

## THE TEXTILE TRADES.

### GENERAL REPORT.

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## GENERAL REPORT.

## Introductory.

The present volume deals with the trades engaged in the preparing, spinning, weaving, bleaching, dyeing, printing and finishing of cotton, wool, jute, flax, hemp, silk and artificial silk, coconut fibre, horse-hair and other textile materials, the manufacture of lace, hosiery; elastic webbing, cordage and nets, the packing of textile goods, and the preparation of flocks and rags. The largest member of the group is the cotton industry (cotton spinning and weaving) which accounted in 1924 for 528,312 persons employed, or 42 per cent. of the group total of 1,256,175 persons. The next largest is the wool textile industry, with 276,465 persons employed, or 22 per cent. of the group total. As the Textile Finishing Trades, most of whose work is done on cotton and wool textiles, employed 115,406 persons (9 per cent. of the group total), and the Hosiery Trades, also concerned mainly with the same two textile materials, employed 97,468 (nearly 8 per cent.), it is clear that cotton and wool are of outstanding importance in comparison with the other textile materials. The Linen Trade of Northern Ireland employed 74,758 persons, and the Linen and Hemp Trades of Great Britain 26,838, equivalent together to about 8 per cent. of the group total. The other major trades in the group, and their corresponding percentages were: Silk and Artificial Silk, about 3 per cent.; Jute, about 2½ per cent.; and Lace, about 1½ per cent.

Each of the separate trades included in the group forms the subject of a separate Report, in which the detailed results of the 1924 Census of Production are set out, and such comparisons as are possible with the results of the Censuses for 1912 and 1907 are made. The object of the present General Report is to bring together the principal results for the whole group of trades, and in addition to set out certain particulars (e.g., as to fuel consumption) which are more conveniently dealt with here than in the separate Trade Reports.

*Principal results for 1924.*

The number of separate Returns received from firms engaged in the Textile Trades in 1924 was 9,368. About 1,000 firms to which schedules were sent did not furnish Returns, but these firms, for the most part, had very small establishments, and they included a number which ceased operations in the course of the censal year. On the basis of the information available, it is estimated that they did not employ more than 6,600 persons and that their net output probably lay between £750,000 and £1,000,000. Whether reckoned on the basis of employees or of net output, the omission due to this cause represents only about one-half of 1 per cent. of the total figures for the group, and the lack of Returns from the firms in question does not materially affect any use made of the figures in this General Report.

The main particulars obtained for 1924 are set out in the following table:—

*Textile Output in 1924.*

Trade.	Gross output (selling value of goods made and value of work done). (1)	Cost of materials used and amount paid to other firms for work given out. (2)	Net output (excess of col. (1) over col. (2)). (3)	Persons employed (except outworkers). (4)	Net output per person employed, as shown in col. (4). (5)
Cotton:—	£'000.	£'000.	£'000.	Number.	£
Spinning .. .. .	195,348	148,417	46,931	252,797	186
Weaving .. .. .	172,197	135,472	36,725	275,515	133
Woolen and Worsted ..	196,771	143,226	53,545	276,465	194
Silk and Artificial Silk ..	20,366	10,183	10,183	40,126	254
Linen (Northern Ireland) ..	28,435	19,494	8,941	74,758	120
Linen and Hemp (Great Britain) .. .. .	9,728	6,200	3,528	26,838	131
Jute .. .. .	14,206	9,816	4,390	34,402	128
Hosiery .. .. .	43,062	27,641	15,421	97,468	158
Textile Finishing .. .. .	43,670	15,066	28,604	115,406	248
Lace .. .. .	9,790	6,669	3,121	19,017	164
Rope, Twine and Net .. .. .	8,556	5,864	2,692	16,712	161
Elastic Webbing .. .. .	1,926	1,067	859	5,535	155
Coconut Fibre, Ramie Fibre, Horsehair and Feather ..	2,328	1,414	914	4,768	192
Flock and Rag .. .. .	7,646	6,025	1,621	7,820	207
Packing .. .. .	3,279	1,518	1,761	8,548	206
<b>TOTAL FOR UNITED KINGDOM:—</b>	<b>757,308</b>	<b>538,072</b>	<b>219,236</b>	<b>1,256,175</b>	<b>175</b>
England and Wales .. .. .	666,415	481,529	184,886	1,034,531	179
Scotland .. .. .	58,708	35,276	23,432	135,614	173
Northern Ireland .. .. .	32,185	21,267	10,918	86,030	127

*Comparability of results for 1924 with those for 1912 and 1907.*

The scope of the Census was not quite the same in the three censal years, but it will be seen from the following particulars that the comparability of the totals for the textile group of trades is not materially affected by the changes:—

(1) The Censuses of 1907 and 1924 extended to all firms, however small, but in 1912 firms employing not more than five persons (excluding proprietors) were merely required to state the average number of persons employed by them in the year. According to the information so furnished, the average number of persons employed in the textile establishments thus excluded was 7,391, or a little more than one-half of 1 per cent. of the total number of persons employed by the remaining firms in 1912.

(2) The Censuses of 1907 and 1912 covered the whole of Great Britain and Ireland, but that of 1924 applied only to Great Britain and Northern Ireland. According to the Census of Production carried out by the Government of the Irish Free State in respect of the year 1926, the Textile Trades carried on

in that country employed nearly 5,000 persons (apart from about 700 outworkers), that is to say, less than one-half of 1 per cent. of the number employed in 1924 by the Textile Trades of the United Kingdom.

(3) The trades of velvet cutting and flax scutching which were included in the Census of 1907 were excluded in 1912 and 1924; in 1907 these trades employed 7,305 persons, and recorded a net output of £186,000. The Packing Trade, which packs textile goods for export, was included in the Census of Production for the first time in 1924; the numbers returned as employed in that trade totalled 8,548, and the total net output amounted to £1,761,000.

The comparability of some of the results of the three Censuses is affected by certain changes which were made in 1924 in the method of taking the Census in some of the textile trades. These changes are explained in the Reports on the trades concerned. The principal example is the separation of the spinning and weaving sections of the Cotton Trades, so that firms engaged in both spinning and weaving were required in 1924 to furnish separate Returns for those two departments of their business instead of furnishing, as in 1912 and 1907, a combined Return covering the two sections taken together. Further, firms in the Hosiery Trade who were engaged in spinning yarns were required in 1924, but not in the two earlier years, to furnish separate Returns (covering output, employment and power equipment) in respect of the yarns of different materials which they spun.\*

In any comparisons of figures representing money values, the changes in the general level of prices which occurred in the period covered by the three Censuses should be kept in mind.

#### Production.

It is difficult to find a satisfactory basis on which to compare production in the several trades in the same year, or in any trade or trades in different years. Obviously, no comparisons between trades could be based on the aggregate quantities of goods produced owing to their varied character, even if the necessary information were available for this purpose. The gross output values recorded in the Census of Production, whether for different trades in the same year or for the same trade in different years, are affected in varying degrees by the repeated record of goods or processes which they involve, and hence they do not form a practicable basis for comparisons. Some of the difficulties can be avoided by basing comparisons on net output, which, being arrived at by deducting, from the value of the gross output, the total cost of materials used and the amount paid to other firms for work given out to them, represents completely and without duplication the value added to the materials in the course of manufacture. The net output thus constitutes for

\* See also pp. 74, 139, 255 and 265.

any industry the fund from which wages, salaries, rent, royalties, rates, taxes, advertisement and sales expenses, and all other similar charges have to be provided, as well as depreciation and profits; and if the net output for any trade is divided by the number of persons employed by firms in that trade, the resulting figure of net output per head furnishes a basis of comparison between the positions of different trades in the same year (or the same trade in different years) which takes account of differences in the numbers of persons employed. The use of net output per head as a basis of comparison was discussed at length in the Final Report on the first Census of Production (1907), where it was pointed out that "as the net output is the fund out of which all charges on industry, except the cost of materials as delivered at the works, are met, it will naturally vary with the amount of those charges" (page 12 of Cd. 6320). The conclusion reached was that "the average net output per head gives a somewhat fictitious representation of the condition of a trade" and that it constitutes only a rough measure on which to base comparisons (pages 14, 15). Hence, while it remains true that the net output for a trade represents a fact, i.e., the value added to materials by capital and labour, and constitutes the best available basis for the comparisons in view, the qualifications to which its use for this purpose is subject must be kept in mind throughout this section of the Report.

*Net output per head in 1924, 1912, and 1907.*—The following table shows for each of the trades included in the textile group the net output per head of persons employed as ascertained at the Censuses of 1924, 1912 and 1907.

