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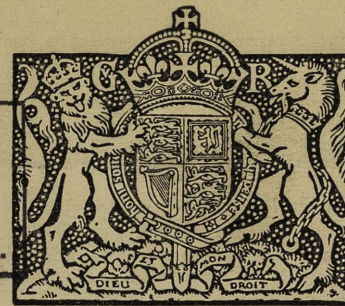
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FINAL REPORT
on the
Fourth Census of Production of
the United Kingdom (1930)

PART V

GENERAL REPORT

*Presented to Parliament in pursuance of the Census of
Production Act, 1906 [6 Edw. 7, Ch. 49]*

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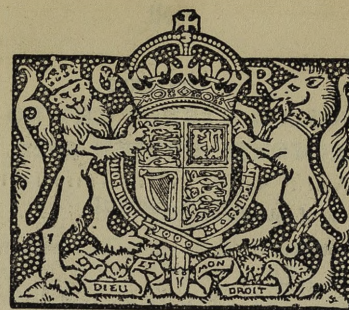
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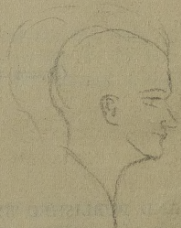
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FINAL REPORT ON THE FOURTH CENSUS OF PRODUCTION OF THE UNITED KINGDOM (1930)

Introduction

The results of the Fourth Census of Production (1930) are issued in five volumes, four of which (Parts I—IV) contain reports on individual trades and industrial groups. The present volume summarises the particulars given in the four preceding volumes and also provides information on certain subjects (e.g., the various industrial activities of the principal areas of the United Kingdom) which cannot conveniently be dealt with from the standpoint of particular industries.

Previous Censuses.—The Census of Production is conducted by the Board of Trade under the authority of the Census of Production Act, 1906. The first Census related to 1907 and after compilation of its final results an Order was made providing that further Censuses should be taken at intervals of five years. The Census of 1912 was interrupted by the War and was not completed. In the year 1917, when the third Census fell due, an amending Act was passed (the Census of Production Act, 1917) by which the fixed interval established by the previous Order was abolished. A third Census was taken in respect of the year 1924.

Scope of the Fourth Census.—The schedule to the Census of Production Act, 1906, specifies the following list of persons required to make returns :—

- (a) The occupier of every factory or workshop within the meaning of the Factory and Workshop Act, 1901.
- (b) The owner, agent, or manager of every mine and quarry.
- (c) Every builder, that is to say, a person who by way of trade or business undertakes the construction or alteration of a building or any part thereof.
- (d) Every person who by way of trade or business executes works of construction, alteration or repair of railroads, tramroads, harbours, docks, canals, sewers, roads, embankments, reservoirs or wells, or of laying or altering gas or water pipes, or telegraphic, telephonic, or electric lines or works, or any other prescribed works.
- (e) Every person who by way of trade or business gives out work to be done elsewhere than on his own premises.
- (f) Every person carrying on any other trade or business which may be prescribed.

The Act enables the Board of Trade to make rules exempting, either wholly or to the prescribed extent, any class of persons or firms from the obligation to make returns. Under this provision a general rule was made exempting from the 1930 Census all persons or firms that employed not more than ten persons on the average (including the head of the firm), subject to a statement of the average number of their employees. Further rules were made exempting the following classes of business unconditionally :—

Laundry work, and the dyeing and cleaning of used garments.

Taxidermy work.

The making of wigs.

Flax scutching.

Portrait or trade photography (other than the making of or printing from blocks or metal plates prepared by photographic processes, and the printing of cinematograph films).

Productive work done by Parish Councils and Parish Meetings.

Certain classes of persons or firms were not included in the Home Office lists of occupiers of factories or workshops, and were consequently not supplied with Census schedules. The principal class so excluded were those who, not being themselves manufacturers, gave out work to other firms. In these cases, the number of persons employed in the work and (where the receiver of the work employed more than ten persons) the value of the work done were returned, but the value of the products and of the materials worked on escaped record.

Returns were not required in respect of the following classes of business: tea blending, coffee roasting and grinding, hay, corn and seed merchants, bottle washing, fruit cleaning and other kindred occupations generally carried on as incidental to a merchanting business.

Changes in the geographical field.—At the Censuses of 1907 and 1912, the powers of the Board of Trade to require returns extended to Great Britain and the whole of Ireland. Upon the establishment of the Government of Northern Ireland by the Government of Ireland Act, 1920, the Board's powers in this matter, so far as they related to Northern Ireland, were transferred to the Ministry of Commerce of Northern Ireland. These powers were used by the Ministry of Commerce in respect of both 1924 and 1930, the taking of the Census for the former year being carried out by the Board of Trade, by an agency arrangement, and for the year 1930 by the Ministry of Commerce directly. The scope of the Census taken for Northern Ireland in respect of the year 1930 was the same as that of the Census of Great Britain except that a limit of five employees was adopted for the exemption of small businesses.

Method of canvass.—The Census was conducted by correspondence, no local staff of enumerators being employed. All firms other than mine and quarry owners and public utility undertakings were supplied at the beginning of 1930 with an advance copy of the schedule appropriate to the trade in which they were understood to be engaged and those that employed not more than ten persons on the average during 1929 were invited to claim exemption. The total number of preliminary schedules issued for Great Britain was about 319,000, and of these about 142,000 were returned by firms that claimed exemption and a further 20,000 were found to relate to defunct businesses or occupations to which the Census did not apply.

The issue of formal schedules, numbering about 163,000, took place in January, 1931, three months being allowed for the completion and delivery of the returns; out of this number a further 65,000 small firms claimed exemption or were otherwise identified. Second applications were necessary in about 90,000 cases and third applications in about 16,000. Of the total number of returns ultimately tabulated (56,362), about 30 per cent. were defective or incorrect when originally received.

Comparison between results of successive Censuses.—The results of the First Census (1907) were shown in full detail in the Final Report on the Third Census (1924). As it is not possible to adjust the results of the 1907 Census to correspond with the more limited industrial and geographical field covered by the 1930 Census, comparisons are restricted throughout this volume to the results for the years 1930 and 1924. With a few specified exceptions, the particulars given for both years under each subject cover the United Kingdom and (except as noted above for Northern Ireland) relate to firms employing more than ten persons on the average. The general results for the year 1907 are shown below, those for the years 1924 and 1930 being added for reference :—

Geographical area (1)	Gross output [§] (2)	Net output (3)	Average number of persons employed (except out-workers) (4)	Net output per person employed (5)	Power available	
					Prime movers (6)	Electric motors driven by purchased electricity (7)
	£ mill.	£ mill.	Thousand	£	Th. H.P.	Th. H.P.
Firms employing more than ten persons:—						
England and Wales ...	1930 3,022.3 1924 3,314.0	1,341.7 1,363.8	6,278.0 6,361.9	214 214	18,670.0 14,505.1	5,408.5 3,612.0
Scotland ...	1930 324.4 1924 366.1	143.1 160.9	717.3 779.2	200 206	2,276.5 1,940.2	822.8 697.2
Great Britain ...	1930 3,346.7 1924 3,680.1	1,484.8 1,524.7	6,995.3 7,141.1	212 214	20,946.5 16,445.9	6,231.3 4,309.2
Northern Ireland†	1930 59.4 1924 67.4	20.4 23.9	146.1 157.0	140 153	263.2 228.0	76.2 41.4
United Kingdom	1930 3,406.1 1924 3,747.5	1,505.2 1,548.6	7,141.4 7,298.1	211 212	21,209.7 16,673.9	6,307.5 4,350.6
All firms:—						
Great Britain ...	1924 3,874.5 1907 1,689.5	1,703.4 682.3*	7,614.3 6,567.1	224 104	16,533.4 10,452.3	4,580.6 †
Northern Ireland	1924 67.4	23.9	157.0	153	228.0	41.4
Irish Free State...	1926 59.0	22.7	99.9	227	†	†
Ireland ...	1907 66.5	22.6*	286.4	79	257.3	†

§ Including subsidy on home-grown sugar (£6,022,000).

‡ The figures for 1930 relate to firms employing more than five persons, and those for 1924 to all firms.

* Inclusive of Excise duties amounting, for the United Kingdom, to £15,300,000.

† Not available.

In order that the range of industries covered by the above table should be the same throughout, the figures shown for "All firms" for the years 1926, 1924 and 1907 represent the published results of the Censuses for those years in each of the geographical areas specified, less the particulars relating to the Laundry, Dyeing and Cleaning industry.

CHAPTER I

GENERAL RESULTS

The table on pages 2 and 3 shows, for each industrial group and for all industries together, the general results obtained at the Censuses of 1930 and 1924 in respect of firms and undertakings that employed more than ten persons on the average, except in the case of Northern Ireland, where they relate, for 1930, to firms that employed more than five persons and, for 1924, to all firms. The totals for Northern Ireland given in the table in respect of the year 1924 represent an aggregation of the particulars shown for that division of the United Kingdom in the individual trade reports and group reports already published. Owing to the necessity for avoiding the disclosure of the business of individual firms, the returns of certain firms, which were allocated to different groups in the report of the Government of Northern Ireland on the 1930 Census and in the Final Report on the 1924 Census, are duplicated in the above total. The difference between this total and that published in the Northern Ireland report is only 0.1 per cent.

In this table and in other tables throughout this report the various industries and industrial groups have been classified in two main categories, viz., "Factory trades" and "Non-Factory trades". The former represent those trades which are chiefly engaged in the manufacture or processing of goods: the latter cover mining and quarrying, the Building and Contracting Trade and all productive work carried out by the staffs of public utility undertakings and Government Departments.

A list of the trades covered by the 1930 Census, classified according to the trade groups specified in the table, will be found in Appendix I on page 138.

Trade group (1)	Gross output (selling value of goods made and value of work done) (2)	Cost of materials used and amount paid for work given out (3)	Net output (excess of Col. (2) over Col. (3)*) (4)
	£'000	£'000	£'000
Factory trades :—			
Iron and Steel	1930 237,695 1924 295,445	145,967 196,801	91,728 98,644
Engineering, Shipbuilding and Vehicles	1930 461,331 1924 402,155	231,346 203,749	229,985 198,406
Non-Ferrous Metals	1930 107,590 1924 92,333	83,994 67,061	23,596 25,272
Textiles	1930 432,387 1924 762,826	283,385 541,030	147,402 221,796
Leather	1930 36,017 1924 42,070	25,837 30,441	10,180 11,629
Clothing	1930 180,499 1924 183,227	102,352 107,508	78,147 75,719
Food, Drink and Tobacco	1930 663,947† 1924 669,532	403,222 406,908	188,205† 172,454
Chemicals, etc.	1930 181,752 1924 194,062	103,621 125,078	72,921 65,805
Paper, Printing and Sta- tionery	1930 177,373 1924 161,603	73,984 67,644	103,309 93,884
Timber	1930 68,708 1924 59,387	37,243 32,055	31,465 27,332
Clay and Building Materials	1930 71,800 1924 68,900	26,699 25,330	45,101 43,570
Miscellaneous	1930 91,868 1924 94,474	48,950 53,023	42,918 41,451
TOTAL—Factory trades ...	1930 2,710,967 1924 3,026,014	1,566,600 1,856,628	1,064,957 1,075,962
Non-Factory trades :—			
Building and Contracting	1930 194,288 1924 162,725	100,223 82,131	94,065 80,594
Mines and Quarries	1930 187,344 1924 273,037	32,140 46,634	155,204 226,403
Public Utility Services and Government Depart- ments	1930 313,483 1924 285,727	122,463 120,056	191,020 165,671
TOTAL—Non-Factory trades	1930 695,115 1924 721,489	254,826 248,821	440,289 472,668
TOTAL—ALL TRADES ...	1930 3,406,082 1924 3,747,503	1,821,426 2,105,449	1,505,246 1,548,630
England and Wales	1930 3,022,349 1924 3,313,955	1,606,880 1,863,449	1,341,667 1,363,793
Scotland	1930 324,380 1924 366,124	175,606 198,522	143,166 160,891
Northern Ireland	1930 59,353 1924 67,424	38,940 43,478	20,413 23,946

* Excluding estimated Excise duty.

Average number of persons employed (except out- workers) (5)	Net output per person employed (6)	Power available		Trade group (9)
		Prime movers (7)	Electric motors driven by purchased electricity (8)	
No.	£	Thous.H.P.	Thous.H.P.	
493,577	186	2,169.9	981.3	1930 } Factory trades :—
498,912	198	2,183.4	711.9	1924 } Iron and Steel.
1,074,749	214	387.1	1,638.0	1930 } Engineering, Shipbuild- ing and Vehicles.
985,578	201	467.3	1,257.8	1924 } Non-Ferrous Metals.
109,718	215	116.3	209.7	1930 }
114,988	220	120.9	141.1	1924 }
1,062,250	139	2,149.2	623.2	1930 } Textiles.
1,261,984	176	2,347.2	404.0	1924 }
46,146	221	34.9	43.3	1930 } Leather.
48,429	240	37.0	35.4	1924 }
492,124	159	36.0	87.7	1930 } Clothing.
473,968	160	47.0	66.0	1924 }
472,437	398	324.2	421.1	1930 } Food, Drink and To- bacco.
439,787	392	317.1	282.5	1924 }
178,151	409	555.4	296.9	1930 } Chemicals, etc.
178,094	369	342.0	161.2	1924 }
380,003	272	484.4	294.2	1930 } Paper, Printing and Sta- tionery.
342,649	274	295.1	181.3	1924 }
167,812	188	109.7	170.1	1930 } Timber.
137,554	199	115.6	99.1	1924 }
224,516	201	319.1	256.6	1930 } Clay and Building Materials.
208,948	209	300.0	103.0	1924 }
174,076	247	183.3	225.6	1930 } Miscellaneous.
165,746	250	200.4	130.7	1924 }
4,875,559	218	6,869.5	5,247.7	1930 } TOTAL—Factory trades.
4,856,637	222	6,773.0	3,574.0	1924 }
453,807	207	97.5	125.8	1930 } Non-Factory trades :—
419,053	192	89.3	87.6	1924 } Building and Contracting
1,018,844	152	3,274.1	639.2	1930 } Mines and Quarries.
1,280,984	177	3,310.7	522.6	1924 }
793,224	241	10,968.6	294.8	1930 } Public Utility Services and Government De- partments.
741,441	223	6,500.9	166.4	1924 }
2,265,875	194	14,340.2	1,059.8	1930 } TOTAL—Non-Factory trades.
2,441,478	194	9,900.9	776.6	1924 }
7,141,434	211	21,209.7	6,307.5	1930 } TOTAL—ALL TRADES.
7,298,115	212	16,673.9	4,350.6	1924 }
6,278,036	214	18,670.0	5,408.5	1930 } England and Wales.
6,361,905	214	14,505.7	3,612.0	1924 }
717,262	200	2,276.5	822.8	1930 } Scotland.
779,218	206	1,940.2	697.2	1924 }
146,136	140	263.2	76.2	1930 } Northern Ireland.
156,992	153	228.0	41.4	1924 }

† Including subsidy on home-grown sugar.

Valuation of gross output.—For all products made for sale the basis of valuation was the net selling value in the year. *Net selling value* was defined as the actual amount charged to customers after deduction of discounts and payments to railway companies and other transport agencies for carriage outwards; in other words the goods were to be valued at the stage of delivery at which they passed out of the hands of the employees of the producing firm and on the basis of immediate cash payment. If delivery was effected by the producing firm's own staff and means of transport, no deduction of transport costs was made, since the employees engaged in delivering the products were to be included as part of the firm's total personnel and the value of their services was expressed in the value of the products.

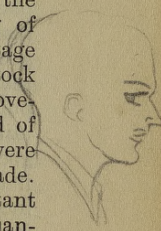
As the net selling value of each description of product, firms were instructed to return the value of their sales in the year, plus the value of stocks held at the end of the year and less the value of stocks at the beginning. Stocks were to be valued at their "book" value, that is, at the value assigned to them for the purposes of the firms' own statements of account at the two dates. The basis of such valuation, it is understood, is normally cost or current market value, whichever is the less. In a period when prices are falling this method of valuation fails to express the full money value of the goods actually produced in the period, since stocks of goods in hand at the beginning of the period will have been assigned a higher valuation than an equal quantity of similar goods at the end. For this reason, the considerable fall that took place in the course of the year 1930 in prices of textile products, for example, may have resulted in some undervaluation of the year's production. As the Census returns did not require the quantity and value of stocks to be stated separately, it is not possible to measure the precise importance of this factor.

Where the construction of the product was spread over a period of time, as in the case of railway carriages, motor vehicles, etc., firms were instructed to return the number of units actually completed in the period of account and their net selling value; but in order to obtain a true measure of the value of the output attributable to that period, a statement of the value of the "work in progress" at the beginning and at the end of the period was also required, the former amount representing a deduction from and the latter an addition to the total value of the products completed in the period. These amounts were expressed as aggregates covering the whole uncompleted output of the establishment at the two dates. While this method provided an accurate valuation of the gross output of the establishment in the period of account, the values returned for individual classes of products were not similarly adjusted.

Goods were normally valued as packed for sale, but if (as is the general custom in the Brewing Trade) the barrels, cases, etc. were returnable, the value recorded was that of the goods only.

Duplication.—It will be understood that while the organisation of industry is characterised by a high degree of specialisation, there are nevertheless very many firms whose operations extend both to semi-finished and to more finished products. In some cases the various processes of manufacture were so distinct and of such importance that they were carried out in separate departments, and where this occurred it was usually possible for each department to be treated for the purposes of the Census as an independent business, the transference of goods from one department to another being regarded as a sale and a purchase respectively. Examples of this kind may be found in the larger undertakings connected with the iron and steel trades and to some extent in the cotton trade. In other cases the two processes are more intimately connected and may both be carried on in the same establishment, as, for example, the spinning of woollen yarn and the weaving of cloth, the manufacture of malt and the brewing of beer, etc. Firms were required to value their products at the stage at which they were delivered from the works, or remained in stock at the end of the year, and consequently, save in the above-mentioned cases, where separate returns were made, no record of value was obtained in respect of semi-finished products which were further worked up in the establishment in which they were made. A record by quantity was, however, furnished for many important classes of semi-finished goods, and particulars of the total quantities of such products made will be found in the reports on the trades concerned.

The finished products of one firm or group of firms frequently form the materials of other firms and the registration by value of all manufactures in the form in which they were sold (or transferred to another department of the same firm) therefore involves a multiple record of the value of the same goods at different stages of completion; for example, single cotton yarn which forms the output of one firm may be purchased and doubled by another, woven by a third, and finished by a fourth, while, in the form of piece-goods, it may be used as material by dressmakers or manufacturers of soft furnishings. The gross value of the output returned by a given trade cannot be interpreted as necessarily expressing the value of the products in the form in which they passed out of that trade, since in most cases inter-sales of goods between firms in the trade will have led to some duplication of record. The entire output of some industries (e.g. blast furnaces) consists of products which, except in so far as they are exported, undergo further processes of manufacture in this country, and this applies in a greater or less degree to practically every industry. The aggregate of all the gross output values recorded by the Census must, therefore, considerably overstate the value of the goods, considered as a whole, when ready for export or consumption. To determine the extent of the duplication it would be necessary to know the value of each class of materials as delivered at the works in which they were



used, together with the cost of merchandising and conveying them from the place of their production; imported materials would have to be separately distinguished, since duplication is only involved in so far as purchases were made from home sources. As this information was not ascertained at the Census, an estimate of the gross value of goods for home consumption or for export, free from duplication, cannot be attempted directly. A calculation by an indirect method is, however, made in Chapter V (pages 52-3).

Materials used.—The cost of the materials used was stated in one sum. Materials were defined as including all raw and other materials purchased and used in producing the output recorded in the firm's return; all fuel, oil, gas and electricity; packing and workshop materials; and all materials used by the firm's own work-people in repairs and maintenance of the firm's own buildings, plant and machinery. The extent, if any, to which such repair and maintenance work fell short of, or exceeded, that required to make good the actual wear and tear was not ascertained. Since the cost required was the amount paid for the materials as received by the purchasing firm, the figure is inclusive of any payments to railway companies or transport contractors for conveyance of the goods from the port of entry or from the producers' works; further, if the goods were purchased through merchants, the cost returned included the merchants' handling expenses and profits. Merchandising and transport charges were not included in the value assigned to the goods by the producing firm, and the latter figure will, under these conditions, be lower than the recorded cost of the goods to the purchasing firm in all cases except where delivery of materials was made direct from the producing to the purchasing firm, by the use of the former's or the latter's own means of transport.

The total cost figure represented purchases of materials in the twelve months, plus stocks of materials at the beginning and less stocks at the end of the year. It will be clear that the considerations mentioned above in regard to the valuation of products in stock at different periods apply equally to stocks of materials. Owing to the fall in the price level in 1930, the cost or market value of materials held in stock at the beginning of the year represented a considerably greater money value than that of an equal quantity of similar materials at the end of the year. In some cases, owing to this fall in prices, the recorded value of the products was found to be less than the value of the materials used in producing them.

Net output.—In the section dealing with "Duplication" on page 5, it has been pointed out that the same goods may pass through the hands of several manufacturing firms and that, as their value is registered at each stage of manufacture, an aggregation of all these values must lead to considerable duplication. This duplication is eliminated if the total cost of the materials used and the amount paid for work given out are deducted from the total value

of the gross output. It is also necessary to deduct Excise duties included in the value of the products and not in that of the materials used. The resulting figure, which is termed the "net output", represents the value added to the materials in the course of manufacture and, after allowance of a sum sufficient to cover depreciation, constitutes the fund out of which wages and salaries and all such charges as rent, rates, taxes, advertisement and selling expenses, etc., have to be provided, as well as profits.

The period covered

Firms were instructed that their returns should relate to the calendar year 1930 or, in cases where the accounting year was not the calendar year, to a period of twelve months ending not earlier than 1st April, 1930, and not later than 31st March, 1931. An exception was made in the case of Local Authorities in Scotland, whose returns were required to relate to the year ended 15th May, 1931, and not to the preceding year of account. This instruction differed from that given at previous Censuses, when returns were accepted either for the calendar year or for the business year most closely corresponding thereto; that is to say, a period of which at least six months fell within the calendar year. For firms whose business years ended on any date between 30th June and 31st March the practice of the 1930 Census was uniform with that followed previously; but where the business year ended on a date between 31st March and 30th June the return made at the 1930 Census covered less than six months of the calendar year. There was, for 1924, no uniformity as regards firms whose business year ended on 30th June, some making returns for the year ended 30th June, 1924, and some for a year later. It will be seen from the table which follows that the returns made for periods ended April, May and June, 1930, taken together, represented about 6 per cent. of the aggregate in terms of employment. It must be remembered, however, that these returns covered more than six months of the year 1929, when productive activity was, generally speaking, at a higher level than in the corresponding period of the censal year. The mean terminal date of all returns made at the Fourth Census was about the middle of the last week of December, 1930. Had the practice in 1924 been adopted for 1930, the mean terminal date of all returns would have been about one or three weeks later according as the firms whose business year ended on 30th June made returns for the year ended 30th June, 1930, or 30th June, 1931. On the basis of the returns for 1930, results approximating most closely to the calendar year could be achieved by requiring returns to be furnished for periods ended not later than 31st May following the censal year.

Periods covered by firms' returns

Returns in respect of 12 months ended	Factory trades				Non-Factory trades			
	Number of returns		Persons employed		Number of returns		Persons employed	
	Number	Per cent. of total	Average number	Per cent. of total	Number	Per cent. of total	Average number	Per cent. of total
April, 1930 ...	558	1.3	69,645	1.5	96	0.7	4,407	0.2
May, 1930 ...	496	1.1	51,051	1.1	69	0.5	2,853	0.1
June, 1930 ...	1,821	4.3	256,044	5.4	263	1.9	13,593	0.6
July, 1930 ...	611	1.5	115,541	2.4	63	0.4	9,608	0.4
August, 1930 ...	737	1.8	126,795	2.7	69	0.5	2,951	0.1
September, 1930	2,059	4.9	269,999	5.7	230	2.0	17,619	0.8
October, 1930 ...	1,049	2.5	142,212	3.0	151	1.1	7,410	0.3
November, 1930	1,012	2.4	125,639	2.6	102	0.7	6,254	0.3
December, 1930	24,943	59.0	2,708,015	57.0	9,300	65.8	1,672,510	74.5
January, 1931 ...	1,790	4.2	166,865	3.5	207	1.4	13,334	0.6
February, 1931...	1,015	2.4	93,218	2.0	129	0.9	7,335	0.3
March, 1931 ...	6,134	14.6	625,144	13.1	3,195	22.6	456,848	20.4
May, 1931* ...	—	—	—	—	213	1.5	30,408	1.4
TOTAL ...	42,225	100.0	4,750,168	100.0	14,137	100.0	2,245,130	100.0

* Returns furnished by Local Authorities in Scotland.

The above particulars relate only to firms in Great Britain, a similar analysis of the returns furnished at the Census of Northern Ireland not being available.

In the manufacturing trades approximately three-fourths of the returns related either to the calendar or to the fiscal year and in the Non-Factory trades over 88 per cent. covered one or other of these periods. For the former group, the mean ending date of all the returns was the beginning of the third week in December, 1930, and for the latter the middle of the third week in January, 1931. Owing to the mean terminal date not coinciding with the end of the year, and to the rapid decline in production during the year 1930, the actual production during that year will have differed somewhat from the recorded production. The index of production for the manufacturing industries for the third quarter of 1930 was 14 per cent. lower than a year earlier and the estimated number of insured workpeople in employment in the Factory trades was 14 per cent. less in December, 1930, than in December, 1929. The latter is not necessarily a reliable guide to production as no account is taken of short time, etc., but the employment figures confirm the substantial fall recorded by the index of production. It may be estimated roughly that the recorded production for the Factory trades was, in the aggregate, about 0.8 per cent. greater than the production in the calendar year 1930. For the Non-Factory trades, the figures recorded probably represented substantially production in the calendar year.

Effect of the exclusion of small firms

At the Census of 1930 firms employing not more than ten persons on the average were exempted from the obligation of making detailed returns, the only information required in such cases being the average number of persons employed in the year. Full returns were required from all businesses, irrespective of size, at the 1924 Census, but out of a total of some 200,000 small establishments known to be in existence at that date only about 134,000 furnished information of statistical value. The number of small employers that failed to make returns for the year 1924 was approximately one-fourth of the total number of establishments on the Census register.

The total number of businesses in respect of which detailed particulars of their production were not received at the 1930 Census was 212,140 and the estimated aggregate number of their employees (including the proprietors) was about 758,000. Exemption of the small firms was effected chiefly by means of forms issued at the beginning of 1930, and the average numbers reported were based, as to about 70 per cent. of the returns, on employment in the year 1929. In view of the general decline that took place between 1929 and 1930 in the level of industrial employment, the numbers recorded by the small firms as employed in 1929 may be assumed to have been in excess of the average of the following year. The totals recorded for 1929 by the small firms in each trade have, therefore, been adjusted to 1930 on the basis of estimates issued by the Ministry of Labour of the movement in employment of insured workpeople, aged 16-64, between these two years. The resulting figures are shown in the following table, the aggregates for 1924 being added for comparison. The table also includes estimates of the numbers employed by firms that gave no information at the two periods.

Trade group	Aggregate number of persons employed by small firms making returns		Estimated number of persons employed by firms that failed to make returns		Estimated total number of persons employed by small firms		
	1924	1929-30	1924	1929-30	1924	1929-30	1930
	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.
Factory trades :—							
Iron and Steel ...	29.0	34.6	10.5	3.5	39.5	38.1	36.7
Engineering, Shipbuilding and Vehicles ...	57.3	101.3	26.1	9.3	83.4	110.6	106.4
Non-Ferrous Metals	10.3	13.7	3.3	0.7	13.6	14.4	13.9
Textiles ...	10.2	15.8	6.9	2.8	17.1	18.6	17.1
Leather ...	5.9	7.1	1.3	1.1	7.2	8.2	7.8
Clothing ...	85.6	126.2	69.1	11.0	154.7	137.2	134.8
Food, Drink and Tobacco ...	79.3	102.8	20.4	3.9	99.7	106.7	106.7
Chemicals, etc. ...	7.6	11.1	1.5	0.6	9.1	11.7	11.4
Paper, Printing and Stationery ...	23.4	31.5	5.8	2.2	29.2	33.7	34.0
Timber ...	35.9	65.2	13.4	4.7	49.3	69.9	68.6
Clay and Building Materials ...	8.4	15.0	3.5	2.0	11.9	17.0	16.6
Miscellaneous ...	8.5	13.8	3.6	1.4	12.1	15.2	14.8
TOTAL—Factory trades	361.4	538.1	165.4	43.2	526.8	581.3	568.8
Non-Factory trades :—							
Building and Contracting ...	95.9	155.4	40.0	12.0	135.9	167.4	163.1
Mines and Quarries...	6.0	12.8	0.9	0.1	6.9	12.9	12.5
Public Utility Services ...	10.0	10.2	1.0	3.0	11.0	13.2	13.6
TOTAL—Non-Factory trades	111.9	178.4	41.9	15.1	153.8	193.5	189.2
TOTAL—ALL TRADES	473.3	716.5	207.3	58.3	680.6	774.8	758.0

With the addition of the aggregates shown in the above table, the total number of persons employed in the productive industries in 1930 and 1924 was distributed between the smaller and the larger establishments in the following manner :—

	1930	1924
	Average numbers employed Thousand	Thousand
Establishments at which more than ten* persons were employed ...	7,141.4	7,298.1
Establishments at which not more than ten* persons were employed ...	758.0	680.6
TOTAL ...	7,899.4	7,978.7

* Five for Northern Ireland.

The proportion of the total number of industrial workers that was employed by the smaller firms is estimated to have increased from about 8.5 per cent. in 1924 to 9.6 per cent. in 1930.

Great precision should not be attached to the estimate of the number of workers employed at the smaller establishments in 1924 since, as already explained, large numbers of these firms failed to give any information for that year. It is, however, clear that the smaller firms were a factor of somewhat greater importance in industrial employment in 1930 than in 1924. While this result may be associated primarily with the expansion that took place in the inter-censal period in certain trades which contain large numbers of small businesses, the results indicate that the relative importance of small enterprises in 1924 was maintained or increased in 1930 over the greater part of the industrial field. This point is brought out in the following table, in which industries are classified according to the importance of the small firms in the total employment.

Persons employed by small firms in the United Kingdom in 1924 and 1930

Trade	Estimated numbers employed by small firms		Numbers employed by firms employing more than ten persons	
	1930	1924	1930	1924
	Thous.	Thous.	Thous.	Thous.
(1) Trades in which less than 85 per cent. of the employees in 1930 were returned by firms employing an average of more than ten persons :—				
Building ...	163.1	135.9	453.8	419.1
Tailoring, Dressmaking, Millinery, etc. ...	102.4	118.0	322.6	296.4
Bread and Biscuit ...	71.0*	69.7*	123.2	99.6
Motor and Cycle ...	60.7	30.4	241.7	192.7
Timber (Sawmilling, etc.) ...	32.7	23.5	57.5	49.6
Furniture and Upholstery ...	32.1	21.1	91.9	68.4
Boot and Shoe ...	24.5	29.8	121.7	130.5
Blacksmithing ...	16.5	20.8	47.4	37.7
Non-Metalliferous (except Slate) Mines and Quarries, including				
Oil Shale Mines ...	10.8	5.0	59.6	53.2
Grain Milling ...	7.8	6.8	26.5	30.2
Plate and Jewellery ...	6.4	6.1	25.4	29.8
Aerated Waters, Cider, Vinegar, British Wines, etc. ...	5.8	5.1	15.6	14.9
Wholesale Bottling ...	4.1	3.0	21.3	17.3
Other trades ...	60.9	57.1	153.5	148.7
Total ...	598.8	532.3	1,761.7	1,588.1

Trade	Estimated numbers employed by small firms		Numbers employed by firms employing more than ten persons	
	1930	1924	1930	1924
	Thous.	Thous.	Thous.	Thous.
(2) Trades in which at least 85 per cent. of the employees in 1930 were returned by firms employing an average of more than ten persons :—				
(a) Trades in which employment increased in 1930 as compared with 1924 :—				
Proportion of total represented by recorded figures :—				
85 per cent. and under				
90 per cent.	48.0	41.2	319.2	301.9
90 per cent. and under				
95 per cent.	16.0	11.9	206.4	173.0
95 per cent. and over ...	60.6	61.8	1,973.6	1,747.6
Total	124.6	114.9	2,499.2	2,222.5
(b) Trades in which employment decreased in 1930 as compared with 1924 :—				
Proportion of total represented by recorded figures :—				
85 per cent. and under				
90 per cent.	3.0	2.4	21.8	27.0
90 per cent. and under				
95 per cent.	9.4	8.2	104.4	113.8
95 per cent. and over ...	22.2	22.8	2,754.3	3,346.7
Total	34.6	33.4	2,880.5	3,487.5
TOTAL	758.0	680.6	7,141.4	7,298.1

* Excluding catering staff.

Group (1) consists of trades in which the estimated number of persons employed by the small firms formed more than 15 per cent. of the total in 1930. Taking this group as a whole, the proportion of the total number that was recorded by firms of this class increased from 25.1 per cent. in 1924 to 25.4 per cent. in 1930. The greatest expansion in the smaller businesses occurred in motor repairing, wholesale bottling and in trades connected with house repair and kindred work (i.e., the Building, Timber and Furniture Trades), but these increases were off-set to some extent by the lower figures shown by small firms engaged in tailoring and dressmaking, boot and shoe repairing and blacksmithing.

As regards the trades where not more than 15 per cent. of the total number of workpeople was recorded by small firms and total employment increased in 1930, the expansion among the small firms was substantially greater than among the larger firms in two of the groups, but in the group where the firms employing not more than ten persons represented at least 5 per cent. of the total employment, these firms showed a slight decrease in employment while among the larger firms there was an expansion of nearly 13 per cent. In trades where total employment declined, the numbers employed by small firms increased by nearly 4 per cent., while for the larger firms there was a decline of 17.4 per cent.; the small firms in these trades were, however, of little relative importance, representing in 1930 under 1.2 per cent. of the total.

The number of persons employed is the only information bearing on the relative importance of the small firms that is available for the year 1930. Such firms include persons working single-handed or with one or two assistants at irregular intervals, and their volume of business is subject to more fluctuation than occurs in the larger establishments. Moreover, the kind of work in which they are predominantly engaged, viz., repairs, involves a relatively lower expenditure on materials than is required in manufacture. The recorded results for 1924 show that, with few exceptions, net production per employee was greater among the larger than among the smaller concerns, and the relative importance of the work done by the latter cannot, therefore, be gauged precisely by the numbers employed in carrying it out.

