter of cotton yarn and cottons, Germany has made rapid strides. Thus, in 1903, she exported £1,625,000 worth of cotton yarn, and £15,080,000 worth of cottons. For 1910 the figures given by the *Statistisches Jahrbuch für 1911* were already £2,740,000 and £18,255,000 respectively.

G.—MINING AND TEXTILES IN AUSTRIA.

To give an idea of the development of industries in Austria-Hungary, it is sufficient to mention the growth of her mining industries and the present state of her textile industries.

The value of the yearly extraction of coal and iron ore in Austria appears as follows :—

	1880.	1890.	1910.
Coal	£1,611,000	£25,337,000	£57,975,000
Brown coal	1,281,300	23,033,000	56,715,000
Raw iron	1,749,000	22,759,000	49,367,000

At the present time the exports of coal entirely balance the imports.

As to the textile industries, the imports of raw cotton into Austria-Hungary reached in 1907 the respectable value of £12,053,400. For raw wool and wool yarn they were £6,055,600 worth, and for silk, £1,572,000; while £3,156,200 worth of woollens were exported.

According to the census of 1902 (*Statistisches Jahrbuch for 1911*), there were already, in Austria-Hungary, 1,408,855 industrial establishments, occupying 4,049,320 workpeople, and having a machinery representing 1,787,000 horse-power. The textile trades alone had in their service 257,500 horse-power (as against 113,280 in 1890).

The small industry evidently prevailed, nearly one-half of all the workpeople (2,066,120) being employed in 901,202 establishments, which had only from one to twenty persons each; while 443,235 workpeople were employed in 10,661 establishments (from twenty-one to 100 workpeople each). Still, the great industry

has already made its appearance in some branches—there being 3,021 establishments which employed more than 100 workers each, and representing an aggregate of 1,053,790 workpeople. Out of them 105 establishments employed even more than 1,000 persons each (115 establishments, 179,876 workpeople in 1910).

In Hungary industry is also rapidly developing; it occupied 1,127,130 persons in 1902 (34,160 in the textiles, and 74,000 in mining). In 1910 the exports of all textiles (stuffs and yarns) from Hungary reached the sum of £7,040,500.

H.—COTTON MANUFACTURE IN INDIA.

The views taken in the text about the industrial development of India are confirmed by a mass of evidence. One of them, coming from authorised quarters, deserves special attention. In an article on the progress of the Indian cotton manufacture, the *Textile Recorder* (15th October, 1888) wrote:—

“No person connected with the cotton industry can be ignorant of the rapid progress of the cotton manufacture in India. Statistics of all kinds have recently been brought before the public, showing the increase of production in the country; still it does not seem to be clearly understood that this increasing output of cotton goods must seriously lower the demand upon Lancashire mills, and that it is not by any means improbable that India may at no very distant period be no better customer than the United States is now.”

One hardly need add at what price the Indian manufacturers obtain cheap cottons. The report of

the Bombay Factory Commission which was laid before Parliament in August, 1888, contained facts of such horrible cruelty and cupidity as would hardly be imagined by those who have forgotten the disclosures of the inquiry made in this country in 1840-1842. The factory engines are at work, as a rule, from 5 A.M. till 7, 8, or 9 P.M., and the workers remain at work for twelve, thirteen, fourteen hours, only releasing one another for meals. In busy times it happens that the same set of workers remain at the gins and presses night and day with half an hour's rest in the evening. In some factories the workers have their meals at the gins, and are so worn out after eight and ten days' uninterrupted work that they supply the gins mechanically "three parts asleep."

"It is a sad tale of great want on one side, and cruel cupidity on the other," the official report concludes. However, it would be absolutely erroneous to conclude that Indian manufactures can compete with the British ones as long as they continue the terrible exploitation of human labour which we see now. Forty years ago the British manufactures offered absolutely the same terrible picture of cruel cupidity. But times will come when Indian workers will restrain the cupidity of the capitalists, and the manufacturers of Bombay will be none the worse for that in their competition with the British manufactures.

The figures relative to the latest growth of the textile industries in India, given in the text, fully confirm the provisions expressed twenty-five years ago. As to the conditions of the workpeople in the Indian cotton-mills, they continue to remain abominable.

I.—THE COTTON INDUSTRY IN THE UNITED STATES.

A few years ago the cotton industry in the United States attracted the attention of the Manchester cotton manufacturers, and we have now two very interesting works written by persons who went specially to the States in order to study the rapid progress made there in spinning and weaving.*

These two inquiries fully confirm what has been said in the text of this book about the rapid progress made in the American industry altogether, and especially in the development of a very fine cotton-weaving machinery. In his preface to Mr. Young's book, Mr. Helm says: "The results of this inquiry may not incorrectly be called a revelation for Lancashire. It was, indeed, already known to a few on this side of the ocean that there were wide differences between the methods and organisation of American and English cotton-mills. But it is only between the last three or four years that suspicion has arisen amongst us that our competitors in the United States have been marching faster than we have in the path of economy of production."

The most important difference between the British and American methods was, in Mr. Helm's opinion, in "the extensive use of the automatic loom." Mr. Young's investigation on the subject left no doubts

* T. M. Young, *The American Cotton Industry*. Introduction by Elijah Helm, secretary to the Manchester Chamber of Commerce, London 1902; and T. W. Uttley, *Cotton Spinning and Manufacturing in the United States: A report . . . of a tour of the American cotton manufacturing centres made in 1903 and 1904*. Publications of Manchester University, Economic Series, No. II., Manchester, 1905.

that the employment of this loom "substantially reduces the cost of production, and at the same time increases the earnings of the weaver, because it permits him to conduct more looms" (p. 15). Altogether, we learn from Mr. Helm's remarks that there are now 85,000 automatic looms running in the United States, and that "the demand for weavers is greater than ever" (p. 16). In a Rhode Island mill, 743 ordinary looms required 100 weavers, while 2,000 Northrop (or Draper) looms could be conducted by 134 weavers only, which means an average of fifteen looms for each weaver. At Burlington, Vermont, from sixteen to twenty Northrop looms were conducted by each weaver, and altogether these looms are spreading very rapidly. But it is not only in the looms that such improvements have been introduced. "The spinning frames," we are told by Mr. Young, "containing 112 spindles a side, were tended by girls who ran four, six, eight, or ten sides each, according to the girl's dexterity. The average for good spinners was about eight sides (896 spindles)" (p. 10).

In a New Bedford fine-spinning mill the ring-spinners were minding 1,200 spindles each (p. 16).

It is also important to note the speed at which the cotton industry has been developing lately in the States. The census of 1900 gave a total of 19,008,350 spindles. But in 1909 we find already 28,178,860 spindles for cotton alone (34,500,000, including silk, wool, and worsted). And, what is still more important, most of this increase fell upon the Southern States, where machinery is also more perfect, both for spinning and weaving, and where most of the work is being done by the whites. In a South Carolina print-cloth mill, containing 1,000 Draper looms, the average for

narrow looms was $15\frac{1}{2}$ looms to each weaver. (T. W. Uttley, *l.c.*, pp. 4, 50, etc.)

As for the American competition in the Chinese markets, Mr. Helm gives imposing figures.

J.—MR. GIFFEN'S AND MR. FLUX'S FIGURES
CONCERNING THE POSITION OF THE
UNITED KINGDOM IN INTERNATIONAL
TRADE.

A few remarks concerning these figures may be of some avail.

When a sudden fall in the British and Irish exports took place in the years 1882–1886, and the alarmists took advantage of the bad times to raise the never-forgotten war-cry of protection, especially insisting on the damages made to British trade by “German competition,” Mr. Giffen analysed the figures of international trade in his “Finance Essays,” and in a report read in 1888 before the Board of Trade Commission. Subsequently, Mr. A. W. Flux analysed again the same figures, extending them to a later period. He confirmed Mr. Giffen’s conclusions and endeavoured to prove that the famous “German competition” is a fallacy.

Mr. Giffen’s conclusions, quoted by Mr. A. W. Flux (“The Commercial Supremacy of Great Britain,” in *Economical Journal*, 1894, iv., p. 457), were as follows:—

“On the whole, the figures are not such as to indicate any great and overwhelming advance in German exports, in comparison with those of the United Kingdom. There is greater progress in certain directions, but, taken altogether, no great disproportionate advance, and in many important markets for the United Kingdom Germany hardly appears at all.”

In this subdued form, *with regard to German competition alone*—and due allowance being made for figures in which no consideration is given to what sort of goods make a given value of exports, and in what quantities—Mr. Giffen's statement could be accepted. But that was all.

If we take, however, Mr. Giffen's figures as they are reproduced in extended tables (on pp. 461-467 of the just quoted paper), tabulated with great pains in order to show that Germany's part in the imports to several European countries, such as Russia, Italy, Servia, etc., had declined, as well as the part of the United Kingdom, all we could conclude from these figures was, that there were other countries besides Germany—namely, the United States and Belgium—which competed very effectively with England, France, and Germany for supplying what manufactured goods were taken by Russia, Italy, Servia, etc., from abroad.