*Net output per head of persons employed (excluding outworkers).\**

Trade.	1924.	1912.	1907.
Cotton :—	£	£	£
Spinning .. .. .	186	81	79
Weaving .. .. .	133	81	70
Woolen and Worsted .. .. .	194	72	55
Silk and Artificial Silk .. .. .	254	54	60
Linen (Northern Ireland) .. .. .	120	71	62
Linen and Hemp (Great Britain) .. .. .	131	68	61
Jute .. .. .	128	109	101
Hosiery .. .. .	158	93	98
Textile Finishing .. .. .	248	81	75
Lace .. .. .	164	72	68
Rope, Twine and Net .. .. .	161	78	68
Elastic Webbing .. .. .	155	71	52
Coconut Fibre, Ramie Fibre, Horsehair and Feather .. .. .	192	..	..
Flock and Rag .. .. .	207	..	..
Packing .. .. .	206	..	..
TOTAL .. .. .	175	81	76

\* It has been ascertained from the Census records that the effect on the net output per head of excluding (a) from the 1907 results, particulars relating to small firms such as were exempted from making Returns in 1912, and (b) from the 1912 results, particulars of production, etc., in Southern Ireland, would be negligible.

A distinct increase in the net output per head occurred between 1907 and 1912 in all but two of the trades distinguished, the average of £81 for the whole of the textile trades in 1912 being about 6·6 per cent. above the average of £76 for 1907. In 1924 the average was £175 and the increase over 1907 exceeded 130 per cent.

The division of this increase between that part of it which is associated with changes, between 1907 and 1924, in money values of products and of materials, and that part which may be due to other causes, such as changes in the grades of goods made, improved organisation, increased use of mechanical power, etc., would require information not available from the Census records, and so far as relevant information is otherwise available it cannot readily be correlated with the particulars recorded in the Returns.

The increase, between 1907 and 1924, in the value of net output per head of persons employed proceeded at very different rates in different trades. At the upper end of the scale (omitting the relatively unimportant Coconut Fibre, etc., Flock and Rag, and Packing Trades) are the Silk and Artificial Silk Trades and the Textile Finishing Trades. The number of persons employed in the Silk and Artificial Silk Trades increased by one-fourth and the net output per head from £55 (28 per cent. below the average for the group) to £254 (45 per cent. above the group average), a result of the great growth of the artificial silk industry and the popularity of its products. The numbers employed in the Textile Finishing Trades increased by 11 per cent., and the net output per head, which in 1907 was 33 per cent. above the average, was in 1924 nearly 42 per cent. above the average, having grown from £101 to £248. Although at a lower level than the two preceding trades, the net output per head in the Wool Textile Industry (where the number of persons employed increased by nearly 5 per cent.) was £194 in 1924, or nearly 11 per cent. above the average, while in 1907 it had been about 8 per cent. below the average. In 1907 the net output per head in the Hosiery Trades (£61) was about 20 per cent. below the textile average; but in 1924 the net output per head, at £158, was only 10 per cent. below the average for the group. The increase in the number of persons employed was 90 per cent.

Contrasted with these trades are the Cotton Trades and the Jute, Linen and Hemp Trades, where the numbers of persons employed fell by 8 per cent. and 12 per cent., respectively, between 1907 and 1924. In the Cotton Trades as a whole, where the net output per head (£79) was 4 per cent. above the average in 1907, the net output per head was £158 (in Spinning £186 and in Weaving £133) in 1924, or about 10 per cent. below the average for the whole group, the net output per head for spinning being 6 per cent. above the average, and that for weaving 24 per cent. below the average. The industry was working much below capacity in 1924, as is indicated by the fall in the net imports of its principal raw material which

were 1,442 million lb. in 1924 as compared with 2,057 million lb. in 1907 and 2,482 million lb. in 1912. In the Jute, Linen and Hemp Trades of the United Kingdom as a whole the net output per head in 1924 was only £123—lower than that of any other trade in the textile group—and was 30 per cent. below the group average as compared with £61 or 20 per cent. below in 1907.

### Employment.

#### Employment in 1924.

*Classification of persons employed in a specified week.*—The following table classifies by sex, age and character of employment the numbers of persons (excluding outworkers) who were recorded as employed in the various textile trades in the week ended 18th October, 1924 :—

#### Number of persons employed (excluding outworkers) in the week ended 18th October, 1924.

Trade.	Operative staff.				Administrative, technical and clerical staff.			
	Males.		Females.		Males.		Females.	
	Under 18.	Total.	Under 18.	Total.	Under 18.	Total.	Under 18.	Total.
Cotton :—		In thou	sands.		No.	No.	No.	No.
Spinning ..	18·8	100·9	31·9	148·8	514	6,468	121	943
Weaving ..	9·2	85·3	24·2	184·8	551	7,052	214	1,267
Woollen and Worsted ..	15·5	106·9	30·4	155·9	720	11,732	410	2,950
Silk and Artificial Silk ..	1·4	13·2	7·8	26·7	118	1,944	80	706
Linen (Northern Ireland)..	3·5	17·9	11·1	55·5	177	2,326	81	847
Linen and Hemp (Great Britain)..	1·0	6·1	4·9	19·2	89	1,125	39	370
Jute ..	2·5	10·8	3·8	22·9	106	715	21	162
Hosiery ..	2·2	15·6	18·7	76·1	517	4,802	465	2,574
Textile Finishing..	8·8	83·0	4·8	22·6	643	8,532	425	2,273
Lace ..	0·5	5·9	2·3	10·7	77	1,734	92	681
Rope, Twine and Net ..	1·5	5·5	2·4	9·5	78	1,026	63	411
Elastic Webbing ..	0·3	1·6	1·0	3·6	13	298	14	146
Coconut Fibre, Ramie Fibre, Horse-hair and Feather ..	0·3	2·0	0·5	2·3	38	302	36	133
Flock and Rag ..	0·2	2·5	0·5	4·5	36	779	20	180
Packing ..	0·4	5·3	0·5	2·4	57	686	27	199
TOTAL ..	66·1	462·5	144·8	745·5	3,734	49,521	2,108	13,842

*Monthly fluctuations in employment.*—In order to ascertain what fluctuation in employment there might be in the course of the censal year, firms were also required to state the average numbers of the operative staff employed in one week in each month. The figures for each trade are shown in the respective Reports, but the following table gives the monthly aggregates for all the textile trades together :—

*Operative staff (excluding outworkers) in textile trades in 1924.*

Week ending	Males.	Females.	Total.
12th January .. .. .	451,790	715,443	1,167,233
16th February .. .. .	453,150	719,620	1,172,770
15th March .. .. .	454,583	724,419	1,179,002
12th April .. .. .	457,638	730,927	1,188,565
17th May .. .. .	459,590	737,558	1,197,148
21st June .. .. .	456,613	733,024	1,189,637
19th July .. .. .	457,204	731,906	1,189,110
16th August .. .. .	456,962	732,135	1,189,097
13th September .. .. .	463,213	741,448	1,204,661
18th October .. .. .	462,502	745,499	1,208,001
15th November .. .. .	463,958	749,038	1,212,996
13th December .. .. .	464,507	751,015	1,215,522
AVERAGE FOR THE 12 MONTHS..	458,476	734,336	1,192,812

The variations in different trades offset each other to some extent, but it would appear that employment as a whole improved as the year went on. The final figure for the year is 1.9 per cent. above the average of the 12 monthly figures, the initial figure 2.1 per cent. below that average. The rate of increase was notably more rapid between March and May than that representing the year's average movement; and between May and August the aggregate numbers employed decreased. During the year the female operatives increased by nearly 5 per cent. and the male operatives by less than 3 per cent. The average numbers were divided between males and females in the proportion of 385 to 615.

*Employment in 1924, 1912 and 1907.*

The following table shows the average numbers of male and female operatives (wage earners), and administrative, technical and clerical staff (salaried persons), in each of the textile trades in the three censal years. The table does not include outworkers. The average numbers shown in this table and the table on page 10 have been determined in the manner explained in Note (20) on page xi.

