

MISCELLANEOUS TRADES

GENERAL REPORT

TRADES

Introduction

The Department of Trade and Commerce has the honor to acknowledge the assistance of the various trade associations and individual firms in the preparation of this report. The information contained herein is based on the returns furnished to the Department during the year 1924.

1924

The total value of the miscellaneous trades in 1924 was \$1,000,000,000, an increase of 10% over the total value of \$900,000,000 in 1923.

1923

The total value of the miscellaneous trades in 1923 was \$900,000,000, an increase of 5% over the total value of \$850,000,000 in 1922.

1922

The total value of the miscellaneous trades in 1922 was \$850,000,000, an increase of 10% over the total value of \$770,000,000 in 1921.

MISCELLANEOUS TRADES.

1. Miscellaneous Trades

The miscellaneous trades include all trades not included in the other sections of this report.

Wholesale

The wholesale trade in miscellaneous goods is a very important part of the trade. It is estimated that the value of the wholesale trade in miscellaneous goods is \$500,000,000.

Each of the trades included in the miscellaneous trades is a very important part of the trade. It is estimated that the value of the miscellaneous trades is \$1,000,000,000.

1924

The number of export orders received from the miscellaneous trades in 1924 was 100,000, an increase of 10% over the number of 90,000 in 1923.

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Introductory.

The following general report deals with the trades engaged in the manufacture of pens, pencils and artists' materials, linoleum and oilcloth, musical instruments, games and toys, billiard tables and sports requisites, scientific instruments, picture frames and fancy articles of ivory, horn, bone, etc., and in the printing of cinematograph films.

Each of the 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. In addition, certain particulars are set out (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 Miscellaneous Trades group in 1924 was 2,905. About 690 firms to which schedules were sent did not furnish returns, but

the great majority of these firms had very small establishments, and they included a number which were no longer carrying on business at the end of the censal year. On the basis of the information available, it is estimated that they did not employ more than about 2,600 persons in all and that their aggregate net output was probably not in excess of £450,000. These figures represent an omission of, at most, about 2·7 per cent. and 2·0 per cent. respectively of the total figures for the group; and the absence of returns from the firms in question does not materially affect the uses made of the figures in this general report.

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

Miscellaneous Trades.
*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)
	£'000	£'000	£'000	Number.	£
Pens, Pencils, etc.	2,135	838	1,297	7,286	178
Linoleum and Oilcloth	11,340	6,091	5,249	12,355	425
Musical Instruments	8,301	3,827	4,474	20,137	222
Games and Toys	1,513	775	738	5,325	139
Billiard Table and Sports Requisites	3,407	1,642	1,765	7,504	235
Scientific Instruments	9,608	4,225	5,383	25,521	211
Film Printing	686	504	182	631	289
Ivory, Horn, etc.	5,873	2,891	2,982	16,882	177
TOTAL—UNITED KINGDOM..	42,863	20,793	22,070	95,641	231
England and Wales	37,773	18,447	19,326	88,000	220
Scotland†	5,063	2,335	2,728	7,559	369
Northern Ireland†	27	11	16	82	195

* Not including the output of, nor the persons employed by, Army Ordnance Factories and Naval Dockyards; particulars relating to these establishments are given in the report on Public Utility Services, which forms part of a separate volume. The value of the goods produced by such establishments is stated in the report on the Scientific Instruments Trade (see page 428 of this volume).

† In order to avoid the possible disclosure of information relating to individual firms, the particulars relating to the Games and Toys Trade and the Film Printing Trade in Scotland have been combined with those for England and Wales: for the same reason, particulars regarding the Scientific Instruments Trade in Northern Ireland have also been combined with those for England and Wales.

Comparability of results with those for 1912 and 1907.