At the same time such figures gave no idea of the fact that where manufactured metal goods were formerly supplied, coal and raw metals were imported for the home manufacture of those same goods; or, where dyed and printed cottons were imported, only yarn was required. The whole subject is infinitely more complicated than it appeared in Mr. Giffen's calculations; and, valuable as his figures may have been for appeasing exaggerated fears, they contained no answer whatever to the many economic questions involved in the matters treated by Mr. Giffen.

The conclusions which I came to in these lines in the first edition of this book found further confirmation in the subsequent economical development of all nations in that same direction. The result is, that—apart from the extraordinary exports of the years 1910 and 1911 (which I venture to explain by the general pre-

vision of a great European war going to break out)—the exports from this country, apart from their usual periodical fluctuations, continued to remain what they were, in proportion to the increasing population, and many of them became less profitable; while the exports from all other countries increased in a much greater proportion.

K.—MARKET-GARDENING IN BELGIUM.

In 1885 the superficies given to market gardening in Belgium was 99,600 acres. In 1894 a Belgian professor of agriculture, who has kindly supplied me with notes on this subject, wrote :—

“ The area has considerably increased, and I believe it can be taken at 112,000 acres (45,000 hectares), if not more.” And further on: “ Rents in the neighbourhood of the big towns, Antwerp, Liège, Ghent, and Brussels, attain as much as £5, 16s. and £8 per acre; the cost of instalment is from £13 to £25 per acre; the yearly cost of manure, which is the chief expense, attains from £8 to £16 per acre the first year, and then from £5 to £8 every year.” The gardens are of the average size of two and a half acres, and in each garden from 200 to 400 frames are used. About the Belgian market-gardeners the same remark must be made as has been made concerning the French *marâchers*. They work awfully hard, having to pay extravagant rents, and to lay money aside, with the hope of some day being able to buy a piece of land, and to get rid of the blood-sucker who absorbs so much of their money returns; having moreover every year to buy more and more frames in order to obtain their produce earlier and earlier, so as to fetch

higher prices for it, they work like slaves. But it must be remembered that in order to obtain the same amount of produce under glass, in greenhouses, the work of *three men only*, working fifty-five hours a week, is required in Jersey for cultivating one acre of land under glass.

But I must refer my readers to the excellent work of my friend, B. Seeborn Rowntree's *Land and Labour : Lessons from Belgium*, London (Macmillan), 1910, a strong volume of more than 600 pages, which is the result of several years of laborious studies. It is full of figures and personal observations, and will be consulted with advantage for all the questions dealing with the economical life of Belgium.

L.—THE CHANNEL ISLANDS—THE SCILLY ISLANDS.

The excellent state of agriculture in Jersey and Guernsey has often been mentioned in the agricultural and general literature of this country, so I need only refer to the works of Mr. W. E. Bear (*Journal of the Agricultural Society*, 1888 ; *Quarterly Review*, 1888 ; *British Farmer*, etc.) and to the exhaustive work of D. H. Ansted and R. G. Latham, *The Channel Islands*, third edition, revised by E. Toulmin Nicolle, London (Allen), 1893.

Many English writers—certainly not those just named—are inclined to explain the successes obtained in Jersey by the wonderful climate of the islands and the fertility of the soil. As to climate, it is certainly true that the yearly record of sunshine in Jersey is greater than in any English station. It reaches from 1,842 hours a year (1890) to 2,300 (1893), and thus

exceeds the highest aggregate sunshine recorded in any English station by from 168 to 336 hours (exclusively high maximum in 1894) a year; May and August seeming to be the best favoured months.* But, to quote from the just mentioned work of Ansted and Latham:—

“There is, doubtless, in all the islands, and especially in Guernsey, *an absence of sun heat* and of the direct action of the sun’s rays *in summer*, which must have its effect, and *a remarkable prevalence of cold, dry, east wind in late spring, retarding vegetation*” (p. 407). Everyone who has spent, be it only two or three weeks in late spring in Jersey, must know by experience how true this remark is. Moreover, there are the well-known Guernsey fogs, and “owing also to rain and damp the trees suffer from mildew and blight, as well as from various aphides.” The same authors remark that the nectarine does not succeed in Jersey in the open air “owing to the absence of autumn heat”; that “the wet autumns and cold summers do not agree with the apricot;” and so on.

If Jersey potatoes are, on the average, three weeks in advance of those grown in Cornwall, the fact is fully explained by the continual improvements made in Jersey in view of obtaining, be it ever so small, quantities of potatoes a few days in advance, either by special care taken to plant them out as soon as possible, protecting them from the cold winds, or by choosing tiny pieces of land naturally protected or better exposed. The difference in price between the earliest and the later potatoes being immense, the greatest efforts are made to obtain an early crop.

The decline of prices per ton is best seen from the following prices in 1910:—

* *Ten Years of Sunshine in the British Isles, 1881–1890.*

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Week ending	Quantities exported.	Prices.		
		Tons.	£	s. d.
April 2-30	210	30	11	0
May 7	600	18	12	8
" 14	1,250	15	12	0
" 21	2,000	13	0	0
" 28	5,500	10	3	8
June 4	7,825	8	13	4
" 11	9,200	6	5	8
" 18	13,000	4	17	6
" 25	9,650	4	8	10
July 2	6,600	3	13	8
" 9	1,900	2	18	6
" 16	145	3	9	4
" 23	10	3	18	0
Total	57,890	£381,373		

The quantities of early potatoes exported varied during the years 1901 to 1910 from 47,530 tons to 77,800 tons, and their value from £233,289 to £475,889.

As to the fertility of the soil, it is still worse advocacy, because there is no area in the United Kingdom of equal size which would be manured to such an extent as the area of Jersey and Guernsey is by means of artificial manure. In the seventeenth century, as may be seen from the first edition of Falle's *Jersey*, published in 1694, the island "did not produce that quantity as is necessary for the use of the inhabitants, who must be supplied from England in time of peace, or from Dantzic in Poland." In *The Groans of the Inhabitants of Jersey*, published in London in 1709, we find the same complaint. And Quayle, who wrote in 1812 and quoted the two works just mentioned, in his turn complained in these terms: "The quantity at this day raised is quite inadequate to their sustenance, apart from the garrison" (*General View of the Agriculture and the Present State of the Islands*

on the Coast of Normandy, London, 1815, p. 77.) And he added: "After making all allowance, the truth must be told; the grain crops are here foul, in some instances execrably so." And when we consult the modern writers, Ansted, Latham, and Nicolle, we learn that the soil is by no means rich. It is decomposed granite, and easily cultivable, but "it contains no organic matter besides what man has put into it."

This is certainly the opinion anyone will come to if he only visits thoroughly the island and looks attentively to its soil—to say nothing of the Quenvais where, in Quayle's time, there was "an Arabian desert" of sands and hillocks covering about seventy acres (p. 24), with a little better but still very poor soil in the north and west of it. The fertility of the soil has entirely been made, first, by the *vraic* (sea-weeds), upon which the inhabitants have maintained communal rights; later on, by considerable shipments of manure, in addition to the manure of the very considerable living stock which is kept in the island; and finally, by an admirably good cultivation of the soil.

Much more than sunshine and good soil, it was the conditions of land-tenure and the low taxation which contributed to the remarkable development of agriculture in Jersey. First of all, the people of the Isles know but little of the tax-collector. While the English pay, in taxes, an average of 50s. per head of population; while the French peasant is over-burdened with taxes of all imaginable descriptions; and the Milanese peasant has to give to the Treasury full 30 per cent. of his income—all taxes paid in the Channel Islands amount to but 10s. per head in the town parishes and to much less than that in the country parishes. Besides, of indirect taxes, none are known but the 2s. 6d. paid for each gallon of imported spirits and 9d. per gallon of imported wine.

As to the conditions of land-tenure, the inhabitants have happily escaped the action of Roman Law, and they continue to live under the *coutumier de Normandie* (the old Norman common law). Accordingly, more than one-half of the territory is owned by those who themselves till the soil; there is no landlord to watch the crops and to raise the rent before the farmer has ripened the fruit of his improvements; there is nobody to charge so much for each cart-load of sea-weeds or sand taken to the fields; everyone takes the amount he likes, provided he cuts the weeds at a certain season of the year, and digs out the sand at a distance of sixty yards from the high-water mark. Those who buy land for cultivation can do so without becoming enslaved to the money-lender. One-fourth part only of the permanent rent which the purchaser undertakes to pay is capitalised and has to be paid down on purchase (often less than that), the remainder being a perpetual rent in wheat which is valued in Jersey at fifty to fifty-four *sous de France* per cabot. To seize property for debt is accompanied with such difficulties that it is seldom resorted to (Quayle's *General View*, pp. 41-46). Conveyances of land are simply acknowledged by both parties on oath, and cost nearly nothing. And the laws of inheritance are such as to preserve the homestead, notwithstanding the debts that the father may have run into (*ibid.*, pp. 35-41).