In the table on page 14 estimates are given of the total net output of all small firms in 1930 and 1924, separate particulars being shown for the trades in which firms of this class exist in the largest numbers. The estimates for 1930 are based on the results recorded by these firms at the Census of 1924 with an allowance for price changes corresponding to those shown in the returns of the larger businesses.

The total net output of the small businesses is estimated to have been about £134 million in 1930 and £121 million in 1924. These estimates are subject to the qualifications mentioned in connection with those relating to employment and should not be taken as precise. The degree of error involved is, however, probably not sufficient to affect the conclusion that the small firms contributed about 8 per cent. of the total net output of industry in 1930, and that the corresponding proportion for 1924 was between 7 and 7½ per cent. Net output per head among the small firms was, on the basis of these estimates, about £177 in 1930 and £178 in 1924.

Estimated net output of small firms in 1924 and 1930

Trade	Estimated net output			
	1924			1930
	Small firms that made returns	Firms that failed to make returns	All small firms	All small firms
	£ mill.	£ mill.	£ mill.	£ mill.
Tailoring, Dressmaking, etc....	9.4	8.2	17.6	15.5
Boots and Shoes	3.1	2.1	5.2	4.5
Motor and Cycle	3.5	2.5	6.0	9.5
Bread and Biscuit	11.8	3.0	14.8	13.5
Timber (Sawmilling, etc.) ...	2.5	0.9	3.4	4.5
Furniture	2.7	1.0	3.7	5.0
Printing, Bookbinding, etc. ...	3.4	0.8	4.2	4.5
Blacksmithing	2.2	0.7	2.9	2.0
Building	16.0	6.7	22.7	29.5
Other trades	30.5	10.0	40.5	45.5
TOTAL	85.1	35.9	121.0	134.0

As regards the mechanical power equipment of the small firms, the only available information is that supplied at the 1924 Census. At that period, the total capacity of electric motors installed at those establishments that made returns was about 175,000 horse-power, or slightly over 2 per cent. of the aggregate equipment of all firms; practically all of these motors were actuated by purchased electricity. The capacity of the prime movers owned by small firms aggregated about 250,000 horse-power, or about 1.5 per cent. of the total installed in industry as a whole. About one-quarter of the total number of small establishments failed to make returns, but as the majority of these are known to have been workshops employing no mechanical power the above totals are probably not very seriously deficient.

Net output in 1930 and 1924

Comparability between the net output at two censal periods is affected by changes in the purchasing power of money. The period of six years between 1924 and 1930 was marked by a continuous fall in the price level, which was much accentuated in the year 1930 itself. Wages, which forms one of the principal factors in the net output total, showed in most trades some measure of adjustment to this fall, and other of the constituent items may be assumed to have changed in the same direction.

Owing to the rapid and unbroken fall in commodity prices and the general industrial depression that prevailed in 1930, products manufactured from materials purchased earlier in the year were

frequently disposed of at prices below the expenses of production. In trades which were most severely affected by the unfavourable conditions, such as the textile trades listed in (2) below, the total value of the net output may in fact have been insufficient, after deduction of wages and salaries, to provide any appreciable margin for other expenses of production.

Net output per person employed provides a convenient method of comparing productivity at different dates and between different trades, but its usefulness in both respects is subject to the qualifications mentioned in the preceding paragraphs. Among other factors which have an important bearing on net output per head, the following may be mentioned.

(1) Net output per head is usually large in trades where the products are sold under the proprietary brands of the manufacturers and heavy outlay is incurred by them in advertising and other selling expenses. This factor was no doubt of considerable importance in the following cases, in each of which net output per head in 1930 was over £500:—

Trade	Net output per head	
	1930	1924
	£	£
Petroleum Refining	1,016	502
Spirit Rectifying, Compounding, etc.	905	1,140
Brewing and Malting	748	708
Tobacco	698	620
Oil and Tallow	613	386
Spirit Distilling	516	563
Starch and Polishes	502	434

(2) Net output per head will be relatively low where trade is depressed and working time is irregular. The following textile trades may be taken as examples:—

Trade	Net output per head	
	1930	1924
	£	£
Cotton Spinning and Weaving	111	158
Linen and Hemp	94	122
Jute	92	128
Textile Finishing	183	248
Packing	163	209

(3) Other things being equal, net output per head will generally be low in trades where the wage level is low, and a relatively lower average, therefore, prevails in trades where women are largely employed than in those where the operatives are mostly males. This result is, however, by no means invariable since the effect of other

factors that have been mentioned may be more than sufficient to offset the effect of the difference in male and female wage levels; for example, the Tobacco Trade, which showed an average of £698 per head for 1930, is primarily a women's trade, and the average earnings per operative in that year amounted to £122.

Examples of men's and women's trades, with average net output figures, are given below. These particulars relate only to firms in Great Britain.

Trade	1930			1924		
	Earnings per operative	Proportion of female operatives employed	Net output per head (all employees)	Earnings per operative	Proportion of female operatives employed	Net output per head (all employees)
	£	Per cent.	£	£	Per cent.	£
Men's trades :—						
Coke and By-products	149	0.2	223	172	0.3	357
Wrought Iron and Steel Tubes ...	138	3.0	219	135	2.7	217
Mechanical Engineering ...	131	4.2	204	123	4.0	193
Timber (Sawmilling, etc.) ...	130	4.9	193	125	5.6	200
Brick and Fireclay ...	131	6.3	202	123	9.0	209
Leather (Tanning and Dressing) ...	133	11.8	258	133	12.5	278
Women's trades :—						
Tailoring, Dressmaking and Millinery ...	84	85.2	154	81	83.8	152
Hosiery ...	89	82.0	155	88	83.0	159
Cardboard Box ...	92	76.9	163	80	76.7	170
Elastic Webbing ...	83	69.8	156	89	68.7	156
Rope, Twine and Net	73	69.4	139	76	64.8	172
Lace ...	103	63.6	175	90	64.5	165

(4) Among other factors which affect the net output per head may be mentioned the need for costly machinery of production, which restricts the trade concerned mainly to the large firms, e.g. the Smelting and Rolling of Metals, Sugar Refining, Paper Making and Grain Milling; the limitation of work to a part of the year only (the seasonal trades), as in the Fish Curing Trade; and, as affecting the output of Government Departments and some public utility undertakings alone, the exclusion of the profit element.

It should be added that these different types of variation are seldom found in isolation and that only in the case of the wages factor can their importance be measured even approximately.

The changes between 1924 and 1930 in the aggregate value of the net output of the principal groups of industries in the United Kingdom, and in the net output per person employed, are shown in the following table :—

Trade group	Net output 1930		Net output 1924		Net output per person employed		
	Amount	Proportion of aggregate	Amount	Proportion of aggregate	1930	1924	Increase (+) or decrease (-) in 1930
	£'000	Per cent.	£'000	Per cent.	£	£	Per cent.
Factory trades :—							
Iron and Steel ...	91,728	6.1	98,644	6.4	186	198	- 6.1
Engineering, Shipbuilding and Vehicles ...	229,985	15.3	198,406	12.8	214	201	+ 6.5
Non-Ferrous Metals... ..	23,596	1.6	25,272	1.6	215	220	- 2.3
Textiles	147,402	9.8	221,796	14.3	139	176	-21.0
Leather	10,180	0.7	11,629	0.8	221	240	- 7.9
Clothing	78,147	5.2	75,719	4.9	159	160	- 0.6
Food, Drink and Tobacco	188,295	12.5	172,454	11.1	398	392	+ 1.5
Chemicals, etc. ...	72,921	4.8	65,805	4.2	409	369	+10.8
Paper, Printing and Stationery	103,309	6.9	93,884	6.1	272	274	- 0.7
Timber	31,465	2.1	27,332	1.8	188	199	- 5.5
Clay and Building Materials	45,101	3.0	43,570	2.8	201	209	- 3.8
Miscellaneous ...	42,918	2.8	41,451	2.7	247	250	- 1.2
TOTAL—Factory trades ...	1,064,957	70.8	1,075,962	69.5	218	222	- 1.8
Non-Factory trades :—							
Building and Contracting ...	94,065	6.2	80,594	5.2	207	192	+ 7.8
Mines and Quarries	155,204	10.3	226,403	14.6	152	177	-14.1
Public Utility Services and Government Departments ...	191,020	12.7	165,671	10.7	241	223	+ 8.1
TOTAL—Non-Factory trades ...	440,289	29.2	472,668	30.5	194	194	—
TOTAL—ALL TRADES	1,505,246	100.0	1,548,630	100.0	211	212	- 0.5

The first and second groups in 1924, in order of importance as contributors to the total industrial output, were the Mining and Quarrying and the Textile trades respectively; in 1930, these two groups of trades occupied the fourth and fifth places respectively, the three leading groups being the Engineering, Shipbuilding and Vehicles Trades, the Public Utility Services and the Food, Drink and Tobacco Trades. Of the twelve groups of Factory trades

only three recorded an increase in net output per person employed; in five groups the decline was of less than 4 per cent., in three of between 5 per cent. and 8 per cent. and in the remaining group (Textiles) there was a decline of over 20 per cent.

The aggregate money value of the net output of firms in the United Kingdom employing more than ten persons was £1,505,246,000 in 1930 and £1,548,630,000 in 1924. The amount of the unrecorded net output, i.e. that of firms employing ten persons or less and of firms that made no returns, is estimated (page 14) as approximately £134 million for 1930 and £121 million for 1924, raising the total industrial output in these two years to £1,639 ± 5 million and about £1,670 million respectively.

The net output per person employed by firms employing more than ten persons in 1930 was £210.8, and in 1924, £212.2; including the estimated figures for the small and the omitted firms, the averages were rather more than £207 and £209 respectively.

The following table shows the total recorded net output in 1930 for each group of trades together with a corresponding figure for each group estimated on the assumption that the relation between gross and net output was similar to that in 1924, and that the average values per unit of the goods produced were the same in the two years, that is to say, that conditions in 1930 were similar to those in 1924. Though in the aggregate the change is not of importance, the figures for certain of the groups are affected by variations between 1924 and 1930 in the amount of duplication in the recorded output (see page 5).

Trade group (1)	Net output 1930 (2)	Estimated net output in 1930 on basis of 1924 (3)	Increase (+) or decrease (-) in column (2) compared with column (3) (4)
	£ mill.	£ mill.	Per cent.
Iron and Steel	91.7	101.3	- 9.4
Engineering, Shipbuilding and Vehicles	230.0	238.7	- 3.7
Non-Ferrous Metals	23.6	27.7	- 14.6
Textiles	147.4	185.2	- 20.4
Leather	10.2	10.9	- 6.9
Clothing... ..	78.1	84.4	- 7.4
Food, Drink and Tobacco ...	188.2	194.6	- 3.3
Chemicals, etc.... ..	72.9	72.2	+ 1.0
Paper, Printing and Stationery	103.3	109.3	- 5.5
Timber	31.5	35.2	- 10.5
Clay, Building Materials and Building	139.2	155.6	- 10.6
Miscellaneous	42.9	49.5	- 13.3
Mines and Quarries	155.2	211.0	- 26.4
Public Utility Services and Government Departments ...	191.0	198.7	- 3.9
TOTAL	1,505.2	1,674.3	- 10.1

The percentage figures in column (4) are the resultant of a number of factors, some of which are referred to below in relation to particular groups of trades, and the more important of the others may be briefly enumerated. The importance of wages and salaries in the aggregate is affected not only by changes in rates of wages between 1924 and 1930 but by the employment of different proportions of operatives and administrative staff, males and females, young persons and adults, skilled and unskilled workers, etc. Fixed charges, represented in the main by rent, rates and taxes, may have undergone changes between 1924 and 1930 which were not without effect on the aggregate, and in this connection the De-rating Act of 1929 is of some importance. In so far as firms employed their own transport to deliver their products or collect their materials in one year and not in the other net output will have been higher in the former than in the latter year. Depreciation has to be met out of net output and the relative amount set aside for this purpose may well have been different in the two years. The most variable factor, and that which causes the greatest changes from year to year in the relative proportion of the various items which have to be met from the net output of industry, is the remuneration to the owner in respect of the capital employed in the business.

In the aggregate, net output on the basis of conditions in 1930 was some 10 per cent. less than on the basis of conditions as they existed in 1924, and for the great majority of trades the decline lay between 5 and 15 per cent. The most substantial decreases were shown by the two groups which were most seriously affected by depressed trade, viz. mines and quarries and the textile industries, in both of which the average fall exceeded 20 per cent. Among textiles may be mentioned in particular Silk and Artificial Silk, and Cotton Spinning, for which declines of 47 and 44 per cent. were recorded. On the other hand the Chemical Trades showed the only increase (1 per cent.), which is not unlikely to have been due to some extent to a substantial increase in the total cost of advertising and other selling expenses, known to be important factors in this group; these factors were probably also of some importance in the Food, Drink and Tobacco group which showed the smallest decline among the other groups. The relatively small decline of 3.7 per cent. in the Engineering, Shipbuilding and Vehicles group may be associated with (a) the factors mentioned on pages 20-21 in relation to the Engineering trades and (b) the inclusion in the recorded output of the Shipbuilding Trade for 1930 of the whole of the profits on contracts placed in 1929 on which a large part of the work had been done in the earlier year, coupled with the rapid decline in new contracts—the net output of this trade in 1930 was as much as 32 per cent. more than it would have been in 1924 when opposite conditions were prevailing. In the case of Public Utility Undertakings, where conditions are relatively stable and the element

of profit, if present, does not vary greatly from year to year, there was a decline of only 3.9 per cent.

It is estimated (page 44) that the volume of the total industrial production in 1930 was about 8 per cent. greater than in 1924, but this included an allowance for the returns not being in all cases for the calendar year, a factor which has no relevance in relation to the numbers actually recorded as employed. The more correct figure to take for this purpose is an increase of about 8½ per cent., so that expressed in terms of values in 1924 the total value of the net output estimated for 1930 (£1,639 ± 5 million) would represent a sum of about £1,812 million, and an average per person employed of £229. In 1924 net output per person employed averaged about £209 and a quantitative increase in net output per head of the order of 10 per cent. is thus indicated as having taken place between the two years.

The method of valuing the output and the materials used may have exerted some influence upon the net output in 1930, having regard to the marked decline in prices which took place during that year and subsequently. The Census formula for valuing the output of a product was the value of the deliveries during the year plus the book value of the stocks held at the end of the year and less the book value of the stocks held at the beginning of the year. Prices of fully manufactured goods were not falling to any marked extent early in 1930, so that the stock at the beginning of the year would be sold in the majority of cases at about the expected value. On the other hand the rapid fall in prices after the end of the year will have led to the realised value of the stocks at the end of the year being less than the expected value. There will accordingly have been some over-statement of the value of the production of goods for which prices were falling at the end of the censal year. In the case of materials, the purchase of materials at higher values than those obtaining when the products were sold will have led to a reduction of the net output, that is to say the goods may not have been sold at a profit, and, as is known to have happened in certain cases, the amount realised for the products may not even have been sufficient to cover the cost of the materials. Though this fall in price has a considerable effect on the net output, it does not tend to falsify the recorded value of the net output as in the case of the valuation of the output itself, and the addition to the value of materials purchased during the year of the book value of the stocks at the beginning of the year and the deduction of the book value of the stocks at the end of the year may be taken as giving a fair representation of the position, though if the book value of the stocks of materials at the end of the year was less than the purchase price of those stocks, some under-statement of the net output may have occurred.

In certain trades such as engineering where the products are under construction for a considerable length of time in fulfilment

of contracts placed at an earlier date, the cost value of the work in progress at the commencement and end of the censal year was required to be estimated and recorded. The element of profit arising from the completion of the contract would thus come wholly into the year of return in the case of products partly completed prior to the censal year, and if, as generally happened, the work in progress at the end of 1930 was much less than the work in progress at the beginning of the year, a greater profit would be recorded for the year than was properly applicable to it, thus leading to an over-statement of the gross and the net output.

CHAPTER II

THE NUMBER AND SIZE OF ESTABLISHMENTS

Number of industrial establishments

The number of establishments covered by the returns was tabulated for the first time at the 1930 Census. Prior to 1930 the only information relevant to this subject was the number of returns received.

The number of returns received does not necessarily provide an index of the number of establishments in any trade. A wide range of connected industrial operations may be carried out in one establishment and these operations may be sufficiently distinct to require different industrial classification; in such cases two or more returns may have been furnished in respect of the same establishment. On the other hand it was open to every firm that carried on the same class of trade at more than one establishment to make a combined return for the whole, subject to the general requirement of a separate return for each of the eleven areas into which the United Kingdom has been sub-divided. Many firms maintain factories or warehouses in the same neighbourhood as their main establishments, and the number of establishments recorded in respect of practically all trades exceeded the number of returns tabulated.

In the following table the number of establishments in existence in 1930 in each of the manufacturing groups of trades is shown, together with the number of returns received; figures for 1924 corresponding to the latter are added for comparison. These particulars relate to establishments in Great Britain, similar information not being available for Northern Ireland. The information regarding the number of establishments in the Non-Factory trades is incomplete.

For Census purposes, "establishments" included only premises at which operatives were engaged in carrying out some extractive,

Trade group	1930		1924
	Number of establishments	Number of returns	Number of returns
Iron and Steel	3,667	3,377	3,570
Engineering, Shipbuilding and Vehicles... ..	7,567	6,093	6,315
Non-Ferrous Metals	1,465	1,333	1,651
Textiles	7,238	6,347	7,431
Leather	840	792	869
Clothing	7,179	6,102	7,136
Food, Drink and Tobacco	6,969	5,316	5,882
Chemicals, etc.	1,834	1,602	1,735
Paper, Printing and Stationery	4,434	4,026	4,325
Timber	3,837	3,313	3,289
Clay and Building Materials	2,821	2,480	2,576
Miscellaneous	1,648	1,444	1,802
TOTAL—Factory trades ...	49,499	42,225	46,581

manufacturing or repairing process before delivery of the goods to purchasers, together with premises at which textile fabrics were packed for export. Manufacturers' warehouses and garages situated apart from the factory premises are included as establishments, but not offices at which the employees consisted solely of directive, clerical or selling staffs. As indicated above, it was of common occurrence for a single firm to furnish returns in respect of more than one industry, while many firms whose manufacturing operations were of one kind found it convenient to supply a separate return for each establishment or were required to do so by the circumstance that the establishments were located in different Census areas. For these reasons, among others, it is impracticable to ascertain, from the particulars recorded at the Census, the number of single proprietors in industry.

Size of establishments
(Great Britain)

Though the term "establishments" is used in this section to indicate the unit measured, it is important to bear in mind that the only available basis for a grouping of the results according to size of unit is the number of returns received. For the reasons explained on the preceding page, the number of returns is not equal to the number of establishments and may be even less representative of the number of firms.

Factory trades.—The following table summarises the principal results for the Factory trades in eleven size groups:—

Factory trades

Size group (average numbers employed)	Number of returns	Gross output	Cost of materials	Estimated Excise duty	Amount paid for work given out	Net output*	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	£'000	£'000	No.	£
11-24	13,689	113,280	63,397	1,499	1,574	46,810	234,572	200
25-49	10,676	192,513	108,794	4,662	1,545	77,512	372,079	208
50-99	7,675	308,123	184,753	8,800	2,736	111,834	536,354	209
100-199	5,109	385,078	216,508	15,029	3,308	150,553	715,025	210
200-299	2,025	256,271	149,396	8,408	1,896	98,749	490,641	201
300-399	995	194,669	120,440	5,100	1,061	69,944	341,684	205
400-499	539	127,052	74,979	2,906	919	49,896	240,250	208
500-749	669	237,375	137,605	10,003	1,820	87,947	405,428	217
750-999	313	142,757	77,035	5,663	634	59,425	270,822	219
1,000-1,499	258	170,291	89,334	9,035	566	71,356	311,786	229
1,500 and over	277	524,599	289,607	8,305	2,626	224,061	831,527	269
TOTAL	42,225	2,652,008	1,511,848	79,410	18,685	1,048,087	4,750,168	221

* Including estimated subsidy paid to beet sugar manufacturers.

In addition to the establishments covered by the above table there were in existence in this country in 1930 approximately 160,000 establishments at which the average number of persons employed was less than eleven. The fact that, of the total number of establishments engaged in the manufacturing trades in 1930 only

about 5 per cent. employed one hundred persons or more, indicates the numerical importance of small scale enterprises in the organisation of industry at the present time. It will be observed, however, that establishments of the largest size, numbering only 277, employed in the aggregate 831,527 persons (an average of 3,000 persons at each establishment), an aggregate considerably exceeding the total number estimated to have been employed in 1930 by the 160,000 small establishments that were excluded from the Census.

One of the factors by reference to which the various size groups can be compared is that of net output per person employed. The table shows a progressive increase in this figure in the four lower ranges, but after a substantial drop for the next range (200-299) net output per head advanced thereafter with the increasing size of the establishment, reaching a level for the largest group of over 20 per cent. above the general average. The eleven size groups are not, of course, equally representative of all industrial groups and the results for particular size groups may be affected by the inclusion of a relatively large number of returns for particular industries. The smaller net output per employee in the three groups included in the range 200-499 is chiefly attributable to the fact that about 30 per cent. of all the establishments in these groups were engaged in the manufacture of textile products, and particularly in the Cotton Trade, in which the added value per employee was considerably below the general average of industry.

The most significant indication of greater productivity accompanying an increased scale of operations occurs in the two groups of largest size, in which the value of the products in each establishment averaged considerably over £1,000,000. For convenience of reference, separate particulars relating to these large establishments are given below:—

Establishments in Factory trades employing more than 1,000 persons

Trade group	Number of returns	Gross output	Net output	Average number	Net
				of persons employed	output per person employed
	No.	£'000	£'000	No.	£
Iron and Steel ...	68	64,890	23,848	126,292	189
Engineering, Shipbuilding and Vehicles ...	195	219,571	105,756	469,390	225
Textiles ...	92	68,643	28,362	173,964	163
Clothing ...	32	18,233	8,615	48,116	179
Food, Drink and Tobacco ...	52	184,387	57,035	119,628	477
Chemicals, etc. ...	24	47,112	19,660	52,819	372
Paper, Printing and Publishing ...	30	43,954	26,766	62,615	427
Clay and Building Materials ...	11	8,120	5,774	26,864	215
Miscellaneous (including Timber)...	31	39,980	19,601	63,625	308
TOTAL ...	535	694,890	295,417	1,143,313	258

The gross value of the products of these 535 largest establishments (£694,890,000) formed 26 per cent. of the total value of all manufacturing output in Great Britain. Although, as already observed, the gross value of products does not provide a standard by which productivity in the different industries can be compared, it may be noted that among these very large establishments the value of the gross output varied from an average of about £570,000 for an average of 1,504 persons employed in the clothing industries to over £3,500,000 for an average of 2,301 persons employed in industries connected with the manufacture of food, drink and tobacco. Measuring by net output value, and excluding Excise duties, the average value of £269,000 in the clothing industries contrasts with £1,097,000 in the Food, Drink and Tobacco group and with £892,000 in the Paper, Printing and Publishing group; but the individual groups cover varied kinds of manufacturing operations and the averages may be influenced considerably by exceptionally high figures recorded by important firms in particular trades. Large scale concerns connected with petroleum refining, tobacco manufacture, and newspaper publishing may be mentioned as examples of this kind. While the results for manufacturing industry as a whole indicate a definitely larger net output per employee among establishments employing more than 1,000 persons than in those of smaller size, it is necessary to bear in mind that this result is not by any means invariably the case in individual trades and that the extent of the excess over the whole range of industry is somewhat inflated by the exceptionally high figures referred to.

Though net output per employee shows an increase with the increasing size of establishment, apart from the drop between the groups employing under and over 200 persons, this results from the difference between the two uneven series for gross output per employee and cost of materials per employee set out in the following table:—

Size group (average numbers employed)	Gross output	Cost of materials
	per person employed*	per person employed
	£	£
11- 24 ...	470	270
25- 49 ...	501	293
50- 99 ...	553	344
100- 199 ...	513	303
200- 299 ...	501	305
300- 399 ...	552	352
400- 499 ...	513	312
500- 749 ...	556	339
750- 999 ...	503	284
1,000-1,499 ...	516	287
1,500 and over ...	617	348
TOTAL ...	539	318

* After deduction of amount paid for work given out and of Excise duty.

In the smallest size group, cost of materials and gross output (adjusted as above) are definitely lower per person employed than in any other group. In six of the remaining ten groups the cost of materials varied from £284 to £312 per person employed and the adjusted gross output from £501 to £516. The averages were definitely much higher in four groups, viz., 50-99, 300-399, 500-749 and 1,500 and over. In these groups the cost of materials per person employed varied only between £339 and £352, while the adjusted gross output was respectively £553, £552, £556 and £617 per person employed.

Non-Factory trades.—An analysis on similar lines in respect of the Non-Factory trades is made in the following table:—

Non-Factory trades

Size of firm (average numbers employed)	Number of returns	Gross output	Cost of materials	Net output	Average number of persons employed (excluding out- workers)	Net output per person employed
					No.	£
11- 24 ...	5,421	£'000 32,626	£'000 13,922	£'000 18,704	No. 92,796	£ 202
25- 49 ...	3,688	48,611	21,272	27,339	127,229	215
50- 99 ...	2,093	56,857	26,121	30,736	143,770	214
100- 199 ...	1,174	65,192	28,638	36,554	164,290	223
200- 299 ...	449	45,671	20,967	24,704	109,731	225
300- 399 ...	261	31,961	12,267	19,694	90,914	217
400- 499 ...	176	25,766	9,890	15,876	78,069	203
500- 749 ...	242	43,082	15,653	27,429	146,385	187
750- 999 ...	181	40,325	12,610	27,715	157,645	176
1,000-1,499 ...	180	53,922	16,207	37,715	220,063	171
1,500 and over...	272	244,686	74,406	170,280	914,238	186
TOTAL ...	14,137	688,699	251,953	436,746	2,245,130	195

The results shown in this table are governed by three classes of returns, viz., those for Coal Mines, the Building and Contracting Trade and Public Utility Undertakings, and in view of the uneven distribution of these returns between the various size groups, and of the special features distinguishing one class from another, the aggregate figures are of little practical significance. The four largest size groups contain, proportionately, a far greater number of coal mining returns than do the groups of smaller size and the low average net output shown by the coal mining industry for 1930 (£149 per head) has the effect of depressing the net output per person employed in these four groups to figures below the general average. On the other hand the Building and Contracting Trade contributed about two-thirds of the total number of returns in the three smallest size groups but its representation in the largest groups is relatively small. As regards Public Utility Undertakings the results for individual size groups reflect the inclusion, to a greater or less extent, of concerns yielding particularly high figures of net output per head, such as Electricity, Gas and Water Undertakings.

All trades.—For industry as a whole, a classification by size of establishment was made in the Final Report on the Third Census of Production. Certain adjustments of the 1924 aggregates for some trades have been found necessary, and these are noted in the reports on the trades concerned. Moreover, the 1924 figures included the returns relating to the Laundry, Cleaning and Dyeing Trades but not those relating to Government Departments, so that the aggregates given below for 1924 do not agree with totals given elsewhere in this volume for the same year. Those for 1924 refer to Great Britain and Northern Ireland, whereas those for 1930 relate to Great Britain only. Further, the number of returns obtained for subsidiary or separate departments of the same firm was considerably greater in 1930 than in 1924. The figures for the two years are accordingly not strictly comparable, and this should be borne in mind when considering the following table. No further information relating to size of firms in 1924 is available.

Size of establishments in 1930 and 1924

Size group (average numbers employed)	Number of returns*	Gross output	Cost of materials and amount paid for work given out	Esti- mated Excise duty	Net output†	Average number of persons em- ployed (ex- clud- ing out- workers)	Net output per person em- ployed‡
						Thous.	£
11- 24	1930	19,110	146	79	1	66	327
	1924	26,300	207	117	†	90	422
25- 49	1930	14,364	241	132	4	105	499
	1924	15,500	273	154	†	119	541
50- 99	1930	9,768	365	214	9	142	680
	1924	10,200	390	226	†	164	713
100- 199	1930	6,283	450	248	15	187	879
	1924	6,500	543	330	†	213	910
200- 299	1930	2,474	302	172	9	123	600
	1924	2,600	376	238	†	138	620
300- 399	1930	1,256	227	134	5	90	433
	1924	1,200	246	152	†	94	412
400- 499	1930	715	153	86	3	66	318
	1924	800	197	127	†	70	342
500- 749	1930	911	281	155	10	116	552
	1924	900	281	160	†	121	524
750- 999	1930	494	183	90	6	87	429
	1924	400	186	105	†	81	354
1,000-1,499	1930	438	224	106	9	109	532
	1924	400	243	132	†	111	484
1,500 and over ...	1930	549	769	367	8	394	1,746
	1924	600	794	356	†	438	1,984
TOTAL ...	1930	56,362	3,341	1,783	79	1,485	6,995
	1924	65,400	3,736	2,097	93	1,639	7,306

* The numbers for 1924 are approximate.

† Inclusive of Excise duty in 1924 and of subsidy paid to beet sugar manufacturers in 1930.

‡ Not estimated.

§ Exclusive of Excise duty.

In the following tables the returns have been classified according to whether they were made on a cost basis or on one which included the element of profit (or loss). The returns made on a cost basis are those of Local Authorities and Government Departments, Railway Companies, Tramway and Light Railway Companies, and Canal, Dock and Harbour Companies, and there have also been included in this group the Gas, Electricity and Water Undertakings of Local Authorities. The total figures for 1924 have been added for comparison.

Profit-making trades

Size group (average numbers employed)	Number of returns	Gross output	Cost of materials	Estimated Excise duty	Amount paid for work given out	Net output*	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	£'000	£'000	No.	£
11- 24 ...	18,578	141,894	75,659	1,499	1,574	63,162	318,319	198
25- 49 ...	13,889	233,468	126,908	4,662	1,545	100,263	482,357	208
50- 99 ...	9,347	353,091	205,939	8,800	2,736	135,616	650,309	209
100-199 ...	5,987	432,722	238,537	15,029	3,308	176,168	837,367	210
200-299 ...	2,342	287,555	164,640	8,408	1,896	114,789	568,037	202
300-399 ...	1,186	216,967	129,125	5,100	1,061	83,557	408,299	205
400-499 ...	661	142,443	80,662	2,906	919	59,604	294,461	202
500-749 ...	855	267,510	148,450	10,003	1,820	107,237	517,197	207
750-999 ...	457	170,846	84,619	5,663	634	79,930	396,711	201
1,000-1,499 ...	397	205,174	97,744	9,035	566	97,829	481,148	203
1,500 and over	484	653,352	321,437	8,305	2,626	320,984	1,373,791	234
TOTAL—								
1930	54,183	3,105,022	1,673,810	79,410	18,685	1,339,139	6,327,996	212
1924	59,272	3,489,022	1,958,421	93,424	25,523	1,411,654	6,603,121	214

* Including estimated subsidy paid to beet sugar manufacturers in 1930.

Non-profit-making trades

Size group (average numbers employed)	Number of returns	Gross output	Cost of materials	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	No.	£
11- 24 ...	532	4,012	1,660	2,352	9,049	260
25- 49 ...	475	7,656	3,068	4,588	16,951	271
50- 99 ...	421	11,889	4,935	6,954	29,815	233
100- 199 ...	296	17,548	6,609	10,939	41,948	261
200- 299 ...	132	14,387	5,723	8,664	32,335	268
300- 399 ...	70	9,663	3,582	6,081	24,299	250
400- 499 ...	54	10,375	4,207	6,168	23,858	259
500- 749 ...	56	12,947	4,808	8,139	34,616	235
750- 999 ...	37	12,236	5,026	7,210	31,756	227
1,000-1,499 ...	41	19,039	7,797	11,242	50,701	222
1,500 and over ...	65	115,933	42,576	73,357	371,974	197
TOTAL						
{ 1930	2,179	235,685	89,991	145,694	667,302	218
{ 1924	2,611	191,057	78,027	113,030	538,002	210

The net output of and number of persons employed by the "cost" group in 1930 was between 10 and 11 per cent. of that of the "profit" group. The relative growth in the former group is indicated by the fact that in 1924 the corresponding proportion was about 8 per cent. both for net output and for persons employed. The net output per person employed in the "profit" group was £6 less than that in the other group in 1930 but £4 more in 1924. The change over is due in the main to the marked increase from £210 in 1924 to £218 in 1930 in the net output per person employed in the "cost" group, and this may be attributed in large part to the growth between 1924 and 1930 in the Electricity Undertakings of Local Authorities, for which the net output per person employed was very high:—£480 in 1924 and £512 in 1930. For the "profit" group net output per person employed decreased only from £214 to £212.

The 1930 returns show that, in the profit-making trades, the variation according to size of return in net output per person employed was very small (between £198 and £210) except in the group of largest size (1,500 or more persons employed) for which net output amounted to £234 per person. In the "cost" group, the contrast between the group of largest size and the remainder was equally marked, but in this case in the opposite direction, much the smallest net output per person employed being recorded for the group of largest size. Over half the aggregate net output in the "cost" group was recorded by firms employing 1,500 persons or more, and the number of persons employed by these firms amounted to nearly 56 per cent. of the total.

The large establishments.—In the following table the returns on which 1,500 or more persons were recorded as employed in the Factory trades and the Non-Factory trades are subdivided into four size groups, the figures for the size group 1,000-1,499 being added for purposes of comparison.

Largest returns according to numbers employed

Size group (average numbers employed)	Number of returns	Gross output	Cost of materials	Estimated Excise duty	Amount paid for work given out	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	£'000	£'000	No.	£
Factory trades:—								
1,000-1,499	258	170,291	89,334	9,035	566	71,356	311,786	229
1,500-1,999	101	98,962	56,416	138	504	41,904	174,267	240
2,000-2,999	86	131,254	75,048	4,291	1,073	50,842	207,647	245
3,000-4,999	60	135,768	69,240	3,502	781	62,245	217,030	287
5,000 and over	30	158,615	88,903	374	268	69,070	232,583	297
TOTAL—1,500 and over	277	524,599	289,607	8,305	2,626	224,061	831,527	269
Non-Factory trades:—								
1,000-1,499	180	53,922	16,207	—	—	37,715	220,063	171
1,500-1,999	108	52,543	13,041	—	—	39,502	189,460	209
2,000-2,999	85	54,616	16,645	—	—	37,971	205,503	185
3,000-4,999	50	39,792	9,709	—	—	30,083	186,955	161
5,000 and over	29	97,735	35,011	—	—	62,724	332,320	189
TOTAL—1,500 and over	272	244,686	74,406	—	—	170,280	914,238	186

It has already been pointed out that the net output per person employed in the Factory trades increased almost without exception from the establishments of smallest size to those of largest size. The above table shows that this increase continued as the size of establishment increased beyond 1,500 persons. The following table shows that net output per person employed also tends to increase with the net output of the establishment. The decline for the size group £1,500,000-£2,000,000 compared with the groups on either side of it is attributable to low gross output and cost of materials while the amount of Excise duty paid was relatively high. In these classifications it is important to bear in mind two major qualifications attaching to the figures, viz. that the figures do not relate to size of firm but to size of return, and that individual groups may be affected by the occurrence in them of a number of returns for particular trades in which the average net output per person employed is either specially low or specially high. The general trend is, however, clear from the figures in both tables.

