THE NON-FERROUS METAL TRADES
GENERAL REPORT

The following report summarises in comparable form the principal results of the Censuses of 1930 and 1924 for the non-ferrous metal group of trades, of which detailed particulars are given in the succeeding reports on individual trades. The particulars for the separate trades in this report relate to Great Britain and the aggregates to the United Kingdom except where otherwise specified.

Principal results

The main particulars obtained for 1930 and 1924 are set out in the following table :—

Trade		Gross output (selling value of goods made and value of work done)	Cost of materials used and amount paid for work given out	Net output (excess of Col. (2) over Col. (3))	Average number of persons employed (excluding outworkers)	Net output per person employed	Power available‡
(1)		(2)	(3)	(4)	(5)	(6)	(7)
		£'000	£'000	£'000	No.	£	Thous. H.P.
Copper and Brass (Smelting, Rolling, etc.)*	1930	20,795	15,335	5,460	24,487	223	138·8
	1924	*22,916*	*16,788*	*6,128*	*26,478*	*231*	*106·7*
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)*	1930	26,539	20,355	6,184	22,311	277	125·2
	1924	*31,760*	*25,234*	*6,526*	*22,366*	*292*	*105·5*
Gold and Silver Refining* ...	1930	39,838	38,727	1,111	2,274	489	9·5
	1924	*15,796*	*14,811*	*985*	*1,778*	*554*	*4·5*
Finished Brass* ...	1930	10,730	5,011	5,719	32,439	176	30·2
	1924	*10,165*	*4,398*	*5,767*	*32,335*	*178*	*25·6*
Plate and Jewellery*	1930	8,706	4,105	4,601	25,401	181	20·9
	1924	*10,952*	*5,507*	*5,445*	*29,759*	*183*	*18·7*
Watch and Clock*	1930	898	414	484	2,587	187	1·2
	1924	*626*	*248*	*378*	*1,970*	*192*	*0·8*
Non-Ferrous Metal Trades, Northern Ireland† ...	1930	84	47	37	219	169	0·2
	1924	*118*	*75*	*43*	*302*	*144*	*0·2*
TOTAL— UNITED KINGDOM	1930	107,590	83,994	23,596	109,718	215	326·0
	1924	*92,333*	*67,061*	*25,272*	*114,988*	*220*	*262·0*
England and Wales	1930	105,018	82,365	22,652	105,725	214	273·5
	1924	*89,902*	*65,716*	*24,186*	*111,343*	*217*	*216·7*
Scotland ...	1930	2,488	1,582	907	3,774	240	52·3
	1924	*2,313*	*1,270*	*1,043*	*3,343*	*312*	*45·1*
Northern Ireland...	1930	84	47	37	219	169	*0·2*
	1924	*118*	*75*	*43*	*302*	*144*	*0·2*

* Great Britain

† The Non-Ferrous Metals (Smelting, Rolling, etc.); Finished Brass; Plate and Jewellery; and Watch and Clock Trades.

‡ Total capacity of prime movers and of electric motors driven by purchased electricity.

Deficiencies due to the exclusion of small firms in Great Britain.—There will be found in the report on each trade a brief section setting out the number of persons reported to have been employed in both 1924 and 1930 by firms employing not more than ten persons, with details of the chief classes of goods made and work done by these firms in the earlier year. Taking the non-ferrous metal group as a whole, 13,572 persons were stated to have been employed by firms of this class at the 1930 Census and 10,381 at that of 1924. Thus, of the aggregate number of employees recorded by firms of all classes, the proportion employed by the smaller firms was 11·0 per cent. in 1930 and 8·3 per cent. in 1924.

About 231 firms to which schedules were sent furnished no information at the 1930 Census, but these outstanding cases consisted mainly of small businesses in the Plate and Jewellery and the Watch and Clock Trades. The number of firms that furnished no particulars at the previous Census was about 1,130.