The scope of the Census was not quite the same in the three censal years, and the comparability of the totals for 1924 is affected by the changes referred to in the following paragraphs :—

(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 required to state

only the average number of persons employed by them in the year. The exemption of the small firms in 1912 resulted in the exclusion of an important proportion of some of the trades in the Miscellaneous group and, both for that reason and because the war interrupted the task of dealing with incomplete and incorrect returns, the information available for that year, for the group as a whole, is not sufficiently complete to warrant its use for detailed comparisons. For this reason the 1907 figures only are, except in respect of power equipment, taken for comparison with those for 1924 in this general report.

(2) The Census of 1907 covered Great Britain and the whole of Ireland, but that of 1924 applied only to Great Britain and Northern Ireland. The exclusion of the Irish Free State from the Census of 1924 does not, however, materially affect the comparability of the figures for the Miscellaneous group of trades.

(3) In any comparison of figures representing money values, the changes in the level of prices which occurred in the period between the first and third Censuses should be kept in mind.

(4) The Film Printing Trade was included within the scope of the Census for the first time in 1924 and no comparative figures are available for either 1912 or 1907.

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 are affected in varying degrees by the duplication 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 any industry the fund from which wages, salaries, rent, royalties, rates, taxes, depreciation, advertisement and sales expenses, and all other similar charges have to be provided, as well as 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 and the continuity of their work. 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.

Net output per head in 1924 and 1907.—The following table shows, for each of the trades included in the Miscellaneous group, the net output per head of persons employed in 1924 and 1907:—

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

Trade.	1924.	1907.
	£	£
Pens, Pencils, etc.	178	77
Linoleum and Oilcloth	425	208
Musical Instruments	222	105
Games and Toys	139	59
Billiard Table and Sports Requisites	235	101
Scientific Instruments	211	108
Film Printing	289	—
Ivory, Horn, etc.	177	77
ALL TRADES	231	114

The net output per head of persons employed increased by 103 per cent., for the group as a whole (or 102 per cent. if the Film Printing Trade be excluded from the 1924 total), the greatest increase (136 per cent.) being recorded in the Games and Toys Trade and the smallest (95 per cent.) in the Scientific Instruments Trade.

Relatively to the group average in each year, there was little change in the individual trades, the only change worthy of note taking place in the Billiard Table and Sports Requisites Trade, in which the net output per head rose from £101 (11 per cent. below the group average) in 1907 to £235 (2 per cent. above the group average) in 1924.

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 Miscellaneous Trades in the week ended 18th October, 1924.

* It has been ascertained from the Census records that the exclusion of particulars relating to Southern Ireland from the 1907 figures would not materially affect the results shown.

Number of persons (excluding outworkers) employed 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.
	(In thousands)							
Pens, Pencils, etc.	0.4	2.0	1.4	4.5	30	457	54	288
Linoleum and Oilcloth	1.3	10.1	0.2	1.2	73	844	13	177
Musical Instruments	2.8	17.2	0.8	3.0	92	1,391	61	568
Games and Toys	0.8	1.9	1.6	3.6	29	318	45	261
Billiard Table and Sports Requisites	0.7	4.5	0.5	1.8	27	684	51	363
Scientific Instruments	2.4	13.5	2.7	8.3	176	2,656	226	1,397
Film Printing	†	0.3	†	0.2	2	61	5	28
Ivory, Horn, etc.	1.4	6.9	2.6	8.3	74	1,570	127	754
TOTAL	9.8	56.4	9.8	30.9	503	7,981	582	3,836

† Less than 50.

In the Pens, Pencils, etc., Trades, the Games and Toys Trade and the Ivory, Horn, etc., Trades the number of female operatives exceeded the number of male operatives, these three trades together accounting for over one-half of the total number of female operatives employed in the group but for less than one-fifth of the male operatives. The proportion of female to male operatives was also high in the Scientific Instruments Trade and the Film Printing Trade.

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

Operative staff (excluding outworkers) in the Miscellaneous Trades in 1924.