As regards the Non-Factory trades, the highest net output per person employed was for the group 200-299 persons, and apart from the group of largest size there was a decrease with the increasing size of establishment beyond this. The analysis of the returns on which 1,500 or more persons were recorded as employed shows no well defined trend, such as that for the Factory trades, but the analysis according to the net output of the establishment shows, apart from the group in which the net output was at least £2,000,000, an increase in net output per person employed with the increase in total net output.

Largest returns classified by net output

Size group (net output)	Number of returns	Gross output	Cost of materials	Estimated Excise duty	Amount paid for work given out	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	£'000	£'000	No.	£
Factory trades:—								
Under 500	130	112,061	67,370	135	796	43,760	264,415	165
500 -	55	81,236	46,235	684	835	33,482	142,811	234
750 -	32	55,649	27,489	192	385	27,583	103,969	265
1,000 -	22	61,113	34,488	185	249	26,191	86,855	302
1,500 -	17	54,553	21,044	3,460	85	29,964	101,319	296
2,000 and over	21	159,987	92,981	3,649	276	63,081	132,158	477
TOTAL ...	277	524,599	289,607	8,305	2,626	224,061	831,527	269
Non-Factory trades:—								
Under 500	185	79,925	19,983	—	—	59,942	389,215	154
500 -	36	29,149	7,565	—	—	21,584	124,553	173
750 -	15	18,234	5,876	—	—	12,358	61,485	201
1,000 -	18	30,756	10,026	—	—	20,730	89,050	231
1,500 -	6	14,444	4,514	—	—	9,930	40,214	247
2,000 and over	12	72,178	26,442	—	—	45,736	209,721	218
TOTAL ...	272	244,686	74,406	—	—	170,280	914,238	186

In addition to the returns summarised in the above table, there were 47 returns in the Factory trades and 7 returns in the Non-Factory trades on which a net output exceeding £500,000 was recorded. Of these firms there were 34 (28 Factory, 6 Non-Factory) which had a net output between £500,000 and £750,000, 13 (all Factory) with a net output between £750,000 and £1,000,000, 6 (5 Factory, 1 Non-Factory) with a net output between £1,000,000 and £1,500,000 and 1 (Factory) with a net output exceeding £1,500,000. The summary particulars for these 54 returns are set out in the following table, from which it will be observed that the average number of persons recorded on each return was under 900.

Firms with a net output of over £500,000 employing less than 1,500 operatives

Particulars	Unit	Factory trades	Non-Factory trades	Total
Number of returns	No.	47	7	54
Gross output	£'000	88,389	6,158	94,547
Cost of materials... ..	"	31,854	1,410	33,264
Estimated Excise duty	"	19,724	—	19,724
Amount paid for work given out	"	8	—	8
Net output	"	36,803	4,748	41,551
Average number of persons employed (excluding outworkers)	No.	40,077	8,025	48,102
Net output per person employed	£	918	592	864

Classification by net output per person employed.—The variation in the net output per person employed in each of the groups of Factory and Non-Factory trades is shown in the following tables, the highest and lowest net output in each group being distinguished in heavy type:—

Size group (average numbers employed)	Total numbers employed in all trades	Net output per person employed					
		Engineering, Ship-building and Vehicles	Food, Drink and Tobacco	Paper, Printing, etc.	Miscellaneous	Timber	Leather
11- 24	Thous. 327	£ 185	£ 262	£ 190	£ 186	£ 181	£ 195
25- 49	499	190	306	204	206	183	209
50- 99	680	198	374	216	220	184	215
11- 99	1,506	193	320	207	209	183	209
100- 199	879	204	413	241	214	192	218
200- 299	600	210	398	227	232	199	232
100- 299	1,479	206	407	236	220	194	223
300- 399	433	215	462	240	182	188	265
400- 499	318	209	453	283	214	196	318
500- 749	552	210	417	305	259	201	222
750- 999	429	221	374	320	278	173	—
300- 999	1,732	214	422	286	230	192	269
1,000-1,499	532	219	427	340	273	—	—
1,500 and over	1,746	227	492	451	311	287	—
1,000 and over	2,278	225	477	427	304	287	—
Total number employed Thous.	6,995	1,052	462	375	174	166	46

Size group (average numbers employed)	Net output per person employed						Total—Factory trades	
	Textiles	Clothing	Clay and Building Materials	Non-Ferrous Metals	Iron and Steel	Chemicals, etc.	Numbers employed	Net output per person employed
	£	£	£	£	£	£	Thous.	£
11- 24	149	177	193	198	172	334	234	200
25- 49	159	170	204	210	174	389	372	208
50- 99	143	159	204	226	180	382	536	209
11- 99	148	166	202	215	177	374	1,142	207
100- 199	138	156	204	189	181	502	715	210
200- 299	132	154	211	205	184	491	491	201
100- 299	136	155	206	195	182	498	1,206	207
300- 399	130	152	163	165	193	432	342	205
400- 499	132	151	178	207	210	414	240	208
500- 749	130	144	219	267	186	423	405	217
750- 999	144	157	160	174	181	357	271	219
300- 999	133	151	186	211	191	410	1,258	212
1,000-1,499	144	170	179	357	190	412	312	229
1,500 and over ...	176	196	235	—	188	357	832	269
1,000 and over ...	163	179	215	357	189	372	1,144	258
Total number employed Thous.	995	478	223	109	493	177	4,750	—

Size group (average numbers employed)	Net output per person employed			Total Non-Factory trades	
	Building and Con- tracting	Mines and Quarries	Public Utility Services and Govern- ment Depart- ments	Numbers employed	Net output per person employed
	£	£	£	Thous.	£
11- 24	187	170	302	93	202
25- 49	196	195	301	127	215
50- 99	201	183	261	144	214
<i>11- 99</i>	<i>195</i>	<i>184</i>	<i>281</i>	<i>364</i>	<i>211</i>
100- 199	202	173	288	164	223
200- 299	210	150	286	110	225
<i>100- 299</i>	<i>205</i>	<i>164</i>	<i>287</i>	<i>274</i>	<i>224</i>
300- 399	223	159	286	91	217
400- 499	211	158	262	78	203
500- 749	221	146	264	146	187
750- 999	258	144	251	158	176
<i>300- 999</i>	<i>226</i>	<i>149</i>	<i>265</i>	<i>473</i>	<i>192</i>
1,000-1,499	247	143	237	220	171
1,500 and over	288	153	217	914	186
<i>1,000 and over</i>	<i>279</i>	<i>150</i>	<i>220</i>	<i>1,134</i>	<i>183</i>
Total number employed. <i>Thous.</i>	445	1,017	783	2,245	—

The groups of trades shown in the above table are classified into four types. In the first type net output per person employed increases more or less regularly with the size of firm. Nearly half the groups are of this type, viz. Engineering, Shipbuilding and Vehicles; Food, Drink and Tobacco; Paper, Printing, etc.; Leather; Timber; and Miscellaneous, among the Factory trades, together with Building and Contracting. In the first three of these, the large groups, employing an aggregate of about 1,889,000, and in the Building and Contracting Trade, the smallest net output per person was recorded for the firms of smallest size and the largest for those of largest size, whereas for the remaining three groups of Factory trades, which are relatively small in size, this was not the case. The aggregate numbers employed in this set of trades was about 2,720,000.

The next commonest type is that in which net output per person employed is high for the firms of smallest and of largest size and shows a well-defined drop in net output per person in the middle ranges. The important Textiles and Clothing groups, employing an aggregate of 1,473,000 persons, are of this type, as are also the smaller groups comprising Non-Ferrous Metals, and Clay and Building Materials.

The remaining two groups of Factory trades, Iron and Steel, and Chemicals, etc., employing about 670,000 persons, are of a third type, in which the net output per person employed is highest in the middle ranges.

The fourth type is the reverse of the first, there being a tendency for net output per person employed to decrease with the increasing size of establishment. The groups Mines and Quarries, and Public Utility Services and Government Departments are of this type. In each case special reasons operate. In Coal Mines net output per person employed was nearly the same for all the size groups after the first two, and was relatively low. The increasing importance of Coal Mines in the aggregates for the larger size groups led to net output per employee declining with the increase in size of establishment. In the other group the same result is due to the increasing importance with size of establishment of Local Authorities and Railway Companies, whose output was valued on a cost basis and whose net output per person employed was correspondingly low.

Considering the Factory trades only, the principal changes in net output per person employed are an increase between the 1st and 2nd size groups, a decrease between the 4th and 5th size groups, and increases between the 7th and 8th, and after the 9th size group. The only exception to the increase between the groups 11-24 and 25-49 was in the Clothing Trades, and, as was pointed out in the report on those trades, the higher net output per person among the smaller firms may be associated with the relatively large number of outworkers employed by these firms.

The decline between the groups 100-199 and 200-299 was not so general, applying only to five out of the twelve groups of Factory trades. These groups, however—Textiles; Clothing; Food, Drink and Tobacco; Chemicals, etc.; and Paper, Printing, etc.—employed more than three-fifths of the total number of persons in these size groups. The first three of these groups, together with Iron and Steel and the small Leather group, formed exceptions to the increase in net output per person between the size groups 400-499 and 500-749. The only two groups showing a decline in net output per person between the size groups 750-999 and 1,000-1,499 were Engineering, Shipbuilding and Vehicles, and Miscellaneous. There was also an increase between the groups 1,000-1,499 and 1,500 and over except in respect of Iron and Steel and Chemicals,

etc. It will thus be seen that the increases referred to in the preceding paragraph were nearly general, but the decrease was not so general.

One measure of the average size of firms in the various groups may be found in the size group above and below which approximately equal numbers were employed. In the Leather and Timber groups this size group was the 3rd (50-99 persons). The median group was the 4th (100-199) in the Clothing, Non-Ferrous Metals, and Clay and Building Materials groups; the 5th (200-299) in the Textiles, Food, Drink and Tobacco, Paper, Printing, etc., Chemicals, etc. and Miscellaneous groups; the 6th (300-399) in the Iron and Steel group, and the 9th (750-999) in the Engineering, Shipbuilding and Vehicles group. In the above comparisons firms employing less than ten persons are excluded—their inclusion would involve substantial changes in certain of the groups, e.g. Clothing, and Food, Drink and Tobacco, in which large numbers of small firms are engaged.

CHAPTER III

THE INDEX OF PRODUCTION

The Board of Trade Journal dated 26th July, 1928, contained an account of the method of compilation of the Board of Trade index of industrial production. The index attempts to measure changes in the quantum of goods produced quarter by quarter and it is practicable now to consider to what extent the index has fulfilled its purpose of filling in the gap between one Census of Production and another.

The information from which the various index numbers have been compiled has been obtained from voluntary returns furnished by trade associations and by individual firms, from official returns of imports and exports, employment, wages paid and production, from the bulletins of certain industrial federations, and from trade papers in which production and movement in stocks are shown. The industries included in 1930 within the scope of the index were combined into nine groups as follows:—

1. Mines and Quarries—includes production of coal, coke and iron ore.
2. Iron and Steel and Manufactures thereof—production of pig iron, steel, and their products, including galvanised sheets, tinplates and wire.
3. Non-Ferrous Metals—includes copper, lead, tin and zinc and manufactures thereof.
4. Engineering and Shipbuilding—covers productive activity in electrical, marine and general engineering, and in shipbuilding, and the production of motor cars and motor cycles and of certain electrical goods, including wires and cables, accumulators, electric lamps and thermionic valves.
5. Textiles—includes cotton (spinning, weaving, bleaching, dyeing, and printing), woollen and worsted, jute, silk, artificial silk, linen and hosiery.
6. Chemical and Allied Trades—this group includes the production of heavy chemicals and explosives, synthetic dyes, ammonium sulphate, sulphuric acid, matches, and soap, and the refining of petroleum.
7. Leather and Boots and Shoes—covers leather and manufactures of leather, and boots and shoes.
8. Food, Drink and Tobacco—this group includes grain milling, bread and biscuit making, beer brewing, spirit distilling, cattle foods, sugar refining, cocoa and chocolate, and tobacco.
9. Gas and electricity—gas made and electricity generated.

In addition to the industries enumerated above, particulars relating to newsprint and wrapping paper, rubber manufactures, cement, tiles and musical instruments were included in the calculation of the general index.

The index is weighted according to net output, that figure representing without duplication the value added to materials in the process of manufacture. The net output in 1930 could be compared with that in 1924, but such a comparison, being affected by changes in the value of money between the two years, would fail to express adequately the change in production which the index seeks to measure. Essentially, as it appears, the index should be compared with the volume of goods in their final form for exportation or for consumption in this country. As has already been explained, the records available do not enable such goods to be identified with certainty. The method adopted will therefore be to compare the volume of production for each trade in respect of which particulars are included in the index, by revaluing the output in 1924 at 1930 prices, duplication in the trade being estimated and eliminated in cases where this is of importance.

The basis for combining the volume figures so ascertained could be the aggregate of the figures representing the goods produced in the various trades. This method is open to two objections, the principal one being that it does not allow for duplication between trades. In so far as returns are collected on a similar basis in each year, approximately the same amount of duplication will arise and duplication between trades will not affect the comparison to any appreciable extent, but in certain cases there was an increased departmentalisation of returns in 1930. Separate returns were obtained, for example, for the wholesale bottling establishments of a number of brewers, thus rendering the Wholesale Bottling Trade, as a trade, more complete in 1930 than in 1924, but as a result the beer bottled by these firms is recorded twice, representing a possible extra duplication of some £3 million. Similarly, the returns for Iron and Steel Foundries are swollen in 1930 relative to 1924 by the output of rough castings produced by engineering firms for finishing in their own machine shops.

The second objection which may be urged to the method above mentioned is that it tends to give undue importance in the aggregate to trades in which the material worked on is of high intrinsic value. It is only necessary to mention in this connection the Gold and Silver Refining Trade—in which the gross output of the 2,274 persons employed in 1930 was £39,838,000—and the various trades in which the value of the products is enhanced by high specific duties.

For the above reasons it would not be accurate to make a comparison with the index of production on the basis of gross output, and the weighting of the index, i.e., on the basis of the net output in 1924, will be adopted for the volume comparison as giving a figure comparing most closely with the index. In the following comparisons of the various groups, each trade included has been assigned a weight in the volume figure identical with that used in the compilation of the index of production.

Mines and quarries.—The index of production and the volume of production for this group each show a decline of between 8 and 9 per cent. in 1930 as compared with 1924.

Iron and steel and manufactures thereof.—The decrease of 11.2 per cent. indicated by the index of production as having taken place between 1924 and 1930 is greater than that recorded by the returns to the Census of Production, viz. nearly 6 per cent. To some extent this difference was due to the fact that, as mentioned in the report on the Iron and Steel Trades, the recorded production related on the average to a period of twelve months ending earlier than the 31st December, 1930; there was a substantial decline in production in December, 1930, as compared with a year earlier, and this will necessarily have led to the recorded production being in excess of the actual production during the calendar year. Further, the index for steel, including finished goods, being based upon retained imports of crude steel as well as on the output of steel ingots and castings, would tend to indicate production of the finished goods and rolling mill products in a succeeding period rather than in the quarter in which the goods were imported, so that while the Census figure is for a period rather behind the end of the year 1930, the index would tend to represent production in a period of twelve months ending at some date in 1931.

Engineering and shipbuilding.—The index of production for this group, 116.6, is in close agreement with the volume of production as recorded, the increase in volume being about 18 per cent. Though there are some differences in the figures for some of the constituent industries, notably electrical engineering, it is necessary to bear in mind that for some of these adequate quantitative particulars are not available, and the measurement of a change in the volume of production cannot be precise. In the important general engineering group, the index and the volume of production are in substantial agreement.

Non-ferrous metals.—According to the index of production the increase in the production of non-ferrous metals between 1924 and 1930 was 19.1 per cent., whereas the increase recorded at the Census of Production was only 6 per cent. The figures for tin are in substantial agreement, but in respect of copper, lead and zinc there is a wide disparity. In each of these metals there is an active market and stocks are large and fluctuate considerably from quarter to quarter. The figures for the index of production are based on retained imports of the crude metals adjusted for differences in stocks. The stock figures relate only to stocks in public warehouses, and the figures on which the index is based would be affected considerably if in the course of either year stocks were accumulating in private hands or such stocks suffered any marked contraction.

Textiles.—The index of production for this group was 79·5, which is in substantial agreement with the change in the volume of production between the two years, output in 1930 being about 17 per cent. less than in 1924. For most of the trades in the group, production in 1930 was adequately represented by the data used for the calculation of the index, the only marked divergence being in respect of the output of silk and artificial silk goods. It has been pointed out in the report on this trade (Part I, page 119), that the total output of artificial silk recorded for 1930 may be taken to represent substantially production in the twelve months ended 30th September, 1930. Taking the index of production, which is based on the deliveries of silk for home consumption and the production of artificial silk yarn and waste, the figures for the September year make a better fit with the production figures and those for the June year a better fit still, but the index for the June year is still below the increase in the volume of silk and artificial silk goods produced and it appears probable that this may be due to the marked increase in 1930 relative to 1924 in the output of piece-goods of artificial silk mixed with other materials.

Chemical and allied trades.—The index of production for this group showed production to be at about the same level in 1930 as in 1924, the index number being 99·3, whereas the returns to the Census of Production indicate an increase in volume of about 6 per cent. for the trades covered in 1930 by the index. Reasons for the differences in two cases have been mentioned in the reports on the separate trades. In respect of dyes, attention was called to the deficiency in the returns for 1924 to the Dyestuffs Industry Development Committee, while in respect of refined petroleum it was mentioned that in addition to the crude oil refined, oil imported as refined was further refined in this country. There is some difference also in respect of the figures for heavy chemicals, due to the increased production of a number of miscellaneous chemicals which cannot be covered adequately by any index based on a sample.

Leather and boots and shoes.—An increase of 1 per cent. in 1930 compared with 1924 was shown both by the index of production and by the returns to the Census of Production.

Food, drink and tobacco.—The increase of 4·9 per cent. indicated by the index of production as having taken place between 1924 and 1930 somewhat understates the actual increase which occurred in the items of this group covered by the index, this being about 9 per cent. The disparity is due primarily to the net imports of wheat, adjusted for differences in port stocks, being taken as representative of the Bread and Biscuit Trades as well as of Grain Milling. The index thus took no account of the reduced exports and increased imports of flour in 1930, neither was account taken of changes in the quantity of home-grown wheat milled. The information now available under the Wheat Act enables the index to be made more accurate in this respect for the future. There is also some difference between the index and the actual production in

respect of the Sugar and Glucose Trade, but as the returns to the Census of Production did not cover the calendar year either in 1924 or in 1930 and changes were relatively large within each year, precise agreement was not to be expected.

Electricity and gas.—The index of production is compiled from the returns furnished to the Electricity Board and the Board of Trade in respect of electricity and gas respectively. The returns to the Census of Production are in substantial agreement with the index, which shows an increase of about 39 per cent. as having taken place between 1924 and 1930.

Summary.—The general index includes particulars of certain industries additional to those included in the above groups. In respect of some of these there is close agreement between the volume of production and the index and the only exception it is necessary to mention is rubber. The index is based on retained imports of raw rubber adjusted for stocks, and the index figure for 1930 is substantially higher than that of the volume of production of rubber manufactures. The difference is probably due to 1924 being an exceptional year for rubber. Re-exports of rubber in that year were in excess of imports and it is not improbable that the high prices ruling led to a substantial reduction in stocks held elsewhere as well as at London and Liverpool (those used for the index).

The general index of production for the year 1930 was 103·2. The volume of production, calculated in the manner described above, was 2·9 per cent. higher in 1930 than in 1924 for the items covered by the index, a very satisfactory agreement. Though, as might be expected from the initial attempt to measure production by means of a variety of data instead of by an aggregation of the actual output, there are certain cases in which the index numbers are not a perfect fit with the movement of production, these cases are not of importance in the aggregate, and the series of index numbers from 1927 to 1930 can probably be taken as expressing within a little the actual changes in production which took place during that period in the industries for which particulars are included in the index.

As stated above, the index of production does not cover the whole of the industrial output of the country. The sections of industry covered by information received in connection with the index represented in 1930 about 90 per cent. of the total activity of the groups of industry for which particulars were included in the index and more than two-thirds of the total manufacturing and mining activity of the United Kingdom. For mines and quarries, iron and steel, engineering and shipbuilding, textiles, leather and boots and shoes, and gas and electricity the index was almost completely representative of the whole output. Of the branches of trade not covered by the index the most important were the building and contracting trades (with the exception of the output of cement and tiles), the clothing trades (other than boots and shoes) and public utility services (other than gas and electricity).

CHAPTER IV

THE VOLUME OF PRODUCTION

In the preceding chapter, the change in the index of production between 1924 and 1930 has been compared with the change between those years in the volume of production of the items covered by the index. An estimate has now to be made of the change in the total volume of production between 1924 and 1930. The basis will be the same as that adopted for the comparison with the index of production, i.e., the proportionate change in the volume of production in each trade between 1924 and 1930 will be applied to the net output of the trade in 1924, and the total resulting from the addition of the figures so obtained will be compared with the aggregate net output in 1924.

In Parts I—IV of this Report, estimates have been made of the change in the volume of production of the principal products of each trade, but such figures cannot be related to the net output of the trade. The output of the firms in each trade covers normally only a part of the output of the principal products, and the firms manufacture other goods which are principal products of other trades, and may do repair work or other work of which no account has in many cases been taken in the previous volume calculations. The products manufactured and work done by the firms classified in 1924 in each individual trade have therefore been revalued at the average values shown by the returns for 1930, or on the basis of such other relevant information as is available regarding manufacturing costs, and the results are shown in Appendix II in comparison with the output in 1930. It will be apparent from the foregoing remarks that such results are not additive to arrive at the total volume of production.

The results of applying the change in volume of production for each trade to the net output are shown in the following table for each group of trades:—

Trade group	Net output, 1924	Volume of production in 1930 compared with 1924	Estimated net output in 1930 on basis of 1924 (column (1) × column (2))
	(1)	(2)	(3)
	£'000	Per cent.	£'000
Iron and Steel	98,644	102·6	101,239
Engineering, Shipbuilding and Vehicles	198,406	120·3	238,720
Non-Ferrous Metals	25,272	109·4	27,646
Textiles	221,796	83·5	185,227
Leather	11,629	94·0	10,929
Clothing	75,719	111·5	84,437
Food, Drink and Tobacco	172,454	112·8	194,549
Chemicals, etc.	65,805	109·7	72,197
Paper, Printing and Sta- tionery	93,884	116·4	109,308
Timber	27,332	128·7	35,169
Clay, Building Materials and Building	124,164	125·3	155,588
Miscellaneous	41,451	119·4	49,501
Mines and Quarries	226,403	93·2	211,018
Public Utility Services and Government Depart- ments	165,671	120·0	198,727
TOTAL	1,548,630	108·1	1,674,255

The above table indicates that the volume of production by firms employing more than ten persons was 8·1 per cent. greater in 1930 than in 1924. It has already been calculated that for the items included in the index of production the increase between 1924 and 1930 amounted to 2·9 per cent. The greater increase recorded for the total of industrial production may be attributed in large part to the marked expansion in output in the Building and Contracting Trade (29·3 per cent.) and by Local Authorities (25·3 per cent.). These two together represented between 8 and 9 per cent. of the total industrial production in 1930. Other important trades not included within the scope of the index, which also expanded rapidly between 1924 and 1930, are the Printing and Publishing Trades and the Timber Trades.

In only three groups of trades was the volume of production in 1930 less than in 1924. The decline in respect of Mines and Quarries and the Leather Trades was between 6 and 7 per cent., but for Textiles a much larger decline was recorded—16·5 per cent. Production in the Iron and Steel Trades was about the same in 1930 as in 1924, while in each of the other groups of trades the increase exceeded 9 per cent., and in four groups—Timber; Clay, Building Materials and Building; Engineering, Shipbuilding and Vehicles; and Public Utility Services and Government Departments—there was an expansion of 20 per cent. or more.

The results discussed above relate, as already stated, to the volume of output as recorded at the Census of Production; the omission of the output of the firms employing ten persons or less is of some importance. These firms in 1924 had a recorded net output of £85 million and, including the firms that failed to make returns, it is estimated that the output for 1924 shown in the table is deficient to the extent of rather less than 8 per cent. The numbers employed by the small firms increased between 1924 and 1930 while those employed by the larger firms decreased and the net output shown in the table for 1930 may be deficient by between $8\frac{1}{2}$ and 9 per cent. On the basis of these figures the increase in the volume of production in 1930 would be somewhat greater than has been calculated above, and the change might possibly raise the proportionate increase to over 9 per cent.

No allowance is made in the table for duplication, except in the Sugar and Glucose Trade and Electricity Undertakings, in which there was duplication of some specific item (see page 146). In so far as the amount of duplication was the same in proportion in the two years, the volume of production figure would not be affected. A factor to which reference should be made, but which does not affect the volume comparisons made between 1924 and 1930, is that the actual extent of duplication in some trades, such as the Building and Contracting Trade and the Furniture Trade, will have been substantially smaller for the firms making returns to the 1930 Census than for those making returns to the 1924 Census owing to the restriction of the scope of the later Census to firms employing more than ten persons. The smaller firms in many trades were responsible for a large part of the work done for the trade, which was duplicated in the output of the firms employing them on such work.

In an endeavour to secure more precise information about the total quantity of certain intermediate products manufactured, e.g., iron and steel forgings, or of goods used otherwise by the makers, e.g., cardboard boxes for packing purposes, a greater number of separate returns was obtained at the 1930 Census than at that of 1924. The increase in the departmentalisation of many of the larger firms in the country rendered this practicable. At the same time, the combination of a number of small units into one large unit had in some cases the opposite effect, since in the event of all the operations being carried out in one centralised establishment, the intermediate products manufactured would escape record. Some of the trades for which estimates of duplication have been made are referred to in subsequent paragraphs. It is not believed that, if allowance could be made for all changes in the amount of duplication between 1924 and 1930, the increase during that period in the total volume of industrial output in the United Kingdom would be reduced by much more than one-half of 1 per cent.

Making allowance for the returns not being in all cases for the calendar year (see pages 7 and 8), the volume of industrial output in 1930 may be estimated at about 8 per cent. greater than in 1924.

In the following series of tables a comparison is made, for the firms assigned to each of the principal trades,* of changes in the volume of production between 1924 and 1930, changes in employment, and changes in the volume of production per person employed.

Metal Trades

Trade	Total production			Persons employed in 1930 as a percentage of 1924	Value of production (at 1930 average values) per person employed	
	1930	1924 at 1930 average values	1930 as a percentage of 1924		1930	1924
	£'000	£'000	Per cent.	Per cent.	£	£
Iron and Steel (Smelting and Rolling)	84,366	99,180	85·1	86·4	618	628
Iron and Steel Foundries*	29,423	27,830	105·7	108·4	322	330
Tinplate	15,693	17,740	88·5	90·4	621	634
Hardware, Hollow-ware, Metallic Furniture and Sheet Metal*	28,577	19,800	144·3	123·9	346	297
Chain, Nail, Screw and Miscellaneous Forgings	16,465	12,340	133·4	125·8	347	327
Wrought Iron and Steel Tubes	13,252	11,360	116·6	103·8	514	457
Mechanical Engineering	165,341	159,310	103·8	101·6	363	355
Electrical Engineering... ..	87,875	65,240	134·7	127·5	457	432
Shipbuilding	62,724	72,790	86·2	94·1	470	513
Motor and Cycle	123,558	79,620	155·2	125·4	511	413
Non-Ferrous Metals (Smelting, Rolling, etc.)*	47,334	45,900	103·1	95·8	1,011	940
Finished Brass*... ..	10,730	10,350	103·7	100·3	331	320
Plate and Jewellery*	8,706	9,820	88·6	85·4	343	330

* Great Britain.

Of the trades included in the above table the only two in which duplication within the trade itself is of much importance are the Iron and Steel (Smelting and Rolling) Trade and the Motor and Cycle Trade. In the former trade it was estimated that the duplicated output in 1930 formed about 12 per cent. of the gross value. The calculation made for 1924 was not on a similar basis, but using the method adopted at the 1930 Census it would appear that duplication was somewhat greater in 1924 than in 1930. Taking the output free from duplication in each year the volume of production in 1930 may be estimated at about 13 per cent. less than in 1924, as compared with a decline of 15 per cent. shown in the table.

For the Motor and Cycle Trade the duplicated output would appear to have been about the same in proportion to the total in both years, and accordingly the increase of about 55 per cent. in

* Trades in which the numbers employed exceeded 25,000.

production in 1930 compared with 1924 may be taken as substantially representing the change which took place.

In the case of foundries the figures shown in the table are not affected in any marked degree by duplication of output, but the figures for 1930 are swollen in relation to 1924 by the inclusion of a larger number of returns by engineering firms in respect of their output of castings machined in their own works. The information available indicates that the increase of 6 per cent. in the output of foundries in 1930 compared with 1924 may be attributed entirely to this change in the method of making returns to the Census. The comparability of the production and employment figures for this trade in the table is not affected. The employment figures for Mechanical Engineering are affected by the transfer, and had returns been obtained on the same basis in each year the increase in numbers employed in this trade would have been about 2.8 per cent. instead of 1.6 per cent. as shown in the table.

In the Chain, Nail, Screw, etc., Electrical Engineering, and Non-Ferrous Metals Trades the increase in the volume of production per person employed was between 5 and 7½ per cent. and in three trades it exceeded 10 per cent., viz., Wrought Iron and Steel Tubes, Hardware, Hollow-ware, etc., and Motor and Cycle, the increase in the last mentioned trade being about 24 per cent. In only three of the trades shown in the table was the volume of production per person employed smaller in 1930 than in 1924, when allowance is made for duplication, the decline in Iron and Steel Foundries and the Tinplate Trade being about 2 per cent. and in Shipbuilding over 8 per cent.

Textile, Leather and Clothing Trades

Trade	Total production			Persons employed in 1930 as a percentage of 1924	Value of production (at 1930 average values) per person employed	
	1930	1924 at 1930 average values	1930 as a percentage of 1924		1930	1924
					£'000	£'000
Cotton Spinning* ...	78,624	103,920	75.7	75.5	412	411
Cotton Weaving* ...	79,631	118,120	67.4	72.2	401	429
Woollen and Worsted ...	114,833	147,890	77.6	83.9	499	539
Silk and Artificial Silk ...	23,012	13,510	170.3	149.9	384	338
Linen and Hemp† ...	22,981	28,270	81.3	73.2	316	285
Jute ...	9,605	11,700	82.1	83.5	334	340
Hosiery* ...	39,444	36,870	107.0	110.3	374	386
Textile Finishing ...	30,379	38,940	78.0	91.7	289	339
Leather (Tanning and Dressing)* ...	27,792	30,140	92.2	93.7	975	991
Tailoring, Dressmaking, Millinery, etc. ...	112,408	101,500	110.8	108.9	348	342
Boot and Shoe ...	46,982	44,220	106.3	93.2	386	339
Hat and Cap* ...	12,291	10,750	114.3	102.3	401	359

* Great Britain.

† Including Cotton making-up for Northern Ireland.

In the Cotton and the Woollen and Worsted Trades there is a large amount of duplication and the above figures therefore fail to express the change in production which occurred between 1924 and 1930. For each of these trades estimates have been made of the output free from duplication in each year. In the Cotton Spinning and Weaving Trades the output free from duplication was estimated at £255 million in 1924 and as the output of the small firms is of no relative importance in these trades, that figure may be compared with the estimate of £108 million made on the same basis for 1930. The unduplicated output in each year consisted of final products made and intermediate products exported or used in other trades, and it is practicable to revalue the 1924 output at 1930 prices with some degree of precision. The value of the duplicated output in 1930 was about the same in proportion as it was in 1924, but the revaluation of the 1924 unduplicated output at 1930 prices shows the volume of production in 1930 to have been only about 63 per cent. of that in 1924, which compares with the figure of about 71 per cent. given in the above table.

In the Woollen and Worsted Trade the output free from duplication was estimated at £141 million in 1924, which may be compared with the estimate of £85 million made for 1930 in respect of the output of all firms in the trade. In this case duplication in 1930 was of less importance than in 1924, and the volume of production in 1930 is found by this method to have been about 25 per cent. below that in 1924 as compared with a fall of about 22½ per cent. shown in the table on page 46. It should, however, be borne in mind that the estimates of duplication in this and most other trades cannot be very precise, though a greater degree of precision is possible in trades such as the Woollen and Worsted Trade and the Cotton Trade, where a considerable amount of information is available as to the final products of the trade, than in other trades where the estimate is made on more uncertain data.

Among other textile trades duplication is relatively important in the Silk and Artificial Silk Trade, the Linen and Hemp Trade and the Jute Trade, but the available information indicates no substantial change between 1924 and 1930 in the amount of duplication in these trades and the figures in the table for the volume of production in 1930 relative to 1924 may accordingly be taken as substantially accurate.

Among the trades shown in the table on page 46, there were increases exceeding 10 per cent. in the volume of production per person employed in the Silk and Artificial Silk Trade, Linen and Hemp Trade, Boot and Shoe Trade, and Hat and Cap Trade. Using the figures for output free from duplication, there were in the Woollen and Worsted Trade and the Cotton Trade declines amounting to 12 and 14 per cent. respectively in the volume of output per person employed, while in the Textile Finishing Trade the decline amounted to nearly 15 per cent. These results may be attributed in large part to the prevalence of short time working in

these industries in 1930. The only other trade in which the variation in volume of output per person employed was more than 2 per cent. was the Hosiery Trade, for which a decline of about 3 per cent. was recorded.