*Average numbers (excluding outworkers) employed in 1924, 1912 and 1907 in the several textile trades.*

Trade.	Operatives (wage earners).		Administrative, technical and clerical staff (salaried persons).		Total.	
	Male.	Female.	Male.	Female.		
Cotton .. .. .	1924	184,094	328,488	13,520	2,210	528,312
	1912	229,528	377,703	13,759	526	621,516
	1907	207,968	351,605	12,012	477	572,062
Woollen and Worsted	1924	107,214	154,569	11,732	2,950	276,465
	1912	114,097	159,486	9,723	565	283,871
	1907	105,161	149,217	9,175	468	264,021
Silk and Artificial Silk	1924	12,314	25,162	1,944	706	40,126
	1912	10,282	22,761	1,538	227	34,808
	1907	8,805	21,905	1,265	223	32,198
Linen (Ireland)*	1924	17,682	53,903	2,326	847	74,758
	1912	23,703	53,364	1,758	273	79,098
	1907	22,496	48,448	1,366	139	72,449
Linen and Hemp (Great Britain) .. .. .	1924	6,178	19,165	1,125	370	26,838
Jute .. .. .	1924	10,756	22,769	715	162	34,402
Jute, Hemp and Linen (Great Britain) ..	1912	23,350	53,755	2,043	148	79,296
	1907	23,678	56,178	2,007	184	82,047
	1924	15,288	74,804	4,802	2,574	97,468
Hosiery .. .. .	1912	12,854	46,843	3,154	698	63,549
	1907	10,417	37,270	2,600	926	51,213
	1924	82,222	22,379	8,532	2,273	115,406
Textile Finishing ..	1912	86,695	20,239	7,449	426	114,809
	1907	79,128	18,460	5,987	238	103,813
	1924	5,917	10,685	1,734	681	19,017
Lace .. .. .	1912	14,040	18,689	2,742	443	35,914
	1907	13,909	19,874	2,472	585	36,840
	1924	5,501	9,774	1,026	411	16,712
Rope, Twine and Net..	1912	6,592	8,669	952	190	16,403
	1907	6,171	7,152	791	145	14,259
	1924	1,592	3,499	298	146	5,535
Elastic Webbing ..	1912	1,668	4,259	239	54	6,220
	1907	1,351	2,572	212	35	4,170
	1924	2,007	2,326	302	133	4,768
Coconut Fibre, etc. ..	1912	2,732	3,909	386	41	7,068
	1907	2,572	3,349	327	34	6,282
	1924	2,409	4,452	779	180	7,820
Flock and Rag ..	1912	1,162	3,908	480	62	5,612
	1907	1,298	4,554	472	61	6,385
	1924	5,302	2,361	686	199	8,548
Packing .. .. .	1924	458,476	734,336	49,521	13,842	
	1912	526,703	773,585	44,223	3,653	
	1907	482,954	720,584	38,686	3,515	
TOTALS .. .. .	1924	1,192,812		63,363		1,256,175
	1912	1,300,288		47,876		1,348,164
	1907	1,203,538		42,201		1,245,739

\* In 1924, Northern Ireland only.

*Classification of average numbers employed.*—The following table shows the distribution, according to sex, age and character of employment, of the average numbers of persons (excluding outworkers) employed in the textile group of trades in 1924, 1912, and 1907 :—

*Average numbers (excluding outworkers) employed in all textile trades in the three censal years.*

Sex and age.	1924.		1912.		1907.	
	Operative staff.	Total staff.	Wage earners.	Total staff.	Wage earners.	Total staff.
<i>Males :—</i>						
Under 18—						
Half-timers	65,505	69,239	15,425	15,425	15,775	15,775
Full-timers			94,257	97,874	86,965	90,705
Over 18 ..	392,971	438,758	417,021	457,627	380,214	415,160
TOTAL ..	458,476	507,997	526,703	570,926	482,954	521,640
<i>Females :—</i>						
Under 18—						
Half-timers	142,718	144,826	17,785	17,785	17,624	17,624
Full-timers			181,287	181,991	157,850	158,547
Over 18 ..	591,618	603,352	574,513	577,462	545,110	547,928
TOTAL ..	734,336	748,178	773,585	777,238	720,584	724,099
<i>Males and females :—</i>						
Under 18—						
Half-timers	208,223	214,065	33,210	33,210	33,399	33,399
Full-timers			275,544	279,865	244,815	249,252
Over 18 ..	984,589	1,042,110	991,534	1,035,089	925,324	963,088
TOTAL ..	1,192,812	1,256,175	1,300,288	1,348,164	1,203,538	1,245,739

*Outworkers.*—In addition to the persons employed in or about textile factories and workshops, employment was also given to outworkers who worked in their own homes on materials given out by manufacturing firms. There were recorded as employed an average of 11,491 outworkers in 1924, 18,801 in 1912 and 14,148 in 1907 ; of these, 92·7 per cent. in 1924, 90·9 per cent. in 1912 and 91·8 per cent. in 1907 were females. These figures do not include such of the members of their families as may have assisted the registered outworkers in executing the work given out to them. The trades which recorded the largest numbers of outworkers were the Irish Linen,\* the Lace, and the Hosiery Trades, the totals being :—Irish Linen, 4,771 in 1924, 4,283 in 1912 and 1,912 in 1907 ; Lace, 1,650 in 1924, 4,098 in 1912 and 5,171 in 1907 ;

\* The number recorded for 1924 in the Irish Linen Trade is increased relatively to those for 1912 and 1907 owing to the fact that the bulk of the output of shirts and other articles of clothing in Northern Ireland was returned in 1924 on the schedules for the Linen Trade instead of, as in 1912 and 1907, on those for the Clothing Trades.

Hosiery, 3,076 in 1924, 6,537 in 1912 and 5,803 in 1907. The instructions as to the persons to be described as outworkers appear to have been interpreted differently, in some cases at least, at the three Censuses, for in the Jute, Hemp and Linen Trades of Great Britain only 7 persons were so recorded in 1907 compared with 653 in 1912 and 509 in 1924. Any error involved is not of importance, the total recorded outworkers representing only about 1·2 per cent. of the total operative staff of the textile trades in 1907, about 1·4 per cent. in 1912, and about 1·0 per cent. in 1924.

*Sex and age distribution of operatives.\**—The textile trades, with the exception of the Packing Trade and the Textile Finishing Trades (where the percentage of males in the operative staff was 78·0 in 1924), are dominated by female labour. About 61·6 per cent. of the operatives in all textile trades in 1924, and 65·7 per cent. in textile trades other than the two mentioned above, consisted of females, as compared with 60·0 and 63·6 per cent. respectively in 1907. Between 1907 and 1912 male operatives increased more rapidly than females, the rates of growth being 9·2 and 7·4 per cent. respectively, as compared with an increase of 8·2 per cent. in the total number of operatives, male and female together. Between 1912 and 1924, however, the number of male operatives declined by 11·7 per cent., while the number of females decreased by only 4 per cent., the total number of operatives of both sexes decreasing by 7·1 per cent. Over the whole period between 1907 and 1924 the total operative staff increased by 5,974 persons, or just over 0·5 per cent., while male operatives decreased by 16,590 persons, or about 3·5 per cent., and female operatives increased by 22,564 persons, or about 3·2 per cent.

In the second place, a marked change took place between 1924 and the pre-war censal years in the age grouping of operatives. The half-timers, numbering about 33,000 both in 1907 and 1912, disappeared ; and the number of full-timers under 18, which increased from 244,800 to 275,500 between 1907 and 1912, fell to 208,200 in 1924. Comparing 1924 with 1907, there was a reduction equivalent to about 53,300 full-timers in the number of young persons, and an increase of 59,300 (12,800 males and 46,500 females) in the number of adult operatives. The decrease in the number of young persons was much more marked in the case of males, who declined by the equivalent of about 29,300 full-timers, than in that of females, who declined by the equivalent of about 24,000. Male operatives under the age of 18 formed 8 per cent. of the total operative staff in 1907 and 7·9 per cent. in 1912, but only 5·5 per cent. in 1924. The corresponding percentages for female operatives under 18 are 14·0 in 1907, 14·8 in 1912 and 12·0 in 1924.

\* In this and the following section, two half-timers are taken as equivalent to one full-timer in calculating the numbers of operatives in 1907 and 1912.

From the foregoing it would appear that in 1924 there had either been a relative increase in the kinds of work ordinarily done by women as compared with those ordinarily done by men, or that there had been some substitution of females for males on the same kinds of work. The expansion of the Hosiery Trades, in which the proportion of females was notably greater than in any other textile trade, is a large factor in these changes. The almost complete disappearance of the half-time system and the raising of the school-leaving age from 12 to 14, both of which changes occurred between 1912 and 1924, contributed to some replacement of juvenile labour by adult labour, chiefly female.