Week ended.	Males.	Females.	Total.
12th January	53,552	28,366	81,918
16th February	53,508	28,516	82,024
15th March	53,560	28,708	82,268
12th April	53,435	28,867	82,302
17th May	53,013	29,100	82,113
21st June	52,638	29,310	81,948
19th July	52,633	29,340	81,973
16th August	52,899	29,334	82,233
13th September	54,568	30,032	84,600
18th October	56,354	30,953	87,307
15th November	57,100	31,534	88,634
13th December	57,106	31,466	88,572
AVERAGE FOR THE 12 MONTHS	54,197	29,627	83,824

There were comparatively small fluctuations in employment during the first half of the year, but during the second half there was a steady increase in numbers of both sexes with the exception of a small falling-off of females in December. The total number employed in December exceeded the number employed in January by 6,654, or 8.1 per cent., the increase being made up of 3,554 males and 3,100 females, or 6.2 per cent. and 9.9 per cent. respectively.

The average numbers employed were divided between males and females in the proportion of 647 to 353.

Employment in 1924 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 Miscellaneous Trades in the censal years 1924 and 1907. The figures are exclusive of outworkers. The average numbers shown in this table and the table on page 367 have been determined in the manner explained in Note (19) on page xii.

Average numbers (excluding outworkers) employed in 1924 and 1907 in the several Miscellaneous Trades.

Trade.	Operatives (wage earners).		Administrative technical and clerical staff (salaried persons).		Total.	
	Males.	Females.	Males.	Females.		
Pens, Pencils, etc.	1924	1,973	4,568	457	288	7,286
	1907	1,654	4,371	276	67	6,368
Linoleum and Oilcloth	1924	10,119	1,215	844	177	12,355
	1907	10,759	89	516	36	11,400
Musical Instruments	1924	15,612	2,566	1,391	568	20,137
	1907	8,924	416	676	85	10,101
Games and Toys	1924	1,637	3,109	318	261	5,325
	1907	696	1,020	103	43	1,862
Billiard Table and Sports Requisites	1924	4,566	1,891	684	363	7,504
	1907	4,154	1,608	600	148	6,510
Scientific Instruments	1924	13,243	8,225	2,656	1,397	25,521
	1907	9,344	3,378	1,185	349	14,256
Film Printing	1924	310	232	61	28	631
	1924	6,737	7,821	1,570	754	16,882
Ivory, Horn, etc.	1924	6,703	5,129	1,152	291	13,275
	1907	6,703	5,129	1,152	291	13,275
ALL TRADES	1924	54,197	29,627	7,981	3,836	95,641
	1907	42,234	16,011	4,508	1,019	63,772
TOTALS	1924	83,824		11,817		95,641
	1907	58,245		5,527		63,772

The total numbers employed increased between 1907 and 1924 by 31,869, or 50 per cent. The separate trades all showed an increase in the numbers employed, the greatest relative increase occurring in the Games and Toys Trade in which there was an increase of 186 per cent. The Linoleum and Oilcloth Trade showed a decrease (640) in the number of male operatives and an increase (1,126) in the number of female operatives.

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

Average numbers (excluding outworkers) employed in all the Miscellaneous Trades in the two censal years.

Sex and age.	1924.		1907.	
	Operative staff.	Total staff.	Wage earners.	Total staff.
<i>Males:—</i>				
Under 18	9,381	9,884	10,065	10,497
Over 18	44,816	52,294	32,169	36,245
TOTAL	54,197	62,178	42,234	46,742
<i>Females:—</i>				
Under 18	9,376	9,958	4,941	5,108
Over 18	20,251	23,505	11,070	11,922
TOTAL	29,627	33,463	16,011	17,030
<i>Males and females:—</i>				
Under 18	18,757	19,842	15,006	15,605
Over 18	65,067	75,799	43,239	48,167
TOTAL	83,824	95,641	58,245	63,772

Sex and age distribution of operatives.—Male labour predominated in the Miscellaneous group in both years. The increased employment of operatives recorded in 1924 (44 per cent.) affected all the classes shown in the above table except that of males under 18, where a small decrease of 684 took place. The proportion of all operatives under 18 was 25.8 per cent. in 1907 and 22.4 per cent. in 1924.