Food, Drink and Tobacco Trades

Trade	Total production			Persons employed in 1930 as a percentage of 1924	Value of production (at 1930 average values) per person employed	
	1930	1924 at 1930 average values	1930 as a percentage of 1924			
					1930	1924
	£'000	£'000	Per cent.	Per cent.	£	£
Grain Milling	69,526	73,190	95.0	87.8	2,620	2,420
Bread and Biscuit ...	74,937	65,090	115.1	123.7	608	654
Cocoa and Sugar Confectionery	36,486	32,260	113.1	93.6	502	415
Preserved Foods	33,649	25,700	130.9	114.6	787	689
Brewing and Malting* ...	143,358	151,980	94.3	93.9	2,335	2,326
Tobacco*	115,878	87,630	132.2	114.1	2,636	2,274

* Great Britain.

The only trade among those included in the above table in which there was any considerable duplication is the Brewing and Malting Trade. In 1924 the duplicated output amounted to over 5 per cent. of the total. For 1930 the duplication was rather less, and it is estimated that, if duplication were eliminated from the output in both years, the decrease in volume of production in 1930 compared with 1924 would be about $4\frac{1}{2}$ per cent. instead of the 5.7 per cent. shown by the recorded figures. Though not among the trades included in the table, the Wholesale Bottling Trade should be mentioned by reason of the increase in 1930 in the number of separate returns made in respect of the bottling establishments of brewing firms. This led to a double record of the beer brewed by these firms, and to an overstatement of roughly 9 per cent. in the volume of production for the Wholesale Bottling Trade.

In four of the six trades there was a substantial increase between 1924 and 1930 in the volume of production per person employed, the exceptions being the Brewing and Malting Trade, in which the increase was small, and the Bread and Biscuit Trade, in which there was a decline of 7 per cent. For Preserved Foods and Tobacco the increase exceeded 10 per cent., while for Cocoa and Sugar Confectionery the volume of production per person employed was nearly 21 per cent. greater in 1930 than in 1924.

Miscellaneous Trades

Trade	Total production			Persons employed in 1930 as a percentage of 1924	Value of production (at 1930 average values) per person employed	
	1930	1924 at 1930 average values	1930 as a percentage of 1924			
					1930	1924
	£'000	£'000	Per cent.	Per cent.	£	£
Chemicals, Dyestuffs and Drugs*	52,653	47,220	111.5	105.2	747	705
Soap, Candle and Perfumery	29,105	28,970	100.5	92.6	1,078	993
Paper	38,356	32,790	117.0	104.5	716	640
Printing, Bookbinding, etc.†	57,172	55,080	103.8	99.4	336	322
Printing and Publication of Newspapers and Periodicals	51,606	43,050	119.9	123.1	722	742
Manufactured Stationery†	14,041	9,150	153.4	138.6	371	335
Cardboard Box	10,752	6,540	164.4	144.6	319	281
Timber (Sawmilling, etc.)‡	27,276	21,620	126.1	116.0	474	436
Furniture and Upholstery§	33,815	24,460	138.2	134.3	368	357
Brick and Fireclay	20,968	18,860	111.1	107.1	286	276
China and Earthenware	14,624	15,930	91.8	100.7	209	229
Glass	13,713	10,980	124.9	107.3	347	298
Building Materials	14,075	9,130	154.2	146.1	469	444
Rubber	28,868	20,170	143.1	109.8	553	425
Scientific Instruments, Appliances and Apparatus*	9,964	8,610	115.8	106.1	395	362

* Great Britain.

† Particulars of the Manufactured Stationery Trade in Northern Ireland are included with those for the Printing, Bookbinding, etc. Trades for both 1930 and 1924.

‡ Includes the Wooden Crates, Cases, etc., and Coopering Trades for Northern Ireland.

§ Includes the Cane and Wicker Furniture and Basketware Trade for Northern Ireland.

In the Chemicals, Dyestuffs and Drugs Trades there is considerable duplication, but it was found to be impracticable at the 1924 Census to ascertain the amount of duplication with any degree of precision, the final estimate being that the amount of duplication probably lay between 7 and 18 per cent. of the gross output. In view of the absence of reliable information on which to base an estimate, no similar calculation has been made for 1930, but it may perhaps be assumed with no great degree of error that the amount of duplication in 1930 lay within the limits estimated for 1924. In several other trades included in the above table duplication within the trade itself is of some importance, but in none of

these does it appear that the proportion of duplicated output was appreciably different in 1930 from what it was in 1924. As a result of an increased number of returns being obtained for 1930 from firms that made cardboard boxes and cartons for packing their own products, the output of the Cardboard Box Trade in 1930 is not strictly comparable with that in 1924. The increase in gross output represented by these additional returns was about £400,000 and to this extent the figure given above for 1930 is overstated relative to 1924. The volume of production per person employed is not appreciably affected.

In respect of each of the trades included in the table, with the exception of the Newspaper, etc., Printing and Publishing Trade and the China and Earthenware Trade, the volume of production per person employed was greater in 1930 than in 1924. In these two trades, the data on which to estimate the volume of production are not very complete, and the figures given in the table may therefore be somewhat less accurate than those for most other trades. The increase between 1924 and 1930 in the volume of production per person employed exceeded 10 per cent. in the following trades:—Paper, Manufactured Stationery, Cardboard Box, Glass, and Rubber, the increase in respect of the Rubber Trade amounting to 30 per cent., but in the other four trades being less than 17 per cent. For the Scientific Instruments, Appliances and Apparatus Trade, the increase was just under 10 per cent.

Non-Factory trades

Trade	Total production			Persons employed in 1930 as a percentage of 1924	Value of production (at 1930 average values) per person employed	
	1930	1924 at 1930 average values	1930 as a percentage of 1924		1930	1924
	£'000	£'000	Per cent.		£	£
Building and Contracting	194,288	150,200	129.3	108.3	428	359
Coal Mines	166,770	181,390	91.9	77.9	179	152
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines*	14,083	12,130	116.1	112.0	236	228
Local Authorities† ...	66,354	52,970	125.3	121.1	279	270
Gas Undertakings ...	64,237	58,460	109.9	105.6	564	542
Electricity Undertakings	57,697	30,780	187.4	158.2	733	618
Water Undertakings ...	23,000	21,230	108.3	102.8	754	715
Railway Companies ...	63,704	64,800	98.3	92.0	276	258
Government Departments	29,203	28,280	103.3	94.9	318	292

* Including particulars of all mining and quarrying industries in Northern Ireland.

† Including Canal, Dock, Harbour, etc. Companies for Northern Ireland.

The estimate made for 1924 of the amount of duplication in the output of the Building and Contracting Trade was not precise, owing to the absence of information as to the amount of sub-contract work done. The latter comprised the main element in the duplicated output and was specifically recorded both at the Census of 1930 and at that of 1907, but no separate record was obtained for 1924. The estimate made for 1924 could in any case not be used for comparison with any estimate made for 1930 in view of the inclusion in the former Census of the output of the small firms, who were probably responsible for undertaking a considerable amount of sub-contract work, leading therefore to a greater proportion of duplication for years in which their output was included. For 1930 the value of the sub-contract work represented rather less than 5 per cent. of the gross output of the firms employing more than 10 persons. The table shows an increase between 1924 and 1930 of nearly 20 per cent. in the volume of production per person employed in this trade. It seems not improbable that this large increase may have resulted from a relatively greater volume of work being sub-let by building firms in 1930 to the small firms (whose increase in employment was about 20 per cent. as compared with 8 per cent. for the firms covered by the Census) or to firms whose returns were made on schedules for other trades.

The only other trades included in the table in which the volume of production per person employed increased by more than 10 per cent. were Electricity Undertakings and Coal Mines, for which increases of nearly 19 and 18 per cent. respectively were recorded. In the other trades there were increases varying from 3 to 9 per cent.

CHAPTER V

PRODUCTION, EXPORTS AND IMPORTS

A direct comparison of the aggregate value of goods produced with the value of exports or of imports is not practicable from the returns of gross output, in view of the duplication involved by the goods produced by one industry forming the materials of another; moreover, in most of the individual trades, which form the subject of separate reports, the returns of gross output include goods sold by one firm in the trade to another, and in some of these trades duplication is very important. A more reliable method of calculating the total value of goods produced is to estimate the value of the raw materials of industry and to add the net output, in which there is no duplication. Allowance is necessary for the transport and handling charges on goods between one factory and another—"factory" being used to denote any place at which goods are produced, manufactured or processed—since the value of the materials at the second factory includes these charges whereas they are not included in the value of the output of the first factory. A similar allowance for transport and other charges is necessary in respect of materials for industry which are imported, or which are the products of home agriculture, fisheries or forestry.

Materials used in industry.—The value of the goods imported in 1924 which were subjected to manufacturing processes in this country was about £660 million and a corresponding estimate for 1930 gives a figure of £483 million. The produce of agriculture, fisheries and forestry used as materials in industrial establishments was roughly £98 million in the earlier and £80 million in the later year. It is also necessary to take into account certain products forming the waste of consumption, which are used as materials in industry, but are not the produce of establishments covered by the Census, goods such as old iron and steel, waste paper and wool rags. The value of these may be estimated at about £16 million in 1924 and £12 million in 1930. The total value of all materials for industry was thus about £774 million in 1924 and £575 million in 1930.

Transport, &c., charges.—In the report on the First Census of Production, the value of transport and handling charges on materials for industry—including the charges on goods passing from one industrial establishment to another—was estimated as probably lying between 10 and 15 per cent. of the value of the materials for industry. On this basis, the transport and handling charges amounted to £96 ± 19 million in 1924 and £72 ± 14 million in 1930.

Net output.—The net output of industry, after deduction of Excise duties in those cases in which they were included in the value of the goods produced but not in that of the materials used,

amounted in 1924 to £1,670 million, this sum including an estimate of the net output of the firms that made no returns, but excluding the net output of the Laundry, Cleaning and Dyeing Trades, which were not included within the scope of the 1930 Census. That Census being limited to firms employing more than ten persons, the data on which to calculate a corresponding figure for that year are rather less precise. The net output of the firms employing more than ten persons in 1930 was about £1,505 million, this figure comparing with one of £1,549 million for 1924. So far as can be judged from the information available as to the number of firms exempted from the scope of the 1930 Census and the recorded number of their employees, it seems probable that the net output of these firms in 1930 was not less than £130 million, and the total net output for that year may be estimated at £1,639 ± 5 million.

Value of industrial products.—Adding together the figures given in the preceding paragraphs, a total of £2,286 ± 19 million is reached for 1930, the corresponding figure for 1924 being £2,540 ± 19 million.

Value of other goods produced.—The value of the gross output of agriculture is substantially free from duplication and it is accordingly possible to use that figure for the value of the agricultural produce, giving for 1924 a figure of about £297 million and for 1930 about £254 million. The value of the fish landed from British fishing boats was £20 million in 1924 and £19 million in 1930, while forestry products were valued at £2 million in the earlier and £1½ million in the later year. The produce of small holdings and market gardens must be included in the total of goods produced for profit, and the value of such produce may be estimated very roughly as £15-16 million for 1930, the corresponding figure for 1924 being roughly £18 million. The total value of other goods produced was thus about £290 million in 1930 and £337 million in 1924.

Total goods produced.—The manufactured fertilisers, animal feeding stuffs, &c., made in industrial establishments in this country and used as materials for agriculture, fisheries, forestry, &c., were valued in 1924 at about £55 million and in 1930 at £39 million. In arriving at the total value of the goods produced, the value of these goods as well as of the produce of agriculture, fisheries and forestry used as materials in industrial establishments has to be deducted from the aggregate value of industrial and other goods produced. Making these deductions the value of all goods produced in 1930 was £2,457 ± 20 million as compared with £2,724 ± 20 million in 1924.

Exports and production.—The exports of produce and manufactures of the United Kingdom were valued at £801 million in 1924 and £571 million in 1930. These totals include goods (as indicated above) not resulting from production but forming the waste

of consumption. The value of these goods in each year was some £2-3 million, and this sum has to be deducted before any comparison is made with the value of the goods produced. The charges on goods between the place of production and their stowage on board ship was estimated in connection with the First Census of Production at from 10 to 15 per cent. of the factory value. A detailed examination of these charges made recently* indicates that for the years covered by the Third and Fourth Censuses the addition to be made to the factory value is considerably smaller than that estimated for 1907. The deduction to be made from the f.o.b. value of exports to arrive at the factory value is estimated at 6-8 per cent. for 1924 and 5-7 per cent. for 1930; using these figures, the value of the exports at place of production may be put at £743 ± 8 million in 1924 and £535 ± 6 million in 1930. On the basis of the mean figures the exports represented 27 per cent. of the production in 1924 and under 22 per cent. in 1930. Of the total decline of roughly £270 million in the value of production between 1924 and 1930, the decline in the value of the exports accounted for £208 million, or practically four-fifths of the total.

The decline in the value of the output of cotton goods represented £137 million out of the total decline of about £270 million in total production, while the value of cotton goods exported decreased by about £104 million or just half the decline in the value of all exports. Woollen and worsted goods accounted for roughly £56 million of the decline in production and £32 million of the decline in exports. For coal, the corresponding figures were £85 million and about £25 million. The decline in shipments of bunker coal, not included in the export figures, may be estimated at about £6½ million. The value free from duplication of the iron and steel goods produced cannot be estimated with any degree of precision; the decline in exports of iron and steel and manufactures thereof, including cutlery and tools, valued at factory, was about £22 million.

An important increase in the value of the goods produced was recorded for several trades, and in most of these, exports also increased. The largest increase in terms of value was that of £21 million in the output of motors and cycles—reduced to about £15 million if account be taken of duplication—to which may be added the increase of £5½ million in the output of rubber tyres and tubes. The corresponding increase in exports was £3½ million. The increase in the value of tobacco manufactured, after allowing for the change in duty between 1924 and 1930, was about £11 million, of which the increase in exports represented £2 million.

The value of new ships constructed increased by about £6½ million while the value of the exports increased by £14½ million. The shipbuilding returns issued by Lloyd's Register show that while there was practically no change during the year 1924 in the tonnage of vessels over 100 tons gross in course of construction in

* London and Cambridge Economic Service, Special Memorandum No. 41.

Great Britain and Ireland, the tonnage under construction at the end of 1930 was 651,000 tons gross less than at the end of 1929. The larger increase in 1930 in the recorded value of exports than of production may therefore be attributed to the completion in that year of ships ordered previously, on which a large part of the work had been done in 1929.

The output of silk and artificial silk goods (other than apparel) in 1930 was £10 million more than in 1924, while the value of the exports increased by £1 million. The output of bacon, hams, lard, sausages, &c., increased by £5 million; exports of these products were relatively small in each year.

Goods ready for distribution.—In arriving at the total value of goods ready for distribution, it is necessary to deduct exports from the total of goods produced, to add imports of goods ready for consumption, and to add the total Customs and Excise duties paid in respect of the goods imported or produced. The value of the imports of goods not forming materials for industry, agriculture, &c., was roughly £444 million in 1924, the corresponding figure for 1930 being £449 million. Customs and Excise duties amounted in 1924 to about £227 million and in 1930 to about £235 million. Deducting exports, the total value of the goods available for distribution in 1930, valued at the place of production or import, was roughly £2,606 ± 26 million in 1930, this total comparing with £2,652 ± 28 million for 1924.

These totals are subject to some qualifications, for which no quantitative measure is practicable, but which are likely to affect the figures for 1930 to a greater extent than those for 1924 owing to the rapid decline in production and the rapid fall in prices which took place during the later year. As indicated on pages 20-21, the net output figure recorded for 1930 was higher than the figure which would have been recorded in more normal circumstances. On the other hand, the time lag between the importation of materials for industry and their use in manufacture will have led to the value of the materials used (and recorded as used) in 1930 being considerably greater than the value of the industrial materials imported in that year. For total imports retained in the United Kingdom, which in the aggregate are all included in the value of goods ready for distribution, the value in the year 1930 was £957 million and in the twelve months ended November, 1930, £14 million more.

CHAPTER VI

SPECIALISATION IN INDUSTRY

Manufacturing industry is divisible into a multitude of more or less distinct sections which, for convenience of the Census enumeration, are grouped to form a comparatively small number of "industries". A list showing the industrial classification followed at the 1930 Census is given in Appendix I. The particulars regarding these industries given in the present chapter relate only to Great Britain.

In confining all the miscellaneous varieties of production within the numbers mentioned there is necessarily some measure of arbitrary selection in the combination of products or processes to form an industrial group. It is thus the case that while most of the Census industries represent distinct and well-defined branches of industry, there remain a number which comprise a variety of allied products and many of these are capable of further subdivision. The principal bases used for the combination of products are the similarity of the purposes for which the products are used, and the principal material of which they are composed. For example, the numerous classes of goods included within the Electrical Engineering Trade may be said to be allied in the very general sense that they are all used in connection with the generation, transmission, or utilisation of electrical energy, though differing widely in character and in the materials of which they are composed; on the other hand, the products of the Finished Brass Trade resemble each other in respect of the materials used in their manufacture, but are wholly dissimilar in other respects. In a few industries, of which the Scientific Instruments, Appliances and Apparatus Trades and the Coir Fibre, Horse-hair and Feather Trades are examples, certain less important products, which are only remotely connected either in their purpose or their composition, are assembled together.

The industrial classification adopted for 1924 was drawn up after consultation with the Home Office, the Ministry of Labour and the Registrar-General, and that used for 1930 was substantially the same, the only important change being the creation of a special group for Iron and Steel Foundries, the products of which, in the previous Census, were distributed between the Iron and Steel Smelting, Rolling and Casting Trade, the Light Castings Trade and some other metal working trades. The remaining principal output of the Light Castings Trade was transferred to Mechanical Engineering.

Where a firm was engaged in more than one industry separate returns were required in respect of each industry so far as practicable. This separation was as a rule only practicable in cases where the different industries were maintained as distinct departments and separate records could fairly readily be extracted from

the firm's accounts. Among such cases may be mentioned blast furnaces and steel works, the spinning and weaving of cotton, shipbuilding and marine engineering; a special return relating to the iron foundries owned by engineering firms was obtained frequently, though not invariably. Generally, the separation was effected without substantial difficulty where the products of one department were used as materials in the second department and there were essential differences in the nature of the manufacturing processes involved.

Many manufacturing businesses that are concerned in more than one Census industry are not organised departmentally. As a rule one industry greatly predominates, the others being of quite secondary importance. The same workpeople are engaged in the different industries from time to time and the only practicable dissection is between the different classes of goods produced. Such firms were assigned to the principal trade in which they were engaged and one return, covering the business as a whole, was furnished on the schedule for that trade. Products characteristic of one trade were thus frequently recorded as secondary output on schedules for other trades. Firms were, so far as practicable, classified in the same trade in each year, thus ensuring some comparability of results, but it was found in a number of cases that the secondary output in one year had been developed while the principal output had declined. This was particularly the case in respect of certain firms, principally engaged in cotton weaving in 1924, which by 1930 had become mainly manufacturers of artificial silk goods.

Few industries are completely self-contained in the sense that the manufacturing operations of the particular firms assigned to them are confined to the characteristic products of that industry and do not extend in some degree to processes mainly associated with other industries. It therefore follows that although the total production of goods characteristic of an industry (principal products) can be aggregated from the output statements of all industries, it is not possible to determine precisely the cost of the materials, the number of workpeople employed, or the mechanical power utilised in the manufacture of those products. An example of this overlapping of industries is that of the Silk and Artificial Silk Trade, above mentioned, nearly one-third of the characteristic products of this trade being recorded on schedules for other textile trades.

By separately enumerating the "principal products" of an industry it is possible to measure the extent to which the firms assigned to that industry specialise in the products under consideration. It will be clear that this question is of less significance in the case of the large composite industries, that are themselves associations of smaller divisions, than in those of more limited range.

The following table shows, for each of the Factory trades, (1) the value of the gross output recorded for 1930, (2) the share of the total value of the "principal products" that was contributed by the firms assigned to the trade, and (3) the proportion which the value of the "principal products" made by those firms formed of their gross output.

Trade	Gross output	Proportion of the total production of principal products included in gross output of firms in trade	Proportion of the gross output of firms in trade represented by such principal products
	£'000	Per cent.	Per cent.
IRON AND STEEL :—			
Iron and Steel (Blast Furnaces) ...	23,820	98	92
Iron and Steel (Smelting and Rolling) ...	84,366	95	93
Iron and Steel Foundries ...	29,423	88	88
Tinplate ...	15,693	95	94
Hardware, Hollow-ware, Metallic Furniture and Sheet Metal ...	28,577	88	95
Chain, Nail, Screw and Miscellaneous Forgings ...	16,465	85	85
Wrought Iron and Steel Tubes ...	13,252	97	96
Wire ...	13,747	76	92
Tool and Implement ...	6,061	74	85
Cutlery ...	3,067	94	82
Needle, Pin, Fish-hook and Metal Smallwares ...	2,645	88	94
Small Arms ...	485	95	69
ENGINEERING, SHIPBUILDING AND VEHICLES :—			
Mechanical Engineering ...	161,646	96	95
Electrical Engineering ...	87,674	98	94
Shipbuilding ...	57,299	100	99
Motor and Cycle (Manufacturing) ...	109,697	98	91
Motor and Cycle (Repairing) ...	13,559	73	90
Aircraft ...	8,688	88	98
Railway Carriage and Wagon ...	10,735	94	94
Carriage, Cart and Wagon ...	2,349	79	79
NON-FERROUS METALS :—			
Copper and Brass (Smelting, Rolling, etc.) ...	20,795	86	80
Aluminium, Lead, Tin, etc. (Smelting, Rolling, etc.) ...	26,539	91	89
Gold and Silver Refining ...	39,838	100	98
Finished Brass ...	10,730	85	81
Plate and Jewellery ...	8,706	95	97
Watch and Clock ...	898	83	91

Trade	Gross output	Proportion of the total production of principal products included in gross output of firms in trade	Proportion of the gross output of firms in trade represented by such principal products
	£'000	Per cent.	Per cent.
TEXTILES :—			
Cotton Spinning ...	78,624	98	100
Cotton Weaving ...	79,631	98	88
Woollen and Worsted ...	114,572	100	98
Silk and Artificial Silk ...	23,012	70	93
Linen and Hemp ...	4,911	85	84
Jute ...	9,605	97	91
Hosiery ...	39,444	98	99
Textile Finishing ...	29,002	99	99
Lace ...	7,449	98	97
Rope, Twine and Net ...	6,229	95	88
Canvas Goods and Sack ...	4,814	87	97
Asbestos Goods and Engine and Boiler Packing ...	3,809	80	96
Flock and Rag ...	3,932	100	98
Elastic Webbing ...	1,770	100	70
Coir Fibre, Horse-hair and Feather Roofing Felts ...	1,995	93	93
Packing ...	882	95	87
	1,475	98	100
LEATHER :—			
Fellmongery ...	3,186	95	98
Leather (Tanning and Dressing) ...	27,792	100	98
Saddlery, Harness and Leather Goods ...	5,002	92	92
CLOTHING :—			
Tailoring, Dressmaking, Millinery, etc. ...	108,965	99	100
Boot and Shoe ...	46,885	99	100
Hat and Cap ...	12,291	99	99
Glove ...	2,940	99	97
Fur ...	4,124	96	99
Umbrella and Walking Stick ...	1,754	100	88
FOOD, DRINK AND TOBACCO :—			
Grain Milling ...	66,695	100	100
Biscuit ...	14,851	91	96
Bread, Cakes, etc. ...	57,122	98	95
Cocoa and Sugar Confectionery ...	36,431	96	96
Preserved Foods ...	33,486	93	89
Bacon Curing and Sausage ...	24,132	86	93
Butter, Cheese, Condensed Milk and Margarine ...	27,568	100	91
Sugar and Glucose ...	44,116*	100	99
Fish Curing ...	5,913	100	98

Trade	Gross output	Proportion of the total production of principal products included in gross output of firms in trade	Proportion of the gross output of firms in trade represented by such principal products
	£'000	Per cent.	Per cent.
FOOD, DRINK AND TOBACCO—cont.			
Cattle, Dog and Poultry Foods ...	6,076	88	98
Ice	1,123	100	100
Brewing and Malting	143,358	100	94
Spirit Distilling	4,841	99	94
Spirit Rectifying, Compounding and Methylating	5,344	95	99
Aerated Waters, Cider, Vinegar and British Wine	8,414	90	85
Wholesale Bottling	48,051	86	100
Tobacco	115,878	100	100
CHEMICALS, ETC. :—			
Chemicals, Dyestuffs and Drugs ...	52,653	94	96
Fertiliser, Disinfectant, Glue, etc. ...	5,717	49	85
Soap, Candle and Perfumery	28,969	97	93
Paint, Colour and Varnish	19,528	97	94
Seed Crushing... ..	21,824	84	99
Oil and Tallow	16,446	85	74
Petroleum Refining	16,087	100	89
Explosives and Fireworks	5,227	88	97
Starch and Polishes	6,997	94	98
Match	4,264	100	100
Ink, Gum and Sealing Wax	3,468	92	98
PAPER, PRINTING AND STATIONERY :—			
Paper and Board	38,004	100	95
Wallpaper	3,130	100	100
Printing, Bookbinding, Stereotyping, Engraving, etc.	56,597	91	82
Printing and Publication of Newspapers and Periodicals	50,993	91	94
Manufactured Stationery	14,041	71	87
Cardboard Box	10,608	79	90
Pens, Pencils, and Artists' Materials	2,316	100	92
TIMBER :—			
Timber (Sawmilling, etc.)	26,835	91	93
Furniture and Upholstery	33,526	95	97
Cane and Wicker Furniture and Basketware	806	93	92
Wooden Crates, Cases, Boxes and Trunks	4,981	86	88
Coopering	1,830	91	97

Trade	Gross output	Proportion of the total production of principal products included in gross output of firms in trade	Proportion of the gross output of firms in trade represented by such principal products
	£'000	Per cent.	Per cent.
CLAY AND BUILDING MATERIALS :—			
Brick and Fireclay	20,726	95	97
China and Earthenware	14,603	99	92
Glass	13,713	99	96
Cement	8,267	97	99
Building Materials	13,930	79	71
MISCELLANEOUS :—			
Rubber	28,868	99	92
Scientific Instruments, Appliances and Apparatus	9,964	83	92
Musical Instruments	11,428	99	99
Coke and By-Products, etc.	16,962	75	73
Fancy Articles	4,007	92	93
Linoleum and Oilcloth	8,964	99	100
Brush	3,155	98	99
Sports Requisites	3,117	68	97
Games and Toys	2,000	84	87
Manufactured Abrasives	1,515	99	99
Incandescent Mantles	641	100	100
Cinematograph Film Printing	1,053	100	99

* Excluding subsidy (£6,022,000).

In 21 of the 109 trades included in this table the entire output of the characteristic products was produced by the firms assigned to the trade, and in 15 of these trades the firms in question were also concerned in operations that fell within the range of other trades. Only in 6 trades, viz. Grain Milling, Ice, Tobacco, Match, Wallpaper and Incandescent Mantles, were the operations of these firms confined within the boundaries of the trade concerned. These 6 trades represent the only cases of complete segregation and specialisation in the Census list. As regards the remaining 15 completely self-contained trades, the degree of specialisation of the firms concerned was considerable; in 8 cases the value of "other products" formed less than 2 per cent. of the gross output and only in 3 trades was it greater than 10 per cent. Six cases are shown in which the firms concerned specialised completely in the principal products of the trade but were not responsible for the entire output of those products, viz. Cotton Spinning, Textile Packing, Tailoring, Dressmaking and Millinery, Boot and Shoe, Wholesale Bottling, and Linoleum and Oilcloth; 14 per cent. of the total production of bottled liquors was produced by other trades, but

in each of the remaining 5 cases the contribution of firms outside the trade was not more than 2 per cent.

Of the 109 trades included in the table the degree of specialisation, as indicated in the fourth column, was 95 per cent. or higher in 54 cases; 90 per cent. but less than 95 per cent. in 29; 80 per cent. but less than 90 per cent. in 20; and less than 80 per cent. in 6. The 6 trades last mentioned were Small Arms, Carriage, Cart and Wagon, Elastic Webbing, Oil and Tallow, Building Materials, and Coke and By-Products, etc. The low proportion of 73 per cent. shown for the Coke and By-Products, etc., Trade is due to the circumstance that, for purposes of classification, coal-tar products were regarded as principal products of the Chemicals, Dyestuffs and Drugs Trades.

The figures shown in the third column of the table indicate that in 61 of the specified trades 95 per cent. or more of the principal products was recorded by firms engaged mainly in the trade; in 17 trades the proportion was 90 per cent. and less than 95 per cent.; in 20, more than 80 per cent. and less than 90 per cent.; and in 11, less than 80 per cent., including the Silk and Artificial Silk Trade, for which the proportion was 70 per cent. The very low figure of 49 per cent. shown for the Fertiliser, etc. Trade results from the inclusion of sulphate of ammonia (mainly produced by manufacturers of chemicals) among the principal products of that trade.

As has already been explained, these trades include a number of composite groupings of wide range and any indications of specialisation in these cases are of only limited value. Parts I-IV of this Report contain 22 trades which have been further subdivided and reference to these volumes should be made for the various sectional particulars recorded for 1930. A few examples of this fuller classification are considered in the following pages. The other trades for which sectional particulars were recorded are shown below:—

Hardware, Hollow-ware, Metallic Furniture and Sheet Metal.
Chain, Nail, Screw and Miscellaneous Forgings.
Motor and Cycle.
Lace.
Rope, Twine and Net.
Canvas Goods and Sack.
Coir Fibre, Horse-hair and Feather.
Leather (Tanning and Dressing).
Grain Milling.
Cocoa and Sugar Confectionery.
Brewing and Malting.
Soap, Candle and Perfumery.
Scientific Instruments, Appliances and Apparatus.
Musical Instruments.

Mechanical Engineering

In this trade 23 specific sub-groups were distinguished, and separate particulars of these are given in the following table:—

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Mechanical Engineering ...	161,646	96	95
Marine engineering	23,495	97	87
Prime movers and boilers (not marine)	19,518	80	78
Textile machinery and accessories ...	11,925	96	94
Conveyers, lifts, cranes and hoists ...	7,060	80	78
Machine tools	6,155	97	78
Food preparation, dairy, sugar and tobacco machinery	4,677	87	75
Heating, ventilating and sanitary plant and appliances	4,304	88	89
Printing and bookbinding machinery...	4,016	97	90
Sewing and boot and shoe making machinery	3,547	99	98
Mining and quarrying machinery ...	3,347	71	61
Agricultural machinery... ..	3,259	85	70
Metal casements and window frames ...	2,781	87	85
Gas meters	2,546	98	78
Pumps	2,387	61	70
Weighing machinery	2,046	96	68
Refrigerating machinery	1,722	94	81
Steel works, blast furnace, coke oven and metal-working machinery ...	1,323	73	66
Gas and chemical machinery	1,317	59	56
Domestic wringing and mangling machines	1,024	90	81
Laundry machinery	772	80	69
Typewriters, cash registers, adding and calculating machines	712	92	69
Road making and concrete mixing machinery	611	60	78
Constructional engineering	18,358	81	94

From the percentage figures in the third column it will be seen that the majority of these groups are adequately representative of their characteristic products. In ten cases the firms composing the group covered 90 per cent. or more of the total output of the principal products and in eight the proportion covered was between 80 and 90 per cent.; in the five remaining groups the firms concerned were less representative of the total production, the figures

for three groups (gas and chemical machinery, pumps, and road-making and concrete mixing machinery) being only about 60 per cent. The figures in the fourth column indicate on the whole a somewhat lower degree of specialisation than obtains in the majority of the Census industries, as might perhaps be expected from all firms alike being engaged in the manufacture of machinery; stress should be laid rather upon the extent to which the large output of this trade can be broken up into more or less self-contained groups than upon the fact that in some of the groups the firms had an appreciable output of other products in addition to that of their main output. In only one of the groups were both proportions less than 70 per cent., and that group (gas and chemical machinery) is, accordingly, somewhat ill defined. A figure of at least 90 per cent. in each column indicates the very high degree of specialisation that exists in the production of textile machinery and accessories, printing and bookbinding machinery, and sewing and boot and shoe making machinery.

Electrical Engineering

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Electrical Engineering ...	87,674	98	94
Electrical machinery	24,797	88	75
Electric wires and cables	24,624	93	72
Telegraph and telephone apparatus ...	7,976	79	60
Wireless apparatus (except valves) ...	5,870	74	86
Wireless valves and electric lamps ...	2,829	62	91
Primary batteries and accumulators ...	6,488	93	92
Electric lighting accessories and fittings	1,689	66	84

Of the seven groups specified there were two cases in which the firms composing the group contributed more than 90 per cent. of the total output of the characteristic products, while in two groups the proportion was rather less than two-thirds. A high degree of specialisation is indicated in the case of firms manufacturing primary batteries and accumulators, and wireless valves and electric lamps, though in respect of the latter the output of wireless valves and electric lamps by other firms formed 38 per cent. of the total.

As indicating the importance of some of the groups distinguished in these tables it may be noted that the gross output of the firms mainly concerned in the production of electrical machinery and of electric wires and cables was only exceeded by 34 of the 109 Factory trades specified on pages 58-61.

Aluminium, Lead, Tin, &c.

This trade comprises firms concerned in the smelting, rolling and casting of non-ferrous metals, except copper and brass and the precious metals, which were dealt with as separate trades. The special groups segregated are shown below:—

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Aluminium, Lead, Tin, etc.	26,539	91	89
Aluminium	5,789	84	89
Lead	5,097	94	67
Tin	9,849	96	96
Zinc	1,106	81	91
Nickel and nickel alloys	3,138	82	78
White metal alloys and type metal ...	763	69	86

Except for the group concerned mainly with white metal alloys and type metal, the firms included in each group contributed more than 80 per cent. of the total output of the characteristic products, the group engaged in tin smelting being an almost completely self-contained trade. There was also a high degree of specialisation among the firms engaged in the smelting of zinc and aluminium, but about one-third of the gross output of lead smelters consisted of products other than of lead.

Woollen and Worsted

The number of special groups formed in this trade was nine and the particulars tabulated were as follows:—

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Woollen and Worsted ...	114,572	100	98
Recovered wool	1,250	95	93
Spinning only (woollen)	2,875	66	92
Weaving only (woollen)	6,570	25	94
Flannels and delaines	1,410	96	89
Blankets, shawls, coverlets, etc. ...	2,706	86	93
Carpets	9,554	100	91
Top making	3,672	72	92
Spinning only (worsted)	28,323	92	90
Weaving only (worsted)	13,441	57	92

Worsted spinning appears as a large and well-defined industry in which the firms engaged specialise to a very considerable extent. The carpet section is a further instance on a rather smaller scale, while the figures for recovered wool, flannels and delaines, and blankets, shawls, coverlets, etc. give evidence of the same kind. Only one-fourth of the total output of woven goods of wool was produced by firms mainly engaged in that branch of production, the weaving of woollen fabrics being mainly done by firms that made their own yarn; in the spinning of woollen yarn and the weaving of worsted cloth the proportions did not exceed two-thirds. The high proportions in the last column indicate the marked concentration of each group on its own particular output.