*Changes in numbers of operatives in individual trades.*—If, after adjusting for half-timers, comparisons be made between the numbers of operatives (excluding outworkers) employed in 1924 and 1907 in the several textile trades, it will be found that the following show a decline in employment:—

*Operative staff (wage earners).*

Trade.	1924.			1924 as percentage of 1907.		
	Males.	Females.	Total.	Males.	Females.	Total.
	In thousands.			Per cent.		
Cotton .. .. .	184.1	328.5	512.6	90.4	94.8	93.2
Jute, Hemp and Linen (Great Britain) .. .	17.0	41.9	58.9	72.8	75.5	74.7
Lace .. .. .	5.9	10.7	16.6	42.6	53.8	49.2
Coconut Fibre, etc. .. .	2.0	2.3	4.3	78.1	69.5	73.2
TOTAL .. .. .	209.0	383.4	592.4	85.9	90.1	88.6

The aggregate reduction in those four trades amounted to 76,300 persons (34,400 males and 41,900 females). In the eight following trades there was an aggregate increase of 74,500 persons (12,400 males and 62,100 females):—

*Operative staff (wage earners).*

Trade.	1924.			1924 as percentage of 1907.		
	Males.	Females.	Total.	Males.	Females.	Total.
	In thousands.			Per cent.		
Woolen and Worsted .. .	107.2	154.6	261.8	103.9	105.0	104.6
Silk and Artificial Silk .. .	12.3	25.2	37.5	142.3	116.1	123.6
Linen (Northern Ireland) .. .	17.7	53.9	71.6	80.5	113.0	102.7
Hosiery .. .. .	15.3	74.8	90.1	146.8	200.8	189.1
Textile Finishing .. .. .	82.2	22.4	104.6	104.4	122.1	107.8
Rope, Twine and Net .. .. .	5.5	9.7	15.2	89.1	136.7	114.7
Elastic Webbing .. .. .	1.6	3.5	5.1	118.3	136.1	129.9
Flock and Rag .. .. .	2.4	4.4	6.8	185.6	97.8	117.1
TOTAL .. .. .	244.2	348.5	592.7	105.4	121.7	114.4

*Administrative, technical and clerical staff.*—The increase of the administrative, technical and clerical staff (described in 1907 and 1912 as *salaried persons*) both absolutely and relatively to the operative staff (*wage-earners*) is remarkable. In 1907 this staff, in the textile trades as a whole, numbered 42,201 persons or about 3.4 per cent. of the total number of persons employed (adjustment being made for half-time operatives); in 1912 it had increased by a little over 13.4 per cent. to 47,876 persons, or about 3.6 per cent. of the total numbers employed; in 1924 the numbers were 63,363, or over 5 per cent. of the total numbers employed and an increase of 32.3 per cent. on the numbers recorded for 1912. Males increased by 14.3 per cent. between 1907 and 1912, and by nearly 12 per cent. between 1912 and 1924; the increase was almost entirely among adults, who were over 31 per cent. more in numbers in 1924 than in 1907. Between 1907 and 1912 the number of females increased by only a little over 3.9 per cent., but between 1912 and 1924 the number of young persons trebled and the number of adults all but quadrupled. The increase in males would appear to signify an increase in management and sales staff, more especially as the increase was in adults. The growth of the female staff, on the other hand, probably relates largely to increase of clerical staff, with more keeping of records and more detailed accounting.

This category of workpeople differs markedly from that of the operatives in that (1) it consists mainly of males, though between 1912 and 1924 a great increase in the proportion of females took place; and (2) the proportion of young persons is considerably lower. Both in 1907 and 1912 males represented about 92 per cent. of the total number of persons in the category. In 1924, while males increased to 49,521 from 44,223 in 1912, females increased to 13,842 from 3,653 in the earlier year, and the proportion of males in the total fell to 78 per cent.

Young persons under 18 years of age (all full timers) represented 10.5 per cent. (males 8.9 and females 1.6) of this category of workers in 1907 and 9.0 per cent. (males 7.6 and females 1.4) in 1912. In 1924 the proportion of young persons to the total was 9.2 per cent., made up of 5.9 per cent. males and 3.3 per cent. females.

The only trade in the textile group in which the number of administrative, technical and clerical staff in 1924 was less than the number of salaried persons in the pre-war years was the Lace Trade, where the total for 1924 was 21 per cent. below the number in 1907; in the same period the number of operatives in the trade fell by 51 per cent. In all the other trades in the group the numbers of administrative, technical and clerical staff in 1924 were greater than the numbers of salaried persons in 1907, even in those cases where the numbers of operatives declined; and they increased at a greater rate than the operatives in those trades where the latter showed an increase.

The following table shows the proportions of the administrative, technical and clerical staff in 1924, and of the salaried staff in 1907, to the total staff in those years in the larger textile trades :—

Trade.	Proportion of total staff represented by	
	Administrative, technical and clerical in 1924.	Salaried persons in 1907.
Cotton .. .. .	3·0	2·2
Woollen and Worsted .. .. .	5·3	3·7
Silk and Artificial Silk .. .. .	6·6	4·7
Linen (Northern Ireland) .. .. .	4·2	2·1
Jute, Hemp and Linen (Great Britain) .. .. .	3·9	2·7
Hosiery .. .. .	7·6	6·9
Textile Finishing .. .. .	9·4	6·0
Lace .. .. .	12·7	8·3

### Wages in 1924.

The following table summarises the information contained in the Reports on the separate trades as to the amount of wages paid by firms in those trades in 1924. The particulars of wages shown in column (5) of the table are those ascertained by the Ministry of Labour as a result of the voluntary inquiry undertaken by that Department into wages and hours of labour in the United Kingdom in 1924. The numbers of operatives shown in column (1) are those returned to the Census of Production as employed by the firms concerned in the week ended 18th October, 1924. The proportion of each trade represented by the firms that furnished particulars of their wage-bills is shown in columns (2) and (4) on the bases of numbers of operatives employed and of net output, respectively.

Trade.	Firms furnishing returns of wages.					
	Operatives employed.		Net output.		Wages paid.	
	Number.	Proportion of trade total.	Amount.	Proportion of trade total.	Amount.	Proportion of net output.
	(1)	(2)	(3)	(4)	(5)	(6)
		Per cent.	£'000.	Per cent.	£'000.	Per cent.
Cotton .. .. .	366,513	70·5	60,894	72·8	33,168	54·5
Woollen and Worsted .. .. .	207,048	78·8	41,769	78·0	20,943	50·1
Silk and Artificial Silk .. .. .	27,505	69·0	8,084	79·4	2,538	31·4
Jute, Hemp and Linen .. .. .	101,178	76·4	13,155	78·0	7,337	55·8
Hosiery .. .. .	55,960	61·0	9,267	60·1	4,882	52·7
Textile Finishing .. .. .	65,473	62·0	18,053	63·1	8,416	46·6
Lace .. .. .	8,854	53·3	1,610	51·6	796	49·4
Rope, Twine and Net .. .. .	10,898	72·8	1,946	72·3	824	42·3
Elastic Webbing .. .. .	3,634	69·2	598	69·6	323	54·0
Coconut Fibre, etc. .. .. .	2,416	56·1	545	59·6	195	35·8
Flock and Rag .. .. .	3,787	53·9	948	58·5	349	36·8
Packing .. .. .	4,960	65·1	1,252	71·1	616	49·2
<b>TOTAL .. .. .</b>	<b>858,226</b>	<b>71·0</b>	<b>158,121</b>	<b>72·1</b>	<b>80,387</b>	<b>50·8</b>

It will be observed that, in the majority of the trades included in the table, the wages returns covered a larger proportion of the total net output of the trade than of the total number of operatives employed. These differences may be associated with the fact that, as a rule, the response to voluntary inquiries is more general among the larger and more highly organised establishments, and the value of the net output per operative in these establishments is frequently somewhat above the average for the trade as a whole.

In only a few trades do the particulars as to wages constitute a large enough sample to justify any attempt to estimate the wage-bill of the whole of the trade concerned. The estimates made in such cases will be found in the Reports on the trades in question.

While the incompleteness of the data precludes any useful comparisons between the various trades as to the importance of wages as an element in net output, it may be noted that in seven out of the twelve trades shown in the table the percentage of net output represented by the wage-bills of the firms who furnished particulars ranged between 45 and 55, and that in the six major textile trades the range was from 46·6 to 55·8 per cent., except in the case of silk and artificial silk, which had the low percentage of 31·4.

### Mechanical Power.

The power equipment of factories consists in the first instance of the prime movers installed in the works, part being used to apply power mechanically and part to actuate generators for the production of electrical energy. Only a part of that electrical energy is used for power, i.e., to drive electric motors, part being used for other purposes, such as lighting. In addition, many factories derive part or all of their power from electricity purchased to drive electric motors, and a few firms rent their power together with their premises.

*Power equipment of the various trades in 1924, 1912 and 1907.*—The particulars furnished at the three Censuses regarding prime movers, electric generators and electric motors in factories in the textile trades are shown in the following table. Particulars as to electric motors were not obtained in 1907. In connection with the omission of the Irish Free State from the 1924 Census (see page 3), it may be mentioned that, according to the Census of Production conducted by the Free State Government in respect of the year 1926, the total capacity of prime movers in textile factories in that year was under 7,000 horse-power, which is less than one third of 1 per cent. of the total recorded for the United Kingdom in 1924; and the capacity of motors driven by purchased electricity was under 50 horse-power. It follows that the absence of the Irish Free State from the 1924 Census does not appreciably affect the comparability of the general results for that year with those for 1912 and 1907.