After having shown how small are the farms in the islands (from twenty to five acres, and very many less than that)—there being “less than 100 farms in either island that exceed twenty-five acres; and of these only about half a dozen in Jersey exceed fifty acres”—Messrs. Ansted, Latham, and Nicolle remark:—

“In no place do we find so happy and so contented a country as in the Channel Islands. . . .” “The

system of land-tenure has also contributed in no small degree to their prosperity. . . ." "The purchase becomes the absolute owner of the property, and his position cannot be touched so long as the interest of these [wheat] rents be paid. He cannot be compelled as in the case of mortgage, to refund the principal. *The advantages of such a system are too patent to need any further allusion.*" (*The Channel Islands*, third edition revised by E. Toulmin Nicolle, p. 401; see also p. 443.)

The following will better show how the cultivable area is utilised in Jersey (*The Evening Post Royal Almanack*):—

	1894.	1911.	
	Acres.	Acres	
Corn crops	Wheat	1,709	656
	Barley and bere	113	125
	Oats and rye	499	1,213
	Beans and peas	16	34
Green crops	Potatoes	7,007	8,911
	Turnips and swedes	111	61
	Mangolds	232	137
	Other green crops	447	176
Clover, sainfoin and grasses under rota- tion	For hay	2,842	2,720
	Not for hay	2,208	1,731
Permanent pasture or grass	For hay	1,117	944
	Not for hay	3,057	2,522
	Bare fallow	—	53
Fruit	Small fruit	—	99
	Orchards and small fruit.	—	1,151
	Other crops	—	240
			<hr/>
	21,252	20,733	

Living Stock.

	1894.	1911.
Horses used solely for agriculture	2,252	2,188
Unbroken horses	83	69
Mares solely for breeding	16	—
	<hr/>	<hr/>
Horses	2,351	2,257

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<i>Living Stock.</i>		1894.	1911.
Cows and heifers in milk or in calf		6,709	6,710
Other cattle :—			
Two years or more	864	}	5,321
One year to two years	2,252		
Less than one year	2,549		
Total cattle		12,374	12,031
Sheep, all ages		332	186
Pigs, including sows for breeding		6,021	4,639

<i>Exports.</i>		1887.	1888.	1899.
Bulls		102	100	92
Cows and heifers		1,395	1,639	1,629

Potatoes exported:—

Average.	Tons.	£
1887-1890	54,502	308,713
1891-1894	62,885	413,609
1901-1905	66,731	455,773
1906	51,932	308,229
1907	77,800	377,259
1908	53,100	356,305
1909	62,690	332,404
1910	57,890	381,373

The export value *per acre* varied in different years from £27, 6s. in 1893 to £66, 1s. in 1894, and even £95, 18s. in 1904.

As regards greenhouse culture, a friend of mine, who has worked as a gardener in Jersey, has collected for me various information relative to the productivity of culture under glass. Out of it the following may be taken as a perfectly reliable illustration, in addition to those given in the text:—

Mr. B.'s greenhouse has a length of 300 feet and a width of 18 feet, which makes 5,400 square feet, out of which 900 square feet are under the passage in the

middle. The cultivable area is thus 4,500 square feet. There are no brick walls, but brick pillars and boards are used for front walls. Hot-water heating is provided, but is only used occasionally, to keep off the frosts in winter—the crops being early potatoes (which require no heating), followed by tomatoes. The latter are Mr. B.'s speciality. Catch crops of radishes, etc., are taken. The cost of the greenhouse, without the heating apparatus, is 10s. per running foot of greenhouse, which makes £150 for one-eighth of an acre under glass, or a little less than 7d. per glass-roofed square foot.

The crops are: potatoes, four cabots per perch—that is, three-quarters of a ton of early potatoes from the greenhouse; and tomatoes, in the culture of which Mr. B. attains extraordinary results. He puts in only 1,000 plants, thus giving to his plants more room than is usually given; and he cultivates a corrugated variety which gives very heavy crops but does not fetch the same prices as the smooth varieties. In 1896 his crop was four tons of tomatoes, and so it would have been in 1897—each plant giving an average of twenty pounds of fruit, while the usual crop is from eight to twelve pounds per plant.

The total crop was thus four and three-quarter tons of vegetables, to which the catch crops must be added—thus corresponding to 85,000 lb. per acre (over 90,000 lb. with the catch crops). I again omit the money returns, and only mention that the expenditure for fuel and manure was about £10 a year, and that the Jersey average is three men, each working fifty-five hours a week (ten hours a day), for every acre under glass.

The Scilly Islands.—These islands also give a beautiful illustration of what may be obtained from the soil by an intensive cultivation. When shipping and

supplying pilots became a decaying source of income, the Scillonians took to the growing of potatoes. For many years, we are told by Mr. J. G. Uren (*Scilly and the Scillonians*, Plymouth, 1907), this was a very profitable industry. The crop was ready at least a month in advance of any other source of supply on the mainland. Every year about 1,000 tons of potatoes were exported. "In its palmy days the potato harvest in Scilly was the great event of the year. Gangs of diggers were brought across from the mainland," and the prices went occasionally up to £28 a ton for the earliest potatoes. Gradually, however, the export of potatoes was reduced to less than one-half of what it was formerly. Then the inhabitants of the islands went for fishing, and later on they began to grow flowers. Frost and snow being practically unknown in the islands, this new industry succeeded very well. The arable area of the islands is about 4,000 acres, which are divided into small farms, less than from fifteen to twenty acres, and these farms are transmitted, according to the local custom, from father to son.

It is not long ago that they began to grow wild narcissuses, to which they soon added daffodils (a hundred varieties), and lilies, especially arum-lilies, for Church decoration. All these are grown in narrow strips, sheltered from the winds by dwarf hedges. Movable glass-houses are resorted to shelter the flowers for a certain time, and in this way the gardeners have a succession of crops, beginning soon after Christmas, and lasting until April or May.

The flowers are shipped to Penzance, and thence carried by rail in special carriages. At the top of the season thirty to forty tons are shipped in a single day. The total exports, which were only 100 tons in 1887, have now reached 1,000 in 1907.

M.—IRRIGATED MEADOWS IN ITALY.

In the *Journal de l'Agriculture* (2nd Feb., 1889) the following was said about the *marcites* of Milan :—

“ On part of these meadows water runs constantly, on others it is left running for ten hours every week. The former give six crops every year ; since February, eighty to 100 tons of grass, equivalent to twenty and twenty-five tons of dry hay, being obtained from the hectare (eight to ten tons per acre). Lower down, thirteen tons of dry hay per acre is the regular crop. Taking eighty acres placed in average conditions, they will yield fifty-six tons of green grass per hectare—that is, fourteen tons of dry hay, or the food of three milch cows to the hectare (two and a half acres). The rent of such meadows is from £8 to £9, 12s. per acre.”

For Indian corn, the advantages of irrigation are equally apparent. On irrigated lands, crops of from seventy-eight to eighty-nine bushels per acre are obtained, as against from fifty-six to sixty-seven bushels on unirrigated lands, also in Italy, and twenty-eight to thirty-three bushels in France (Garola, *Les Céréales*).

N.—PLANTED WHEAT.

The Rothamsted Challenge.

Sir A. Cotton delivered, in 1893, before the Balloon Society, a lecture on agriculture, in which lecture he warmly advocated deep cultivation and planting the seeds of wheat wide apart. He published it later on as a pamphlet (*Lecture on Agriculture*, 2nd edition, with Appendix. Dorking, 1893). He obtained, for the

best of his sort of wheat, an average of "fifty-five ears per plant, with three oz. of grain of fair quality—perhaps sixty-three lbs. per bushel" (p. 10). This corresponded to ninety bushels per acre—that is, his result was very similar to those obtained at the Tomblaine and Capelle agricultural stations by Grandeau and F. Dessprèz, whose work seems not to have been known to Sir A. Cotton. True, Sir A. Cotton's experiments were not conducted, or rather were not reported, in a thoroughly scientific way. But the more desirable it would have been, either to contradict or to confirm his statements by experiments carefully conducted at some experimental agricultural station. Unfortunately, so far as I know, no such experiments have yet been made, and the possibility of profitably increasing the wheat crop by the means indicated by Sir A. Cotton has still to be tested in a scientific spirit.

O.—REPLANTED WHEAT.

A few words on this method which now claims the attention of the experimental stations may perhaps not be useless.