Textile Finishing

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Textile Finishing	29,002	99	99
Cotton piece-goods :—			
Bleaching	3,408	85	91
Dyeing	4,645	71	82
Printing	7,279	93	81
Cotton yarns, bleaching, dyeing and finishing	2,414	88	92
Woollen and worsted tissues, flannels and delaines, stoving, dyeing, etc. ...	2,278	71	98

The figures in the third column indicate that there is a considerable degree of segregation in this trade particularly in regard to the printing and bleaching of cotton piece-goods and the finishing of cotton yarns. Specialisation is almost complete among firms whose principal output consisted in the finishing of tissues of wool but other firms were engaged in such finishing work to a considerable extent.

Tailoring, Dressmaking, Millinery, &c.

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Tailoring, Dressmaking, Millinery, etc.	108,965	99	100
Retail bespoke tailoring, etc.	23,100	97	91
Wholesale tailoring, etc.	45,255	96	94
Mackintoshes and other proofed garments	6,836	83	89
Corsets and the like	3,748	96	95
Undergarments (other than corsets and the like)	12,832	89	87
Millinery	3,035	91	97
Artificial flowers... ..	359	98	94

The small group concerned with the production of artificial flowers is almost self-contained and highly specialised. The figures indicate a similar position in the case of wholesale tailoring and the manufacture of corsets, and also, to a somewhat less extent, in respect of retail bespoke tailoring and the manufacture of millinery.

The importance of the wholesale tailoring group is indicated by its gross output being nearly double the average for the manufacturing industries on which separate reports were made at the Census. The figures shown for the manufacture of undergarments represent goods made mainly of woven as distinct from knitted fabrics, the latter being for the most part included in the Hosiery Trade.

Chemicals, Dyestuffs and Drugs

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
	£'000	Per cent.	Per cent.
TOTAL—Chemicals, Dyestuffs and Drugs	52,653	94	96
Drugs and medicinal preparations	16,015	90	86
Dyes and dyestuffs	5,003	95	88
Coal tar products (other than dyes)	5,373	41	46

The manufacture of drugs and medicinal preparations and of dyes and dyestuffs was largely concentrated in the hands of the firms principally concerned in those classes of production and the output of products other than those characteristic of these groups was in each case not more than 14 per cent. of the total. As regards coal tar products, the group is not so well defined; the low figure in the third column is due to the large production of coal tar products at coke ovens and gas works, and in the last column to the exclusion of tar and pitch, which were classified as principal products of coke ovens.

Paper and Board

Group	Gross output	Proportion of the total production of principal products included in gross output of firms in group	Proportion of the gross output of firms in group represented by such principal products
		£'000	Per cent. 100
TOTAL—Paper and Board	38,004		
Newsprint	11,141	100	81
Other printing paper	9,568	79	76
Writing paper in large sheets	4,088	72	79
Packing and wrapping paper (excluding oiled and waxed paper)	4,956	83	80
Board (including vulcanised fibre board)	3,886	92	75

The whole of the output of newsprint was produced by firms mainly engaged in that branch of the trade and 92 per cent. in the case of board (including vulcanised fibre board). The extent to which the firms in these five groups specialised in the production of their principal output is somewhat lower than in the majority of the special groups distinguished in other trades, though in no case was the value of the characteristic products less than three-fourths of the total output of the firms concerned.

CHAPTER VII

REGIONAL DISTRIBUTION OF INDUSTRY

Production in the three divisions of the United Kingdom.—In the reports on the individual trades contained in the four preceding volumes, separate statistics have been given for the year 1930 in respect of production in England and Wales and in Scotland. The principal aggregates for these two divisions of Great Britain, with corresponding figures for Northern Ireland, are shown for both 1930 and 1924 in the Summary table on page vi. These aggregates are, for convenience of reference, re-stated in the following table, which also gives particulars for the year 1907 in respect of England and Wales and of Scotland.

Division	Gross output†	Net output	Average number of persons employed (excluding outworkers)	Net output per person employed
England and Wales :—	£'000	£'000	No.	£
Factory trades... { 1930	2,394,666	945,746	4,243,709	223
{ 1924	2,670,394	944,485	4,193,169	225
Non-Factory trades { 1930	627,683	395,921	2,034,327	195
{ 1924	643,561	419,308	2,168,736	193
ALL TRADES { 1930	3,022,349	1,341,667	6,278,036	214
{ 1924	3,313,955	1,363,793	6,361,905	214
{ (1907)*	(1,482,803)	(596,879)	(5,696,119)	(105)
Scotland :—				
Factory trades... { 1930	263,364	102,341	506,459	202
{ 1924	294,617	111,170	526,799	211
Non-Factory trades { 1930	61,016	40,825	210,803	194
{ 1924	71,507	49,721	252,419	197
ALL TRADES { 1930	324,380	143,166	717,262	200
{ 1924	366,124	160,891	779,218	206
{ (1907)*	(206,708)	(85,495)	(870,916)	(98)
Great Britain :—				
ALL TRADES { 1930	3,346,729	1,484,833	6,995,298	212
{ 1924	3,680,079	1,524,684	7,141,123	214
{ (1907)*	(1,689,511)	(682,374)	(6,567,035)	(104)

* All firms.

† Including subsidy (£6,022,000) on home-grown sugar for 1930.

Division	Gross output	Net output	Average number of persons employed (excluding outworkers)	Net output per person employed
	£'000	£'000	No.	£
Northern Ireland :—				
Factory trades... { 1930	52,937	16,870	125,391	135
{ 1924	61,003	20,307	136,669	149
Non-Factory trades { 1930	6,416	3,543	20,745	171
{ 1924	6,421	3,639	20,323	179
ALL TRADES ... { 1930	59,353	20,413	146,136	140
{ 1924	67,424	23,946	156,992	153

The figures shown for 1907, being inclusive of the majority of firms employing not more than ten persons, are not comparable with those for the later years. The relative importance of the small firms in total production in 1924 was substantially the same in Scotland as in England and Wales,* so that the proportion of the total output attributable to each part of Great Britain in 1907 may be compared with that in 1924. The 1907 figures are of service mainly as an indication of the trend of industry since the pre-war period. It may be noted that the numbers of persons shown as employed in England and Wales in 1924 and 1930 were substantially greater than those recorded for 1907, in spite of the more comprehensive range of the latter, whereas for Scotland the more recent aggregates are markedly lower than in 1907. Scotland contributed 12.5 per cent. of the net output of Great Britain in 1907, 10.6 per cent. in 1924 and 9.6 per cent. in 1930; measured by employment the proportion for Scotland declined from 13.3 per cent. in 1907 to 10.9 per cent. in 1924 and again to 10.3 per cent. in 1930. As already explained, there are no data on which to base a similar comparison as regards production in Northern Ireland.

Between 1924 and 1930 industrial employment in Scotland declined by nearly 8 per cent., the Factory trades showing a decrease of 4 per cent. and the Non-Factory trades (in which coal mining represents about one-half of the total) one of 16.5 per cent. In Northern Ireland employment declined in 1930 by 8 per cent. in the Factory trades but in the Non-Factory trades there was a slight increase. On the other hand, total employment in England and Wales was lower in 1930 by little more than 1 per cent.; the

* At the 1924 Census, the number of persons employed by small firms formed 6.2 per cent. of the total recorded for England and Wales and 6.5 per cent. of the total for Scotland.

decline was due entirely to a falling-off in the Non-Factory trades (principally coal mining), the numbers employed in the Factory trades being slightly higher than in 1924.

The decline in the total industrial output of Scotland and Northern Ireland was due to the fact that, apart from Shipbuilding and Marine Engineering, the principal industries of these two countries, viz., in Scotland, Coal Mining, Jute, Linen and other textiles, and the Heavy Iron and Steel Trades, and, in Northern Ireland, Linen, were among those that were the most seriously affected by depressed trade; in England and Wales, although production in these industries declined in an approximately equal degree, the decline was offset by a substantial improvement in other industries—for example, in Electrical Engineering, Motor and Cycle, Artificial Silk, Newspaper Publishing, and the majority of trades concerned in the preparation of food products. Products of many old-established industries have been supplanted to some extent by alternative products of the "newer" industries, the majority of the latter being located in England, and particularly in the South of England.

Production in the principal industrial areas.—An attempt to obtain information as to the extent to which industries were localised in particular districts was first made at the 1924 Census and a summary of the particulars tabulated was published in the concluding volume of the final report.* Similar particulars were sought at the Census of 1930 and the general results obtained are given in the next table, with those for the previous Census.

In general, little difficulty appears to have been found by firms in the Factory trades in furnishing separate returns for branch establishments situated in different Census areas. It was not found possible however to obtain those details from all firms carrying out contracting work, and returns covering the whole business of those firms were accepted in a large number of cases, being assigned to the areas in which the head offices were situated. This qualification applies principally to the figures for the Building and Contracting Trade, but the same procedure was generally followed by constructional engineers (Mechanical Engineering) and by certain contractors for electrical work (Electrical Engineering).

The following table gives the leading particulars for 1930 and 1924 for each of the areas into which the United Kingdom was subdivided. A list of the districts included within the first four areas, which are not confined within definite county boundaries, is given in Appendix III.

* The particulars published in the report on the 1924 Census included the Laundry, Cleaning and Dyeing Trades but excluded Government Departments.

Area	Number of returns	Gross output*	Net output†	Average number of persons employed (excluding out-workers)	Net output per person employed	
	No.	£'000	£'000	No.	£	
FACTORY TRADES						
1. Greater London...	{ 1930 1924	{ 9,567 10,225	{ 603,561 534,476	{ 250,571 213,817	{ 884,516 798,395	{ 283 268
2. Lancashire, with North Cheshire and the Glossop and New Mills District of Derbyshire ...	{ 1930 1924	{ 7,510 8,458	{ 532,338 754,250	{ 195,249 230,303	{ 1,020,437 1,109,814	{ 191 208
3. The West Riding of Yorkshire and the City of York	{ 1930 1924	{ 4,636 5,700	{ 249,763 360,181	{ 96,536 119,359	{ 516,238 583,232	{ 187 205
4. Northumberland, Durham and the Cleveland District of Yorkshire ...	{ 1930 1924	{ 1,220 1,387	{ 98,788 104,941	{ 35,551 34,132	{ 177,249 171,580	{ 201 199
5. Warwickshire, Worcestershire and Staffordshire ...	{ 1930 1924	{ 4,847 5,269	{ 297,307 298,669	{ 133,918 129,728	{ 643,966 600,577	{ 208 216
6. The rest of England (except Monmouthshire)	{ 1930 1924	{ 9,103 9,420	{ 538,321 507,500	{ 210,540 184,455	{ 903,286 806,582	{ 233 229
7. Glamorganshire, Monmouthshire and Carmarthenshire ...	{ 1930 1924	{ 689 812	{ 62,299 95,483	{ 20,414 26,332	{ 85,035 100,416	{ 240 262
8. The rest of Wales	{ 1930 1924	{ 178 234	{ 6,267 14,894	{ 2,967 6,359	{ 12,982 22,573	{ 229 282
TOTAL—England and Wales	{ 1930 1924	{ 37,750 41,505	{ 2,388,644 2,670,394	{ 945,746 944,485	{ 4,243,709 4,193,169	{ 223 225
9. Lanarkshire, Renfrewshire and Dumbartonshire	{ 1930 1924	{ 1,953 2,303	{ 137,594 153,916	{ 54,888 58,069	{ 268,260 283,351	{ 205 205
10. The rest of Scotland ...	{ 1930 1924	{ 2,522 2,773	{ 125,770 140,701	{ 47,453 53,101	{ 238,199 243,448	{ 199 218
TOTAL—Scotland	{ 1930 1924	{ 4,475 5,076	{ 263,364 294,617	{ 102,341 111,170	{ 506,459 526,799	{ 202 211
TOTAL—Great Britain	{ 1930 1924	{ 42,225 46,581	{ 2,652,008 2,965,011	{ 1,048,087 1,055,655	{ 4,750,168 4,719,968	{ 221 224
11. Northern Ireland	{ 1930 1924	{ 1,242 1,589	{ 52,937 61,003	{ 16,870 20,307	{ 125,391 136,669	{ 135 149
TOTAL—UNITED KINGDOM	{ 1930 1924	{ 43,467 48,170	{ 2,704,945 3,026,014	{ 1,064,957 1,075,962	{ 4,875,559 4,856,637	{ 218 222

* Excludes subsidy of £6,022,000 on home-grown sugar for 1930.

† Excludes Excise duties estimated at £79,410,000 for 1930 and £93,424,000 for 1924.

Area	Number of returns	Gross output	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed	
	No.	£'000	£'000	No.	£	
NON-FACTORY TRADES						
1. Greater London	{ 1930 1924	{ 2,176 2,110	{ 151,779 116,018	{ 83,690 63,059	{ 317,030 259,570	{ 264 243
2. Lancashire, with North Cheshire and the Glossop and New Mills District of Derbyshire	{ 1930 1924	{ 1,651 1,930	{ 75,301 91,718	{ 47,001 60,332	{ 234,554 313,412	{ 200 193
3. The West Riding of Yorkshire and the City of York ...	{ 1930 1924	{ 1,071 1,294	{ 62,713 75,750	{ 44,775 54,152	{ 257,710 273,224	{ 174 198
4. Northumberland, Durham and the Cleveland District of Yorkshire ...	{ 1930 1924	{ 738 865	{ 51,256 69,314	{ 37,803 50,762	{ 233,579 284,291	{ 162 179
5. Warwickshire, Worcestershire and Staffordshire ...	{ 1930 1924	{ 901 987	{ 50,407 48,041	{ 31,013 32,068	{ 160,416 166,340	{ 193 193
6. The rest of England (except Monmouthshire) ...	{ 1930 1924	{ 4,948 5,302	{ 181,969 167,637	{ 110,178 101,275	{ 584,972 543,031	{ 188 187
7. Glamorganshire, Monmouthshire and Carmarthenshire...	{ 1930 1924	{ 603 741	{ 45,754 64,522	{ 35,210 49,628	{ 206,486 279,976	{ 171 177
8. The rest of Wales	{ 1930 1924	{ 289 371	{ 8,504 10,561	{ 6,251 8,032	{ 39,580 48,892	{ 158 164
TOTAL—England and Wales ...	{ 1930 1924	{ 12,377 13,600	{ 627,683 643,561	{ 395,921 419,308	{ 2,034,327 2,168,736	{ 195 193
9. Lanarkshire, Renfrewshire and Dumbartonshire ...	{ 1930 1924	{ 633 643	{ 27,235 31,522	{ 17,889 21,350	{ 84,150 104,982	{ 213 203
10. The rest of Scotland ...	{ 1930 1924	{ 1,127 1,059	{ 33,781 39,985	{ 22,936 28,371	{ 126,653 147,437	{ 181 192
TOTAL—Scotland	{ 1930 1924	{ 1,760 1,702	{ 61,016 71,507	{ 40,825 49,721	{ 210,803 252,419	{ 194 197
TOTAL—Great Britain	{ 1930 1924	{ 14,137 15,302	{ 688,699 715,068	{ 436,746 469,029	{ 2,245,130 2,421,155	{ 195 194
11. Northern Ireland	{ 1930 1924	{ 434 660	{ 6,416 6,421	{ 3,543 3,639	{ 20,745 20,323	{ 171 179
TOTAL—UNITED KINGDOM ...	{ 1930 1924	{ 14,571 15,962	{ 695,115 721,489	{ 440,289 472,668	{ 2,265,875 2,441,478	{ 194 194

Among the Factory trades, the principal changes occurring in the inter-censal period were the increased importance of Areas 1 (Greater London), 5 (Warwickshire, Worcestershire and Staffordshire) and 6 (the "rest of England") and the heavy decline in the two Welsh areas. Greater London and the "rest of England", taken together, represent roughly the South of England, and the proportion of the total net output of the United Kingdom that was contributed by those two areas increased from 37 per cent. in 1924 to 43 per cent. in 1930. The share of the North of England (composed of Areas 2, 3 and 4) declined in this period from 36 per cent. to about 31 per cent. In both years Lancashire was the most important area in respect of numbers of workpeople employed, followed by the "rest of England", Greater London and the Midland area in that order, but whereas, in 1924, the highest gross and net outputs were recorded for Lancashire, Greater London occupied the first place in 1930 followed by the "rest of England".

Net output per head was notably high in the Greater London area in both years and in 1930 exceeded the United Kingdom average for the Factory trades by nearly 30 per cent. The high figure for this area is due partially to the circumstance that some of the industries showing exceptionally large averages of net output per employee are mainly located there—for example, the Publishing of Newspapers, etc., and the manufacture of various food products—but it will be found from the details given in the preceding volumes that among the individual industries this figure is generally higher for Greater London than for other parts of the country. Industry in Lancashire yielded, in the aggregate, a net output per head lower in both years than the United Kingdom average, this result being due principally to the dominating importance of the Cotton Trade, though even if all persons employed in this trade were omitted Lancashire would not fall below the third place in order of importance among the areas engaged in manufacturing production. The average net output in Lancashire factories, apart from cotton, was relatively high, being £234 per head in 1930. The figures for the wool textile industry have a much smaller effect on the average recorded for the West Riding of Yorkshire.

In the Non-Factory trades, the net output per head shown for Greater London was again substantially greater than in other areas, but this area was not affected, as were all other areas, by the low average prevailing in the Coal Mining industry. The figure for the Clyde District, although thus affected, exceeded the United Kingdom average in both years owing to the importance of the activities of Public Utility Undertakings in this area.

Broadly speaking, the results for the individual trades do not indicate any great degree of concentration of an industry within one particular area. If the basis for assigning an industry to a

particular area in 1930 is taken as one-half of the total number of employees in the industry, the following of the major Factory trades* may be said to be located in the areas specified—

Area	Trades
<i>Greater London</i>	Manufactured Stationery, Musical Instruments, Scientific Instruments, etc., Leather Goods, Fancy Articles, Fur.
<i>Lancashire and District</i> ...	Cotton Spinning and Weaving, Textile Finishing.
<i>West Riding of Yorkshire</i> ...	Woollen and Worsted, Tool and Implement, Cutlery.
<i>Warwickshire, Worcestershire and Staffordshire.</i>	Chain, Nail, Screw, etc., China and Earthenware, Copper and Brass (Smelting, Rolling, etc.), Finished Brass, Wrought Iron and Steel Tubes, Needle, Pin and Metal Smallwares, Flate and Jewellery.
<i>South Wales</i>	Tinplate.
<i>The rest of Scotland</i>	Jute.
<i>Northern Ireland</i>	Linen and Hemp.

If the analysis is extended to all trades (i.e., including trades in which the number of employees in each area was less than 5,000) and three-fourths of total employment is taken as the basis for regarding trades as concentrated in particular areas, the distribution of such highly localised trades in the United Kingdom in 1930 was as follows:—

Area	Trades
<i>Greater London</i>	Fur, Musical Instruments, Spirit Rectifying, Compounding, etc., Ink, Gum and Sealing Wax, Incandescent Mantles, Cinematograph Film Printing.
<i>Lancashire and District</i> ...	Cotton Spinning and Weaving, Packing.
<i>West Riding of Yorkshire</i> ...	Cutlery.
<i>Warwickshire, Worcestershire and Staffordshire.</i>	Needle, Pin and Metal Smallwares, China and Earthenware.
<i>South Wales</i>	Tinplate.
<i>The rest of Scotland</i>	Jute.
<i>Northern Ireland</i>	Linen and Hemp.

* Those employing more than 5,000 persons in any area.

The rest of England has not been included above in view of its somewhat ill-defined position but substantially with Greater London it represents the industrial area in the South of England. Omitting the trades mentioned on page 75, in which over one-half of the number of employees were situated in one area, that is to say, the trades which are not fairly well distributed, and considering only the principal trades in which more than 25,000 persons were employed in 1930, the following table shows, for each of the Factory trades in which employment increased or decreased between 1924 and 1930, the respective proportion of the total employment and total net output in Great Britain recorded by firms in the South of England in the two years, the trades being arranged according to the numbers of persons employed in 1930.

Trade	Number employed in Great Britain in 1930	Proportion represented by South of England		Net output in 1930	Proportion represented by South of England	
		1930	1924		1930	1924
		No.	Per cent.		Per cent.	£'000
<i>Expanded trades:—</i>						
Mechanical Engineering	444,530	33·0	28·9	90,800	35·3	30·2
Tailoring, Dressmaking, Millinery, etc. ...	308,325	52·4	52·2	47,617	57·2	57·2
Motor and Cycle ...	240,253	39·0	35·2	53,303	39·3	36·0
Electrical Engineering	191,970	50·6	49·8	44,833	52·2	52·4
Bread and Biscuit ...	118,776	46·8	50·7	29,830	50·3	51·1
Hosiery ...	105,410	71·7	75·0	16,354	77·0	78·1
Iron and Steel Foundries ...	91,351	23·7	27·0	17,032	24·9	27·5
Furniture and Upholstery ...	90,886	62·6	60·4	17,000	66·8	64·2
Hardware, Hollow-ware, etc. ...	82,600	34·6	27·3	14,687	38·7	31·8
Brick and Fireclay ...	72,434	42·4	38·5	14,660	46·7	40·1
Chemicals, Dyestuffs and Drugs ...	70,475	33·4	32·3	24,985	38·2	35·7
Printing and Publication of Newspapers, etc. ...	69,925	61·4	64·4	36,255	62·7	65·0
Timber (Sawmilling, etc.) ...	56,639	59·9	58·0	10,929	63·2	58·0
Paper ...	53,041	46·3	45·1	13,255	52·6	47·0
Tobacco ...	43,960	73·5	70·2	30,690	84·1	81·3
Preserved Foods ...	42,525	64·3	63·0	14,016	64·4	64·0
Cardboard Box ...	33,087	68·7	69·7	5,399	72·6	73·3
Hat and Cap ...	30,628	52·9	53·7	4,994	56·7	56·6
Building Materials ...	29,731	57·2	53·4	7,511	57·6	51·5
Other expanded trades*	151,612	31·4	23·5	31,981	30·3	21·3

Trade	Number employed in Great Britain in 1930	Proportion represented by South of England		Net output in 1930	Proportion represented by South of England	
		1930	1924		1930	1924
		Per cent.	Per cent.		£'000	Per cent.
<i>Contracted trades:—</i>						
Printing, Bookbinding, etc. ...	167,849	62·8	61·2	37,073	66·8	65·1
Iron and Steel (Smelting and Rolling) ...	136,417	5·7	6·0	25,577	5·8	6·0
Shipbuilding ...	123,571	21·5	23·7	25,920	21·7	25·5
Boot and Shoe ...	121,311	80·2	79·2	20,733	82·1	80·5
Cocoa and Sugar Confectionery ...	72,582	45·2	45·0	16,248	41·1	39·3
Brewing and Malting... Leather (Tanning and Dressing) ...	61,391	54·9	48·7	45,934	56·8	44·9
Soap, Candle and Perfumery ...	28,506	47·2	47·5	7,355	46·2	45·4
Grain Milling ...	26,789	41·1	41·0	12,862	41·2	36·0
	25,611	50·8	47·1	9,082	52·1	49·1

* Silk and Artificial Silk, Rubber and Glass Trades.

The table includes 22 trades in which employment was larger in 1930 than in 1924. Of these trades the number in which more than one-half of the total workpeople were employed in establishments situated in the South of England was 11 in each year, the Electrical Engineering Trade replacing the Bread and Biscuit Trade in 1930. In trades which declined in total employment those situated mainly in the South of England numbered 4 in 1930 and 2 in 1924, the Brewing and Malting and Grain Milling Trades being added in the later year. It may be noted that the greatest measure of increase in the share of the South of England was recorded for the group comprising the Silk and Artificial Silk, Rubber and Glass Trades, the figures for which are combined in order to avoid possible disclosure of information arising from the publication of separate figures for the South of England. Other cases in which a considerable increase took place in the share of the South of England were the Hardware, Hollow-ware, etc. Trades, in which the proportion of the South of England increased from 27·3 per cent. in 1924 to 34·6 per cent. in 1930, and the Brewing and Malting Trade, where the proportions were respectively 48·7 per cent. and 54·9 per cent.

In trades where more than 25,000 persons were employed, apart from those concerned in the Smelting, Rolling and Casting of Iron and Steel, Shipbuilding and the Silk and Artificial Silk Trade, the share of the South of England in total net output in 1930 was in all cases greater than one-third. In all the expanded trades, except the Rubber Trade, the South of England recorded a larger proportion of the total net output than of the total number of employees, but in the case of the nine contracted trades this result was not shown in two cases. Thus the net output per employee in the South of England was larger than elsewhere

in practically all cases where employment expanded and also in the majority of trades where employment declined.

Apart from six trades in which the change in the relative share of the South of England was under one half of one per cent. of the total, all except seven of the principal trades recorded in 1930 an increase in the South of England proportion of the total number of employees. The seven trades were:—Bread and Biscuit, in which there was a considerable increase in Lancashire associated probably with a decline in home baking in that area; Hosiery, the number of establishments and the aggregate number of employees in Warwickshire, Worcestershire and Staffordshire being more than twice as great in 1930 as in 1924; Iron and Steel Foundries, a marked increase in the Midlands and Lancashire contrasting with declines in both parts of the South of England; Printing and Publication of Newspapers and Periodicals, the larger increase in the rest of the country being due in part to the development of the practice whereby certain London daily papers now issue a Manchester or Glasgow edition; Cardboard Box—for this trade the figures for the two years are not strictly comparable (see page 50); Hat and Cap, there being a marked decline in the London area; and Shipbuilding, the heavy decline in employment in the London area resulting from the nature of the work mainly carried out in that area, viz. running repairs and maintenance work, which were much affected by the depression in shipping.

All the expanded trades except Iron and Steel Foundries recorded an increase in employment in the South of England between 1924 and 1930, and for all except Mechanical Engineering an increase was recorded in the rest of the country. In the contracted trades, there was a decline in both parts of the country in each trade except Printing, Book-binding, etc. and Brewing and Malting, in which there was increased employment in the South of England in 1930.

The trades shown in the table on pages 76-7 may be summarised thus:—

Change in employment	Number of principal trades well distributed	Total number employed in 1930	Increase (+) or decrease (-) between 1924 and 1930 in the numbers employed in	
			South of England	Rest of Great Britain
Increase:—	No.	No.	Per cent.	Per cent.
Over 30 per cent. ...	4	213,580	+ 58.2	+ 25.5
From 20 to 30 per cent. ...	5	703,524	+ 29.4	+ 22.2
From 10 to 20 per cent. ...	4	248,534	+ 12.8	+ 14.4
From 5 to 10 per cent. ...	6	634,321	+ 8.8	+ 6.7
Under 5 per cent. ...	3	528,199	+ 13.2	- 3.7
<i>Total—Expanded trades</i> ...	22	2,328,158	+ 20.3	+ 9.4
Decrease:—				
Under 7 per cent. ...	5	451,639	- 1.6	- 8.5
Over 7 per cent. ...	4	312,388	-12.6	- 10.4
<i>Total—Contracted trades</i> ...	9	764,027	- 3.7	- 9.6

The tables in Appendix III show for each area the principal results for 1930 and 1924 in respect of all industries in which 5,000 or more workpeople were employed in that area in 1930 by firms employing more than ten persons. The trades are arranged in descending order according to the number of persons employed in 1930.

Owing to the risk of disclosure of information relating to individual businesses, it has been necessary to omit from certain areas particulars for industries which would otherwise have been separately enumerated. Among these may be mentioned the tobacco industry in the London area and the "rest of England" and the rubber industry in Warwickshire, Worcestershire and Staffordshire, while particulars for railway companies have been omitted from each of the areas except London, Lancashire, and the "rest of England".

Certain changes in industrial classification affect the comparability of the figures for the two years. The principal trades affected are Iron and Steel Foundries and Mechanical Engineering (page 46), Wholesale Bottling and Brewing and Malting (page 48), and Electricity Undertakings and Railway Companies (page 109), the employment figures for the first named of the three pairs of trades being overstated in 1930 relative to 1924 by about 5,000, 1,900 and 1,400 persons respectively. In addition, the factors referred to on page 71 had some influence on the comparability of the figures.

Area 1 (Greater London).—The table distinguishes 34 Factory trades in which more than 5,000 persons were employed in this area. Generally speaking the principal industries are those concerned in the production of finished goods for consumption rather than semi-finished or intermediate products. The predominance of the Tailoring, Dressmaking and Millinery Trades, in which some 9 per cent. of the aggregate number of persons employed in the area were engaged, will be noted. This predominance would be even greater if it were possible to take into account the very large number of persons employed by the small firms in these trades.

Of the 34 Factory trades employment increased in 25 cases and declined in 9. Among the trades showing an important development between the two years in this area may be mentioned Electrical Engineering, Motor and Cycle, Furniture and Upholstery, Hardware, Hollow-ware, etc., Manufactured Stationery, Cardboard Box, Aircraft, Glass and Building Materials, in each of which employment in 1930 was more than 20 per cent. greater than in 1924, the expansion in aircraft construction, in which employment more than doubled, being particularly striking. The increase of about 8,000 in the numbers employed in Mechanical Engineering in this area was greater than the increase

in the country as a whole. The only trades among those shown in the table in which employment declined by over 20 per cent. were Shipbuilding and the Aluminium, Lead, Tin, etc. Trade.

There was a great development in the Building and Contracting Trade in Greater London between 1924 and 1930; the expansion in Electricity Undertakings was also outstanding.

Area 2 (Lancashire and District).—Particulars are shown for 34 Factory trades, of which 20 recorded an increase in employment in 1930. The Cotton (Spinning and Weaving) and Textile Finishing Trades, taken together, employed 402,000 persons in 1930, or about 40 per cent. of the total for the Factory industries; in 1924, the aggregate recorded for these two industries was nearly 525,000, or rather less than 50 per cent. of the total. In addition to these trades, there was a substantial decline in the numbers employed in Mechanical Engineering. The expanded trades in this area include the Bread and Biscuit, Silk and Artificial Silk, Iron and Steel Foundries, Newspaper, etc. Printing and Publishing, Furniture and Hosiery Trades, the expansion in each case being greater in this area than in the country as a whole.

Of the total number of industrial workers recorded as employed in 1930 in this area, over 81 per cent. were employed in the Factory trades, a higher proportion than was recorded for any other area in Great Britain.

Area 3 (West Riding of Yorkshire).—The number of Factory trades in which more than 5,000 workpeople were employed in 1930 was 20. Only five trades showed increases in numbers employed in 1930; there was a considerable development in the Tailoring, Dressmaking, etc. Trade in this area, but only in the Motor and Cycle Trade was the increase greater than 20 per cent. In the Woollen and Worsted and the Textile Finishing Trades, taken together, about 185,000 persons were employed in this area in 1930 out of a total of 774,000 and about 229,000 persons out of 856,000 in 1924, a decline of nearly 20 per cent. The numbers employed in Mechanical Engineering declined from 58,800 to 46,200 and in Cotton Weaving from 17,400 to under 6,000. About two-thirds of the industrial population of the West Riding were engaged in the Factory trades in 1930.

Area 4 (North-East Coast).—Employment as a whole declined in 1930 by 45,000, or about 10 per cent., due primarily to the depression in the Coal Mining industry, but the fall of some 40 per cent. recorded for the Building and Contracting Trade is striking in view of the increase for this trade in the country as a whole. Shipbuilding, Engineering (Mechanical and Electrical) and the Iron and Steel Trades covered about 60 per cent. of all factory employment in 1930. The development in this area of the

Chemicals and the Electrical Engineering Trades was of considerable importance, the numbers engaged in the former trade rising from 4,300 to 10,100 and in the latter from 3,000 to 5,700. The average size of the industrial establishments (factories) in this area in 1930 (145 persons) was greater than in other parts of the country, the next highest average being recorded for the Clyde District (137 persons).

Area 5 (Warwickshire, Worcestershire and Staffordshire).—Of the 26 Factory trades distinguished in the table, the metal working trades (including Engineering and Vehicles) numbered 14. About 62 per cent. of all factory employees in 1930 were recorded by all the metal-working trades, and about 11 per cent. in the manufacture of pottery and bricks. Employment declined in 1930 in the Iron and Steel (Smelting and Rolling), Brewing and Malting and Cocoa and Sugar Confectionery Trades and in the industries concerned in the working of non-ferrous metals, but improved in all other trades of major importance. The growth in Mechanical Engineering and in Iron and Steel Foundries was substantially greater than in the country as a whole. Of the total number of workpeople employed in all industries, about 80 per cent. in both years was recorded in respect of the Factory trades.

Area 6 (The rest of England).—Of the 33 Factory trades for which particulars are shown, employment in 1930 was higher in 25 cases than in 1924. There was a more than three-fold increase in the numbers employed in this area in the Silk and Artificial Silk Trade, and in aircraft construction the increase was about 145 per cent. Among the most important trades in this area, notably higher figures were recorded for the Furniture Trade (67 per cent.), the Electrical Engineering Trade (61 per cent.) and the Motor and Cycle Trade (38 per cent.). In seven other trades an increase exceeding 20 per cent. was recorded, viz., Bread and Biscuit, Cardboard Box, Newspapers, etc., Hardware, Hollow-ware, etc., Chemicals, Building Materials and Manufactured Stationery. The principal employing trade in this area in 1924 was the Boot and Shoe Trade but the first place in 1930 was taken by Mechanical Engineering in which there was an increase of about 12,000 persons (15 per cent.); the Boot and Shoe Trade showed a decline of about 5 per cent. Of the other seven trades reporting decreased employment, the amount of the decrease was less than 5 per cent. in three, 8 per cent. in Textile Finishing and between 10 per cent. and 15 per cent. in the Woollen and Worsted, Grain Milling and China and Earthenware Trades.

As regards the Non-Factory trades, "the rest of England" was the only area in which an increase was recorded in the Coal Mining industry. This area was second in importance only to Greater London in respect of building activity, but the net output per person employed in the Building and Contracting Trade was somewhat lower than the average for the United Kingdom.

Area 7 (South Wales and District).—Coal Mining, and the Tinplate and Heavy Iron and Steel Trades provided employment for roughly three-fourths of the industrial population of this area in both years. Production as a whole declined heavily in 1930, employment in the Factory trades being lower by 15 per cent. and in the Non-Factory trades by over 26 per cent. The reduction of 37 per cent. in the Building and Contracting Trade parallels that in the North-East Coast area. As a contrast to the general decline the numbers employed by Local Authorities in productive work increased by about one-third.