## Power equipment of the several textile trades.

Trade.	Prime movers.			Electric generators.		
	1924.	1912.	1907.	1924.	1912.	1907.
	Thousand	H.P.		Thousand	Kw.	
Cotton .. .. .	1,419.6	1,403.0	1,239.2	98.9	64.5	32.1
Woollen and Worsted .. .. .	450.0	363.2	325.2	73.6	34.5	19.1
Silk and Artificial Silk .. .. .	37.0	23.6	18.9	17.0	4.0	1.7
Linen (Northern Ireland) .. .. .	71.7	72.9	65.4	15.4	8.9	4.7
Linen and Hemp (Great Britain) .. .. .	33.0	101.8	102.7	3.7	13.0	6.1
Jute .. .. .	52.5					
Hosiery .. .. .	16.0	10.6	7.8	3.7	1.5	0.8
Textile Finishing .. .. .	221.7	203.1	190.3	56.1	43.2	15.0
Lace .. .. .	10.8	13.0	10.3	3.0	4.9	2.0
Rope, Twine and Net .. .. .	21.5	18.7	15.3	3.4	0.7	0.6
Elastic Webbing .. .. .	1.1	1.8	1.5	0.3	0.4	0.2
Coconut Fibre, etc. .. .. .	2.8	2.5	2.0	0.7	0.4	—
Flock and Rag .. .. .	8.6	3.8	2.6	0.7	—	—
Packing* .. .. .	0.4	(not ascertained)	(not ascertained)	0.1	(not ascert'd.)	(not ascert'd.)
TOTAL .. .. .	2,346.7	2,218.0	1,981.2	285.4	176.0	82.3

Trade.	Electric motors driven by electricity generated in same works.		Electric motors driven by purchased electricity.		All electric motors.	
	1924.	1912.	1924.	1912.	1924.	1912.
	Thousand	H.P.	Thousand	H.P.	Thousand	H.P.
Cotton .. .. .	92.4	46.5	181.2	29.9	273.6	76.4
Woollen and Worsted .. .. .	66.6	19.1	77.6	12.0	144.2	31.1
Silk and Artificial Silk .. .. .	14.5	3.0	18.2	0.9	32.7	3.9
Linen (Northern Ireland) .. .. .	12.5	4.9	2.0	0.6	14.5	5.5
Linen and Hemp (Great Britain) .. .. .	3.1	10.2	5.2	2.9	8.3	13.1
Jute .. .. .	7.7					
Hosiery .. .. .	2.7	0.8	14.2	2.0	16.9	2.8
Textile Finishing .. .. .	82.2	32.6	65.2	14.7	147.4	47.3
Lace .. .. .	2.2	1.5	3.9	1.1	6.1	2.6
Rope, Twine and Net .. .. .	3.8	0.7	10.7	2.4	14.5	3.1
Elastic Webbing .. .. .	0.2	0.2	1.8	0.6	2.0	0.8
Coconut Fibre, etc. .. .. .	0.7	0.4	1.7	0.8	2.4	1.2
Flock and Rag .. .. .	0.6	—	6.8	0.8	7.4	0.8
Packing* .. .. .	—	—	3.1	—	3.1	—
TOTAL .. .. .	289.2	119.9	398.9	68.7	688.1	188.6

\* As to hydraulic power used in the Packing Trade, see page 276.

The distribution of the power equipment recorded in 1924 among the three geographical areas covered by the Census was as follows:—

	Prime movers.	Electric generators.	Electric motors driven by	
			Electricity generated in same works.	Purchased electricity.
	Th. H.P.	Th. Kw.	Th. H.P.	Th. H.P.
England and Wales .. .. .	2,073.3	222.3	220.8	356.6
Scotland .. .. .	176.9	42.5	49.6	39.8
Northern Ireland .. .. .	96.5	20.6	18.8	2.5
TOTAL .. .. .	2,346.7	285.4	289.2	398.9

A small proportion of firms in the textile trades rented their power as well as their factories; the particulars of the persons employed by such firms in the three censal years are as follows:—

## Firms in textile trades renting power.

Trade.	1924.		1912.		1907.	
	Number of persons employed.	Percentage of total persons employed in trade.	Number of persons employed.	Percentage of total persons employed in trade.	Number of persons employed.	Percentage of total persons employed in trade.
Cotton .. .. .	35,760	6.8	47,800	7.7	40,371	7.1
Woollen and Worsted .. .. .	19,794	7.2	29,687	10.5	29,158	11.0
Silk and Artificial Silk .. .. .	384	1.0	695	2.0	1,531	4.8
Hosiery .. .. .	1,125	1.2	921	1.4	2,178	4.3
Lace .. .. .	2,926	15.4	7,867	21.9	9,010	24.5
Other textiles .. .. .	213	0.1	1,880	0.6	1,164	0.4
TOTAL .. .. .	60,202	4.8	88,850	6.6	83,412	6.7

Classification of power equipment of textile group.—The next table, which relates to the power equipment of all the textile trades taken together, classifies the prime movers according to kinds, the electric generators according to the description of prime movers by which they were driven, and the electric motors according as they were actuated by purchased electricity or by electricity generated in the same factory or works.

Power equipment.	1924.	1912.	1907.
	Th. H.P.	Th. H.P.	Th. H.P.
PRIME MOVERS:—			
Reciprocating steam engines .. .. .	2,098.7	2,079.4	1,880.3
Steam turbines .. .. .	151.4	43.1	14.0
Gas and oil engines .. .. .	64.9	53.5	39.7
Water power .. .. .	31.7	42.0	47.2
TOTAL .. .. .	2,346.7	2,218.0	1,981.2
	Th. Kw.	Th. Kw.	Th. Kw.
ELECTRIC GENERATORS:—			
Driven by—			
Reciprocating steam engines .. .. .	173.6	117.4	73.1
Steam turbines .. .. .	92.1	33.8	5.0
Gas and oil engines .. .. .	11.9	24.8	4.2
Water power .. .. .	7.8		
TOTAL .. .. .	285.4	176.0	82.3
	Th. H.P.	Th. H.P.	Th. H.P.
ELECTRIC MOTORS:—			
Driven by—			
Electricity generated in same works .. .. .	289.2	119.9	(not ascertained).
Purchased electricity .. .. .	398.9	68.7	
TOTAL .. .. .	688.1	188.6	..

In all three years steam engines formed the great bulk of the prime movers in the textile trades. Steam turbines, though not representing a large amount of power, increased markedly in each of the intercensal intervals, the main purpose for which they were installed being the driving of electric generators. Comparing the rate of growth of electric generators between 1912 and 1924 with the increase in the electric motors driven by electricity generated in the same works, it will be seen that the capacity of the generators increased by about 60 per cent., and that of the motors driven from them by 140 per cent. Generators are, however, used for producing electricity for various purposes (e.g., lighting) other than driving motors; and if allowance were made for the capacity used for such purposes (which may not have been widely different in 1924 from that so used in 1912), the rate of increase shown by the electric generators used for driving motors would doubtless be found to approximate much more closely to that shown by the horse-power of the corresponding category of motors.

The main feature of interest shown by the table in regard to electric motors is the great growth in the horse-power of motors driven by purchased electricity, which increased between 1912 and 1924 by 480 per cent., as compared with about 140 per cent. for motors driven from firms' own generators, indicating a tendency to rely upon electricity for power purposes from public supply undertakings instead of installing plant in the factory itself for the generation of all the electricity required. The quantity of electricity purchased for power, lighting, and all other purposes in the Textile Trades in 1907 was 20,883,000 Board of Trade units, and the capacity of the electric motors driven by the electricity purchased for power purposes was obviously much less than in 1912.

*Power equipment in use and not in use in 1924.*—The firms making Returns to the Census for 1924 were required to distinguish between the prime movers, electric generators, and electric motors ordinarily in use in the course of the year and those that were in reserve or idle. The proportion not in use should not be taken as a direct measure of the inactivity of trade during the year, because, while some of the engines, generators, and motors were not in use on account of lack of orders for goods, some were idle because they were normally in reserve against a breakdown or sudden rush of trade and others may have been in various stages of obsolescence, awaiting the time for being dismantled. The particulars recorded as to power ordinarily in use and not in use in 1924 are given in the following table:—