Administrative, technical and clerical staff.—The increase in the administrative, technical and clerical staff in 1924 (described as salaried persons in 1907) was 6,290, or 114 per cent. Of this increase males accounted for 3,473 and females for 2,817. The increase in males probably signified an increase in management and sales staffs; the increase in females probably related largely to clerical staff, reflecting a widespread adoption of more detailed accounting methods, and to clerical labour associated with selling organisation.

The proportion of males in the administrative staff in 1907 was 81 per cent., and of females, 19 per cent., as compared with 68 per cent. and 32 per cent. respectively in 1924.

Outworkers.—In addition to the staff dealt with in the preceding paragraphs, employment was also given in some trades to outworkers, i.e., persons who worked in their own homes on materials given out to them by their employers. The following table shows the average numbers of such outworkers employed in the Miscellaneous group of trades in 1924 and 1907:—

Trade.	1924.			1907.		
	Males.	Females.	Total.	Males.	Females.	Total.
Pens, Pencils, etc. ..	—	1	1	2	21	23
Games and Toys ..	2	63	65	3	62	65
Billiard Table and Sports Requisites ..	17	794	811	70	394	464
Scientific Instruments ..	29	35	64	111	22	133
Ivory, Horn, etc. ..	33	142	175	120	89	209
TOTAL ..	81	1,035	1,116	306	588	894

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 enquiry 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.
Pens, Pencils, etc. ..	3,057	47	666	51	274	41.2
Linoleum and Oilcloth ..	7,663	68	3,707	71	1,097	29.6
Musical Instruments ..	13,015	64	2,934	66	1,794	61.1
Games and Toys ..	3,181	58	435	59	189	43.4
Billiard Table and Sports Requisites ..	3,746	59	1,162	66	533	45.8
Scientific Instruments ..	11,192	51	2,711	50	1,214	44.8
Ivory, Horn, etc. ..	7,388	49	1,437	48	699	48.6
TOTAL ..	49,242	57	13,052	60	5,800	44.4

No figures are available for the Film Printing Trade.

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 portion of that electrical energy is used for power, i.e., to drive electric motors, the remainder being used for lighting, heating, etc., and for manufacturing purposes. In addition, many factories derive part or all of their power from electricity purchased and used for driving electric motors.

Power equipment of the various Miscellaneous Trades in 1924, 1912 and 1907.—The particulars furnished at the three Censuses regarding prime movers and electric generators in factories in the

Miscellaneous group of trades are shown in the following table. Particulars of electric motors were not obtained in 1907, and particulars relating to 1924 and 1912 only can be given.

The summary figures of power equipment secured at the 1912 Census are included in this and the following paragraphs, though they are omitted from most of the individual trade reports. The exclusion in that year of firms employing not more than five persons and the incompleteness of many of the returns rendered the results secured for the most part ineffective for purposes of comparison. The figures relating to power equipment are, however, likely to have been affected in a less degree than other aggregates by the omission of the small enterprises. The main interest of the figures given for 1912 lies in the indication which they afford of the increase that has occurred since that year in the use of electricity, particularly purchased electricity, as a source of power. The omission of small firms in 1912 may have had a particular importance in reference to this feature.

As already stated on page 363, the omission 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 1907 and 1912.

Power equipment of the several Miscellaneous Trades.

Trade.	Prime movers.			Electric generators.		
	1924.	1912.	1907.	1924.	1912.	1907.
	Thousand H.P.			Thousand Kw.		
Pens, Pencils, etc. ..	1.3	1.8	1.5	0.3	0.2	0.1
Linoleum and Oilcloth ..	37.5	36.7	26.8	10.4	6.1	3.6
Musical Instruments ..	5.3	5.0	2.2	3.2	2.4	0.3
Games and Toys ..	0.7	0.2	0.3	0.2	—	†
Billiard Table and Sports Requisites ..	2.7	1.6	1.2	0.5	0.2	0.2
Scientific Instruments ..	4.8	2.7	2.9	2.0	0.7	0.6
Film Printing ..	—	—	—	—	—	—
Ivory, Horn, etc. ..	5.2	3.8	2.8	2.7	1.0	0.5
TOTAL ..	57.5	51.8	37.7	19.3	10.6	5.3

† Less than 50 Kw.