Area 8 (The rest of Wales).—No Factory trade in this area recorded as many as 5,000 employees. Factory employment as a whole suffered a heavy decline in 1930, being lower by about 9,600 persons, or 42 per cent., than in 1924. The decline in employment in Coal Mines matched that in factory employment and was proportionately nearly double that shown for the country as a whole. In the Slate quarrying industry, employment declined only slightly in 1930.

Area 9 (Clyde District).—In 8 of the 11 Factory trades for which particulars are given employment in 1930 was lower than in 1924, but in the principal industry, viz. Mechanical Engineering, which gave employment in 1930 to nearly twice as many persons as any other industry in the area, there was an increase of about 4½ per cent. Mechanical Engineering and Shipbuilding, taken together, covered about 27 per cent. of the total number of industrial workers in 1930 and about 25 per cent. in 1924. The decline which affected most of the larger Factory trades was to some extent offset by the substantial increase in some of the smaller industries ("Other Factory trades") in which employment nearly doubled. The decline in coal mining was about 40 per cent. or nearly double that in the rest of the country.

Area 10 (The rest of Scotland).—The principal Factory industries in this area are the Jute, Hemp and Linen and the Woollen and Worsted Trades. Employment was lower in 1930 in each of these trades, the decline in the former amounting to nearly 17 per cent. and in the latter to about 4 per cent. Only 4 of the 11 Factory trades mentioned in the table recorded increased employment in 1930, viz. the Bread and Biscuit, Iron and Steel Foundries, Hosiery and Rubber Trades. The most notable change between the two years occurred in the Bread and Biscuit Trade in which employment was higher by 56 per cent. and net output by 30 per cent. although the number of returns received for the trade was substantially the same.

Building activity in this area was definitely greater in 1930, higher figures of employment being recorded by both private firms and Local Authorities.

Area 11 (Northern Ireland).—In 1930 there were only five Factory trades in this area in which the number of employees exceeded 5,000. The Linen and Hemp and the Textile Finishing Trades taken together employed about 62,300 persons in 1930 and 81,200 persons in 1924, a decline in 1930 of nearly double that for all industries in the area. These two trades covered about 50 per cent. of the total number of persons employed in factories in 1930 compared with nearly 60 per cent. in 1924. In the Tailoring, Dressmaking, etc. Trades and in the combined Mechanical Engineering and Shipbuilding Trades there was in each case an increase in employment amounting to about 4,000 persons, or 42 and 22 per cent., respectively. In the Non-Factory group employment as a whole showed little change, but an increase of about 10 per cent. was recorded in the Building and Contracting Trade.

CHAPTER VIII.

EMPLOYMENT

Including the numbers estimated to have been employed by the small firms and by firms from whom no information was received, the total numbers of persons engaged in the industries covered by the Census in 1930 and 1924 were as follows:—

Trades	1930			1924		
	Operatives	Administrative, etc.	Total	Operatives	Administrative, etc.	Total
	Thous.	Thous.	Thous.	Thous.	Thous.	Thous.
Factory trades ...	4,692·3	752·0	5,444·3	4,716·0	667·4	5,383·4
Non-Factory trades	2,271·5	183·6	2,455·1	2,429·6	165·7	2,595·3
TOTAL ...	6,963·8	935·6	7,899·4	7,145·6	833·1	7,978·7

In addition to the above, the average number of outworkers recorded as employed in 1930 was 30,700 and, in 1924, 41,100.

In comparing these aggregates with the estimated numbers of insured workpeople issued by the Ministry of Labour, the different scope of the two sets of statistics should not be overlooked. In any case the comparison cannot be extended to the Non-Factory trades as the numbers recorded as employed in Public Utility Services for the purposes of unemployment insurance include workpeople engaged in certain services that are excluded from the Census. As regards the Factory trades, the Census totals include working proprietors and non-manual workers whose annual remuneration removes them from the field of the Unemployment Insurance Acts, as well as all persons under 16 and over 65 years of age; further, in some industries where the delivery of the products to consumers is normally undertaken by the manufacturer (e.g. in the baking of bread), the persons engaged in this service are included in the Census aggregates, whereas such staff are generally classified with "Distributive" employees in the unemployment insurance records. The estimated number of insured workpeople in employment in the manufacturing industries of Great Britain and Northern Ireland at June, 1930, was about 5,125,100, and at June, 1924, about 5,240,500; these aggregates are lower than those of the Census for the Factory trades by 5·9 per cent. and 2·7 per cent. respectively, but the figure for 1930 relates only to workpeople aged 16-64, whereas that for 1924 relates to all workpeople over 16 years of age.

Comparison between 1930 and 1924.—The particulars given in the remaining tables in this chapter relate only to firms that employed more than ten* persons on the average in the censal years, the details necessary to enable similar comparisons to be made in respect of the smaller firms not being available for the year 1930.

* Five for Northern Ireland.

Persons employed were classified under the two headings of (1) Operatives, which were defined as including all wage earners employed in or about the works (including foremen, van and lorry drivers and warehousemen) or in outside work of construction and repair, and (2) Administrative, Technical and Clerical Staff, that is to say, the office and management staff, including working proprietors, managing directors, managers, designers, salesmen, travellers, etc.; clerks, typists and other persons engaged mainly in office work were included under the second heading, and not as operatives. The returns showed the numbers of each class employed, i.e. on the pay sheets, in the week ended 18th October, 1930 (or 19th October, 1929, if the return covered a period ended before 18th October, 1930); the numbers of males and females were distinguished separately as also were young persons (persons under 18 years of age) and adults. The returns also showed the number of operatives employed in a middle week in each month of the year of return, the numbers of male and of female operatives being shown separately for 1924, but not for 1930.

The table below shows the numbers of operatives and of administrative, technical and clerical staff employed in 1930 and 1924, males and females being distinguished separately. In the case of operatives the numbers relate to the average of the twelve monthly figures, and, for 1930, have been distributed among male and female staff according to the proportions recorded for the week ended 18th October, 1930; for the administrative, technical and clerical staff the numbers are those recorded for the week ended 18th October in both years.

Average numbers (excluding outworkers) employed in 1930 and 1924

Trade group	Operatives		Administrative, technical and clerical staff		Total
	Males	Females	Males	Females	
Factory trades:—					
Iron and Steel ...	1930 374,576	72,184	35,370	11,447	493,577
	1924 392,238	63,812	33,436	9,376	498,912
Engineering, Shipbuilding and Vehicles ...	1930 821,273	92,248	118,482	42,746	1,074,749
	1924 780,128	72,003	99,514	33,933	985,578
Non-Ferrous Metals ...	1930 71,569	23,003	9,893	5,253	109,718
	1924 74,313	26,233	9,314	5,128	114,988
Textiles ...	1930 386,653	610,629	48,457	16,511	1,062,250
	1924 461,185	737,018	49,526	14,255	1,261,984
Leather ...	1930 28,632	12,292	3,683	1,539	46,146
	1924 31,344	11,788	3,895	1,402	48,429
Clothing ...	1930 126,410	317,784	25,591	22,339	492,124
	1924 133,008	297,169	25,686	18,105	473,968
Food, Drink and Tobacco ...	1930 219,997	169,286	55,601	27,553	472,437
	1924 215,130	154,466	51,069	19,122	439,787
Chemicals, etc. ...	1930 104,057	32,594	29,305	12,195	178,151
	1924 107,815	35,112	25,482	9,685	178,094

Operatives and salaried staff.—The total number of operatives employed showed a decline in 1930 of 248,000 (3.7 per cent.) and that of administrative, technical and clerical staff an increase of 91,000 (14.4 per cent.). The decline in numbers of operatives was mainly in the extractive industries; the number of operatives employed in 1930 in all industries other than Mines and Quarries was 8,000 greater than in 1924, while for administrative, technical and clerical staff there was an increase of 97,000. In consequence of the large increase in the administrative and clerical staffs, the proportion of such staffs rose from 8.7 per cent. of the aggregate for all trades in 1924 to 10.1 per cent. in 1930. A relative expansion in the controlling and clerical staffs was common to all the groups of manufacturing industries and was one of the most striking changes disclosed by the Census. The only group in which the proportion of operatives in the aggregate was more in 1930 than in 1924 was Mines and Quarries. For the Factory trades alone the aggregate numbers of the administrative, technical and clerical staff increased from 511,600 in 1924 to 589,200 in 1930, forming 10.5 per cent. of all employees in the earlier and 12.1 per cent. in the later year; in the same period operatives declined in numbers from 4,345,000 in 1924 to 4,286,400 in 1930.

It has already been estimated (see page 44) that the volume of goods produced in 1930 was about 8 per cent. greater than in 1924. It is noteworthy that an increased output of goods was associated with a slight decrease in the staffs employed in the manipulative processes but with definitely larger numbers of employees connected with management, technical and clerical operations. If from the total of goods produced there be deducted the output of the extractive industries, it will be seen that with no appreciable change in the number of operatives and with an increase of 16 per cent. in the controlling and clerical staffs, output increased between 1924 and 1930 by nearly 11 per cent. In this connection, the increase of 18 per cent. in the power in use per operative employed in these industries (other than Electricity Undertakings and Railway Companies) may be noted.

Males and females.—Over the entire range of industries covered, the numbers of both male and female employees were slightly smaller in 1930 than in 1924, the aggregate of males declining by 2.6 per cent. and of females by 0.7 per cent. Of the operatives employed in the manufacturing industries, the relative proportion of males to females increased from 1.67 to 1 in 1924 to 1.72 to 1 in 1930; in the Non-Factory trades, the number of female operatives was, through the nature of the work, negligible.

As regards the question of the displacement of male by female labour, the following table shows the proportion of females in the total number of operatives employed in the Factory trades in the two years. Separate particulars are given for those trades in which the total number of operatives employed in 1930 was greater than

the number employed in 1924 ("Expanded trades") and those in which the number was smaller in 1930 than in 1924 ("Contracted trades").

Proportion of male to female operatives	1930		1924	
	Total number of operatives	Proportion of females	Total number of operatives	Proportion of females
	No.	Per cent.	No.	Per cent.
(1) 10 to 1 and over ...	1,082,623	3.6	1,095,580	3.6
<i>Expanded trades</i> ...	715,613	4.6	672,153	4.9
<i>Contracted trades</i> ...	367,010	1.5	423,427	1.5
(2) 5 to 1 and under 10 to 1 ...	451,950	12.0	420,267	12.0
<i>Expanded trades</i> ...	281,566	12.5	233,572	12.1
<i>Contracted trades</i> ...	170,384	11.2	186,695	12.0
(3) 2 to 1 and under 5 to 1	596,180	26.7	545,713	24.9
<i>Expanded trades</i> ...	472,026	27.9	402,755	26.5
<i>Contracted trades</i> ...	124,154	21.7	142,958	20.4
(4) 3 to 2 and under 2 to 1	299,920	38.5	285,947	38.0
<i>Expanded trades</i> ...	187,024	37.7	164,616	37.0
<i>Contracted trades</i> ...	112,896	39.9	121,331	39.2
(5) 1 to 1 and under 3 to 2	300,304	42.8	290,762	42.9
<i>Expanded trades</i> ...	108,458	44.4	90,565	42.8
<i>Contracted trades</i> ...	191,846	41.8	200,197	43.0
(6) 2 to 3 and under 1 to 1	371,568	57.8	403,412	58.6
<i>Expanded trades</i> ...	127,772	55.2	111,096	57.2
<i>Contracted trades</i> ...	243,796	59.2	292,316	59.2
(7) 1 to 2 and under 2 to 3	486,641	64.7	615,688	64.2
<i>Expanded trades</i> ...	71,932	64.4	59,661	65.6
<i>Contracted trades</i> ...	414,709	64.7	556,027	64.1
(8) Under 1 to 2	697,199	79.2	687,630	78.0
<i>Expanded trades</i> ...	514,811	81.5	466,121	80.8
<i>Contracted trades</i> ...	182,388	72.5	221,509	72.1
TOTAL ...	4,286,385	36.8	4,344,999	37.5
<i>Expanded trades</i> ...	2,479,202	34.5	2,200,539	33.9
<i>Contracted trades</i> ...	1,807,183	39.9	2,144,460	41.1

In the expanded groups of Factory trades distinguished in the above table, five show increases in the proportion of female operatives employed and three decreases. The contracted trades are divided into four groups with an increased proportion of females and two with a decreased proportion, while in two groups the proportion was the same in the two years. In only three of the groups, Nos. (3), (4) and (8), was there a relative expansion in females in both the expanded and the contracted part of the group. The most predominantly female group, in which female operatives outnumber males by more than 2 to 1, has become female to a greater extent than before. In each of the expanded groups the expansion applied to males as well as to females, and in the contracted groups likewise the numbers of both males and females decreased in each group.

9·7 per cent. less than in 1924 and for the older operatives 5·9 per cent. The total number of operatives employed on 18th October, 1930, was about 432,000 less than six years earlier, the difference being considerably greater than that (248,000) between the averages for the two years; the decline in young operatives was about 83,000. Of the total reduction of nearly 70,000 in young male operatives, over half represented a decrease in employment of operatives under 16 years of age in the Mines and Quarries group, the number employed in this group in December, 1930 (37,468) being roughly one-half the corresponding figure for 1924. For Coal Mines alone the reduction was 35,707, and the proportion of operatives under 16 years of age in the Mines and Quarries group fell from 5·9 to 3·9 per cent. of the total as a result of the 23 per cent. reduction in employment, which had a marked effect on the number of new entrants into the industry.

In the manufacturing industries employment of young operatives declined by about 41,100 (5·6 per cent.), males being fewer by 28,300 (8·4 per cent.) and females by 12,800 (3·3 per cent.); the corresponding figures for operatives over 18 years of age were:—total, 142,400 (3·9 per cent.); males 59,700 (2·5 per cent.); females 82,700 (6·5 per cent.). While, therefore, young male operatives in the Factory trades decreased to a much greater extent than older operatives, in the case of female operatives there was a relative increase in 1930 in the number of juveniles. In only two groups of trades, Timber, and Paper, Printing and Stationery, was the number of young male operatives employed in 1930 greater than in 1924, and these were the two groups in which the proportionate increase in male operatives was much larger than in any other group. Of the seven groups showing a decrease in male operatives, the only one in which the decline in the older operatives was greater than in juveniles was the small Leather group.

In most groups of Factory trades the employment of young female operatives increased to a greater extent or decreased to a less extent than that of female operatives over 18 years of age, but in the two groups in which employment of female operatives decreased most, viz. Textiles (20·5 per cent.) and Non-Ferrous Metals (15·5 per cent.) there was a larger decrease among the juveniles than among the older female operatives, and in the Engineering, Shipbuilding and Vehicles group the number of young female operatives increased by 9 per cent. and of the older operatives by 29 per cent. In the small Leather group, an increase among the older female operatives was accompanied by a decrease in juveniles, both movements being about 3 per cent.

Considering the administrative, technical and clerical staff there was in every group, except Mines and Quarries, an increase in the number of young as well as of older females employed, but in five groups the number of male juveniles decreased, the decrease being small except in the Textile group and Mines and Quarries. In the aggregate, males under 18 years of age increased by 6·8 per cent.

and over that age by 11·1 per cent. while young females increased by 45·4 per cent. and the older female administrative, etc., staff by 22·4 per cent.

Monthly fluctuations in employment.—Firms were required to state the total number of operatives employed in a middle week of each month of the period which their returns covered. Thus, if the return covered the twelve months ended 31st March, the figures recorded for the three months, January to March, related to the year following the censal year while returns for the twelve months ended 30th September, included the last three months of the year preceding the censal year. As 36·9 per cent. of the total number of operatives in Great Britain was recorded on returns relating to periods other than the calendar year 1930, the true course of employment in the censal year may not be disclosed by an aggregation of the monthly figures shown in all the returns irrespective of the period covered. The numbers recorded in returns relating to the calendar year 1930 are, therefore, shown separately in the following table, which summarises the monthly aggregates of employment in each year. Particulars for the calendar year are only available for 1930 and are confined to Great Britain.

Monthly fluctuations in the operative staff (excluding outworkers) employed in 1930 and 1924

Middle week in	Factory trades		Non-Factory trades		Total number	
	1930	1924	1930†	1924†		
	Total number	Number employed by firms furnishing returns in respect of the twelve months ended December*	Total number	Number employed by firms furnishing returns in respect of the twelve months ended December*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
January	4,424,754	2,478,273	4,213,192	1,105,049	576,603	1,031,751
February	4,391,168	2,462,912	4,264,714	1,119,223	583,578	1,054,300
March ...	4,388,201	2,455,642	4,290,188	1,127,801	590,292	1,068,374
April ...	4,404,173	2,446,196	4,322,990	1,120,675	603,064	1,078,585
May ...	4,337,944	2,413,620	4,367,218	1,137,861	608,000	1,088,440
June ...	4,266,726	2,379,035	4,369,128	1,149,900	610,211	1,094,298
July ...	4,256,090	2,348,951	4,366,213	1,148,160	606,253	992,951
August...	4,171,268	2,301,753	4,328,449	1,156,231	610,322	992,394
September	4,171,230	2,307,895	4,368,816	1,152,117	605,985	1,092,050
October	4,224,930	2,304,442	4,408,448	1,137,103	595,216	1,101,076
November	4,213,611	2,291,190	4,410,011	1,119,256	582,023	1,096,033
December	4,186,523	2,253,874	4,430,600	1,116,378	569,947	1,095,373
AVERAGE FOR THE TWELVE MONTHS	4,286,385	2,370,315	4,344,999	1,132,480	595,125	1,065,469

* Great Britain only.

† Excluding Mines and Quarries.

The figures in column (3) show that, except for a slight increase following the holiday month of August, employment in factories declined month by month in 1930 and was over 9 per cent. lower at the end of the year than at the beginning. In the Non-Factory group (excluding Mines and Quarries) employment in 1930 (column (6)) improved each month until June and reached its peak in August, being in that month 5.8 per cent. higher than at the beginning of the year; there was a progressive decline in the remaining months and the average number in employment in December was about one per cent. lower than in January. The range of variation was smaller in the Non-Factory trades than in the Factory trades, the figure for December being 6.6 per cent. below the high figure for August. The movement in this group is dominated by the seasonal employment in the Building Trade.

The table below shows the variations in employment in the consecutive quarters of 1930 in relation to the average of the twelve months. The variations indicated by the figures for all returns (columns (3) and (5) of the table) are added for comparison.

Period, 1930	Extent of variation from the yearly average			
	Factory trades		Non-Factory trades	
	Returns covering December year	All returns	Returns covering December year	All returns
	Per cent.	Per cent.	Per cent.	Per cent.
March quarter ...	+ 4.0	+ 2.7	- 1.9	- 1.3
June quarter ...	+ 1.8	+ 1.2	+ 2.0	+ 0.3
September quarter ...	- 2.1	- 2.0	+ 2.1	+ 1.7
December quarter ...	- 3.7	- 1.8	- 2.1	- 0.7

The above figures are of interest chiefly as showing the extent to which, in a period of rapid changes such as the year 1930, the actual variations in employment may be masked by an aggregation of the employment records without reference to the period covered by the returns. Corresponding information for the year 1924 is not available.

Relative importance of trades in 1930 and 1924.—The following table shows, according to the numbers of persons employed, the relative importance in 1930 and in 1924 of the larger industries in the United Kingdom. For the purpose of this table the estimated numbers employed by the small firms have been included throughout. The industries specified in column (1) are those that employed more than 25,000 persons in 1930. Some of these trades are affected by the increased departmentalisation of certain firms secured at the 1930 Census, but the only cases where this change in

procedure affected the position of the trade in the table are Iron and Steel Foundries, which would be reduced to twenty-third place, Brewing and Malting, raised to thirty-first place, and Cardboard Box, reduced to forty-fourth place, while the numbers employed in the Wholesale Bottling Trade would be reduced below 25,000.

Trade (1)	Number of persons employed (including the small firms)		Increase (+) or decrease (-) in 1930 compared with 1924 (4)	Order of importance	
	1930 (2)	1924 (3)		1930 (5)	1924 (6)
	Thous.	Thous.	Per cent.		
Coal Mines ...	933.8	1,198.8	-22.1	1	1
Building and Contracting ...	616.9	555.0	+11.2	2	2
Mechanical Engineering ...	479.7	478.5	+ 0.3	3	4
Tailoring, Dressmaking, Millinery, etc. ...	425.0	414.4	+ 2.6	4	5
Cotton (Spinning and Weaving)	390.7	530.1	-26.3	5	3
Motor and Cycle ...	302.4	223.1	+35.5	6	8
Local Authorities ...	242.8	200.4	+21.2	7	9
Woollen and Worsted ...	233.8	278.1	-15.9	8	6
Railway Companies ...	230.7	250.9	- 8.1	9	7
Electrical Engineering ...	198.8	157.1	+26.5	10	14
Printing, Bookbinding, etc. ...	198.6	196.5	+ 1.1	11	10
Bread and Biscuit ...	194.2	169.3	+14.7	12	12
Iron and Steel (Blast Furnaces and Smelting and Rolling)	155.9	185.1	-15.8	13	11
Boot and Shoe ...	146.2	160.3	- 8.8	14	13
Shipbuilding ...	136.0	144.0	- 5.6	15	15
Furniture and Upholstery ...	124.0	89.5	+38.5	16	20
Gas Undertakings ...	117.1	110.6	+ 5.9	17	17
Hosiery ...	108.1	97.5	+10.9	18	19
Textile Finishing ...	106.5	115.9	- 8.1	19	16
Iron and Steel Foundries ...	94.0	87.5	+ 7.4	20	21
Hardware, Hollow-ware, etc.	93.7	75.5	+24.1	21	23
Timber (Sawmilling, etc.) ...	90.2	73.1	+23.4	22	24
Electricity Supply Undertakings ...	80.3	51.0	+57.5	23	33
Brick and Fireclay ...	76.8	70.9	+ 8.3	24	25
Cocoa and Sugar Confectionery	76.2	80.5	- 5.3	25	22
Chemicals, Dyestuffs and Drugs ...	73.6	69.5	+ 5.9	26	27
Linen and Hemp ...	73.0	99.9	-26.9	27	18
Printing and Publication of Newspapers, etc. ...	72.1	58.9	+22.4	28	29
China and Earthenware ...	71.0	70.4	+ 0.9	29	26
Non-Metalliferous Mines and Quarries ...	70.4	58.2	+21.0	30	31
Chain, Nail, Screw, etc. ...	63.9	58.5	+ 9.2	31	30
Brewing and Malting ...	63.4	67.5	- 6.1	32	28
Silk and Artificial Silk ...	60.3	40.3	+49.6	33	36
Paper ...	53.8	51.4	+ 4.7	34	32
Rubber ...	53.5	48.3	+10.8	35	34
Tobacco ...	44.5	39.0	+14.1	36	37
Preserved Foods ...	44.4	38.5	+15.3	37	38
Glass ...	41.4	38.3	+ 8.1	38	39

Trade (1)	Number of persons employed (including the small firms)		Increase (+) or decrease (-) in 1930 compared with 1924 (4)	Order of importance	
	1930 (2)	1924 (3)		1930 (5)	1924 (6)
	Thous.	Thous.	Per cent.		
Manufactured Stationery ...	40.5	28.7	+41.1	39	50
Admiralty	40.1	47.2	-15.0	40	35
Building Materials	40.1	27.6	+45.3	41	53
Cardboard Box	35.6	24.2	+47.1	42	59
Grain Milling	34.3	37.0	- 7.3	43	40
Finished Brass	34.1	34.3	- 0.6	44	43
Water Undertakings	34.1	32.6	+ 4.6	45	44
General Post Office	33.8	31.9	+ 6.0	46	46
Hat and Cap	33.0	32.1	+ 2.8	47	45
Plate and Jewellery	31.8	35.9	-11.4	48	41
Leather (Tanning and Dressing)	30.8	31.9	- 3.4	49	47
Jute	28.7	34.4	-16.6	50	42
Scientific Instruments, etc.	28.3	26.1	+ 8.4	51	55
Soap, Candle and Perfumery	28.2	30.4	- 7.2	52	48
Wrought Iron and Steel Tubes	25.9	24.9	+ 4.0	53	57
Copper and Brass (Smelting, Rolling, etc.)	25.6	27.8	- 7.9	54	52
Musical Instruments	25.4	20.9	+21.5	55	61
Wholesale Bottling	25.4	20.3	+25.1	56	63
Tinplate	25.3	28.0	- 9.6	57	51

It will be observed that the first 15 places in the table are occupied by the same group of industries in both years and that each of these industries employed more than 125,000 persons. The order of importance of these 15 trades changed in certain cases, mainly on account of the adverse conditions existing in the primary industries in 1930. The operation of these conditions is reflected in the decline of the cotton industry from third place in 1924 to fifth place in 1930 and of the heavy iron and steel industry from eleventh to thirteenth place, while railway companies fell from seventh to ninth place. The coal mining industry, which was similarly affected, was, however, so far ahead of other industries in the number of persons to whom it gave employment that it retained its position at the head of the table in spite of a decrease of over 22 per cent. in employment. On the other hand employment in the Motor and Cycle Trade and in the Electrical Engineering Trade increased in 1930 by 35.5 per cent. and 26.5 per cent. respectively and raised these trades from eighth to sixth place and from fourteenth to tenth place respectively. The increase of over 21 per cent. in the number of persons employed by Local Authorities in 1930 on building and highway construction and other productive work raised these services from ninth place in 1924 to seventh in 1930.

In the lower section of the table several noteworthy changes took place between 1924 and 1930. The development of the use of electricity led to an increase of about 55 per cent. in the number employed by Electricity Supply Undertakings,* which occupied twenty-third place in 1930 as compared with thirty-third place in 1924. The Manufactured Stationery Trade, the Building Materials Trade and the Cardboard Box Trade also showed considerable expansion in 1930 and occupied positions in the table appreciably higher in that year than in 1924. The general decline of the trades engaged in the spinning, weaving, and finishing of textiles is further illustrated in this part of the table by the much lower positions held in 1930 by the Textile Finishing Trade, the Linen and Hemp Trade and the Jute Trade, but an exception was provided by the Silk and Artificial Silk Trade, which rose from thirty-sixth place in 1924 to thirty-third place in 1930. A decline of seven places was recorded for Plate and Jewellery and of six places for Tinplate.

The trades which employed over 25,000 persons in 1924 but fewer than that number in 1930 were the Railway Carriage and Wagon Trade, the Tool and Implement Trade and the Wire Trade. The largest number employed in 1924 by any of these trades was 29,700 in the Railway Carriage and Wagon Trade.

In addition to providing a measure of the importance of individual trades in the industrial structure of the United Kingdom, the above table also furnishes evidence of the relative value of certain groups of trades as employers of labour. In the following table are shown the numbers employed in 1930 and 1924 in each of the specified groups, together with the proportion which each group represents of the total number of persons employed in industry:—

Size group (number of persons employed in each trade)	Number of trades or services falling within the group		Number of persons employed in the group		Proportion of total number of persons employed in industry	
	1930	1924	1930	1924	1930	1924
	No.	No.	Thous.	Thous.	Per cent.	Per cent.
Over 500,000	2	3	1,550.7	2,283.9	19.6	28.6
250,000-500,000	4	4	1,597.8	1,421.9	20.2	17.8
100,000-250,000	13	10	2,192.7	1,662.3	27.7	20.8
50,000-100,000	16	16	1,166.2	1,159.8	14.8	14.6
25,000-50,000	22	23	731.3	772.4	9.3	9.7
Under 25,000	68	69	660.7	678.4	8.4	8.5
Total	125	125	7,899.4	7,978.7	100.0	100.0

* Based on comparable figures for the two years (see pages 109-10).

CHAPTER IX

WAGES

Under the Census of Production Act, 1906, the Board of Trade are prohibited from requiring in connection with a Census of Production particulars of the amount of wages paid. Voluntary inquiries on this subject were, however, conducted by the Ministry of Labour in respect of both 1930 and 1924 and, by arrangement with the Ministry, the total wages bill was ascertained for groups of firms that made returns to the two Departments. In many cases these returns were not co-extensive, owing chiefly to differences in the period covered or in the number of branches of the business to which they related. Consequently, it was not found possible to make use of the whole of the voluntary wages data supplied in any industry. For Coal Mines the information published by the Mines Department has been utilised.

The particulars shown for the two years in the table on pages 100-1 relate to firms employing more than ten persons on the average and are confined to Great Britain.

The proportion of the total net output covered by the ascertained data was comparatively high at both periods, viz., 67.3 per cent. in 1930 and 70.0 per cent. in 1924, but the different groups were by no means equally represented in the total. In the *Factory* group, information was given for rather less than two-thirds of the total net output of 1930 and for rather more than two-thirds of the 1924 total. In the *Non-Factory* group, Public Utility Undertakings are not represented owing to the fact that the information supplied to the Ministry of Labour did not, in many cases, contain separate details in respect of the staff engaged in productive operations covered by the Census, and other staff engaged in performing services. The particulars for this group showed that more than three-fourths of the total net output of both years was represented by the wages returns, but this high proportion was due mainly to the fact that the large net output of Coal Mines was almost completely covered. The Timber group was inadequately represented by the returns for either year, while the information relating to the Building and Contracting Trade covered only 39 per cent. of the net output in 1924.

For all *Factory* trades taken together, the amount paid in wages formed the same proportion of the net output in both years, viz., 46.1 per cent.; in the *Non-Factory* trades wages represented 73.4 per cent. of the total net output in 1930 and 76.8 per cent. in 1924. Changes in the wages proportion from one year to another merely provide an indication of the importance of the wages bill in relation to all other items contributing to the net

output and do not, of course, reflect the movement in the earnings of the workpeople employed. In depressed industries, such as those in the Textile group, the average money earnings of the employees were lower in 1930 than in 1924, but other items in the net output declined to a considerably greater extent, leading to a substantial increase in the importance of the wages bill as a factor in net output; on the other hand, in the Building and Contracting Trade, wages formed a notably lower proportion of net output in 1930 than in 1924 although the average money earnings of the workpeople showed little or no change.

Factory trades.—The money earnings per operative in the year 1930, i.e. the total wages bill divided by the average number of operatives employed, varied from £68 in the Incandescent Mantles Trade and £70 in the Linen and Hemp Trade to £237 in the Newspaper and Periodical Printing and Publishing Trade, the latter being the only trade in which the yearly earnings exceeded £200. Grouped according to the yearly earnings of the operatives the sample for 1930 showed that earnings were £100 or less per operative in 28 *Factory* trades; between £101 and £120 in 19; between £121 and £140 in 34; between £141 and £160 in 16; and over £160 in 7. The trades included in these groups are shown in the table on pages 102-3, together with the net output per head and the proportion of net output represented by wages, but it should be borne in mind that the net output figure is based on all employees in the trade, i.e., including the administrative, technical and clerical staff as well as the operatives. The particulars shown relate only to firms in Great Britain.

Except for the Hardware, Hollow-ware, etc., Cutlery*, and Cane and Wicker Furniture, etc., Trades, the majority of the operatives employed in all the trades included in group (1) consisted of females, while in groups (3) and (4) males formed the majority in every case except the Fur Trade and the Tobacco Trade; in group (2) females outnumbered males in six of the 19 trades included. The smaller ranges of net output per head are found chiefly in trades included in the lowest group of the wage scale and the increase in the level of earnings is reflected, to some extent, in the higher average net output per employee. There are, however, a number of trades in each wage group in which the net output figure is exceptionally high and the wages bill represents a factor of relatively minor importance. These trades are found chiefly in the Food, Drink and Tobacco and the Chemicals groups, their products being commonly sold under the manufacturers' proprietary brands (e.g., tobacco, beer, motor spirit, soap, etc.) and subject to heavy on-costs on account of advertising expenses.

* The sample in this case was small and probably unrepresentative.

In the following table, the leading particulars for each of these five wage groups are shown:—

Average earnings per operative	Number of trades	Number of operatives employed	Approximate proportion of females	Net output	Wages paid	Wages as a proportion of net output
	No.	No.	Per cent.	£'000	£'000	Per cent.
Not exceeding £100 ...	28	873,953	68	147,358	76,810	52.1
£101—£120 ...	19	460,503	37	116,085	51,748	44.6
£121—£140 ...	34	769,627	14	219,367	100,311	45.7
£141—£160 ...	16	478,676	15	155,073	71,162	45.9
Over £160 ...	7	59,695	6	38,991	12,333	31.6
TOTAL ...	104	2,642,454	36	676,874	312,364	46.1

The wages bill formed the largest proportion (52.1 per cent.) of the net output in the lowest wage group and in the second, third and fourth groups was in the neighbourhood of 45 per cent., while for the small group in which average earnings exceeded £160, wages formed only a little over 30 per cent. of the net output.

Of the total number of operatives employed in the Factory trades in 1930, the first group, in which average earnings did not exceed £100, covered 33 per cent., the second about 18 per cent., the third 29 per cent. and the fourth 18 per cent.

Non-Factory trades.—In the absence of particulars for Public Utility Services and Government Departments, which together contributed about 43 per cent. of the total net output of this group, the results shown for the Non-Factory trades cannot be related to the total figures given for these trades in earlier tables. Earnings in 1930 averaged about £155 in the Building and Contracting Trade, £114 in Coal Mines and £132 in other mines and quarries, the average net output per head being £208, £149 and £191, respectively. In each case, the wages bill formed much the largest item in the net output, contrasting in this respect with the great majority of the Factory trades in which charges such as rent, selling expenses, etc., are of relatively greater importance. The proportion of females employed in the Non-Factory trades was negligible.

Total wages bill.—A good deal of uncertainty must attach to the use of these samples for the purpose of estimating the total amount of the wages bill in industry. It will be seen from the table on pages 100-1 that the different groups are by no means equally represented in the total, the groups in which wages lower than the average prevail (e.g., Textiles and Coal Mines) being on the whole more adequately covered than those in which the wage level is higher. It must also be borne in mind that the figures for individual groups are themselves aggregates covering a large number of trades of varied structure and conceal many differences of the same kind. Examination of the particulars available for the individual trades

shows that the sample was not equally representative of the employment and the net output aggregates and in many of the smaller trades the disparities between the two proportions were comparatively wide. As the wages bill is one of the principal factors in net output, it is clear that these disparities may be due, in some measure, to differences between the yearly earnings of the employees covered by the samples and the remaining employees in the trade.

Although the total wages bill in industry cannot be determined with any great degree of precision from the partial information available, a rough estimate may be made on the basis of the particulars available for each trade separately. Four proportions are given for 1930 in the wages table for each trade, viz. the proportions which the samples represent of (1) the total number of operatives employed in the week ended 18th October; (2) the total average number of operatives employed during the year; (3) the total gross output; and (4) the total net output. For 1924 only the proportions (1) and (4) are available. Each of these proportions provides a basis for estimating the total wages bill in industry and yields different results, but the difference for 1930 between the highest (2) and the lowest (3) of the aggregates based on the four methods is under two-thirds of one per cent. of the total. On general grounds it appears likely that the particulars of average numbers of operatives may provide the most representative basis, but the indications afforded by the other particulars cannot be neglected; for 1924 the average numbers of operatives are not available.