In Japan, rice is always treated in this way. It is treated as our gardeners treat lettuce and cabbage—that is, it is let first to germinate; then it is sown in special warm corners, well inundated with water and protected from the birds by strings drawn over the ground. Thirty-five to fifty-five days later, the young plants, now fully developed and possessed of a thick network of rootlets, are *replanted* in the open ground. In this way the Japanese obtain from twenty to thirty-two bushels of *dressed* rice to the acre in the poor provinces, forty bushels in the better ones, and from

sixty to sixty-seven bushels on the best lands. The average, in six rice growing states of North America, is at the same time only nine and a half bushels.*

In China, replanting is also in general use, and consequently the idea has been circulated in France by M. Eugène Simon and the late M. Toubeau, that replanted wheat could be made a powerful means of increasing the crops in Western Europe.† So far as I know, the idea has not yet been submitted to a practical test; but when one thinks of the remarkable results obtained by Hallet's method of planting; of what the market-gardeners obtain by replanting once and even twice; and of how rapidly the work of planting is done by market-gardeners in Jersey, one must agree that in replanted wheat we have a new opening worthy of the most careful consideration. Experiments have not yet been made in this direction; but Prof. Grandeau, whose opinion I have asked on this subject, wrote to me that he believes the method must have a great future. Practical market-gardeners (Paris *marâcher*) whose opinion I have asked, see, of course, nothing extravagant in that idea.•

With plants yielding 1,000 grains each—and in the Capelle experiment they yielded an average of 600 grains—the yearly wheat-food of one individual man (5.65 bushels, or 265 lbs.), which is represented by from 5,000,000 to 5,500,000 grains, could be grown on a

* Dr. M. Fesca, *Beiträge zur Kenntniss der Japanesischen Landwirtschaft*, Part ii., p. 33 (Berlin, 1893). The economy in seeds is also considerable. While in Italy 250 kilogrammes of the hectare are sown, and 160 kilogrammes in South Carolina, the Japanese use only sixty kilogrammes for the same area. (Semler, *Tropische Agrikultur*, Bd. iii., pp. 20-28.)

† Eugène Simon, *La cité chinoise* (translated into English); Toubeau, *La répartition métrique des impôts*, 2 vols., Paris (Guillaumin), 1880.

space of 250 square yards; while for an experienced hand replanting would represent no more than ten to twelve hours' work. With a proper machine-tool, the work could probably be very much reduced. In Japan, two men and two women plant with rice three-quarters of an acre in one day (Ronna, *Les Irrigations*, vol. iii., 1890, p. 67 *seq.*). That means (Fesca, *Japanesische Landwirtschaft*, p. 33) from 33,000 to 66,000 plants, or, let us say, a minimum of 8,250 plants a day for one person. The Jersey gardeners plant from 600 (inexperienced) to 1,000 plants per hour (experienced).

P.—IMPORTS OF VEGETABLES TO THE UNITED KINGDOM.

That the land in this country is not sufficiently utilised for market-gardening, and that the largest portion of the vegetables which are imported from abroad could be grown in this country, has been said over and over again within the last twenty-five years.

It is certain that considerable improvements have taken place lately—the area under market-gardens, and especially the area under glass for the growth of fruit and vegetables, having largely been increased of late. Thus, instead of 38,957 acres, which were given to market-gardening in Great Britain in 1875, there were, in 1894, 88,210 acres, exclusive of vegetable crops on farms, given to that purpose (*The Gardener's Chronicle*, 20th April, 1895, p. 483). But that increase remains a trifle in comparison with similar increases in France, Belgium, and the United States. In France, the area given to market-gardening was estimated in 1892 by M. Baltet (*L'horticulture dans les*

cing parties du monde, Paris, Hachette, 1895) at 1,075,000 acres—four times more, in proportion to the cultivable area, than in this country; and the most remarkable of it is that considerable tracts of land formerly treated as uncultivable have been reclaimed for the purposes of market-gardening as also of fruit growing.

As things stand now in this country, we see that very large quantities of the commonest vegetables, each of which could be grown in this country, are imported.

Lettuces are imported—not only from the Azores or from the south of France, but they continue until June to be imported from France, where they are mostly grown—not in the open air, but in frames. Early cucumbers, also grown in frames, are largely imported from Holland, and are sold so cheaply that many English gardeners have ceased to grow them.* Even beetroot and pickling cabbage are imported from Holland and Brittany (the neighbourhoods of Saint Malo, where I saw them grown in a sandy soil, which would grow nothing without a heavy manuring with guano, as a second crop, after a first one of potatoes); and while onions were formerly largely grown in this country, we see that, in 1894, 5,288,512 bushels of onions, £765,049 worth, were imported from Belgium (chief exporter), Germany, Holland, France, and so on.

Again, that early potatoes should be imported from the Azores and the south of France is quite natural. It is not so natural, however, that more than 50,000 tons of potatoes (58,060 tons, £521,141 worth, on the average during the years 1891–1894) should be imported from the Channel Islands, because there are

* *The Gardener's Chronicle*, 20th April, 1895, p. 493. The same, I learn from a German grower near Berlin, takes place in Germany.

hundreds if not thousands of acres in South Devon, and most probably in other parts of the south coast too, where early potatoes could be grown equally well. But besides the 90,000 tons of early potatoes (over £700,000 worth) which are imported to this country, enormous quantities of late potatoes are imported from Holland, Germany, and Belgium; so that the total imports of potatoes reach from 200,000 to 450,000 tons every year. Moreover, this country imports every year all sorts of green vegetables, for the sum of at least £4,000,000, and for £5,000,000 all sorts of fruit (apart from exotic fruit); while thousands of acres lie idle, and the country population is driven to the cities in search of work, without finding it.

Q.—FRUIT-CULTURE IN BELGIUM.

It appears from the *Annuaire statistique de la Belgique* that, out of a cultivated area of 6,443,500 acres, the following areas were given in Belgium, at the time of the last census, to fruit-growing, market-gardening, and culture under glass: Orchards, 117,600 acres; market-gardens, 103,460 acres; vineries, 173 acres (increased since); growing of trees for afforestation, gardens, and orchards, 7,475 acres; potatoes, 456,000 acres. Consequently, Belgium is able to export every year about £250,000 worth more vegetables, and nearly £500,000 worth more fruit, than she imports. As to the vineries, the land of the communes of Hoeylant and Overyssehe near Brussels is almost entirely covered with glass, and the exports of home-grown grapes attained, in 1910, 6,800 tons, in addition to 34,000 tons of other home-grown fruit. Besides, nearly 3,000 acres in the environs of Ghent are covered with horticultural estab-

lishments which export palms, azaleas, rhododendrons, and laurels all over the world, including Italy and the Argentine.

R.—CULTURE UNDER GLASS IN HOLLAND.

Holland in its turn has introduced gardening in hothouses on a great scale. Here is a letter which I received in the summer of 1909 from a friend :—

“Here is a picture-postcard which J. (a professor of botany in Belgium) has brought from Holland, and which he asks me to send you. [The postcard represents an immense space covered with frames and glass lights.] Similar establishments cover many square kilometres between Rotterdam and the sea, in the north of Heuve. At the time when J. was there (June 10) they had cucumbers, quite ripe, and melons as big as a head in considerable numbers, exported abroad. The cultures are made to a great extent without heating. The gardeners sow also radishes, carrots, lettuce, under the same glass. The different produce comes one after the other. They also cultivate large quantities of strawberries in frames.

“The glass-frames are transported at will, so as to keep under glass for several days or weeks the plants sown in any part of the garden. J. is full of admiration for the knowledge of the gardeners. Instead of the usual routine, they apply the last progress of science. He was told that glass is broken very seldom; they have acquired the art of handling glass-frames with facility and great skill.

“Besides the frames represented on the photograph, the region between Rotterdam and the sea, which is named Westland, has also countless glass-houses,

where they cultivate, with or without heating, grapes, peaches, northern cherries, haricot beans, tomatoes, and other fruit and vegetables. These cultures have reached a very high degree of perfection. The gardeners take the greatest care to fight various plant diseases. They also cultivate ordinary fruit—apples, pears, gooseberries, strawberries, and so on—and vegetables in the open air. Westland being very much exposed to strong winds, they have built numerous walls, which break the wind, and serve at the same time for the culture of fruit upon the walls.

“All the region feels the favourable influence of the agricultural school of Naaldwijk, which is situated almost in the centre of the Westland.”

S.—PRICES OBTAINED IN LONDON FOR DESSERT GRAPES CULTIVATED UNDER GLASS.

The Fruit and Market-Gardener gives every week the prices realised by horticultural and intensive gardening produce, as well as by flowers, at the great market of Covent Garden. The prices obtained for dessert grapes—Colmar and Hamburg—are very instructive. I took two years—1907–1908—which differ from ordinary years by the winters having been foggy, which made the garden produce to be somewhat late.

In the first days of January the Colmar grapes arriving from the Belgian hothouses were still sold at relatively low prices—from 6d. to 10d. the pound. But the prices slowly rose in January and February; the Hamburg grapes were late that year, and therefore in the middle of March and later on in April the Colmars fetched from 1s. 6d. to 2s. 6d.

The English grapes, coming from Worthing and so

on, are certainly preferred to those that come from Belgium or the Channel Islands. By the end of April, 1907, and at the beginning of May, they were even sold at 2s. and 4s. the pound. The best and largest grapes for the dinners are evidently fetching fancy prices.

But at last the Hamburg grapes, which were late in 1907 and 1908, began to arrive from Belgium, the Channel Islands, and England, and the prices suddenly fell. By the end of May the Belgian Hamburgs fetched only from 10d. to 1s. 4d. the pound, and the prices were still falling. In June and July the gardeners could only get from 5d. to 7d., and during the months of September, October, and November, 1908, the best Guernsey grapes were quoted at 6d. the pound. Very beautiful ones fetched only 4d. the pound.