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.	
Pens, Pencils, etc. ..	0.2	0.1	3.0	1.0	3.2	1.1
Linoleum and Oilcloth ..	15.3	2.3	5.8	0.5	21.1	2.8
Musical Instruments ..	5.9	1.9	8.9	1.5	14.8	3.4
Games and Toys ..	0.2	—	1.4	0.2	1.6	0.2
Billiard Table and Sports Requisites ..	0.6	0.4	3.2	0.6	3.8	1.0
Scientific Instruments ..	2.1	0.8	11.2	2.5	13.3	3.3
Film Printing ..	—	—	0.3	—	0.3	—
Ivory, Horn, etc. ..	3.0	1.5	4.0	1.2	7.0	2.7
Total ..	27.3	7.0	37.8	7.5	65.1	14.5

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

Area.	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	45.7	14.7	19.7	32.7
Scotland†	11.8	4.6	7.6	5.1
Northern Ireland	—	—	—	*
TOTAL	57.5	19.3	27.3	37.8

* Less than 50 H.P.

† See footnote (†) to table on page 362.

Classification of power equipment of the Miscellaneous group.—The next table, which relates to the power equipment of all the 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.
PRIME MOVERS:—	Th. H.P.	Th. H.P.	Th. H.P.
Reciprocating steam engines	35.1	39.8	31.1
Steam turbines	11.2	1.3	0.4
Gas and oil engines	10.9	10.5	5.9
Water power	0.3	0.2	0.2
Other power	—	—	0.1
TOTAL	57.5	51.8	37.7
ELECTRIC GENERATORS:—	Th. Kw.	Th. Kw.	Th. Kw.
Driven by—			
Reciprocating steam engines	8.1	8.2	4.5
Steam turbines	7.4	0.4	0.3
Gas and oil engines	3.7	2.0	0.5
Water power	0.1		
Other power	—		
TOTAL	19.3	10.6	5.3
ELECTRIC MOTORS:—	Th. H.P.	Th. H.P.	Th. H.P.
Driven by—			
Electricity generated in same works ..	27.3	7.0	(not ascertained).*
Purchased electricity	37.8	7.5	
TOTAL	65.1	14.5	..

* The total amount of electrical energy recorded as purchased for all purposes in 1907 was 1,615,000 Board of Trade units (Kilowatt-hours) and it would appear that the quantity generated by the dynamos operated by the firms in this group of trades may have amounted to nearly 10,000,000 Board of Trade units.

Power equipment in use and not in use in 1924.—The firms that made 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. 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 Miscellaneous Trades in 1924.

Trade.	Prime movers.		Electric generators.		Electric motors.	
	(a) Ordinarily in use; (b) not in use.	Percentage not in use.*	(a) Ordinarily in use; (b) not in use.	Percentage not in use.*	(a) Ordinarily in use; (b) not in use.	Percentage not in use.*
	Th. H.P.		Th. Kw.		Th. H.P.	
Pens, Pencils, etc.	(a) 1.0 (b) 0.3	19.8	0.2	19.1	3.0	7.8
			0.1		0.2	
Linoleum and Oil-cloth	(a) 31.2 (b) 6.3	16.6	8.4	19.3	19.4	8.0
			2.0		1.7	
Musical Instruments	(a) 3.1 (b) 2.2	41.3	1.8	44.2	12.6	14.8
			1.4		2.2	
Games and Toys	(a) 0.7 (b) —	7.2	0.2	—	1.5	6.8
			—		0.1	
Billiard Table and Sports Requisites ..	(a) 2.2 (b) 0.5	17.8	0.3	40.0	3.5	8.2
			0.2		0.3	
Scientific Instruments	(a) 4.0 (b) 0.8	17.5	1.6	21.8	12.1	9.0
			0.4		1.2	
Film Printing	(a) — (b) —	—	—	—	0.3	3.0
			—		—	
Ivory, Horn, etc.	(a) 4.0 (b) 1.2	22.8	2.0	26.0	6.6	4.9
			0.7		0.4	
TOTAL	(a) 46.2 (b) 11.3	19.6	14.5	24.9	59.0	9.4
			4.8		6.1	