As indicated by the greater number of firms that furnished no particulars at the earlier Census, the apparent increase between 1924 and 1930 in the proportion employed by the smaller firms is due largely to lack of completeness of the 1924 survey in respect of firms of this class, whose business records were frequently insufficient to enable them to supply the detailed information required for that year.

Periods covered by firms' returns

As explained in Note 1 on page xi, firms were given the option of making returns for the calendar year 1930 or for their period of account most closely corresponding thereto, provided that the ending date of that period was not later than 31st March, 1931. The following table shows, for the non-ferrous metal group of trades as a whole, the total number of returns and the numbers of persons employed according to the periods covered by the returns received. The particulars relate only to firms in Great Britain, a similar analysis of the returns furnished at the Census of Northern Ireland not being available.

Returns in respect of twelve months ended	Number of returns		Persons employed	
	Number	Per cent. of total	Average number	Per cent. of total
April, 1930	10	0·7	357	0·3
May, 1930	15	1·1	1,047	1·0
June, 1930	58	4·4	5,442	5·0
July, 1930	26	1·9	5,739	5·2
August, 1930	27	2·0	2,490	2·3
September, 1930 ..	39	2·9	2,728	2·5
October, 1930	22	1·7	1,018	0·9
November, 1930	4	0·3	69	0·1
December, 1930 ...	897	67·3	74,100	67·7
January, 1931	32	2·4	2,405	2·2
February, 1931 ...	22	1·7	1,260	1·1
March, 1931	181	13·6	12,844	11·7
TOTAL ...	1,333	100·0	109,499	100·0

The mean terminal date of all returns for the non-ferrous metal group of trades at the 1930 Census was about the middle of the third week of December, 1930.

About 67 per cent. of the total number of returns received were for the calendar year, and the firms concerned employed nearly 68 per cent. of the total number of persons recorded. The following table shows the number of returns and the numbers of persons employed in each trade in respect of these firms.

Returns covering the twelve months ended December 31st, 1930

Trade	Number of returns		Persons employed	
	Number	Per cent. of total	Average number	Per cent. of total
Copper and Brass (Smelting, Rolling, etc.)	144	64	18,228	74
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)	119	67	16,017	72
Gold and Silver Refining	17	81	1,701	75
Finished Brass	269	65	18,118	56
Plate and Jewellery ..	317	72	18,363	72
Watch and Clock ...	31	58	1,673	65
TOTAL	897	67	74,100	68

Production

Gross output.—As between one trade and another the money value of the gross output (column 2 of the table on page 397) is largely dependent on the intrinsic value of the materials from which the products are manufactured. The table referred to exemplifies the importance of this factor in the Gold and Silver Refining Trade, the gross output of which formed about 37 per cent. of the total value shown for the entire group for 1930 while the number of persons employed was only about 2 per cent. of the total. As between one year and another the figure for the same trade is influenced by changes in the prices of those materials and in manufacturing costs and profits. Further, in certain trades duplication in the gross output value leads to a considerable over-statement of the value of the products as finally delivered, this factor affecting each trade to a different extent. For these reasons the gross output figure does not provide a satisfactory representation of the position either of different trades in relation to each other in a given year or of the same trade in different years.

Net output.—The net output figure eliminates any over-statement due to the factors of duplication and the differing values of materials handled, but its utility as a basis of comparison between different trades in the same year is subject to the reservations mentioned in

the Introductory Notes (pages x and xi) ; moreover, the relationship between the net output reported by a given trade for different years is affected by fluctuations in the various items which the figure comprises, viz., wages and salaries, rent, sales expenses, etc., as well as depreciation and profits. Measurement of production by net output is therefore only a rough guide and the important qualifications to which the results are subject should not be overlooked. The aggregate net output in this group of trades was lower in 1930 than in 1924 by nearly 5 per cent., and the net output per employee declined by about 2 per cent.