*Power ordinarily in use and not in use in the textile trades in 1924.*

Trade.	Prime movers.		Electric generators.		Electric motors.	
	(a) Ordinarily in use. (b) Not in use.	Per- centage not in use.	(a) Ordinarily in use. (b) Not in use.	Per- centage not in use.	(a) Ordinarily in use. (b) Not in use.	Per- centage not in use.
	Th.H.P.		Th.Kw.		Th.H.P.	
Cotton .. .. .	{ (a) 1,321.5 (b) 98.1	} 6.9	{ 89.4 9.5	} 9.6	{ 258.3 15.3	} 5.6
Woollen and Worsted ..	{ (a) 392.1 (b) 57.9	} 12.9	{ 62.4 11.2	} 15.2	{ 130.1 14.1	} 9.8
Silk and Artificial Silk ..	{ (a) 29.5 (b) 7.5	} 20.3	{ 13.2 3.8	} 22.4	{ 28.1 4.6	} 14.1
Linen (Northern Ireland)	{ (a) 59.6 (b) 12.1	} 16.9	{ 11.3 4.1	} 26.6	{ 12.4 2.1	} 14.5
Linen and Hemp (Great Britain).	{ (a) 24.8 (b) 8.2	} 24.8	{ 2.6 1.1	} 29.7	{ 5.6 2.7	} 32.5
Jute .. .. .	{ (a) 45.4 (b) 7.1	} 13.5	{ 5.7 3.1	} 35.2	{ 13.6 1.4	} 9.3
Hosiery .. .. .	{ (a) 13.4 (b) 2.6	} 16.2	{ 3.0 0.7	} 18.9	{ 15.6 1.3	} 7.7
Textile Finishing ..	{ (a) 185.2 (b) 36.5	} 16.5	{ 44.7 11.4	} 20.3	{ 131.1 16.3	} 11.1
Lace .. .. .	{ (a) 8.2 (b) 2.6	} 24.1	{ 2.3 0.7	} 23.3	{ 5.2 0.9	} 14.8
Rope, Twine and Net ..	{ (a) 19.2 (b) 2.3	} 10.7	{ 3.0 0.4	} 11.8	{ 12.3 2.2	} 15.2
Elastic Webbing ..	{ (a) 0.9 (b) 0.2	} 18.2	{ 0.2 *	} 24.0	{ 1.5 0.5	} 25.0
Coconut Fibre, etc. ..	{ (a) 2.6 (b) 0.2	} 7.1	{ 0.6 *	} 4.9	{ 2.3 0.1	} 4.2
Flock and Rag .. ..	{ (a) 7.9 (b) 0.7	} 8.1	{ 0.6 *	} 8.5	{ 6.9 0.5	} 6.8
Packing .. .. .	{ (a) 0.3 (b) 0.1	} 25.0	{ * *	} 66.9	{ 2.9 0.2	} 6.6
TOTAL .. .. .	{ (a) 2,110.6 (b) 236.1	} 10.1	{ 239.0 46.4	} 16.3	{ 625.9 62.2	} 9.0

\* In these cases the capacity recorded was less than 100 kw. The percentage not in use, however, is in each case based upon the actual figures returned.

*Power available for mechanical and electrical application in 1924 and 1912.*—In order to ascertain the actual amount of power available in the several trades, and the proportion of that power applied electrically, the capacity of the prime movers used to actuate electric generators must be replaced by the capacity of the electric motors driven by the electricity so produced. How far it may be legitimate to add together the capacity of engines applying, or intended to apply, power mechanically and the capacity of the electric motors, so as to obtain the power capacity of a factory using both forms of energy, will depend on the organisation of the factory. The information supplied furnishes no guidance as to the effective capacity of the power equipment, for on the one hand actual working capacity is not necessarily identical with the indicated horse-power or that which an engine was originally built to develop,

data which served largely as the basis of Returns ; and on the other hand it does not follow that an engine could run uniformly at its peak load, and some engine-power is generally provided as a reserve against break-downs and not for regular use. In particular, a series of motors (whose aggregate capacity would be returned to the Census) may be installed to run on successive processes, some of which are carried on intermittently as the materials to be treated become available, so that the series always includes some idle units. In such cases the aggregate horse-power of the motors, being greater than the power called for at any moment, may be greater than the prime mover horse-power required to actuate the generators from which the series of motors is driven. Since, however, the mechanical power available per operative employed is regarded as a useful basis of comparison, an estimated measure of this power in the several textile trades is given below, but the result can only be regarded as a rough indication claiming no high degree of precision.

In calculating the suggested measure, the power allocated for driving electric generators has to be deducted from the total capacity of prime movers ; for this purpose, 746 kilowatts of electrical energy are taken as the equivalent of 1,000 horse-power of mechanical energy, and an average loss of ten per cent. is allowed in the conversion of mechanical into electrical energy except in the case of steam turbines, which are usually bolted direct to the shafting of the generator. The power available to be applied mechanically is thus ascertained ; and the electrical power available is the sum of the capacities of motors driven by purchased electricity and of those driven by electricity generated in the same works. Such calculations of power available are only possible for 1924 and 1912, since in 1907 the capacity of electric motors was not ascertained.

The calculation relating to power in 1924 has been made on the basis of the power equipment installed and not that recorded as being in use, since it is only on this basis that a comparison with 1912 is feasible. For this and other reasons already given, it must be recognised that the figures representing power available per operative employed are, to some extent which cannot be determined, in excess of the average power utilisable ; but the same qualification is also applicable in some degree to the figures for 1912, when a distinction between power in use and power not in use was not required to be made.

The following table sets out the result of the calculation, in which allowance has been made for half-timers in 1912, and the persons employed in factories renting their power have been excluded :—

*Power available in the several textile trades in 1924 and 1912.*

Trade.	Power applied mechanically.		Power applied electrically.		Total power.	Per head of average number of operatives employed in establishments not renting power.
	Th. H.P.	Th. H.P.	Th. H.P.	H.P.		
Cotton .. .. .	1924	1,278.2	273.6	1,551.8	3.25	
	1912	1,310.2	76.4	1,386.6	2.48	
Woollen and Worsted .. .. .	1924	343.4	144.2	487.6	2.01	
	1912	312.1	31.1	343.2	1.41	
Silk and Artificial Silk .. .. .	1924	13.6	32.7	46.3	1.25	
	1912	17.9	3.9	21.8	0.67	
Linen (Northern Ireland) .. .. .	1924	49.5	14.5	64.0	0.89	
	1912	59.7	5.5	65.2	0.85	
Linen and Hemp (Great Britain) .. .. .	1924	27.5	8.3	35.8	1.41	
Jute .. .. .	1924	40.3	15.0	55.3	1.65	
Jute, Hemp and Linen (Great Britain) .. .. .	1912	83.4	13.1	96.5	1.26	
Hosiery .. .. .	1924	10.5	16.9	27.4	0.31	
	1912	8.4	2.8	11.2	0.19	
Textile Finishing .. .. .	1924	139.0	147.4	286.4	2.74	
	1912	138.9	47.3	186.2	1.76	
Lace .. .. .	1924	6.4	6.1	12.5	0.91	
	1912	5.8	2.6	8.4	0.34	
Rope, Twine and Net .. .. .	1924	16.6	14.5	31.1	2.04	
	1912	17.6	3.1	20.7	1.36	
Elastic Webbing .. .. .	1924	0.7	2.0	2.7	0.53	
	1912	1.2	0.8	2.0	0.35	
Coconut Fibre, etc. .. .. .	1924	1.8	2.4	4.2	0.97	
	1912	1.9	1.2	3.1	0.47	
Flock and Rag .. .. .	1924	7.6	7.4	15.0	2.19	
	1912	3.7	0.8	4.5	0.90	
Packing .. .. .	1924	0.2†	3.1	3.3†	0.43†	
	1912					
TOTAL .. .. .	1924	1,935.3	688.1	2,623.4	2.32	
	1912	1,960.8	188.6	2,149.4	1.80	

† The figure for the combined Jute, Hemp, and Linen Trades (Great Britain) is 1.55.

‡ Excluding hydraulic power (see p. 276).

### Fuel and Electricity in 1924.

All firms receiving schedules were asked to furnish voluntarily particulars of their consumption of fuel (of specified kinds) and electricity (distinguishing that purchased from that generated in the works) under two headings, namely, (i) for power (driving engines), and (ii) for heating or lighting the premises, transport, etc. Firms whose aggregate net output was 66.3 per cent. of the net output\* of all firms in the textile trades in 1924 furnished information in response to this request, though, as will appear later, many of them

\* For the purposes of this section the total net output of each trade and of the textile group as a whole in 1924 excludes the net output of those firms that rented all their power. The net output of such firms is not, however, available for 1907, and figures relating to net output for that year include all firms in the trade or group.

were unable to divide their particulars into the two categories indicated. Moreover, the information returned was not equally representative of fuel consumption, production of electricity, and consumption of purchased electricity, as the data supplied under these three headings respectively covered 69.2 per cent. of all the prime movers (not hydraulic) in use in the textile group of trades, 45.8 per cent. of the electric generators, and 65.4 per cent. of the electric motors driven by purchased electricity. The proportion of the trade for which particulars were furnished also varied greatly between one trade and another, as will be seen from the tables given below.