Estimated total of Wages paid in Great Britain in 1930 and 1924

Trade group	1930	1924
	£ mill.	£ mill.
Factory trades:—		
1 Iron and Steel ...	58.4	61.2
2 Engineering, Shipbuilding and Vehicles ...	119.5	108.8
3 Non-Ferrous Metals ...	12.2	12.1
4 Textiles ...	84.1	107.2
5 Leather ...	4.8	5.1
6 Clothing ...	40.1	40.1
7 Food, Drink and Tobacco ...	45.6	43.8
8 Chemicals, etc. ...	19.3	19.6
9 Paper, Printing and Stationery ...	45.2	40.5
10 Timber ...	18.2	15.5
11 Clay and Building Materials ...	25.1	22.8
12 Miscellaneous ...	17.7	17.5
TOTAL—Factory trades ...	490.2	494.2
Non-Factory trades:—		
Building and Contracting ...	63.8	59.1
Mines and Quarries* ...	114.2	171.7
TOTAL—Non-Factory trades*† ...	178.0	230.8
TOTAL—ALL TRADES*† ...	668.2	725.0

* Excluding Oil Shale Mines and Salt Mines, Brine Pits and Salt Works.

† Excluding Public Utility Services and Government Departments.

For the Census trades for which information is available, it is estimated that the total amount of wages paid to operatives employed by firms in Great Britain that employed more than ten persons was in the neighbourhood of £668 million in 1930 and £725 million in 1924. An estimate for the firms employing not more than ten persons is considerably more speculative, as the number of operatives employed by those firms is not known precisely for either year and allowance cannot be made with certainty for differences in the continuity of their work and in the rates of wages paid. Such information as is available suggests that the total wages bill of the small firms in 1930 lay between £50 million and £60 million and in 1924 between £45 million and £55 million. The wages bill of firms in Northern Ireland appears to have been about £11 million in 1930 and about £12 million in 1924.

The aggregate amount paid in wages in private industrial establishments is thus estimated, for 1930, as £734 ± 10 million, the corresponding aggregate for 1924 being £787 ± 10 million. These totals represent about 51 per cent. of the aggregate net output in 1930 and about 52 per cent. in 1924.

Values available to industry after deduction of wages and cost of materials.—On page 53 estimates are given of the value of the industrial output of the United Kingdom, taken as a whole. In the following paragraphs an attempt is made to determine the amount available to industry after the two chief items of expenditure, viz., the cost of materials and the wages bill, have been defrayed. In order to bring the estimates of the wages bill, which do not include the Public Utility Undertakings, into relation with the estimated value of the aggregate industrial output, some rough adjustments of the latter have been made.

The following table gives the principal results:—

Particulars	1930	1924
	£ mill.	£ mill.
Value of industrial products	2,090±20	2,369±20
Cost of materials used (including transport, etc., charges)	642±15	865±20
Wages	734±10	787±10
Balance	714±30	717±30

No considerable degree of precision should be attached to the above estimates, the principal purpose of which is to indicate the approximate importance of the chief constituent elements in the total productive expenditure. Taking the mean figures as estimated, the wages bill represented 35 per cent. and the expenditure on materials nearly 31 per cent. of the value of the industrial output

in 1930; in 1924, wages formed rather more than 33 per cent. and materials 36½ per cent. of the total. All other costs of production, such as salaries, rent, taxes, selling expenses and depreciation, together with profits, were covered by the residue, which amounted to about 34 per cent. in 1930 and 30 per cent. in 1924.

Appendix IV shows for all trades in which more than 25,000 persons were employed the estimated amount of the wages bill and the balance of the net output in 1930 and 1924 together with the total number of persons (operatives and administrative, etc. staff) employed in the two years. The particulars relate only to Great Britain and to firms employing more than ten persons, as information is lacking to enable sufficiently precise estimates to be made for all firms, including those situated in Northern Ireland.

In the Factory trades taken together the money value of wages paid to the operatives in 1930 was about 1 per cent. lower than in 1924 and that of the other items in the net output declined to the same extent. Among the different industries the movement of these two items varied considerably, but on the whole the total wages bill appears to have been subject to less extensive changes than the aggregate of the other items. The table shows 18 trades in which the total net output decreased in 1930 and in 11 of these trades both wages and the balance of the net output were lower, the decline in the latter being particularly severe in the Cotton, Woollen and Worsted, Linen and Jute, and Textile Finishing Trades. Most of the remaining trades in which total net output declined in 1930 show increases in one item, offset by decreases in the other, the most striking case being the Silk and Artificial Silk Trade in which wages increased by nearly 68 per cent. and the balance of the net output decreased by nearly 48 per cent. Of the 25 trades in which total net output increased, there were 19 cases showing increases both for wages and the remaining items, 4 in which the increase affected the wages bill only and 2 (Shipbuilding and the Soap, Candle and Perfumery Trade) in which the wages bill declined. Among the important trades showing considerable increases in the net output balance may be mentioned the Shipbuilding, Electrical Engineering, and Motor and Cycle Trades; in the Shipbuilding Trade the increase of 59 per cent. contrasts with a small decline in the wages bill.

In the Non-Factory trades, excluding Public Utility Services and Government Departments, both the wages bill and the balance of the net output declined in 1930, the decrease in the former (23 per cent.) being considerably greater than in the latter (6 per cent.). This result was mainly due to a heavier reduction in the wages bill of Coal Mines (36 per cent.) than in that of the net output balance (27 per cent.), and an important increase, about 43 per cent., in the net output balance of the Building and Contracting Trade, while the wages bill increased by 8 per cent.

CHAPTER X

THE POWER EQUIPMENT OF INDUSTRY

All firms that made returns at the Censuses of 1924 and 1930 were required to state the capacity of the prime movers, electric generators and electric motors in their works. With regard to *prime movers* the capacity to be stated was the effective horse-power which they could develop, for *electric generators* the rated capacity in kilowatts, and for *electric motors* the rated horse-power. In addition, electric motors were divided as between motors driven by electricity generated in firms' own works and motors driven by purchased electricity. A further sub-division of motors in the former group, according to whether the electricity by which they were driven was generated in "the same works" or in "other works under the same ownership", was made for 1930 and is shown separately in the tables in this Chapter; this further sub-division was not made completely at the 1924 Census and the figures shown for that year under these headings should not be taken as being precisely comparable with those for 1930.

At the earlier Census firms were instructed, "in the case of turbo-generators, motor generators and like sets", to include the horse-power of the prime mover under either "Prime movers" or "Electric motors", as might be appropriate, and the capacity of the generator under "Electric generators": particulars of electric motors were to be given "exclusive of converters and transformers". At the 1930 Census the instructions given to firms stated (1) that motor generators, converters and transformers were not to be included either with electric generators or with electric motors and (2) that obsolete engines and engines of motor vehicles and locomotives were not to be included with prime movers. These differences of definition may possibly have had some slight effect on the comparability of the particulars obtained for individual trades but so far as the general results discussed below are concerned they may be ignored.

A further classification of all power equipment as between engines "ordinarily in use" and "in reserve or idle" was required for both years, the former class containing all engines which were in use during the greater part of the year of return, even if they were not working to their full capacity: engines which were not in use during the greater part of the year, or which were used only occasionally or during periods of breakdown of machinery ordinarily in use, were classified as "in reserve or idle". Owing to the definite instruction given in 1930 that obsolete engines were not to be included, and the absence of such instruction in 1924, the figures given for plant in reserve or idle in the two years may not be precisely comparable.

Total power equipment in 1930 and 1924

The following table summarises the total power equipment of all firms in the United Kingdom that employed more than ten persons on the average. The omission of the small firms does not lead to any serious defect in the figures since the use of power equipment is not general among such firms, a large proportion of which are known to have been classifiable as "workshops", i.e. establishments employing no mechanical power. Such information as is available indicates that the small firms in 1924 accounted for between 1 and 2 per cent. of the available total capacity of prime movers and of electric motors and less than 1 per cent. of that of electric generators. In the table the plant installed at Electricity Supply Undertakings is shown separately for each year since the capacity of prime movers installed in generating stations and used for producing current for industrial consumption is partly duplicated in the capacity of electric motors driven by purchased electricity as returned by other industries.

Power equipment	1930		1924	
	All trades except Electricity Supply Undertakings	Electricity Supply Undertakings	All trades except Electricity Supply Undertakings	Electricity Supply Undertakings
Prime movers :—	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.
Ordinarily in use...	8,919·4	8,651·5	9,306·2	4,378·0
In reserve or idle...	2,126·4	1,512·4	1,794·3	1,195·4
TOTAL—Prime movers ...	11,045·8	10,163·9	11,100·5	5,573·4
Electric generators:—	Th. Kw.	Th. Kw.	Th. Kw.	Th. Kw.
Ordinarily in use...	2,055·8	6,315·7	1,816·7	3,161·4
In reserve or idle...	883·5	1,117·8	712·5	856·7
TOTAL—Electric generators ...	2,939·3	7,433·5	2,529·2	4,018·1
Electric motors :—	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.
Ordinarily in use...	9,286·1	442·7	6,658·6	235·3
In reserve or idle...	1,309·2	81·6	1,062·8	40·0
TOTAL—Electric motors ...	10,595·3	524·3	7,721·4	275·3

The subdivision made in the above table is not on precisely comparable lines for 1930 and 1924 owing to certain railway companies making combined returns for their workshops and generating

stations in 1924 and separate returns in 1930; this lack of comparability should be borne in mind in connection with the comments that follow relating to the power equipment of industrial establishments not primarily employed in the generation of electricity. It will be observed from the particulars recorded for 1930 for these railway generating stations given below, which are included in the above figures under Electricity Supply Undertakings, that comparability of the figures for electric motors is essentially not affected.

Prime movers		Electric generators		Electric motors	
Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle
Th. H.P.	Th. H.P.	Th. Kw.	Th. Kw.	Th. H.P.	Th. H.P.
285.4*	28.0*	197.6	19.5	12.5	2.1

* Steam turbines—281.8 and 15.5.

The total available capacity of prime movers increased by 27.2 per cent. between 1924 and 1930, the increase in the plant ordinarily in use being rather greater, viz. 28.4 per cent. The increase was wholly in prime movers recorded as installed at Electricity Supply Undertakings, the capacity of such plant, and also of electric generators at these Undertakings ordinarily in use in 1930 being practically double that in 1924; of these increases rather more than 6 per cent. represented the equipment of the railway generating stations referred to above. Excluding Electricity Undertakings, the capacity of electric generators increased by 16.2 per cent. and that of electric motors by 37.2 per cent.; the respective increases for plant ordinarily in use were 13.2 per cent. and 39.5 per cent. Had the returns for 1924 been made on the same lines as for 1930, it is possible that the increases for electric generators in industrial undertakings would have been not less than 20 per cent. In 1930 the capacity of electric motors in use at establishments not primarily engaged in generating electricity just exceeded that of the prime movers at such establishments, whereas in 1924 their recorded capacity was 28.4 per cent. less than that of the prime movers.

Of the total power equipment installed the following proportions were recorded at the two Censuses as being in reserve or idle:—

	1930	1924
	Per cent.	Per cent.
Prime movers	17.2	17.9
Electric generators	19.3	24.0
Electric motors	12.5	13.8

Of the total available capacity of the three main categories of power plant, the proportion represented by Electricity Supply

Undertakings showed an increase in each case in 1930 as compared with 1924, as follows:—

	1930	1924
	Per cent.	Per cent.
Prime movers	47.9	33.4
Electric generators	71.7	61.4
Electric motors	4.7	3.4

✓ **Prime movers.**—The following table shows the capacity of the various types of prime movers recorded for 1930 and 1924:—

Prime movers	1930			1924		
	Ordinarily in use	In reserve or idle	Proportion in reserve or idle	Ordinarily in use	In reserve or idle	Proportion in reserve or idle
	Th. H.P.	Th. H.P.	Per cent.	Th. H.P.	Th. H.P.	Per cent.
Reciprocating steam engines } (a)	5,936.3	1,059.8	15.1	6,868.1	1,080.1	13.6
} (b)	94.1	116.4	55.3	279.4	223.2	44.4
Steam turbines ... } (a)	2,053.5	851.7	29.3	1,520.2	495.2	24.6
} (b)	8,294.2	1,351.4	14.0	4,019.7	957.2	19.2
Internal combustion engines:—						
Gas } (a)	490.4	140.0	22.2	644.2	180.9	21.9
} (b)	16.1	5.1	23.9	17.6	5.1	22.6
Petrol, kerosene or other light oils } (a)	82.8	17.4	17.4	58.5	9.7	14.2
} (b)	1.6	0.8	32.6	0.9	0.4	29.8
Heavy oils } (a)	246.9	44.9	15.4	83.2	19.2	18.7
} (b)	102.3	5.9	5.5	50.9	6.8	11.8
Water engines } (a)	104.6	12.2	10.4	107.2	4.3	3.9
} (b)	143.2	32.8	18.6	9.5	2.7	22.2
Other prime movers* (a)	4.9	0.4	7.5	24.8	4.9	16.5
TOTAL } (a)	8,919.4	2,126.4	19.3	9,306.2	1,794.3	16.2
} (b)	8,651.5	1,512.4	14.9	4,378.0	1,195.4	21.4
TOTAL—PRIME MOVERS	17,570.9	3,638.8	17.2	13,684.2	2,989.7	17.9

(a) All trades exclusive of Electricity Supply Undertakings.

(b) Electricity Supply Undertakings.

* Excluding locomotives, road rollers, dredgers, etc.

For industries other than the supply of electricity, the total available capacity of prime movers, as recorded, was 0.5 per cent. less in 1930 than in 1924, the decrease in the capacity that was recorded as being ordinarily in use being 4.2 per cent. The exclusion from the 1924 figures of those relating to the railway generating stations referred to above would lead to the conclusion that there was some increase in the total capacity of prime movers installed, but still a decrease in the capacity in use. The figures, while thus indicating a slight decline in the use of prime movers

for the direct supply of motive power to industry, do not by any means reflect the position with regard to the various types of engine included in this group for, though the proportion of steam engines and of internal combustion engines in the total varied but slightly between the two years, there were important variations within these two classes. There was a fall in the relative importance of reciprocating steam engines and a considerable increase in that of steam turbines, the changes in the capacity in use, as recorded, being a decrease of 13·6 per cent. for the former and an increase of 35·1 per cent. for the latter. In the case of internal combustion engines there was a decline in the relative importance of gas engines while that of both light and heavy oil engines increased. An increase of 196·8 per cent. (from 83,200 h.p. to 246,900 h.p.) in the capacity of heavy oil engines in use showed the marked development in the use of this type of prime mover in factories.

A consideration of all industries together (including Electricity Supply Undertakings) reveals some striking variations from the figures given in the preceding paragraph. The following table shows for each of the specified types of prime mover ordinarily in use, the proportionate increase or decrease in capacity in 1930 as compared with 1924, together with the proportion of the total capacity in each year that was represented by each kind of engine :—

Prime movers	Capacity ordinarily in use		
	Increase (+) or decrease (-) in 1930 as compared with 1924	Proportion of total capacity of prime movers	
		1930	1924
	Per cent.	Per cent.	Per cent.
Reciprocating steam engines ...	- 15·6	34·3	52·2
Steam turbines ...	+ 86·8	58·9	40·5
Internal combustion engines :—			
Gas ...	- 23·5	2·9	4·8
Petrol, kerosene or other light oils ...	+ 42·1	0·5	0·4
Heavy oils ...	+160·4	2·0	1·0
Water engines ...	+112·3	1·4	0·9
Other prime movers ...	- 80·2	—	0·2
All prime movers...	+ 28·4	100·0	100·0

The use of steam turbines as the principal source of power at electric generating stations and the rapid expansion that occurred in the production of electricity between 1924 and 1930 led to the displacement of reciprocating steam engines by steam turbines as the principal original source of power in industry. The increase in the recorded capacity of steam turbines in use in all industries was 86·8 per cent., the increase for Electricity Supply Undertakings

(excluding the railway generating stations mentioned above) alone being 99·3 per cent. For other trades (including these generating stations) it is calculated that steam turbines used for the production of electricity increased in capacity from 1,300,000 to 1,877,000 h.p., or by 44 per cent.; the increase in the capacity of other steam turbines was from 220,000 to 458,000 h.p., or over 100 per cent. This fact, taken in conjunction with the general decline in the use of reciprocating steam engines, furnishes evidence that, between 1924 and 1930, there was an appreciable displacement of reciprocating steam engines by steam turbines for direct power purposes.

Water engines, from being of negligible importance in 1924 as prime movers used in the Electricity Undertakings, became in 1930 the second most important source of power in these undertakings, and owing to this development the capacity of water engines used in all industry more than doubled between 1924 and 1930.

Electric generators.—In the following table is shown the capacity of electric generators in 1930 and 1924 classified according to the kind of prime mover by which they were driven :—

Electric generators	1930			1924		
	Ordinarily in use	In reserve or idle	Pro- portion in reserve or idle	Ordinarily in use	In reserve or idle	Pro- portion in reserve or idle
	Th. Kw.	Th. Kw.	Per cent.	Th. Kw.	Th. Kw.	Per cent.
Driven by :—						
Reciprocating steam engines	(a) 593·4	266·7	31·0	616·3	293·3	32·2
	(b) 66·7	79·1	54·3	191·3	150·8	44·1
Steam turbines	(a) 1,205·4	529·3	30·5	969·8	331·2	25·5
	(b) 6,067·0	1,007·9	14·2	2,917·7	695·9	19·3
Internal combustion engines :—						
Gas ...	(a) 132·0	56·7	30·0	152·8	74·1	32·7
	(b) 11·5	3·0	20·9	10·8	3·7	25·3
Petrol, kerosene or other light oils	(a) 4·6	3·5	43·2	3·9	2·7	40·9
	(b) 1·5	0·2	12·6	0·7	0·3	28·9
Heavy oils	(a) 77·9	20·8	21·1	30·8	11·0	26·3
	(b) 69·0	4·1	5·5	34·4	4·5	11·6
Water engines	(a) 42·4	6·5	13·3	43·1	0·2	0·5
	(b) 100·0	23·5	19·0	6·5	1·5	18·7
Other prime movers	(a) 0·1	—	—	—	—	—
TOTAL ...	(a) 2,055·8	883·5	30·1	1,816·7	712·5	28·2
	(b) 6,315·7	1,117·8	15·0	3,161·4	856·7	21·3
TOTAL — ELECTRIC GENERATORS ...	8,371·5	2,001·3	19·3	4,978·1	1,569·2	24·0

(a) All trades exclusive of Electricity Supply Undertakings.

(b) Electricity Supply Undertakings.

The above figures show that there was a substantial increase (16.2 per cent.) in the total generating capacity available in industrial establishments, apart from Electricity Supply Undertakings, in 1930 as compared with 1924, and that a greater proportion of generating plant was held in reserve in the later year, the increase in the amount in reserve being essentially in generators driven by steam turbines. As indicated in the section on prime movers, there was a notable growth in the capacity of generators driven by steam turbines and by heavy oil engines.

The changes which took place between 1924 and 1930 in the actual recorded capacity of generating plant in use and in the proportions driven by the various types of prime mover in the two years are shown below:—

Electric generators	Capacity ordinarily in use					
	Increase (+) or decrease (—) in 1930 as compared with 1924.		Proportion of total capacity of electric generators			
	All trades except Electricity Supply Undertakings	Electricity Supply Undertakings	All trades except Electricity Supply Undertakings		Electricity Supply Undertakings	
			1930	1924	1930	1924
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	
Driven by:—						
Reciprocating steam engines...	—3.7	—65.1	28.9	33.9	1.0	6.1
Steam turbines ...	+24.3	+107.9	58.6	53.4	96.1	92.3
Internal combustion engines:—						
Gas	—13.6	+6.1	6.4	8.4	0.2	0.3
Petrol, kerosene or other light oils	+17.9	+108.5	0.2	0.2	—	—
Heavy oils ...	+152.9	+100.4	3.8	1.7	1.1	1.1
Water engines ...	—1.6	+1,437.1	2.1	2.4	1.6	0.2
Other prime movers	—	—	—	—	—	—
All electric generators...	+13.2	+99.8	100.0	100.0	100.0	100.0

So far as industries other than Electricity Supply were concerned, there was little change in the proportions of generating plant driven by steam engines and by internal combustion engines, but the substitution of reciprocating steam engines by steam turbines in the former class and of gas engines by heavy oil engines in the latter is clearly shown. More than one-half of the generating plant recorded in 1924 was turbine driven and the increase in 1930 in the actual recorded capacity so driven was 24.3 per cent. The most

noteworthy development in these trades, as shown by the above figures, is that of the application of heavy oil engines to the generation of electricity. The capacity of generating plant driven by this type of engine was 152.9 per cent. greater in 1930 than in 1924, while the proportion of all generating plant so driven increased from 1.7 per cent. in 1924 to 3.8 per cent. in 1930.

Electric motors.—The following table shows the capacity of electric motors recorded for 1930 and 1924:—

Electric motors	1930			1924		
	Ordinarily in use	In reserve or idle	Proportion in reserve or idle	Ordinarily in use	In reserve or idle	Proportion in reserve or idle
	Th. H.P.	Th. H.P.	Per cent.	Th. H.P.	Th. H.P.	Per cent.
Driven by						
Electricity generated in same works ...	3,534.9	574.3	14.0	2,884.7	491.8	14.6
Electricity generated in other works under same ownership	621.7	81.2	11.6	244.2	25.4	9.4
Purchased electricity	5,572.2	735.3	11.7	3,765.0	585.6	13.5
TOTAL	9,728.8	1,390.8	12.5	6,893.9	1,102.8	13.8

The particulars shown for the three separate categories of motors do not afford a basis of precise comparison between the two years for the following reasons:—

(a) No uniform practice was followed by firms at the 1924 Census in the recording of motors driven by electricity generated in other works owned by the firm, some being shown separately, some being described as driven by purchased current and some by current generated in the same works.

(b) Railway companies that made combined returns for their workshops and generating stations in 1924 and separate returns in 1930, recorded their electric motors as being driven by current generated in the same works in the earlier year and by purchased current in the later year.

The table shows, however, that a marked development occurred between 1924 and 1930 in the use of electric motors as a source of industrial power, and that the increase applied to all three categories of motors shown. The increase in the total capacity of motors installed was 39.1 per cent., while the capacity of motors ordinarily in use increased by 41.1 per cent.

Neither in the Factory trades nor in the Non-Factory trades was the decrease in prime movers general: in the former, substantial increases were shown for the Chemicals group and the Paper, Printing and Stationery group, while small increases were recorded for the Food, Drink and Tobacco group and the Clay and Building Materials group; in the latter, a small increase took place in the Building and Contracting Trade.

The industries making the largest use of prime movers were, in each year, Mines and Quarries, the Textile Trades and the Iron and Steel Trades but the capacity in operation was in each case smaller in 1930 than in 1924. It may be noted that in each of these groups the prime movers were used mainly for direct application and not for the generation of electricity. These three groups accounted in 1930 for 70.8 per cent. of the capacity of prime movers in use in all trades (except Electricity Supply Undertakings) as compared with 71.7 per cent. in 1924.

The same three groups possessed in each year the largest electric generating capacity, their proportion of the total generating capacity in use being rather smaller in 1930 (57.8 per cent.) than in 1924 (59.7 per cent.). The increase in the total capacity of the generating plant in these three groups was 9.4 per cent., and in all other industries apart from Electricity Supply Undertakings, 18.7 per cent.

With regard to electric motors driven by purchased electricity, the chief user in each year was the Engineering, Shipbuilding and Vehicles group, followed by the Iron and Steel group. The Textiles and Mines and Quarries groups came next in order of importance, but whereas the latter was more important than the former in 1924, the positions were reversed in 1930.

The proportions of the capacity of prime movers, electric generators and electric motors in use* in the Factory trades and the Non-Factory trades in 1930 and 1924 are shown in the following table:—

Power equipment	Factory trades		Non-Factory trades	
	1930	1924	1930	1924
	Per cent.	Per cent.	Per cent.	Per cent.
Prime movers	61.5	60.1	38.5	39.9
Electric generators	67.0	57.1	33.0	42.9
Electric motors driven by—				
Electricity generated in firms' works	61.3	55.1	38.7	44.9
Purchased electricity	83.6	82.0	16.4	18.0

It will be seen from this table that the proportion of the chief classes of power plant in use in the Factory trades was greater in each case in 1930 than in 1924.

* See qualification on page 108.

The general trend of the various industrial groups towards an increased use of electricity, whether generated by firms' own generating plant or purchased, is illustrated in the following table which shows for each group the relative increase or decrease in the capacity of plant in use in 1930, the corresponding figure for 1924 being 100 in each case:—

Power index numbers (capacity in use) for 1930 (1924 = 100)

Trade group	Prime movers	Electric generators	Electric motors driven by	
			Electricity generated in firms' own works	Purchased electricity
Factory trades:—				
Iron and Steel	94	105	125	135
Engineering, Shipbuilding and Vehicles	85	102	112	143
Non-Ferrous Metals	80	83	97	150
Textiles	94	141	141	154
Leather	93	118	139	126
Clothing	77	104	103	135
Food, Drink and Tobacco ...	101	155	153	151
Chemicals, etc.	144	215	187	170
Paper, Printing and Stationery	146	249	297	165
Timber	93	193	235	175
Clay and Building Materials ...	101	129	135	256
Miscellaneous	84	90	124	178
All Factory trades ...	98	133	143	151
Non-Factory trades:—				
Building and Contracting ...	102	80	80	137
Mines and Quarries	95	98	120	119
Public Utility Services and Government Departments (excluding Electricity Supply Undertakings)	82	54	70	188
All Non-Factory trades (excluding Electricity Supply Undertakings)	92	87	111	135
All trades (excluding Electricity Supply Undertakings)	96	113	128	148
Electricity Supply Undertakings...	198	200	192	48

The use of electric motors driven by purchased electricity showed a substantial increase throughout all industries, Factory and Non-Factory alike, with the unimportant exception of Electricity Supply Undertakings. The increase in electric generating capacity in all

but two of the groups of Factory trades is, however, in marked contrast to the decline in generating capacity in the Non-Factory trades. The decline in respect of Public Utility Services and Government Departments is more apparent than real, since, omitting the non-comparable figures for railway companies, generating capacity in this group increased by 61 per cent. between 1924 and 1930.

Total power in use in 1930 and 1924

The table below shows, for the various industrial groups, the total power in use in the two years, divided as between power applied mechanically, i.e. directly from prime movers to looms, rolling mills and other industrial machinery, and power applied electrically, i.e. through electric motors. The former figure can only be estimated by deducting, from the total capacity of prime movers, the capacity of those that are required for driving electric generators which, in turn, supply current to electric motors. The calculation has been made on the basis that 1,000 horse-power of mechanical energy is equivalent to 746 kilowatts of electrical energy and that a transmission loss of 10 per cent. occurs between the prime mover and the generator, except in the case of steam turbines; these are usually bolted direct to the generators and the transmission loss is negligible. The power applied electrically represents the total capacity of all electric motors, whether driven by purchased electricity or by electricity generated in firm's own works. The capacity recorded as being "ordinarily in use" has been taken as the basis of the calculation in each case.

Electricity Supply Undertakings are excluded from the table since, as already stated, the power required for the generation of electricity for industrial uses is partially duplicated in the capacity of electric motors driven by purchased electricity.

Power in use in 1930 and 1924

Trade group	Power applied		Total power	Proportion of power applied electrically	
	mechanically	electrically			
	Th. H.P.	Th. H.P.	Th. H.P.	Per cent.	
Factory trades :—					
Iron and Steel ...	1930	1,205.8	1,469.3	2,675.1	54.9
	1924	1,316.0	1,127.9	2,443.9	46.2
Engineering, Shipbuilding and Vehicles ...	1930	82.4	1,784.7	1,867.1	95.6
	1924	137.4	1,307.9	1,445.3	90.5
Non-Ferrous Metals ...	1930	28.4	220.0	248.4	88.6
	1924	38.4	160.0	198.4	80.6
Textiles ...	1930	1,505.0	937.8	2,442.8	38.4
	1924	1,763.4	631.7	2,395.1	26.4
Leather... ..	1930	14.7	55.5	70.2	79.1
	1924	18.9	42.9	61.8	69.4

Trade group	Power applied		Total Power	Proportion of power applied electrically	
	mechanically	electrically			
	Th. H.P.	Th. H.P.	Th. H.P.	Per cent.	
Factory trades—cont.					
Clothing	1930	19.2	87.7	106.9	82.0
	1924	23.7	66.3	95.0	69.8
Food, Drink and Tobacco	1930	141.5	520.5	662.0	78.6
	1924	180.8	344.1	524.9	65.6
Chemicals, etc.	1930	127.2	398.7	525.9	75.8
	1924	131.5	225.1	356.6	63.1
Paper, Printing and Stationery	1930	128.3	575.8	704.1	81.8
	1924	152.1	267.3	419.4	63.7
Timber	1930	68.0	193.3	261.3	74.0
	1924	90.9	105.1	196.0	53.6
Clay and Building Materials	1930	161.9	358.0	519.9	68.9
	1924	181.8	183.2	365.0	50.2
Miscellaneous	1930	55.6	332.9	388.5	85.7
	1924	71.3	218.4	289.7	75.4
TOTAL—Factory trades {	1930	3,538.0	6,934.2	10,472.2	66.2
	1924	4,111.2	4,679.9	8,791.1	53.2
Non-Factory trades :—					
Building and Contracting	1930	76.6	111.3	187.9	59.2
	1924	73.5	83.3	156.8	53.1
Mines and Quarries	1930	1,945.3	1,807.7	3,753.0	48.2
	1924	2,070.0	1,507.7	3,577.0	42.1
Public Utility Services and Government Departments (excluding Electricity Supply Undertakings)	1930	476.6	432.9	909.5	47.6
	1924	490.0	388.4	878.4	44.2
TOTAL—Non-Factory trades (excluding Electricity Supply Undertakings) ... {	1930	2,498.5	2,351.9	4,850.4	48.5
	1924	2,633.5	1,978.7	4,612.2	42.9
ALL TRADES (excluding Electricity Supply Undertakings) ... {	1930	6,036.5	9,286.1	15,322.6	60.6
	1924	6,744.7	6,658.6	13,403.3	49.7

In considering the above table, it should be remembered that the horse-power of motors designed to be driven by electricity generated in the same works may be greater than that of the prime movers used to drive them, since machines required for special processes are frequently equipped with individual motors which will only be in use on those occasions when the need for these processes arises. Further, the capacity measurement which firms were instructed to state was the effective horse-power which their engines could develop and this measurement does not necessarily represent the capacity at which the engines were normally operated. For these

reasons, the figures given and the general deductions made from them should be treated with some reserve and should be taken as providing only rough indications of the actual amount of power employed and of the degree of electrification in any group.

In all the trade groups shown in the table both the total power in use in 1930 and the proportion that was electrically applied were greater than in 1924; in only one case, the Building and Contracting Trade, was the power applied mechanically greater in the later year than in the earlier. In the aggregate the power applied electrically in 1924 was about the same as that applied mechanically, but in 1930 the respective proportions were 60.6 and 39.4 per cent.

The groups which used the largest amount of power at both Censuses were, in order of importance, Mines and Quarries, the Iron and Steel Trades, the Textile Trades, and the Engineering, Shipbuilding and Vehicles Trades. In the first three groups mentioned and in Public Utility Services the power applied mechanically exceeded the power applied electrically in 1924, but in 1930 the Iron and Steel group used more electrical than mechanical power.

The highest degree of electrification was recorded in the Engineering, Shipbuilding and Vehicles group in each year, the proportion of the total power which was applied electrically being as high as 95.6 per cent in 1930, and the lowest in the Textile group, in which the proportion applied electrically rose from 26.4 per cent. in 1924 to 38.4 per cent. in 1930. The following table shows the relationship between the power applied mechanically and electrically in the Factory trades and the Non-Factory trades in 1924 and 1930:—

Group	1930			1924		
	Power applied mechanically	Power applied electrically	Total	Power applied mechanically	Power applied electrically	Total
Factory trades	23.1	45.2	68.3	30.7	34.9	65.6
Non-Factory trades	16.3	15.4	31.7	19.6	14.8	34.4
All trades	39.4	60.6	100.0	50.3	49.7	100.0

Power per operative employed

The following table shows, for each group of trades, the power in use per operative employed, based on the total horse-power in use as shown in the table on pages 120-1 and the average number of operatives employed in each group. The figures are subject to the qualifications mentioned on page 121, but serve as an approximate indication of the extent and progress of mechanisation in the chief

industrial groups in 1930 and 1924. The particulars shown do not form a basis for comparisons regarding the efficiency of the different groups of industries, since the conditions will clearly vary from group to group according to the manufacturing processes carried out. Electricity Supply Undertakings are omitted from the table.

Trade group	Power in use per operative employed		1930 as a percentage of 1924
	1930	1924	
Factory trades:—	H.P.	H.P.	Per cent.
Iron and Steel	5.99	5.36	112
Engineering, Shipbuilding and Vehicles... ..	2.04	1.70	120
Non-Ferrous Metals	2.63	1.97	134
Textiles	2.45	2.00	123
Leather	1.72	1.43	120
Clothing	0.24	0.22	109
Food, Drink and Tobacco	1.70	1.42	120
Chemicals, etc.	3.80	2.50	152
Paper, Printing and Stationery	2.20	1.45	152
Timber	1.75	1.59	110
Clay and Building Materials	2.52	1.89	133
Miscellaneous	2.62	1.98	132
All Factory trades	2.44	2.02	121
Non-Factory Trades:—			
Building and Contracting	0.45	0.40	113
Mines and Quarries	3.76	2.85	132
Public Utility Services and Government Departments (excluding Electricity Supply Undertakings)	1.40	1.38	101
All Non-Factory trades (excluding Electricity Supply Undertakings)	2.34	2.02	116
All Trades (excluding Electricity Supply Undertakings)	2.41	2.02	119

With the exception of Public Utility Services and Government Departments and the Clothing Trades all groups showed an increase in 1930 of 10 per cent. or more in the power in use per operative, the largest increase (52 per cent.) being in the Chemicals group and the Paper, Printing and Stationery group.