* Based in each case upon the actual figures returned.

† 52 H.P.

‡ 9 H.P.

Power available for mechanical and electrical application in 1924.—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, nor with that which an engine was originally built to develop, data which served largely as the basis of returns; and, on the other hand, it cannot be assumed that an engine can 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 units not actually in operation. 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 horse-power of the prime movers 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 significant of the efficiency of an organisation, an attempt has been made to provide such a measure, though the result can only be regarded as a rough indication claiming no high degree of precision.

In calculating this 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 10 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. Comparison with power available in 1907 is not possible, since the capacity of electric motors was not ascertained in that year.

The calculation relating to power available has been made on the basis of the power equipment installed and not on that recorded as being in use. For reasons already given, it must be recognised that the figures representing power available per operative employed are, to some extent which cannot be determined from the data available in the Census office, in excess of the average power utilisable.

The following table sets out the results of the calculation:—

Power available in the several Miscellaneous Trades in 1924.

Trade.	Power for mechanical application.	Power for electrical application.	Total power.	Per head of average number of operatives employed.
	Th. H.P.	Th. H.P.	Th. H.P.	H.P.
Pens, Pencils, etc.	0·8	3·2	4·0	0·6
Linoleum and Oilcloth	22·9	21·1	44·0	3·8
Musical Instruments	0·7	14·8	15·5	0·9
Games and Toys	0·4	1·6	2·0	0·4
Billiard Table and Sports Requisites	2·0	3·8	5·8	0·9
Scientific Instruments	1·8	13·3	15·1	0·7
Film Printing	—	0·3	0·3	0·5
Ivory, Horn, etc.	1·3	7·0	8·3	0·6
TOTAL	29·9	65·1	95·0	1·1

Fuel and Electricity in 1924.

All firms that received 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, and for manufacturing processes, etc. Firms whose aggregate net output was 62·3 per cent. of the net output of all firms in the Miscellaneous Trades in 1924 furnished information in response to this request, though, as will appear later, many of them were unable to divide their particulars into the two categories indicated. Moreover, the information returned was not equally representative of fuel consumption, of production of electricity, and of consumption of purchased electricity, as the data supplied under these three headings respectively covered 49·0 per cent. of the capacity of all the prime movers (not hydraulic) in use in the group, 45·4 per cent. of the capacity of the electric generators, and 65·8 per cent. of that of the electric motors driven by purchased electricity. The proportion of the trade for which particulars were furnished also varied 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 purpose, the firms that furnished particulars had 40 per cent. of the net output of the group as a whole, and they recorded a consumption of 44,500 tons of coal and 6,500 tons of coke. The consumption recorded in 1924 by firms representing 62·3 per cent. of the net output of the group, included 199,000 tons of coal and 12,000 tons of coke.

The following table summarises the information which was received from firms regarding the quantities of different kinds of

fuel which they consumed in 1924. These quantities 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, for manufacturing processes, etc., so far as the particulars furnished enable the 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 purpose could be assigned. These quantities are shown under heading (c) in the table.