#### Fuel consumption.

In 1907, when firms were only asked to state their consumption of coal and coke without specification of purposes, the firms that furnished particulars had 77.6 per cent. of the net output of the textile trades as a whole (excluding flax scutching and velvet and fustian cutting) and they recorded a consumption of 8,133,000 tons of coal and 45,000 tons of coke. The consumption recorded in 1924, by firms representing 66.3 per cent. of the net output\* of the textile group, included 6,505,000 tons of coal and 52,000 tons of coke. For the three leading trades the proportion of firms making returns was, in terms of net output\*: Cotton Trades, 1907, 81.2 per cent., 1924, 67.7 per cent.; Woollen and Worsted Trades, 1907, 65.8 per cent., 1924, 60.1 per cent.; Textile Finishing Trades, 1907, 92 per cent., 1924, 80.7 per cent.

The table on pp. 23-4 summarises the information which was received from firms regarding the quantities of different kinds of fuel which they consumed in 1924. The quantities reported as consumed are divided into (a) the amounts used for power purposes, i.e., driving engines, and (b) the amounts used for the lighting or heating of premises, transport, etc., so far as the particulars furnished enable this classification to be made. It appears from the returns, however, that the basis of classification adopted by the various firms which furnished information was by no means uniform; and apart from this, considerable quantities were reported for which no particulars of purposes could be assigned. These quantities are shown under heading (c) in the table.

In certain textile trades fuel is used for manufacturing purposes other than the production of power, i.e., for driving engines. Examples of such use are the consumption of gas in cotton mills for the gassing of yarns, and in incandescent gas mantle works (included in the Jute, Hemp and Linen Trades) for the testing of mantles; and the use of fuel (mainly coal and coke) in the Textile Finishing and the Woollen and Worsted Trades, and to a smaller extent in the Lace and the Silk and Artificial Silk Trades, for special heating, washing and drying processes. Quantities of fuel so consumed were intended as a general rule to be included under heading

\* See footnote on p. 21.

(b), but in the case of the Textile Finishing Trades, where such special consumption of fuel is of particular importance, information was invited as to the quantities used for the heating of vats. Information in response to this request was received from some of the firms engaged in bleaching, dyeing, finishing, etc., but as it has not been found possible to utilise the data for the proposed purpose in the present Report, the quantities of fuel of various kinds which were so returned have been included in the table with the fuel used in the Textile Finishing Trades for lighting or heating premises, transport, etc., i.e., under heading (b) in the table.

For the reasons given below it is not possible to draw detailed conclusions from the figures shown in the table, but they indicate to what a great extent coal predominates over other forms of fuel (an indication which may be considered in conjunction with the predominance of steam engines among prime movers, as pointed out on page 18). A substantial part of the recorded consumption of light oils under heading (b) may be regarded as representing the use of petrol in motor delivery vehicles.

#### Consumption of fuel (so far as reported) in the several textile trades in 1924.

(NOTES:—1. The figures in italics below the name of the trade represent respectively (1) the percentage of the total net output\* of the trade represented by the firms giving information, and (2) the percentage of the total capacity of prime movers (not hydraulic) in use in the trade represented by the firms giving information.

2. The fuel consumed is, in each case, classified according to the purpose for which it was used, as follows: (a) for power (driving engines); (b) for heating and lighting premises and for transport, etc.; (c) for purposes not separately distinguished).

Trade.	Coal and slack.	Coke and breeze.	Heavy oils.	Light oils.	Gas purchased.†
	Th. tons.	Th. tons.	Th. galls.	Th. galls.	Th. therms.
Cotton .. .. .	(a) 1,525.7	2.5	31.0	30.8	152.2
	(b) 207.8	3.2	48.6	497.5	2,229.0
	(c) 836.9	0.3	3.0	46.7	87.9
Woollen and Worsted .. .. .	(a) 559.1	3.0	721.3	13.9	271.3
	(b) 210.9	9.7	15.8	401.2	755.1
	(c) 354.7	1.0	11.0	0.5	430.5
Silk and Artificial Silk .. .. .	(a) 72.1	—	10.9	0.5	74.5
	(b) 84.0	2.0	0.1	41.1	690.1
	(c) 15.8	—	0.5	1.5	26.5
Linen (Northern Ireland) .. .. .	(a) 91.4	2.2	1.7	5.9	43.2
	(b) 25.6	0.7	0.3	43.8	175.2
	(c) 39.3	—	—	—	23.0
Jute, Hemp and Linen (Great Britain) .. .. .	(a) 154.0	0.1	2.8	0.8	46.1
	(b) 22.4	1.1	64.4	34.4	143.0
	(c) 27.4	—	16.0	—	2.6
Hosiery .. .. .	(a) 8.1	0.1	1.2	5.6	201.8
	(b) 28.5	2.5	11.6	33.1	194.3
	(c) 10.2	—	—	2.0	31.7

\* See footnote on page 21.

† The amount of gas purchased was, in many cases, returned in terms of cubic feet. In such cases 200 cubic feet have been taken as equivalent to 1 therm.

## Consumption of fuel—(continued).

Trade.	Coal and slack.	Coke and breeze.	Heavy oils.	Light oils.	Gas purchased.†
	Th. tons.	Th. tons.	Th. galls.	Th. galls.	Th. therms.
Textile Finishing (1) 80.7; (2) 83.1.	(a) 329.4	4.8	343.7	10.9	255.4
	(b) 829.4	4.9	485.1	536.0	1,721.1
	(c) 940.9	2.5	69.9	120.4	132.8
Lace (1) 51.2; (2) 60.8.	(a) 9.4	—	26.4	—	57.4
	(b) 12.1	0.1	0.3	10.0	61.2
	(c) 26.0	0.4	—	0.5	27.5
Rope, Twine and Net (1) 55.6; (2) 64.6.	(a) 27.8	0.5	0.7	1.0	55.8
	(b) 7.0	0.6	0.9	48.8	36.5
	(c) 1.3	0.8	—	0.6	36.4
Elastic Webbing.. (1) 93.6; (2) 88.6.	(a) 3.9	—	0.7	—	7.2
	(b) 4.7	0.3	—	3.0	21.5
	(c) 1.1	—	6.3	—	5.3
Coconut Fibre, etc. (1) 76.1; (2) 61.5.	(a) 6.0	0.5	1.9	1.8	18.1
	(b) 6.5	0.9	0.9	12.3	22.1
	(c) 2.2	0.1	—	—	4.0
Flock and Rag (1) 65.8; (2) 70.2.	(a) 13.3	0.1	4.7	2.7	40.5
	(b) 3.1	2.7	2.1	75.6	19.0
	(c) 4.2	—	5.2	0.9	4.1
Packing (1) 78.5; (2) 40.9.	(a) 0.2	—	0.1	—	7.0
	(b) 2.9	4.3	—	1.1	154.3
	(c) 0.1	—	—	—	3.5
ALL TEXTILE TRADES (1) 66.3; (2) 69.2.	(a) 2,800.4	13.8	1,147.1	73.9	1,230.5
	(b) 1,444.9	33.0	630.1	1,737.9	6,222.4
	(c) 2,260.1	5.1	111.9	173.1	795.8
GRAND TOTAL (ALL PURPOSES)	6,505.4	51.9	1,889.1	1,984.9	8,248.7

† The amount of gas purchased was, in many cases, returned in terms of cubic feet. In such cases 200 cubic feet have been taken as equivalent to 1 therm.

The difficulty of drawing conclusions and making generalisations on the basis of the figures shown in the preceding table is due primarily to the large percentages of fuel consumption for which no particulars of purpose could be specified by the firms that furnished information. The following table shows these percentages for the three largest trades in the textile group (which accounted for 89 per cent. of the total consumption of coal reported) and for the group as a whole:—

## Proportion of fuel consumption for purposes not defined.

Trade.	Coal and slack.	Coke and breeze.	Heavy oils.	Light oils.	Gas purchased.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Cotton Trades .. .. .	32.6	5.0	3.6	8.1	2.8
Woollen and Worsted Trades .. .. .	31.5	7.3	1.5	0.1	29.5
Textile Finishing Trades .. .. .	44.8	20.5	7.8	18.0	6.3
All textile trades .. .. .	34.7	9.8	5.9	8.7	9.6

Where the quantities of fuel consumed for purposes not distinguished form only small percentages of the total quantities reported, it may involve no great error to distribute them, e.g., in the

proportions recorded for the purposes for which consumption was specified; but where the undistributed portion is large in proportion to the total consumption such a process could not be justified.

In these circumstances it is not practicable to estimate with any degree of confidence the quantities of the different kinds of fuel used for power, and for other purposes, by the firms that replied to the question in the Census schedules on the subject. Any attempt to extend the particulars furnished so as to estimate the quantities of different kinds of fuel used by all the firms in each of the textile trades would encounter other difficulties, even if distinction of purpose be ignored and attention be confined to the fuel used for all purposes combined. The table on pp. 23-4 shows that the firms which furnished information represented very varying proportions of the several trades, and only in a minority of the fourteen trades shown in the table was the proportion over 75 per cent. Even in these latter cases, however, any assumption that the firms which did not furnish information distributed their consumption among the different kinds of fuel in the proportions represented by the practice of those firms which supplied particulars would be extremely hazardous in the absence of further information regarding the practice of the several trades.