CHAPTER XI

CONSUMPTION OF COAL, COKE AND ELECTRICITY

The 1930 Census was the first occasion on which the compulsory powers of the Act of 1906 were applied to the obtaining of particulars of the quantities of coal and coke used in industry, but the obligation to furnish information was limited to power requirements, i.e., the quantities of coal and coke used for driving engines. At the same time, all undertakings* were asked to supply voluntarily particulars of the quantities used for *all* purposes.

A return of the quantity of electricity used for all purposes in the year was also required, current generated by firms' own plant being distinguished from current purchased from outside sources.

At the 1924 Census comprehensive information regarding consumption of fuel (coal, coke, heavy oils, petrol and light oils, and gas) and electricity was sought on a voluntary basis only, all firms being requested to give separate particulars of the amounts used for power and for other purposes.

The information supplied regarding coal and coke consumption is dealt with in the following section while that relating to electricity consumption is discussed later (see pages 129-36).

Coal and coke

Completeness of the survey.—At the 1924 Census the response to the request for voluntary information varied considerably from trade to trade; measured in terms of net output value, the firms and undertakings that furnished particulars covered 65·1 per cent. of all trades and services included in the Census. The total quantities of fuel actually recorded were as follows:—

1924	Coal	Coke
	Th. tons	Th. tons
Fuel used for:—		
Power	31,869·7	1,741·7
Other purposes, excluding railway locomotive fuel	50,961·4	12,900·2
Unclassified	9,297·3	702·8
TOTAL	92,128·4	15,344·7

So far as it is possible to estimate, the total shown above for coal covers about 80 per cent. of the total requirements of industry in 1924. This proportion is considerably in excess of that indicated by

* Local Authorities (except their gas and electricity undertakings), tramway and light railway companies and canal, dock and harbour companies were not included in this request, and only the quantities used for driving engines were recorded by these undertakings.

the proportion of net output value represented (65·1 per cent.), firstly, because large numbers of the smaller firms use little or no coal and, secondly, because the large consumers are usually able to give information more readily than small consumers.

As already explained, at the 1930 Census it was made compulsory for firms to state the quantity of coal and coke used by them for driving engines. While a number were unable to give this information separately and recorded only the quantity used for all purposes, the proportion that could give no information at all on this matter was negligible. The response to the request for additional particulars of fuel used for all purposes was much more complete than at the previous Census but this may be largely due to the fact that small firms were outside the scope of the later Census. Measured in terms of net output value the proportion covered by the firms that gave this voluntary information was 83·1 per cent. The total quantities of coal and coke recorded are shown below and it should be remembered that this information relates only to the larger firms and that both Northern Ireland and the Laundry, Dyeing and Cleaning industry are excluded.

1930	Coal	Coke
	Th. tons	Th. tons
Fuel used for:—		
Power	36,090·4	2,030·2
Other purposes, excluding railway locomotive fuel	49,238·2	12,310·1
Unclassified	1,522·9	616·4
TOTAL	86,851·5	14,956·7

The total of coal shown above covers nearly 88 per cent. of the estimated requirements of the undertakings covered by the 1930 Census. The proportion of unclassified coal in the recorded total fell from 10 per cent. in 1924 to less than 2 per cent. in 1930, but the proportion of unclassified coke was only slightly less in 1930 than in the earlier year.

Total consumption of coal and coke.—The table in Appendix V on pages 168-73 shows the estimated quantities of coal and coke used in Great Britain in 1930 and 1924 by firms that employed more than ten persons on the average, separate figures being given for those trades that consumed more than 200,000 tons of coal in 1930. Particulars for 1930 are also given showing the quantities used for driving engines and for other purposes.

In view of the large proportion of the power requirements covered by the returns made at the 1930 Census, the unclassified fuel has been apportioned to the two classes by estimating, on the basis of the capacity of steam engines in use, the amounts necessary to complete the power requirements of each trade and assigning such

balance of unclassified fuel as remained to "other purposes". On the basis of the proportion of the net output value of each trade covered by those firms that gave particulars of their total consumption of coal and coke, the aggregate quantities used in each trade for other purposes have then been estimated. An exception to this method of working has been made in the case of the Coke and By-Products and Manufactured Fuel Trades, where the record of coal used was unsatisfactory. For these trades the quantity of coal used for power has been roughly estimated while the quantity of coal used for other purposes has been taken from the Tenth Annual Report of the Secretary for Mines. Excluding the Coke and By-Products and Manufactured Fuel Trades, there were 79 out of the 119 industries covered by the Census in which the total net output of the trade represented in 1930 by those firms that gave separate particulars of their consumption for power and for other purposes was in excess of 90 per cent. This number would be raised to 85 if the method (described above) of apportioning the unclassified fuel be regarded as a reasonably accurate one. While it is true that the use of alternative forms of fuel (e.g., oil, gas, etc.) in those industries that require heat for process purposes would affect the accuracy of estimates based on net output, the large number of trades in which the sample obtained represented over 90 per cent. would appear to justify the assumption that any error in the total is probably small. The actual extent of the estimation involved in the 1930 figures of coal consumption, after making allowance for the Coke and By-Products and Manufactured Fuel Trades, is 2.8 per cent. in the case of coal for power purposes and 4.7 per cent. in the case of coal for other purposes. On the whole, therefore, it is believed that the 1930 figures represent a fairly close approximation to the facts.

So far as the 1924 figures are concerned, the much larger proportion of unclassified coal recorded for that year precludes any attempt at giving separate particulars of coal used for power and for other purposes, while the less adequate response to the request for information makes the estimation of total requirements more uncertain. It may be stated, however, that the response was generally greater in those trades that consumed large quantities of fuel than in the other trades and that the figures shown for those trades are probably more reliable than the others. As a basis of comparison of the aggregate requirements of industry in the two years, the use of the total figure of coal consumption in 1924 will probably not involve any serious degree of error, but no precision is claimed for the figures shown for individual trades.

The figures shown in the table for both years cover only firms in Great Britain that employed an average of more than ten persons, the 1924 figures having been roughly adjusted, on a basis of net output value, to conform to this more limited scope. The requirements of small firms are difficult to estimate and the only information available is that obtained at the 1924 Census. This is unsatisfactory by reason of the poor response received from large numbers of the smaller firms, especially in important fuel-using

trades, such as baking and blacksmithing. It appears from the data supplied, however, that the requirements of the small firms are unlikely to have exceeded 1,000,000 tons of coal. Laundries, which were outside the scope of the 1930 Census and are not included in the table, probably did not require more than 500,000 tons, while Local Authorities, Tramway and Light Railway Companies and Canal, Dock and Harbour Companies, from which information was received as to power requirements only in 1930, may be estimated to have used about 200,000 tons for other purposes in that year. Thus, to cover the whole range of industrial activity in Great Britain in 1930 and 1924, 1,700,000 tons and 1,500,000 tons respectively should be added to the totals shown in the table, making a total consumption of about 101 million tons in 1930 and 113 million tons in 1924, a decrease of between 10 and 11 per cent. Of the total decrease of 12 million tons, over 4 million tons was in respect of the Iron and Steel Trade (Blast Furnaces and Smelting, Rolling, etc.) and 3 million tons in respect of Coal Mines, the two industries which, apart from the coke-making industries, used the largest amounts of coal in 1924. Apart from these trades the decrease was fairly widespread, but there were some trades in which considerably greater quantities of coal were used, notably Electricity Undertakings and the Paper Trade. In general, the decrease may be attributed in large part to the increased use of electricity for power and process purposes and also to the increase in heavy oil engines (see pages 115 and 112).

As regards Northern Ireland, information comparable with that given in Appendix V is not available. The published Report on the Census of Production of Northern Ireland, 1930, shows a total quantity of 388,000 tons of coal and 24,000 tons of coke as having been consumed in 1930 for driving engines, while 242,000 tons of coal and 41,000 tons of coke were used by Gas Undertakings in the production of gas. No further particulars of fuel consumption for purposes other than power have been published.

Coal and coke used in various industries.—The table in Appendix V shows separate particulars for 1930 for each trade that consumed more than 200,000 tons of coal, while the remaining trades in each industrial group are in most cases taken together. The Coke and By-Products and Manufactured Fuel Trades and Gas Undertakings are shown separately at the foot of the table because, these trades being the main sources of metallurgical and gas coke used by other industries, there is duplication between the quantity of coal used for conversion to coke at coke ovens and gas works and the quantity of coke shown as used by other trades.

The figures for the two years show a fairly general decrease in consumption of coal and coke in 1930, though there are some prominent exceptions to this, e.g., the Cement Trade, the Chemicals, Dyestuffs and Drugs Trades, the Silk and Artificial Silk Trade, the Sugar and Glucose Trade, the Paper Trade, Electricity Undertakings, and Gas Undertakings.

The industries consuming the largest quantities of coal in 1930 were, in order of importance :—

	Th. tons
Coke ovens and manufactured fuel works	18,360·0
Gas works	17,851·3
Coal mines	14,204·2
Electricity undertakings	9,374·0
Blast furnaces and steel works	7,050·2
TOTAL	66,839·7

These industries together accounted for over 67 per cent. of the total quantity of coal used in 1930 by the firms covered by the Census. The figures issued by the Mines Department for the year 1930* are in substantial agreement with those quoted above, being as follows :—

	Mill. tons
Coke ovens (coal carbonised)	17·23
Manufactured fuel works (coal used for making briquettes, etc.)	1·05
Gas undertakings	18·35
Coal mines (engine fuel)	13·51
Electricity undertakings (including coke used)	9·68
Blast furnaces and steel works and other iron works†	18·79

While the Census figure shown for blast furnaces and steel works represents coal consumption only, the corresponding Mines Department figure includes the coal equivalent of coke used, thus largely duplicating that shown for coke ovens.

Considerable variations occur between one trade and another in the relationship of the coal and coke used for driving engines to the capacity of the engines so driven. Precise information on this point is not available since in some cases boilers may be fired by oil or gas and, in other cases, the fuel may be used in gas producer plant for the purpose of driving gas engines. The average for all industries covered by the Census was between 2 and 3 tons of coal per effective horse power of steam engines in use, but a consumption of as much as 5 tons per horse power was fairly common. The ascertained figures are, of course, largely affected by continuity of working, but as no information other than the distinction between plant "ordinarily in use" and plant "in reserve or idle" was obtained, no allowance can be made for this factor.

The total quantity of coke made in 1930 at coke ovens and gas works was 24,300,000 tons. Of this total 2,500,000 tons were exported, 4,500,000 tons were used at gas works and about 11,300,000 tons were used by other undertakings that made returns to the Census (see table on pages 168-73). There were thus about 6,000,000 tons available for use by small firms and by industries not covered by the Census (laundries, agriculture, horticulture, etc.) and as domestic fuel.

* See Tenth Annual Report of the Secretary for Mines for the year ended 31st December, 1930.

† i.e., works concerned in the manufacture of goods coming within the purview of the National Federation of Iron and Steel Manufacturers.

Electricity

As mentioned on page 124, all firms that made returns at the 1930 Census were required to state the total quantity of electricity used by them in the year for all purposes, distinguishing between current generated by their own plant and that purchased from outside sources. Many industrial undertakings maintain central power plant from which their various factories are supplied. In the tables which follow, current so supplied is described as being "generated in other works under the same ownership", the motors driven by this electricity also being distinguished separately under a similar description. No difficulty was experienced in obtaining returns of the quantity of electricity purchased and the record of such electricity is complete. In the case of current generated by firms' own plant, particulars of the quantities used were not always measured, but the unrecorded current was small in the aggregate. In the tables given throughout the reports on individual trades, separate estimates have been made to remedy this deficiency, the basis of the estimation being the capacity of generators in use.

As no particulars were required of the purposes for which the electricity was utilised, it is not possible to say what proportions of the amounts recorded were used for lighting and heating, for power, or for process purposes.

Total consumption of electricity.—The table in Appendix VI shows the total quantity of electricity consumed in 1930 by firms that employed more than ten persons on the average, distinguishing between that generated by firms' own plant and that purchased from outside sources. The total amounted to 11,693·5 million units (54·2 per cent.) were generated by the industrial concerns themselves and 5,355·7 million units (45·8 per cent.) were purchased.

The Factory trades accounted for about two-thirds of the total quantity of electricity used in the year and the Non-Factory trades for about one-third. The following statement shows the proportions used by the chief consuming trades :—

Factory trades :—	Per cent.
Blast Furnaces and Iron and Steel Smelting and Rolling	7·8
Paper	6·2
Chemicals, Dyestuffs and Drugs	5·3
Mechanical Engineering	4·3
Cotton	4·2
Cement	3·4
Aluminium, Lead, Tin, etc. (Smelting and Rolling)	3·3
Other Factory trades	31·8
Non-Factory trades :—	
Coal Mines	22·9
Electricity Undertakings	6·3
Other Non-Factory trades	4·5
TOTAL	100·0

The general statement that the various industries relied on electricity purchased from outside sources to a greater extent than on current generated by their own plant is subject to certain exceptions, of which the Iron and Steel Trade, the Sugar and Glucose Trade, the Paper Trade, Coal Mines, and the Coke and By-Products and Manufactured Fuel Trades are the most notable.

The returns received from Electricity Undertakings at the 1930 Census showed that 5,298 million units* were sold for power and manufacturing purposes, while in the report of the Electricity Commission for the year ended March, 1931, the total sales for these purposes were stated as 5,371 million units. Bearing in mind the qualifications governing the three sets of figures, these quantities are in close agreement with the total of 5,356 million units recorded as purchased by industrial undertakings in the year.

Electricity generated in industry.—As stated in the preceding section, 54.2 per cent. of the total quantity of electricity used by industrial concerns in 1930 was generated by their own plant. Excluding Electricity Undertakings from the calculation, this proportion is reduced to 51.3 per cent.

The table on pages 132-3 shows, for certain important consuming industries and for all industries together (except Electricity Undertakings), particulars of the quantities of electricity generated and used in firms' own works (exclusive of transmission losses), the capacity of dynamos ordinarily in use during the year in those works, and the average number of Board of Trade units (kilowatt-hours) used per kilowatt of generating capacity. The latter figure represents the average number of hours' running at the full rated capacity of the generators in the respective industries and should not be regarded as reflecting the efficiency of any one trade in relation to another. It will be observed that the average output per kilowatt is highest for those trades in which considerable quantities of electricity are used for process work e.g. the Glass Trade, the Cement Trade, the Chemicals, Dyestuffs and Drugs Trades, the Petroleum Refining Trade, the Aluminium, Lead, Tin, etc. (Smelting, Rolling, etc.) Trade, the Sugar and Glucose Trade, the Paper Trade, etc. The number of units generated per kilowatt, as shown in column (5) represents a minimum figure, since the electricity shown in column (3) has not been included in calculating the average figure except in the case of the final figure covering all trades. In the majority of trades the electricity generated "in other works owned by the firm" doubtless formed part of the output of the generating plant shown in column (4) for the same trades, but in the cases of chief importance, viz., Blast Furnaces and Iron and Steel Smelting and Rolling works, Coke and By-Products and Manufactured Fuel, and Coal Mines, this assumption is not justified. Composite undertakings including

* See Report on Electricity Undertakings: Part IV, page 490.

works engaged in two or more of these industries were frequently supplied with power from a central power-house, the generating plant installed being in most cases assigned by the firms making the returns to the trade which appeared most suitable, with the result that, for example, the current shown for the coke-making industry in column (3) may, in large part, have been generated by plant shown for the coal mining industry in column (4).

Though the aggregate of current generated and used "in own works" and "in other works owned by the firm" covers the major part of the total output of industrial generating plant, it does not take into account current sold to other consumers. Firms that supplied electricity for consumption outside the works in which the generating plant was situated were required to show such current as part of the output of the works, but were not asked to distinguish transfers to their other factories separately from sales to outside concerns. The amounts recorded in respect of these sales and transfers were as follows:—

	Mill. units	£'000
Electricity sold to other factories maintained by the firm or to outside consumers	746.5	1,513
	(not stated)	81
Total value		1,594

The industries (apart from Electricity Undertakings) in which the largest quantities were recorded as sold are those mentioned above, the quantities sold being as follows:—

	Million units
Blast furnaces and steel works	391.7
Collieries	294.2
Coke ovens	17.8

Taking these quantities into account, the average number of units generated in these industries would be raised to about 3,800 units per kilowatt for blast furnaces and steel works, 3,500 units for collieries and 3,000 units for coke ovens.

The total quantity of electricity supplied by industrial firms for outside consumption may be estimated as 775-780 million B.T. units, and of this total the table below shows that 766.5 million B.T. units, or over 98 per cent., were recorded as supplied for use "in other works owned by the firm."

The total quantity of electricity recorded as generated and used industrially in Great Britain by the firms covered by the Census of 1930 was 5,624.7 million units, of which the quantity generated by the Factory trades was between 3,065.4 and 3,831.9 million (55.68 per cent.) and that generated by the Non-Factory trades was between 2,559.3 and 1,792.8 million (45.32 per cent.). If allowance be made for the firms that were excluded from the scope of the Census, and also for sales to other consumers, the total

quantity of current generated in industry in 1930 appears to have been rather more than half the quantity generated by undertakings operating for public supply.

Electricity generated and used in firms' works in 1930

Trade (1)	Quantity of electricity generated		Capacity of electric generating plant ordinarily in use (4) Th. Kw.	Number of units generated per kilowatt of generators in use (5) B.T.U. per Kw.
	In same works (2) Million B.T.U. (Kw.-hrs.)	In other works owned by the firm (3)* Million B.T.U. (Kw.-hrs.)		
Factory trades :				
Iron and Steel :—				
Iron and Steel (Blast Furnaces and Smelting and Rolling)	510.3	122.6	237.8	2,146
Iron and Steel Foundries	12.7	23.7	11.1	1,151
Tinplate	22.1	9.9	14.2	1,553
Other Iron and Steel trades	28.4	5.3	19.5	1,453
Engineering, Shipbuilding and Vehicles :—				
Mechanical Engineering... ..	125.5	5.1	91.9	1,366
Electrical Engineering	28.2	0.9	13.1	2,145
Shipbuilding	16.6	4.3	10.7	1,554
Motor and Cycle	30.1	—	18.8	1,602
Other Vehicle trades	20.3	0.4	10.0	2,022
Non-Ferrous Metals :—				
Aluminium, Lead, Tin, etc. (Smelting, Rolling, etc.)	165.5	0.4	28.5	5,789
Other Non-Ferrous Metals trades	19.4	†	10.3	1,879
Textiles :—				
Cotton	149.0	1.0	123.4	1,207
Woollen and Worsted	101.2	—	82.9	1,221
Silk and Artificial Silk	66.6	0.5	24.5	2,715
Textile Finishing	78.2	1.4	58.1	1,346
Other Textile trades	25.0	0.2	21.3	1,178
Leather trades	15.6	0.4	9.7	1,607
Clothing trades	8.9	0.4	7.8	1,136
Food, Drink and Tobacco :—				
Grain Milling	23.5	0.1	11.5	2,054
Sugar and Glucose	118.5	—	37.1	3,196
Other Food, Drink and Tobacco trades	62.3	0.2	34.2	1,819
Chemicals :—				
Chemicals, Dyestuffs and Drugs	359.9	20.9	95.3	3,778
Soap, Candle and Perfumery	21.5	—	15.4	1,397
Seed Crushing	21.6	3.6	7.4	2,928
Petroleum Refining	42.5	†	12.0	3,532
Other Chemical trades	25.8	12.2	14.8	1,738

Trade (1)	Quantity of electricity generated		Capacity of electric generating plant ordinarily in use (4) Th. Kw.	Number of units generated per kilowatt of generators in use (5) B.T.U. per Kw.
	In same works (2) Million B.T.U. (Kw.-hrs.)	In other works owned by the firm (3)* Million B.T.U. (Kw.-hrs.)		
Factory trades—cont.				
Paper, Printing and Stationery :—				
Paper	620.2	4.0	161.3	3,845
Other Paper, Printing and Stationery trades	12.2	1.0	10.8	1,135
Timber trades	23.5	0.5	21.5	1,098
Clay and Building Materials :—				
Brick and Fireclay	24.9	13.1	12.9	1,921
Glass	67.9	—	14.7	4,631
Cement	114.9	1.1	37.3	3,079
Other Clay and Building Materials trades	7.0	4.6	6.2	1,138
Miscellaneous :—				
Rubber	23.7	†	12.8	1,860
Coke and By-Products and Manufactured Fuel	27.7	75.4	14.9	1,867
Linoleum and Oilcloth	23.6	—	13.3	1,778
Other trades in the Miscellaneous group	20.6	—	12.4	1,655
TOTAL—Factory trades...	3,065.4	313.2	1,339.4	2,289
Non-Factory trades :				
Building and Contracting... ..	1.8	0.2	2.2	843
Mines and Quarries :—				
Coal Mines	1,592.5	444.1	535.2	2,975
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines	45.3	6.6	18.0	2,514
Other Mines and Quarries	24.3	2.4	13.1	1,864
Public Utility Services and Government Departments (excluding Electricity Supply Undertakings) :—				
Gas Undertakings	48.2	—	28.8	1,675
Admiralty	47.4	—	45.0	1,052
Other Public Utility Services and Government Departments	33.3	—	34.7	962
TOTAL—Non-Factory trades	1,792.8	453.3	677.0	2,644
TOTAL—ALL TRADES	4,858.2	766.5	2,016.4	2,789

* So far as recorded separately.

† Less than 50,000 units.

APPENDIX I

List of industries covered by the Census of Production (1930)

FACTORY TRADES

IRON AND STEEL TRADES :

Iron and Steel (Blast Furnaces)
 Iron and Steel (Smelting and Rolling)
 Iron and Steel Foundries
 Tinplate
 Hardware, Hollow-ware, Metallic Furniture and Sheet Metal
 Chain, Nail, Screw and Miscellaneous Forgings
 Wrought Iron and Steel Tubes
 Wire
 Tool and Implement
 Cutlery
 Needle, Pin, Fish-hook and Metal Smallwares
 Small Arms

ENGINEERING, SHIPBUILDING AND VEHICLES TRADES :

Mechanical Engineering
 Electrical Engineering
 Shipbuilding
 Motor and Cycle
 Aircraft
 Railway Carriage and Wagon
 Carriage, Cart and Wagon

NON-FERROUS METAL TRADES :

Copper and Brass (Smelting, Rolling, etc.)
 Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)
 Gold and Silver Refining
 Finished Brass
 Plate and Jewellery
 Watch and Clock

TEXTILE TRADES :

Cotton (Spinning)
 Cotton (Weaving)
 Woollen and Worsted
 Silk and Artificial Silk
 Linen and Hemp
 Jute
 Hosiery

TEXTILE TRADES—continued

Textile Finishing
 Lace
 Rope, Twine and Net
 Canvas Goods and Sack
 Asbestos Goods and Engine and Boiler Packing
 Flock and Rag
 Elastic Webbing
 Coir Fibre, Horse-hair and Feather
 Roofing Felts
 Packing

LEATHER TRADES :

Fellmongery
 Leather (Tanning and Dressing)
 Saddlery, Harness and Leather Goods

CLOTHING TRADES :

Tailoring, Dressmaking, Millinery, etc.
 Boot and Shoe
 Hat and Cap
 Glove
 Fur
 Umbrella and Walking Stick

FOOD, DRINK AND TOBACCO TRADES :

Grain Milling
 Bread, Cakes, etc.
 Biscuits
 Cocoa and Sugar Confectionery
 Preserved Foods
 Bacon Curing and Sausage
 Butter, Cheese, Condensed Milk and Margarine
 Sugar and Glucose
 Fish Curing
 Cattle, Dog and Poultry Foods
 Ice
 Brewing and Malting
 Spirit Distilling
 Spirit Rectifying, Compounding and Methylating
 Aerated Waters, Cider, Vinegar and British Wines
 Wholesale Bottling
 Tobacco

CHEMICALS, ETC. TRADES :

Chemicals, Dyestuffs and Drugs
 Fertiliser, Disinfectant, Glue, etc.
 Soap, Candle and Perfumery

CHEMICALS, ETC. TRADES—*continued*

/ Paint, Colour and Varnish
 / Seed Crushing
 / Oil and Tallow
 / Petroleum Refining
 / Explosives and Fireworks
 / Starch and Polishes
 / Match
 / Ink, Gum and Sealing Wax

PAPER, PRINTING AND STATIONERY TRADES :

Paper
 Wallpaper
 Printing, Bookbinding, Stereotyping, Engraving, etc.
 Printing and Publication of Newspapers and Periodicals
 Manufactured Stationery
 Cardboard Box
 Pens, Pencils and Artists' Materials

TIMBER TRADES :

Timber (Sawmilling, etc.)
 Furniture and Upholstery
 Cane and Wicker Furniture and Basketware
 Wooden Crates, Cases, Boxes and Trunks
 Coopering

CLAY AND BUILDING MATERIALS TRADES :

/ Brick and Fireclay
 / China and Earthenware
 / Glass
 / Cement
 / Building Materials

MISCELLANEOUS TRADES :

Rubber
 Scientific Instruments, Appliances and Apparatus
 Musical Instruments
 / Coke and By-Products and Manufactured Fuel
 Fancy Articles
 Linoleum and Oilcloth
 Brush
 Sports Requisites
 Games and Toys
 Manufactured Abrasives
 Incandescent Mantles
 Cinematograph Film Printing

NON-FACTORY TRADES

BUILDING AND CONTRACTING TRADE

MINES AND QUARRIES :

/ Coal Mines
 / Non-Metalliferous (except Slate) Mines and Quarries, including
 Oil Shale Mines
 / Metalliferous Mines and Quarries
 / Slate Mines and Quarries
 / Salt Mines, Brine Pits and Salt Works

PUBLIC UTILITY SERVICES AND GOVERNMENT DEPARTMENTS :

Local Authorities
 Gas Undertakings
 Electricity Undertakings
 Water Undertakings
 Railway Companies
 Tramway and Light Railway Companies
 Canal, Dock and Harbour Companies
 Government Departments

Trade	Gross output			1930 as a percentage of 1924
	1930	1924		
	As returned (1)	As returned (2)	At 1930 average values (3)	(4)
	£'000	£'000	£'000	Per cent.
PUBLIC UTILITY SERVICES				
Local Authorities††	66,354	57,372	52,970	125
Gas Undertakings	64,237	63,737	58,460	110
Electricity Undertakings 	57,697	38,646	30,780	187
Water Undertakings	23,000	19,177	21,230	108
Railway Companies	63,704	71,414	64,800	98
Tramway and Light Railway Com- panies	1,369	1,629	1,600	86
Canal, Dock and Harbour Com- panies*	928	847	800	116
GOVERNMENT DEPARTMENTS				
Admiralty	12,489	13,577	13,120	95
General Post Office... ..	11,858	11,177	10,330	115
War Office	3,320	4,104	3,720	89
Air Ministry... ..	515	290	240	§§
H.M. Stationery Office	526	472	450	117
H.M. Office of Works	375	310	290	§§
Ordnance Survey Department	120	139	130	90

* Great Britain.

† The trades included are those in the trade group which are indicated by an asterisk.

‡ Exclusive of subsidy on home-grown sugar (£6,022,000) and duplicated output of unrefined sugar.

§ Including particulars of the Manufactured Stationery Trade in Northern Ireland.

|| Includes the Wooden Crates, Cases, etc., and the Coopering Trades for Northern Ireland.

¶ Includes the Cane and Wicker Furniture and Basketware Trade for Northern Ireland.

** Includes Matches, Ice, Umbrella and Walking Stick, Scientific Instruments and Musical Instruments.

†† Including particulars of all mining and quarrying industries in Northern Ireland.

‡‡ Including Canal, Dock, Harbour, etc. Companies for Northern Ireland.

||| Exclusive of bulk supplies of electricity sold to authorised distributors.

§§ These figures would have no significance owing to differences in the scope of the figures for the two years. These differences are explained in the individual reports concerned.

APPENDIX III

Regional distribution of Industry in 1930 and 1924

The eleven industrial areas distinguished are constituted as follows:

- (1) GREATER LONDON, comprising—
London Administrative County (including the City of London).
Maldon, Chelmsford, Ongar, Epping and other parts of South Essex.
Middlesex Administrative County.
Surrey Administrative County.
Gravesend, Sevenoaks and other parts of West Kent.
Barnet and other parts of South Hertfordshire.
- (2) LANCASHIRE, WITH NORTH CHESHIRE AND THE GLOSSOP AND NEW MILLS DISTRICT OF DERBYSHIRE, comprising—
Lancashire Administrative County.
Birkenhead, Chester, Northwich, Macclesfield and other parts of North Cheshire.
Glossop, New Mills and other parts of North Derbyshire.
- (3) WEST RIDING OF YORKSHIRE, WITH THE CITY OF YORK, comprising—
The West Riding (except Goole and Saddleworth).
Whitby, Kirkby Moorside, Thirsk and other southern parts of the North Riding.
- (4) NORTHUMBERLAND, DURHAM, AND THE CLEVELAND DISTRICT OF YORKSHIRE, comprising—
Northumberland Administrative County.
Durham Administrative County.
Guisborough, Stokesley, Northallerton, Richmond, Reeth and other northern parts of the North Riding of Yorkshire.
- (5) WARWICKSHIRE, WORCESTERSHIRE AND STAFFORDSHIRE.
- (6) THE REST OF ENGLAND (EXCEPT MONMOUTHSHIRE).
- (7) GLAMORGANSHIRE, MONMOUTHSHIRE AND CARMARTHENSHIRE.
- (8) THE REST OF WALES.
- (9) LANARKSHIRE, RENFREWSHIRE AND DUM-BARTONSHIRE.
- (10) THE REST OF SCOTLAND.
- (11) NORTHERN IRELAND.

GLAMORGANSHIRE, MONMOUTHSHIRE AND CARMARTHENSHIRE
(AREA 7)

Trade	Number of returns	Gross output	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	No.	£
Factory trades :—					
Tinplate	{ 1930 59 1924 69	{ 14,288 19,776	{ 4,604 5,468	{ 22,856 24,484	{ 201 223
Blast Furnaces and the Smelting of Iron and Steel and Non-Ferrous Metals	{ 1930 53 1924 66	{ 20,711 37,125	{ 5,333 8,439	{ 22,791 31,060	{ 234 272
Other Factory trades ...	{ 1930 577 1924 677	{ 27,300 38,582	{ 10,477 12,425	{ 39,388 44,872	{ 266 277
TOTAL—Factory trades	{ 1930 689 1924 812	{ 62,299 95,483	{ 20,414 26,332	{ 85,035 100,416	{ 240 262
Non-Factory trades :—					
Coal Mines	{ 1930 272 1924 265	{ 34,325 51,373	{ 28,094 41,872	{ 172,026 241,532	{ 163 173
Local Authorities ...	{ 1930 57 1924 64	{ 2,314 2,026	{ 1,328 1,039	{ 8,535 6,478	{ 156 160
Building and Contracting	{ 1930 137 1924 250	{ 1,959 3,015	{ 967 1,569	{ 5,314 8,465	{ 182 185
Other Non-Factory trades	{ 1930 137 1924 162	{ 7,156 8,108	{ 4,821 5,148	{ 20,611 23,501	{ 234 219
TOTAL—Non-Factory trades	{ 1930 603 1924 741	{ 45,754 64,522	{ 35,210 49,628	{ 206,486 279,976	{ 171 177
TOTAL—ALL TRADES	{ 1930 1,292 1924 1,553	{ 108,053 160,005	{ 55,624 75,960	{ 291,521 380,392	{ 191 200

THE REST OF WALES (AREA 8)

Trade	Number of returns	Gross output	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	No.	£
Factory trades	{ 1930 178 1924 234	{ 6,267 14,894	{ 2,967 6,359	{ 12,982 22,573	{ 229 282
Non-Factory trades :—					
Coal Mines	{ 1930 25 1924 33	{ 2,313 4,178	{ 1,923 3,406	{ 14,778 24,450	{ 130 39
Slate Mines and Quarries	{ 1930 38 1924 42	{ 1,546 1,987	{ 1,450 1,852	{ 8,677 8,938	{ 167 202
Other Non-Factory trades	{ 1930 226 1924 296	{ 4,645 4,396	{ 2,878 2,774	{ 16,125 15,504	{ 178 179
TOTAL—Non-Factory trades	{ 1930 289 1924 371	{ 8,504 10,561	{ 6,251 8,032	{ 39,580 48,892	{ 158 164
TOTAL—ALL TRADES	{ 1930 467 1924 605	{ 14,771 25,455	{ 9,218 14,391	{ 52,562 71,465	{ 175 201

Estimated consumption of coal and

Trade	Capacity of steam engines in use	1930			
		Fuel used for power		Fuel used for other purposes	
		Coal	Coke	Coal	Coke
Th. H.P.	Th. tons	Th. tons	Th. tons	Th. tons	
Public Utility Services and Government Departments :—					
Local Authorities ...	97.3	205.5	11.1	†	†
Water Undertakings ...	98.1	501.9	18.5	23.1	7.3
Electricity Undertakings	8,307.6	9,194.3	254.9	179.7	13.7
Railway Companies ...	73.3	208.5	3.9	323.8	111.3
Government Departments	110.8	162.1	2.6	109.1	28.0
Other Public Utility Services (excluding Gas Undertakings) ...	13.1	21.2	0.9	†	†
Total (excluding Coke and By-Products and Manufactured Fuel and Gas Undertakings) ...	16,049.0	36,968.1	1,039.4	26,026.6	10,128.1
Coke and By-Products and Manufactured Fuel ...	38.9	80.0	—	18,280.0	162.4
Gas Undertakings ...	103.1	83.4	1,009.2	17,767.9	3,483.0
TOTAL—ALL TRADES ...	16,191.0	37,131.5	2,048.6	62,074.5	13,773.5

† Not ascertained.

coke in Great Britain in 1930 and 1924—cont.

		1924		Trade
Total		Total		
Coal	Coke	Coal	Coke	
Th. tons	Th. tons	Th. tons	Th. tons	
205.5	11.1	500	86	Public Utility Services and Government Departments :—
525.0	25.8	570	33	Local Authorities.
9,374.0	268.6	8,529.†	247.†	Water Undertakings.
532.3	115.2			Electricity Undertakings.
271.2	30.6	395	36	Railway Companies.
				Government Departments.
21.2	0.9	17	5	Other Public Utility Services (excluding Gas Undertakings).
				Total (excluding Coke and By-Products and Manufactured Fuel and Gas Undertakings).
62,994.7	11,167.5	74,257	13,321	
18,360.0	162.4	19,697	123	Coke and By-Products and Manufactured Fuel.
17,851.3	4,492.2	17,506	4,410	Gas Undertakings.
99,206.0	15,822.1	111,460	17,854	TOTAL—ALL TRADES.

† Owing to the fact that in 1924 certain railway companies included particulars of their generating stations in their returns on the schedule for Railway Companies, comparable figures cannot be given separately for that year.

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