It was only in the first days of November that the prices went up to 10d. and 1s. 1d. But already, in the second half of December, the new crop of Colmars began to pour in from Belgium, and the prices fell to 9d., and even to 6d. per pound about Christmas.

We thus see that, notwithstanding a great demand for the best hothouse grapes, with big grains and quite fresh cut, these grapes are sold in the autumn almost at the same prices as grapes grown under the beautiful sun of the south.

As to the quantities of grapes imported to this country, the figures are also most instructive. The average for the three years 1905-1907 was 81,700,000 lbs., representing a value of £2,224,500.

T.—THE USE OF ELECTRICITY IN AGRICULTURE.

In the first editions of this book I did not venture to speak about the improvements that could be ob-

tained in agriculture with the aid of electricity, or by watering the soil with cultures of certain useful microbes. I preferred to mention only well-established facts of intensive culture; but now it would be impossible not to mention what has been done in these two directions.

More than thirty years ago I mentioned in *Nature* the increase of the crops obtained by a Russian landlord who used to place at a certain height above his experimental field telegraph wires, through which an electric current was passed. A few years ago, in 1908, Sir Oliver Lodge gave in the *Daily Chronicle* of July 15 the results of similar experiments made in a farm near Evesham by Messrs. Newman and Bomford, with the aid of Sir Oliver Lodge's son, Mr. Lionel Lodge.

A series of thin wires was placed above an experimental field at distances of ten yards from each other. These wires were attached to telegraph poles, high enough not to stand in the way of the carts loaded with corn. Another field was cultivated by the side of the former, in order to ascertain what would be the crops obtained without the aid of electricity.

The poles, five yards high, were placed far away from each other, so that the wires were quite loose. Owing to the high tension of the currents that had to be passed through the wires, the insulators on the poles were very powerful. The currents were positive and of a high potential—about 100,000 volts. The escape of electricity under these conditions was so great that it could be seen in the dark. One could also feel it on the hair and the face while passing under the wires.

Nevertheless, the expenditure of electric force was small, Sir Oliver Lodge writes; because, if the potential was high, the quantity of consumed energy was, notwithstanding that, very small. It is known, indeed,

that this is also the case with the discharges of atmospheric electricity, which are terrible in consequence of their high tension, but do not represent a great loss of energy. An oil motor of two horse-power was therefore quite sufficient.

The results were very satisfactory. The wheat crop in the electrified field was, in the years 1906-1907, by 29 to 40 per cent. greater, and also of better quality, than in the non-electrified field. The straw was also from four to eight inches longer.

For strawberries the increase of the crop was 35 per cent., and 25 per cent. for beetroot.

As to the inoculation of useful microbes by means of watering the soil with cultures of nitrifying bacteria, experiments on a great scale have been made in Prussia upon some peat-bogs. The German agricultural papers speak of these experiments as having given most satisfactory results.

Most interesting results have also been obtained in Germany by heating the soil with a mixture of air and hot steam passed along the ordinary draining tubes. A society has been formed to propagate this system, and the photographs of the results published by the Society in a pamphlet, *Gartenkultur, Bodenheizung, Klimaverbesserung* (Berlin, 1906), seem to prove that with a soil thus heated the growth of certain vegetables is accelerated to some extent.

U.—PETTY TRADES IN THE LYONS REGION.

The neighbourhoods of St. Etienne are a great centre for all sorts of industries, and among them the petty trades occupy still an important place. Iron-works and coal-mines with their smoking chimneys,

noisy factories, roads blackened with coal, and a poor vegetation give the country the well-known aspects of a "Black Country." In certain towns, such as St. Chamond, one finds numbers of big factories in which thousands of women are employed in the fabrication of *passementerie*. But side by side with the great industry the petty trades also maintain a high development. Thus we have first the fabrication of silk ribbons, in which no less than 50,000 men and women were employed in the year 1885. Only 3,000 or 4,000 looms were located then in the factories; while the remainder—that is, from 1,200 to 1,400 looms—belonged to the workers themselves, both at St. Etienne and in the surrounding country.* As a rule the women and the girls spin the silk or make the winding off, while the father with his sons weave the ribbons. I saw these small workshops in the suburbs of St. Etienne, where complicated ribbons (with interwoven addresses of the manufacture), as well as ribbons of high artistic finish, were woven in three to four looms, while in the next room the wife prepared the dinner and attended to household work.

There was a time when the wages were high in the ribbon trade (reaching over ten francs a day), and M. Euvert wrote me that half of the suburban houses

* I am indebted for the following information to M. V. Euvert, President of the Chamber of Commerce of St. Etienne, who sent me, while I was in the Clairvaux prison, in April, 1885, a most valuable sketch of the various industries of the region, in reply to a letter of mine, and I avail myself of the opportunity for expressing to M. Euvert my best thanks for his courtesy. This information has now an historical value only. But it is such an interesting page of the history of the small industries that I retain it as it was in the first edition, the more so as it is most interesting to compare it with the pages given in the text to the present conditions of the same industries.

of St. Etienne had been built by the *passementiers* themselves. But the affairs took a very gloomy aspect when a crisis broke out in 1884. No orders were forthcoming, and the ribbon weavers had to live on casual earnings. All their economies were soon spent. "How many," M. Euvert wrote, "have been compelled to sell for a few hundred francs the loom for which they had paid as many thousand francs." What an effect this crisis has had on the trade I could not say, as I have no recent information about this region. Very probably a great number of the ribbon weavers have emigrated to St. Etienne, where artistic weaving is continued, while the cheapest sorts of ribbon must be made in factories.

The manufacture of arms occupies from 5,000 to 6,000 workers, half of whom are in St. Etienne, and the remainder in the neighbouring county. All work is done in small workshops, save in the great arm factory of the State, which sometimes will employ from 10,000 to 15,000 persons, and sometimes only a couple of thousand men.

Another important trade in the same region is the manufacture of hardware, which is all made in small workshops, in the neighbourhoods of St. Etienne, Le Chambon, Firminy, Rive de Giers, and St. Bonnet le Château. The work is pretty regular, but the earnings are low as a rule. And yet the peasants continue to keep to those trades, as they cannot go on without some industrial occupation during part of the year.

The yearly production of silk stuffs in France attained no less than 7,558,000 kilogrammes in 1881;* and most of the 5,000,000 to 6,000,000 kilogrammes of raw

* It had been 5,134,000 kilogrammes in 1872. *Journal de la Société de Statistique de Paris*, September, 1883.

silk which were manufactured in the Lyons region were manufactured by hand.* Twenty years before—that is, about 1865—there were only from 6,000 to 8,000 power-looms, and when we take into account both the prosperous period of the Lyons silk industry about 1876, and the crisis which it underwent in 1880–1886, we cannot but wonder about the slowness of the transformation of the industry. Such is also the opinion of the President of the Lyons Chamber of Commerce, who wrote me that the domain of the power-loom is increased every year, “by including new kinds of stuffs, which formerly were reputed as unfeasible in the power-looms; but,” he added, “the transformation of small workshops into factories still goes on so slowly that the total number of power-looms reaches only from 20,000 to 25,000 out of an aggregate of from 100,000 to 110,000.” (Since that time it certainly must have considerably increased.)

The leading features of the Lyons silk industry are the following:—

The preparatory work—winding off, warping and so on—is mostly made in small workshops, chiefly at Lyons, with only a few workshops of the kind in the villages. Dyeing and finishing are also made—of course, in great factories—and it is especially in dyeing, which occupies 4,000 to 5,000 hands, that the Lyons manufacturers have attained their highest repute. Not only silks are dyed there, but also cottons and wools, and not only for France, but also to some extent for London, Manchester, Vienna, and even

* I take these figures from a detailed letter which the President of the Lyons Chamber of Commerce kindly directed to me in April, 1885, to Clairvaux, in answer to my inquiries about the subject. I avail myself of this opportunity for addressing to him my best thanks for his most interesting communication.

Moscow. It is also in this branch that the best machines have to be mentioned.*

As to the weaving, it is made, as we just saw, on from 20,000 to 25,000 power-looms and from 75,000 to 90,000 hand-looms, which partly are at Lyons (from 15,000 to 18,000 hand-looms in 1885) and chiefly in the villages. The workshops, where one might formerly find several *compagnons* employed by one master, have a tendency to disappear, the workshops mostly having now but from two to three hand-looms, on which the father, the mother, and the children are working together. In each house, in each storey of the Croix Rousse, you find until now such small workshops. The *fabricant* gives the general indications as to the kind of stuff he desires to be woven, and his draughtsmen design the pattern, but it is the workman himself who must find the way to weave in threads of all colours the patterns sketched on paper. He thus continually creates something new; and many improvements and discoveries have been made by workers whose very names remain unknown.†

The Lyons weavers have retained until now the character of being the *elite* of their trade in higher artistic work in silk stuffs. The finest, really artistic brocades, satins and velvets, are woven in the smallest workshops, where one or two looms only are kept. Unhappily the unsettled character of the demand for such a high style of work is often a cause of misery amongst them. In former times, when the orders for

* *La fabrique lyonnaise de soieries. Son passé, son présent.* Imprimé par ordre de la Chambre de Commerce de Lyon, 1873. (Published in connection with the Vienna Exhibition.)