For the foregoing reasons, therefore, the information given in the table referred to should not be used as being of more than face value without extreme caution.

## Production and consumption of electricity.

For 1907 the Census Returns showed that about 64,000,000 units of electricity were generated in establishments with dynamos of 58,351 kilowatt capacity, equivalent to 71 per cent. of the total of 82,286 kilowatts in the textile group of trades as a whole. In 1924, firms with generators of 109,540 kilowatt capacity (45.8 per cent. of the group total) recorded an aggregate of over 177,000,000 units of electricity generated and consumed in their works. As regards purchased electricity, a return was obtained from all firms at the 1907 census, and this showed a total of somewhat less than 21,000,000 units purchased for all purposes.\* In 1924 the information received showed that about 252,000,000 units were purchased by firms owning 65.4 per cent. of the electric motors driven by purchased electricity. While the figures form only a slender basis for generalisation, the indications which they yield harmonise with the information available from other sources as to the increase in the use of electricity in the textile trades between 1907 and 1924, and possibly also with the conclusions indicated on page 18 as to the increased tendency to rely on electricity purchased from public supply undertakings rather than on the installation of generating plant in the works themselves.

\* Of this total, the Cotton Trades accounted for nearly 10½ million units, the Woollen and Worsted Trades for about 2½ million, and the Textile Finishing Trades for about 4½ million.

The table on page 27 summarises the detailed information received from firms in the textile trades as to the generation and consumption of electricity in 1924. The figures must, however, be regarded as subject to qualifications similar to those which apply to the particulars given on pp. 23-4, respecting consumption of fuel; and for the same reason they cannot be appropriately used as the basis of generalised deductions. The percentages of the reported consumption of electricity for which no particulars of purpose could be given were as follows in the three largest trades in the group (which accounted for 74 per cent. of the reported total consumption) and in the group as a whole:—

*Proportion of consumption of electricity for purposes not defined.*

Trade.	Electricity.	
	Purchased.	Generated in own works.
	Per cent.	Per cent.
Cotton Trades .. .. .	37.5	16.6
Woollen and Worsted Trades .. .. .	30.5	30.8
Textile Finishing Trades .. .. .	36.7	15.9
All textile trades .. .. .	30.7	17.5

Reference to the table on page 27 will show that, in most of the trades, the percentage of the electric generators in use in the trade that was represented by the information furnished regarding electricity generated, was smaller than the percentage of the electric motors driven by purchased electricity that was represented by the information furnished regarding electricity purchased. This may be due in part to the predominance in the sample of firms drawing the bulk of their electric power from public supply authorities and not from generators installed in their own works; but at the same time it may reflect the fact that, while all firms necessarily know the quantity of electricity they purchase, many do not record the quantity generated in their own works.

The particulars representing the average amount of electricity generated per kilowatt capacity (column (3) of the table) exhibit a wide range of variation. Neglecting the very small average figure shown for the Flock and Rag Trades, the other averages shown in the table vary from 721 kilowatt hours per kilowatt capacity in the case of the Elastic Webbing Trade to 3,469 in the case of the Silk and Artificial Silk Trades. These variations doubtless correspond to some extent with differences in the continuity with which the electric generators were operated in the works of the firms which furnished information. The difficulty of basing general conclusions regarding the several trades as a whole on the data shown in the table applies not less to this particular aspect of the matter than to the others.

*Consumption of electricity (so far as reported) in the several textile trades.*

(NOTES.—1. The figures in italics below the name of the trade represent respectively (1) the percentage of the total capacity of electric generators in use in the trade represented by the firms which stated the quantity of electricity generated in their works; and (2) the percentage of the total capacity of electric motors, driven by purchased electricity, in use in the trade represented by the firms which stated the quantity of electricity purchased by them.

2. The electricity generated and the electricity purchased are, in each case, classified according to the purpose for which they were used, as follows:—(a) For power (driving engines), (b) For heating and lighting premises and for transport, etc., (c) For purposes not separately distinguished.)

Trade.	Electricity generated in works of firms giving information.			Electricity purchased by firms giving information.		
	Capacity of electric generators (in use).	Quantity of electricity generated.	Average per kilowatt capacity of generators.	Capacity of electric motors (in use) driven thereby.	Quantity of electric electricity purchased.	Capacity of electric motors (in use) driven thereby.
	(1)	(2)	(3)	(4)	(5)	(6)
	Th. Kw.	Million B.T. units.	B.T. units.	Th. H.P.	Million B.T. units.	Th. H.P.
Cotton .. .. .	30.8	(a) 30.7 (b) 2.8 (c) 6.7	1,308	34.2	(a) 80.5 (b) 3.5 (c) 50.3	116.5
(1) 34.4; (2) 69.0.		(a) 22.5 (b) 2.2 (c) 11.0	1,342	28.9	(a) 22.3 (b) 2.0 (c) 10.7	38.0
Woollen and Worsted .. .. .	26.6	(a) 37.2 (b) 2.1 (c) 0.7	3,469	10.4	(a) 24.0 (b) 2.4 (c) 0.3	11.6
(1) 42.7; (2) 54.7.		(a) 6.8 (b) 0.6 (c) 1.9	1,371	6.2	(a) 0.6 (b) 0.1 (c) 0.1	0.8
Silk and Artificial Silk .. .. .	11.5	(a) 5.1 (b) 0.2 (c) 4.2	1,954	6.0	(a) 5.3 (b) 0.3 (c) 0.9	5.9
(1) 87.6; (2) 80.7.		(a) 1.0 (b) 0.3 (c) 0.3	1,348	0.7	(a) 2.8 (b) 0.6 (c) 0.4	4.3
Linen (Northern Ireland) .. .. .	6.8	(a) 29.3 (b) 3.9 (c) 6.2	1,516	46.0	(a) 18.6 (b) 2.0 (c) 11.9	43.4
(1) 60.4; (2) 47.4.		(a) * (b) * (c) 0.1	1,500	0.2	(a) 0.8 (b) 0.2 (c) 0.3	1.4
Jute, Hemp and Linen (Great Britain) .. .. .	4.9	(a) 1.0 (b) 0.3 (c) 0.3	1,348	0.7	(a) 18.6 (b) 2.0 (c) 11.9	43.4
(1) 58.7; (2) 55.8.		(a) 1.0 (b) 0.3 (c) 0.3	1,348	0.7	(a) 0.6 (b) 0.6 (c) 0.4	4.3
Hosiery .. .. .	1.2	(a) 29.3 (b) 3.9 (c) 6.2	1,516	46.0	(a) 18.6 (b) 2.0 (c) 11.9	43.4
(1) 39.6; (2) 32.5.		(a) * (b) * (c) 0.1	1,500	0.2	(a) 0.8 (b) 0.2 (c) 0.3	1.4
Textile Finishing .. .. .	26.0	(a) 1.0 (b) 0.3 (c) 0.3	1,348	0.7	(a) 18.6 (b) 2.0 (c) 11.9	43.4
(1) 58.2; (2) 75.0.		(a) * (b) * (c) 0.1	1,500	0.2	(a) 0.8 (b) 0.2 (c) 0.3	1.4
Lace .. .. .	0.1	(a) 1.0 (b) * (c) *	782	1.2	(a) 4.0 (b) 0.1 (c) 0.8	4.8
(1) 5.6; (2) 43.4.		(a) 0.1 (b) * (c) *	721	0.1	(a) 0.8 (b) 0.1 (c) 0.1	1.2
Rope, Twine and Net .. .. .	1.4	(a) 0.3 (b) * (c) *	1,763	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
(1) 45.7; (2) 53.7.		(a) 0.1 (b) * (c) *	1,763	0.1	(a) 1.4 (b) 0.1 (c) 0.1	1.4
Elastic Webbing .. .. .	0.1	(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
(1) 61.0; (2) 88.1.		(a) 0.3 (b) * (c) *	162	0.1	(a) 1.4 (b) 0.1 (c) 0.1	1.4
Coconut Fibre, etc. .. .. .	0.1	(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
(1) 23.8; (2) 85.7.		(a) * (b) * (c) *	162	0.1	(a) 1.4 (b) 0.1 (c) 0.1	1.4
Flock and Rag .. .. .	†	(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
(1) 5.7; (2) 67.7.		(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
Packing .. .. .	—	(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
(1) —; (2) 74.3.		(a) * (b) * (c) *	162	0.1	(a) 0.9 (b) 0.1 (c) 0.1	1.4
TOTAL .. .. .	109.5	(a) 134.1 (b) 12.2 (c) 31.1	1,619	134.1	(a) 162.6 (b) 12.4 (c) 77.2	235.7
(1) 45.8; (2) 65.4.		177.4			252.2	

\* Under 50,000.

† Less than 50 kw.