Consumption of fuel (so far as reported) in the several Miscellaneous 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 manufacturing processes, 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. tons.	Th. tons.	Th. galls.	Th. galls.	Th. galls.	Th. galls.	Th. therms.	Th. therms.
Pens, Pencils, etc. (1) 55.4; (2) 90.9.	(a)	1.0	—	—	4.8	2.9	—	—	35.2	—
	(b)	3.3	1.0	—	—	9.3	—	—	95.0	—
	(c)	1.0	—	—	—	—	—	—	—	—
Linoleum and Oilcloth (1) 45.9; (2) 35.3.	(a)	14.0	0.1	—	74.8	—	—	—	0.1	—
	(b)	16.3	0.1	—	0.2	7.7	—	—	39.5	—
	(c)	82.5	0.1	—	13.1	2.7	—	—	4.4	—
Musical Instruments (1) 68.5; (2) 91.1.	(a)	7.4	*	—	5.2	0.6	—	—	17.8	—
	(b)	16.2	3.4	—	0.3	35.5	—	—	266.4	—
	(c)	1.0	0.1	—	0.2	—	—	—	44.0	—
Games and Toys (1) 81.1; (2) 70.4.	(a)	0.2	—	—	—	‡	—	—	36.8	—
	(b)	0.6	0.5	—	—	10.9	—	—	94.5	—
	(c)	—	—	—	—	—	—	—	0.8	—
Billiard Table and Sports Requisites (1) 58.5; (2) 26.8.	(a)	1.1	*	—	—	0.6	—	—	39.8	—
	(b)	0.7	0.7	—	150.3	7.5	—	—	41.6	—
	(c)	0.3	*	—	—	0.2	—	—	13.8	—
Scientific Instruments (1) 72.8; (2) 90.6.	(a)	0.2	—	—	12.0	0.6	—	—	109.1	—
	(b)	9.2	3.7	—	9.7	40.7	—	—	549.3	—
	(c)	23.2	0.4	—	—	11.1	—	—	53.4	—
Film Printing (1) 80.8; (2) —.	(a)	—	—	—	—	—	—	—	—	—
	(b)	0.1	0.3	—	—	3.2	—	—	141.2	—
	(c)	—	—	—	—	—	—	—	—	—
Ivory, Horn, etc. (1) 60.7; (2) 82.4.	(a)	4.4	0.2	—	‡	0.7	—	—	41.2	—
	(b)	10.0	1.4	—	0.8	9.6	—	—	191.4	—
	(c)	5.9	—	—	—	—	—	—	9.9	—
ALL TRADES (1) 62.3; (2) 49.0.	(a)	28.3	0.3	—	96.8	5.4	—	—	280.0	—
	(b)	56.4	11.1	—	161.7	124.4	—	—	1418.9	—
	(c)	113.9	0.6	—	13.3	14.0	—	—	126.3	—
GRAND TOTAL (ALL PURPOSES)	198.6	12.0	—	271.8	143.8	1825.2	—	—	—	—

* Less than 50 tons.

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

‡ Less than 50 gallons.

The difficulty of drawing conclusions and making generalisations on the basis of the figures shown in the preceding table is due primarily to the quantities of fuel consumed for which no particulars of purpose could be specified by firms that furnished information. The following table shows these quantities as percentages of the total of each class of fuel consumed in certain of the trades in the Miscellaneous group:—

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.
Pens, Pencils, etc.	19.2	—	—	—	—
Linoleum and Oilcloth	73.2	46.6	14.9	26.4	9.9
Musical Instruments	3.9	1.7	3.2	—	13.4
Billiard Table and Sports Requisites	14.5	2.0	—	2.3	14.5
Scientific Instruments	71.3	9.6	—	21.1	7.5
Ivory, Horn, etc.	29.2	—	—	—	4.1
ALL TRADES	57.4	4.9	4.9	9.7	6.9

* See footnote (†) to table on page 374.

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 might lead to erroneous conclusions.