† Marius Morand, *L'organisation ouvrière de la fabrique lyonnaise*; paper read before the Association Française pour l'avancement des Sciences, in 1873.

higher sorts of silks became scarce, the Lyons weavers resorted to the manufacture of stuffs of lower qualities : *foulards, crêpes, tulles*, of which Lyons had the monopoly in Europe. But now the commoner kinds of goods are manufactured by the million, on the one side by the factories of Lyons, Saxony, Russia, and Great Britain, and on the other side by peasants in the neighbouring departments of France, as well as in the Swiss villages of the cantons of Basel and Zurich, and in the villages of the Rhine provinces, Italy, and Russia.

The emigration of the French silk industry from the towns to the villages began long ago—that is, about 1817—but it was especially in the 'sixties that this movement took a great development. About the year 1872 nearly 90,000 hand-loom were scattered, not only in the Rhône department, but also in those of Ain, Isère, Loire, Saône-et-Loire, and even those of Drôme, Ardèche, and Savoie. Sometimes the looms were supplied by the merchants, but most of them were bought by the weavers themselves, and it was especially women and girls who worked on them at the hours free from agriculture. But already since 1835 the emigration of the silk industry from the city to the villages began in the shape of great factories erected in the villages, and such factories continue to spread in the country, making terrible havoc amidst the rural populations.

When a new factory is built in a village it attracts at once the girls, and partly also the boys of the neighbouring peasantry. The girls and boys are always happy to find an independent livelihood which emancipates them from the control of the family. Consequently, the wages of the factory girls are extremely low. At the same time the distance from the village to the factory being mostly great, the girls cannot

return home every day, the less so as the hours of labour are usually long. So they stay all the week at the factory, in barracks, and they only return home on Saturday evening; while at sunrise on Monday a waggon makes the tour of the villages, and brings them back to the factory. Barrack life—not to mention its moral consequences—soon renders the girls quite unable to work in the fields. And, when they are grown up, they discover that they cannot maintain themselves at the low wages offered by the factory; but they can no more return to peasant life. It is easy to see what havoc the factory is thus doing in the villages, and how unsettled is its very existence, based upon the very low wages offered to country girls. It destroys the peasant home, it renders the life of the town worker still more precarious on account of the competition it makes to him; and the trade itself is in a perpetual state of unsettledness.

Some information about the present state of the small industries in this region will be found in the text; but, unfortunately, we have no modern description of the industrial life of the Lyons region, which we might compare with the above.

V.—SMALL INDUSTRIES AT PARIS.

It would be impossible to enumerate here all the varieties of small industries which are carried on at Paris; nor would such an enumeration be complete, because every year new industries are brought into life. I therefore will mention only a few of the most important industries.

A great number of them are connected, of course, with ladies' dress. The *confections*—that is, the

making of various parts of ladies' dress—occupy no less than 22,000 operatives at Paris, and their production attains £3,000,000 every year, while gowns give occupation to 15,000 women, whose annual production is valued at £2,400,000. Linen, shoes, gloves, and so on, are as many important branches of the petty trades and the Paris domestic industries, while one-fourth part of the stays which are sewn in France (£500,000 out of £2,000,000) are made in Paris.

Engraving, book-binding, and all kinds of fancy stationery, as well as the manufacture of musical and mathematical instruments, are again as many branches in which the Paris workmen excel. Basket-making is another very important item, the finest sorts only being made in Paris, while the plainest sorts are made in the centres mentioned in the text (Haute Marne, Aisne, etc.). Brushes are also made in small workshops, the trade being valued at £800,000 both at Paris and in the neighbouring department of Oise.

For furniture, there are at Paris as many as 4,340 workshops, in which three or four operatives per workshop are employed on the average. In the watch trade we find 2,000 workshops with only 6,000 operatives, and their production, about £1,000,000, reaches nevertheless nearly one-third part of the total watch production in France. The *maroquinerie* gives the very high figure of £500,000, although it employs only 1,000 persons, scattered in 280 workshops, this high figure itself testifying to the high artistic value of the Paris leather fancy goods. The jewelry, both for articles of luxury, and for all descriptions of cheap goods, is again one of the specialities of the Paris petty trades; and another well-known speciality is the fabrication of artificial flowers. Finally, we must mention the carriage and saddlery trades, which are

carried on in the small towns round Paris; the making of fine straw hats; glass cutting, and painting on glass and china; and numerous workshops for fancy buttons, attire in mother-of-pearl, and small goods in horn and bone.

W.—RESULTS OF THE CENSUS OF THE FRENCH INDUSTRIES IN 1896.

If we consult the results of the census of 1896, that were published in 1901, in the fourth volume of *Résultats statistiques du recensement des industries et des professions*, preceded by an excellent summary written by M. Lucien March, we find that the general impression about the importance of the small industries in France conveyed in the text is fully confirmed by the numerical data of the census.

It is only since 1896, M. March says in a paper read before the Statistical Society of Paris, that a detailed classification of the workshops and factories according to the number of their operatives became possible; * and he gives us in this paper, in a series of very elaborate tables, a most instructive picture of the present state of industry in France.

For the industries proper—including the industries carried on by the State and the Municipalities, but excluding the transport trades—the results of the census can be summed up as follows:—

There is, first of all, an important division of “heads of establishments (*patrons*) working alone, independent artisans, and working-men without a permanent employment,” which contains 1,530,000 persons. It has

* *Journal de la Société de Statistique de Paris*, June 1901, pp. 189-192, and “*Résultats Généraux*,” in vol. iv. of the above-mentioned publication.

a very mixed character, as we find here, in agriculture, the small farmer, who works for himself; and the labourer, who works by the day for occasional farmers; and in industry the head of a small workshop, who works for himself (*patron-ouvrier*); the working-man, who on the day of the census had no regular employment; the dressmaker, who works sometimes in her own room and sometimes in a shop; and so on. It is only in an indirect way that M. March finds out that this division contains, in its industrial part, nearly 483,000 artisans (*patrons-ouvriers*); and independent working-men and women; and about 1,047,000 persons of both sexes, temporarily attached to some industrial establishment.

There are, next, 37,705 industrial establishments, of which the heads employ no hired workmen, but are aided by one or more members of their own families.

We have thus, at least, 520,000 workshops belonging to the very small industry.

Next to them come 575,530 workshops and factories, giving occupation to more than 3,000,000 persons. They constitute the bulk of French industry, and their subdivision into small, middle-sized, and great industry is what interests us at this moment.

The most striking point is the immense number of establishments having only from one to ten working-men each. No less than 539,449 such workshops and factories have been tabulated, which makes 94 per cent. of all the industrial establishments in France; and we find in them more than one-third of all workpeople of both sexes engaged in industry—namely, 1,134,700 persons.

Next comes the class, still very numerous (28,626 establishments and 585,000 operatives), where we find only from eleven to fifty workmen per establishment. Nearly two-thirds of these small factories (17,342 establishments, 240,000 workmen) are so small that

they give occupation to less than twenty persons each. They thus belong still to the small industry.

After that comes a sudden fall in the figures. There are only 3,865 factories having from fifty-one to 100 employees. This class and the preceding one contain among them $5\frac{1}{2}$ per cent. of all the industrial establishments, and $27\frac{1}{2}$ per cent. of their employees.

The class of factories employing from 101 to 500 workmen contains 3,145 establishments (616,000 workmen and other employees). But that of from 501 to 1,000 employees per factory has only 295 establishments, and a total of only 195,000 operatives. Taken together, these two classes contain less than 1 per cent. of all the establishments (six per 1,000), and 26 per cent. of all the workmen.

Finally, the number of factories and works having more than a thousand workmen and employees each is very small. It is only 149. Out of them, 108 have from 1,001 to 2,000 workmen, twenty-one have from 2,001 to 5,000, and ten only have more than 5,000 workmen. These 149 very big factories and works give occupation to 313,000 persons only, out of more than 3,000,000—that is, only 10 per cent. of all the industrial workers.

It thus appears that more than 99 per cent. of all the industrial establishments in France—that is, 571,940 out of 575,529—have less than 100 workmen each. They give occupation to 2,000,000 persons, and represent an army of 571,940 employers. More than that. The immense majority of that number (568,075 employers) belong to the category of those who employ less than fifty workmen each. And I do not yet count in their number 520,000 employers and artisans who work for themselves, or with the aid of a member of the family.

It is evident that in France, as everywhere, the

petty trades represent a very important factor of the industrial life. Economists have been too hasty in celebrating their death. And this conclusion becomes still more apparent when one analyses the different industries separately, taking advantage of the tables given in *Résultats Statistiques*. A very important fact appears from this analysis—namely, that there are only three branches of industry in which one can speak of a strong “concentration”—the mines, metallurgy, and the State’s industries, to which one may add the textiles and ironmongery, but always remembering that in these two branches immense numbers of small factories continue to prosper by the side of the great ones.