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 Miscellaneous 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 page 374 shows that the firms that furnished information represented varying proportions of the several trades, and only in two of the trades was the proportion, as measured by net output, over 75 per cent. Any assumption that the firms that did not furnish information distributed their consumption among the different kinds of fuel in the proportions represented by the practice of those firms that supplied particulars would be extremely hazardous in the absence of information regarding the general 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 2,750,000 units of electricity were generated in establishments with dynamos of 1,460 kilowatt capacity, equivalent to 28 per cent. of the total capacity of 5,290 kilowatts in the trades as a whole. In 1924, firms with generators (in use) of 6,600 kilowatt capacity (45.4 per cent. of the group total) recorded an aggregate of 13,400,000 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 over 1,600,000 units purchased for all purposes. In 1924 the information received showed that over 19,500,000 units were purchased by firms owning 65.8 per cent. of the electric motors (in use) driven by purchased electricity. While the figures form an inadequate basis for general estimates covering the entire group at both dates, they show clearly that a very large increase in the use of electrical energy took place in these trades, and appear also to be in harmony with the conclusion indicated on page 369 as to the tendency to rely more largely on electricity purchased from public supply undertakings than on the installation of generating plant in the works themselves.

The table on page 377 summarises the detailed information received from firms in the Miscellaneous group of 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 pages 373 to 375 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:—

Proportion of consumption of electricity for purposes not defined.

Trade.	Electricity.	
	Purchased.	Generated in own works.
	Per cent.	Per cent.
Pens, Pencils, etc.	0.3	—
Linoleum and Oilcloth	58.3	99.6
Musical Instruments	10.1	—
Games and Toys	5.3	—
Billiard Table and Sports Requisites	5.9	100.0
Scientific Instruments	13.1	32.6
Film Printing	67.1	—
Ivory, Horn, etc.	17.4	38.9
ALL TRADES	22.5	51.0

The particulars representing the average amount of electricity generated per kilowatt capacity, as shown in column (3) of the table, exhibit considerable variations. 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 that 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 Miscellaneous 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 manufacturing processes, 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). (1)	Quantity of electricity generated. (2)	Average per kilowatt capacity of generators. (3)	Capacity of electric motors (in use) driven thereby. (4)	Quantity of electricity purchased. (5)	Capacity of electric motors (in use) driven thereby. (6)
	Th. Kw.	Th. B.T. units.	B.T. units.	Th. H.P.	Th. B.T. units.	Th. H.P.
Pens, Pencils, etc. (1) 86.2; (2) 48.4.	0.2	(a) 331 (b) 20 (c) —	1,604	0.2	(a) 1,052 (b) 191 (c) 4	1.3
Linoleum and Oilcloth (1) 22.4; (2) 79.9.	1.9	(a) — (b) 16 (c) 3,674	1,966	4.3	(a) 1,644 (b) 141 (c) 2,495	4.3
Musical Instruments (1) 96.8; (2) 58.3.	1.7	(a) 5,031 (b) 29 (c) —	2,966	4.4	(a) 3,171 (b) 468 (c) 408	4.8
Games and Toys (1) 95.1; (2) 71.4.	0.3	(a) 30 (b) 14 (c) —	190	0.2	(a) 577 (b) 134 (c) 40	0.9
Billiard Table and Sports Requisites (1) 1.9; (2) 42.9.	†	(a) — (b) — (c) 6	1,184	—	(a) 549 (b) 86 (c) 40	1.2
Scientific Instruments (1) 57.4; (2) 73.4.	0.9	(a) 1,050 (b) 27 (c) 520	1,738	1.9	(a) 4,584 (b) 721 (c) 801	7.4
Film Printing (1) —; (2) 88.8.	—	(a) — (b) — (c) —	—	—	(a) 52 (b) 74 (c) 257	0.2
Ivory, Horn, etc. (1) 81.6; (2) 68.4.	1.6	(a) 13 (b) 13 (c) 2,650	1,659	2.5	(a) 1,406 (b) 298 (c) 358	2.6
ALL TRADES (1) 45.4; (2) 65.8.	6.6	(a) 6,455 (b) 119 (c) 6,850	2,043	13.5	(a) 13,035 (b) 2,113 (c) 4,403	22.7

* Less than 50 Kw.