In all other branches the small trades are dominant, to such an extent that more than 95 per cent. of the employers employ less than fifty workmen each. In the quarries, in all branches of the alimentation, in the book trade, clothing, leather, wood, metallic goods, and even the brick-works, china and glass works, we hardly find one or two factories out of each hundred employing more than fifty workmen.

The three industries that make an exception to this rule are, we have said, metallurgy, the great works of the State, and the mines. In metallurgy two-thirds of the works have more than fifty men each, and it is here that we find some twenty great works employing each of them more than one thousand men. The works of the State, which include the great shipbuilding yards, are evidently in the same case. They contain thirty-four establishments, having more than 500 men each, and fourteen employing more than 1,000. And finally, in the mines—one hardly would believe that—more than one-half of all establishments employ less than fifty workmen each; but 15 per cent. of them have more than 500 workmen; forty-one mines are

worked by a staff of more than 1,000 persons each, and six out of them employ even more than 5,000 miners.

It is only in these three branches that one finds a rather strong "concentration"; and yet, the small industry continues to exist, as we saw it already in England, by the side of the great one, even in mining, and still more so in all branches of metallurgy.

As to the *textile* industries, they have exactly the same character as in England. We find here a certain number of very large establishments (forty establishments having each of them more than 1,000 workpeople), and especially we see a great development of the middle-sized factories (1,300 mills having from 100 to 500 workpeople). But on the other side, the small industry is also very numerous.*

Quite the same is also seen in the manufacture of all *metallic goods* (iron, steel, brass). Here, also, by the side of a few great works (seventeen works occupy each of them more than 1,000 workpeople and salaried employees; out of them five employ more than 2,000 persons, and one more than 5,000); and by the side of a great number of middle-sized works (440 establishments employing from 100 to 500 persons), we find more than 100,000 artisans who work single-handed, or with the aid of their families; and 72,600 works which have only from three to four workpeople.

In the *india-rubber* works, and those for the manufacture of *paper*, the middle-sized factories are still well represented (13 per cent. of all the establishments

* Here is how they are distributed: Workmen working single-handed, 124,544; with their families, but without paid workmen, 8,000; less than 10 workmen, 34,433 factories; from 10 to 100 workpeople, 4,665 factories; from 101 to 200 workpeople, 748 factories; from 201 to 500 workpeople, 554; from 501 to 1,000, 123; from 1,001 to 2,000, 38; more than 2,000, 2 factories.

have more than fifty workmen each); but the remainder belongs to the small industry. It is the same in the *chemical works*. There is in this branch some ten factories employing more than 500 persons, and 100 which employ from 101 to 500 people; but the remainder is 1,000 of small works employing from ten to fifty people, and 3,800 of the very small works (less than ten workers).

In all other branches it is *the small or the very small industry* which dominates. Thus, in the manufacture of articles of food, there are only eight factories employing more than 500 people each, and 92,000 small establishments having less than ten workpeople each. In the printing industry the immense majority of establishments are very small, and employ from five to ten, or from ten to fifty workpeople.

As to the manufacture of *clothing*, it entirely belongs to the small industry. Only five factories employ more than 200 each; but the remainder represents 630,000 independent artisans, men and women; 9,500 workshops where the work is done by the family; and 132,000 workshops and factories occupying less than ten workpeople each.*

The different branches dealing with straw, feathers, hair, leather, gloves, again, belong to the small and the very small industry: 125,000 artisans and 43,000 small establishments employing from three to four persons each.

Shall I speak of the factories dealing with wood,

* In an excellent monograph dealing with this branch (*Le développement de la fabrique et le travail à domicile dans les industries de l'habillement*, by Professor Albert Aftalion, Paris, 1906), the author gives most valuable data as to the proper domains of domestic work and the factory, and shows how, why, and in which domains domestic work successfully competes with the factory.

furniture, brushes, and so on? True, there are in these branches two large factories employing nearly 2,000 persons; but there are also 214,260 independent artisans and 105,400 small factories and workshops employing less than ten persons each.

Needless to say that jewelry, the cutting of precious stones, and stone-cutting for masonry belong entirely to the small industry; no more than ten to twenty works employing more than 100 persons each. Only in ceramics and in brick-making do we find by the side of the very small works (8,930 establishments), and the small ones (1,277 establishments employing from ten to fifty workpeople), 334 middle-sized works (fifty to 200 workpeople), ninety-three of the great industry (201 to 1,000), and seven of the very great (more than 1,000 workpeople).*

X.—THE SMALL INDUSTRIES IN GERMANY.

The literature of the small industries in Germany being very bulky, the chief works upon this subject may be found, either in full or reviewed, in Schmoller's

* The industrial establishments having more than 1,000 employees each are distributed as follows: Mining, 41; textiles, 40 (123 have from 500 to 1,000); industries of the State and the Communes, 14; metallurgy, 17; working of metals—iron, steel, brass—17; quarries, 2; alimentation, 3; chemical industries, 2; india-rubber, paper, cardboard, 0 (9 have from 500 to 1,000); books, polygraphy, 0 (22 have from 500 to 1,000); dressing of stuffs, clothing, 2 (9 from 500 to 1,000); straw, feathers, hair, 0 (1 from 500 to 1,000); leather, skins, 2; wood, cabinet-making, brushes, etc., 1; fine metals, jewelry, 0; cutting of precious stones, 0; stone-cutting for buildings, 0; earth-works and building, 1; bricks, ceramics, 7; preparation and distribution of food, 0; total, 149 out of 575,531 establishments. To these figures we may add six large establishments in the transports, and five in different branches of trade. We may note also that, by means of various calculations, M. March

Jahrbücher, and in Conrad's *Sammlung national-ökonomischer und statistischer Abhandlungen*. For a general review of the subject and rich bibliographical indications, Schönberg's *Volkwirthschaftslehre*, vol. ii., which contains excellent remarks about the proper domain of small industries (p. 401 *seq.*), as well as the above-mentioned publication of K. Bücher (*Untersuchungen über die Lage des Handwerks in Deutschland*), will be found most valuable. The work of O. Schwarz, *Die Betriebsformen der modernen Grossindustrie* (in *Zeitschrift für Staatswissenschaft*, vol. xxv., p. 535), is interesting by its analysis of the respective advantages of both the great and the small industries, which brings the author to formulate the following three factors in favour of the former: (1) economy in the cost of motive power; (2) division of labour and its harmonic organisation; and (3) the advantages offered for the sale of the produce. Of these three factors, the first is more and more eliminated every year by the progress achieved in the transmission of power; the second exists in small industries as well, and to the same extent, as in the great ones (watchmakers, toy-makers, and so on); so that only the third remains in full force; but this factor, as already mentioned in the text of this book, is a *social* factor which entirely depends upon the degree of development of the spirit of association amongst the producers.

A detailed industrial census having been taken in 1907, in addition to those of 1882 and 1895, most important and quite reliable data showing the importance and the resistance of the small industries were brought to light, and a series of most interesting

comes to the conclusion that 91 per cent. of the workmen and employees in industry and 44 per cent. in commerce are employees—that is, clerks, managers, and so on.

monographs dealing with this subject have been published. Let me name, therefore, some of those which could be consulted with profit: Dr. Fr. Zahn, *Wirtschaftliche Entwicklung, unter besonderer Berücksichtigung der Volkszählung, 1905, sowie der Berufs und Betriebszählung, 1907*; *Sonderabdruck aus der Annalen des Deutschen Reichs*, München, 1910 and 1911; Dr. Josef Grunzel, *System der Industriepolitik*, Leipzig, 1905; and *Der Sieg des Industrialismus*, Leipzig, 1911; W. Sombart, "Verlagssystem (Hausindustrie)", in Conrad, *Handwörterbuch der Staatswissenschaften*, 3te Auflage, Bd. VIII.; R. van der Borght, *Beruf, Gesellschaftliche Gliederung und Betrieb im Deutschen Reiche*, in *Vorträge der Gehe-Stiftung*, Bd. II., 1910; and Heinrich Koch, *Die Deutsche Hausindustrie*, M. Gladbach, 1905. Many other works will be found mentioned by these authors.

In all these books the reader will find a further confirmation of the ideas about the small industries that are expressed in chapters vi. and vii. When I developed them in the first edition of this book, it was objected to me that, although the existence of a great number of small industries is out of question, and although their great extension in a country so far advanced in its industrial development as England was not known to economists, still the fact proves nothing. These industries are a mere survival; and if we had data about the different classes of industry at different periods, we should see how rapidly the small industries are disappearing.

Now we have such data for Germany, for a period of twenty-five years, in the three censuses of 1882, 1895, and 1907, and, what is still more valuable, these twenty-five years belong to a moment in the life of Germany when a powerful industry has developed on

an immense scale with a great rapidity. Here it is that the dying out of the small industries, their "absorption" by the great concerns, and the supposed "concentration of capital" ought to be seen in full.

But the numerical results, as they appear from the three censuses, and as they have been interpreted by those who have studied them, are pointing out to quite the reverse. The position of the small industries in the life of an industrial country is exactly the same which could have been foreseen twenty-five years ago, and very often it is described in the very same words that I have used.

The German *Statistisches Jahrbuch* gives us the distribution of workmen in the different industries of the German Empire in 1882 and 1895. Leaving aside all the concerns which belong to trade and those for the sale of alcoholic drinks (955,680 establishments, 2,165,638 workpeople), as also 42,321 establishments belonging to horticulture, fishing, and poultry (103,128 workpeople in 1895), there were, in all the industries, including mining, 1,237,000 artisans working single-handed, and over 900,000 establishments in which 6,730,500 persons were employed. Their distribution in establishments of different sizes was as follows:—

1895.	Establishments.	Employees.	Average per establishment.
Artisans working single-handed	1,237,000	1,237,000*	—
From 1 to 5 employees	752,572	1,954,125	2.6
" 6 to 50 "	139,459	1,902,049	13
Over 50 "	17,941	2,907,329	162
Total	909,972	6,763,503	7.5
(With the artisans)	(2,146,972)	(8,000,503)	(4)

* In reality there are no employees. I give this figure only for the totals.

Twelve years later the industries, as they appeared in the next census, made in 1907, were distributed as follows:—

	1907.	Establishments.	Employees.	Average per establishment.
Artisans working single-handed		994,743	994,743*	—
From 1 to 5 employees		875,518	2,205,539	2.5
„ 6 to 10 „		96,849	717,282	7
„ 11 to 50 „		90,225	1,996,906	22
„ 51 to 100 „		15,783	1,103,949	70
„ 101 to 500 „		11,827	2,295,401	194
Over 500 „		1,423	1,538,577	1,081
Total		1,091,625	9,858,120	9
(With the artisans)		(2,086,368]	(10,852,863)	(5)

For the sake of comparison, I give also (in round figures) the numbers of establishments obtained by the three censuses:—

	1882.	1895.	1907.
Artisans working single-handed	1,430,000	1,237,000	995,000
From 1 to 5 employees	746,000	753,000	875,000
„ 6 to 50 „	85,000	139,000	137,000
Over 50 „	9,000	18,000	30,000
Total	830,000	910,000	1,092,000
(With the artisans)	(2,270,000)	(2,147,000)	(2,086,000)

What appears quite distinctly from the last census is the rapid decrease in the numbers of artisans who work single-handed, mostly without the aid of machinery. Such an individual mode of production by hand is naturally on the decrease, even many artisans resorting now to some sort of motive power and

* In reality there are no employees. I give this figure only for the totals.

taking one or two hired aids ; but this does not prove in the least that the small industries carried on with the aid of machinery should be on the wane. The census of 1907 proves quite the contrary, and all those who have studied it are bound to recognise it.

“Of a pronounced decay of the small establishments in which five or less persons are employed, is, of course, no sign,” writes Dr. Zahn in the aforementioned work. Out of the 14·3 million people who live on industry, full 5·4 million belong to the small industry.

Far from decreasing, this category has considerably increased since 1895 (from 732,572 establishments with 1,954,125 employees in 1895, to 875,518 establishments and 2,205,539 employees in 1907). Moreover, it is not only the very small industry which is on the increase ; it is also the small one which has increased even more than the preceding—namely, by 47,615 establishments and 812,139 employees.

As to the very great industry, a closer analysis of what the German statisticians describe as giant establishments (*Riesenbetriebe*) shows that they belong chiefly to industries working for the State, or created in consequence of State-granted monopolies. Thus, for instance, the Krupp Shareholders Company employ 69,500 persons in their nine different establishments, and everyone knows that the works of Krupp are in reality a dependency of the State.

The opinions of the above-named German authors about the facts revealed by the industrial censuses are very interesting.

In speaking of the small industries in Germany, W. Sombart writes in the article, “Verlagssystem (Hausindustrie),” in Conrad’s *Handwörterbuch* : “It results from the census of 1907 that the losses in the

small industries are almost exclusively limited to those home industries which are usually described as the *old ones*; while the increases belong to the home industries of modern origin." The statistical data thus confirm that "at the present time a sort of rejuvenation is going on in the home industries; instead of those of them which are dying out, new ones, almost equal in numbers, are growing up" (p. 242). Prof. Sombart points out that the same is going on in Switzerland, and refers to some new works on this subject.*

Dr. J. Grunzel comes to a similar conclusion: "Life experience shows that the home industries are not a form of industrial organisation which has had its time," he writes in his afore-mentioned work. "On the contrary, it proves to be possessed of a great life force in certain branches. It is spread in all branches in which handwork offers advantages above the work of the machine" (p. 46). It is also retained wherever the value of labour exceeds very much the value of the raw produce; and finally, in all the branches devoted to articles which are rapidly changing with the seasons or the vagaries of fashion. And he shows (pp. 46 and 149) how the home industries have been increasing in Germany from 1882 to 1895, and how they are widely spread in Austria, France, Switzerland, Italy, Belgium, and England.

The conclusions of R. van der Borgh are quite similar.

"It is true," Dr. van der Borgh says, "that the

* *Die Hausindustrie in der Schweiz: Auszug aus der Ergebnissen der Eidgenössischen Betriebszahlung von Aug. 9, 1905*; E. Ryser, *L'industrie horlogère*, Zurich, 1909; J. Beok, *Die Schweizerische Hausindustrie, ihre soziale und wirtschaftliche Lage*, Grütliverein, 1909.

numbers of artisans working single-handed have diminished in numbers in most industries; but they still represent two-fifths of all industrial establishments, and even more than one-half in several industries. At the same time, the small establishments (having from one to five workers) have increased in numbers, and they contain nearly one-half of all the industrial establishments, and even more than that in several groups."

As for Koch's work, *Die Deutsche Hausindustrie*, it deserves special mention for the discussion it contains of the measures advocated, on the one side, for the weeding out of the domestic industries, and, on the other side, for improving the condition of the workers and the industries themselves by the means of co-operation, credit, workshops' inspection, and the like.

Y.—THE DOMESTIC INDUSTRIES IN SWITZERLAND.

We have most interesting monographs dealing with separate branches of the small industries of Switzerland, but we have not yet such comprehensive statistical data as those which have been mentioned in the text in speaking of Germany and France. It was only in the year 1901 that the first attempt was made to get the exact numbers of workpeople employed in what the Swiss statisticians describe as *Hausindustrie*, or "the domestic industries' extension of the factory industries" (*der hausindustrielle Anhang der Fabrikindustrie*). Up till then these numbers remained "an absolutely unknown quantity." For many it was, therefore, a revelation when a first rough estimate, made by the factory inspectors, gave the figure of 52,291 work-

people belonging to this category, as against 243,200 persons employed in all the factories, large and small, of the same branches. A few years later, Schuler, in *Zeitung für Schweizerische Statistik*, 1904 (reprinted since as a volume), came to the figure of 131,299 persons employed in the domestic industries; and yet this figure, although it is much nearer to reality than the former, is still below the real numbers. Finally, an official census of the industries, made in 1905, gave the figure of 92,162 persons employed in the domestic industries in 70,873 establishments, in the following branches—textiles, watches and jewellery, straw-plaiting, clothing and dress, wood-carving, tobacco. They thus represent more than one-fourth (28·5 per cent.) of the 317,027 operatives employed in Switzerland in these same branches, and 15·7 per cent. of all the industrial operatives, who numbered 585,574 in 1905.

Out of the just-mentioned 92,162 workpeople, registered as belonging to the domestic trades, nearly three-quarters (66,061 in 49,168 establishments) belong to the textile industry, chiefly knitting and the silks; then comes the watch-trade (12,871 persons in 9,186 establishments), straw-plaiting, and dress. However, these figures are still incomplete. Not only several smaller branches of the domestic trades were omitted in the census, but also the children under fourteen years of age employed in the domestic trades, whose numbers are estimated at 32,300, were not counted. Besides, the census having been made in the summer, during the "strangers' season," a considerable number of persons employed in a variety of domestic trades during the winter did not appear in the census.

It must also be noted that the Swiss census includes under the name of *Heimarbeit* (domestic trades) only those "dependencies of the industrial employers" which

do not represent separate factories placed under the employer's management ; so that those workshops and small factories, the produce of which is sold directly to the consumers, as also the small factories directly managed by small employers, are not included in this category. If all that be taken into consideration, we must agree with the conclusion that the "domestic trades have in Switzerland a much greater extension than in any other country of Europe" (save Russia), which we find in an elaborate recent work, published in connection with the 1910 exhibition of Swiss domestic industries, and edited by Herr Jac. Lorenz (*Die wirtschaftlichen und sozialen Verhältnisse in der Schweizerischen Heimarbeit*, Zurich, 1910-1911, p. 27).

A feature of importance which appears from this last work is, that more than one-half of the workers engaged in domestic trades have some other source of income besides these trades. Very many of them carry on agriculture, so that it has been said that in Switzerland "the domestic trades' question is as much a *peasant question* as a labour question."

It would be impossible to sum up in this place the interesting data contained in the first four fascicles published by Herr Lorenz, which deal with the cotton, the silk, and the linen domestic industries, their struggles against the machine, their defeats in some branches and their holding the ground in other branches, and so on. I must therefore refer the reader to this very instructive publication.

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