Volume of production.—The following table shows, for each *principal class of commodities* produced by the Non-Ferrous Metal Trades, the total output value recorded for the year 1930, and the result of a re-valuation of the output of similar classes of goods in 1924, based on the average factory values shown by the returns for 1930, and other relevant information. The figures for both years represent the total recorded output in Great Britain, whether returned by firms in the trade chiefly concerned in the production of the specified goods, or by firms in other trades. In view of the substantially greater output in 1930 of refined gold and other precious metals and of the disproportionate effect of this change in comparing aggregates which include goods of lower intrinsic value, the output of precious metals is not included in the total.

Kind of goods	Total production			1930 as a percentage of 1924
	1930	1924		
	As returned	As returned	At 1930 average values	
	£'000	£'000	£'000	Per cent.
Crude and semi-finished copper and brass and manufactures thereof (except finished brass goods) ...	18,933	20,831	20,210	94
Crude and semi-finished lead, tin, zinc, aluminium, etc., and manufactures thereof	25,699	30,108	22,155	116
Finished brass goods	10,271	8,039	8,250	125
Plate, jewellery, medals, etc. ...	8,026	9,910	8,745	92
Watches and clocks	988	758	574	172
TOTAL	63,917	69,646	59,934	107
Gold, silver, platinum, etc., refined	39,280	16,356	13,146	299

Number of establishments

The following table shows the number of separate establishments covered by the results for 1930, and the total number of returns received for 1930 and 1924. In the case of a firm owning more than one establishment situated in the same Census area and engaged in the same Census trade, a combined return covering all such establishments was usually accepted provided the number of operatives employed at each establishment was shown separately. The number of establishments reported was thus greater than the number of returns received.

Trade	1930		1924
	Number of establishments	Number of returns	Number of returns
Copper and Brass (Smelting, Rolling, etc.)	250	226	240
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)	210	178	211
Gold and Silver Refining	33	21	26
Finished Brass	443	417	538
Plate and Jewellery	459	438	587
Watch and Clock	70	53	49
TOTAL	1,465	1,333	1,651

These figures relate only to firms in Great Britain, the number of establishments not being recorded separately in the report on the Census of Production of Northern Ireland.

Size of firms

In the following table the main particulars recorded at the Census of 1930 for the Non-Ferrous Metal Trades are grouped according to the average numbers of persons shown in the returns. The particulars given relate only to firms in Great Britain.

Size of firm (average numbers employed)	Number of returns	Gross output	Cost of materials used	Amount paid for work given out	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
	No.	£'000	£'000	£'000	£'000	No.	£
11–24 ...	426	3,955	2,418	66	1,471	7,438	198
25–49 ...	368	6,963	4,239	72	2,652	12,604	210
50–99 ...	255	33,918	29,892	81	3,945	17,456	226
100–199 ...	161	13,358	9,111	120	4,127	21,883	189
200–299 ...	54	6,614	3,905	46	2,663	13,017	205
300–399 ...	25	5,050	3,574	41	1,435	8,712	165
400–499 ...	14	3,732	2,422	4	1,306	6,295	207
500–749 ...	19	26,004	22,973	40	2,991	11,213	267
750–999 ...	6	2,770	1,896	7	867	4,991	174
1,000 and over	5	5,142	3,032	8	2,102	5,890	357
TOTAL ...	1,333	107,506	83,462	485	23,559	109,499	215

Regional distribution

In the following table the principal aggregates for the non-ferrous metal group as a whole, as recorded at the Censuses of 1930 and 1924, are grouped according to the areas in which the firms are situated :—

Area		Number of returns	Gross output	Net output	Average number of persons employed (excluding out-workers)	Net output per person employed
		No.	£'000	£'000	No.	£
1. Greater London ...	1930	251	46,867	4,424	16,841	263
	1924	*296*	*23,755*	*4,167*	*16,050*	*260*
2. Lancashire with North Cheshire and the Glossop and New Mills District of Derbyshire ...	1930	99	12,680	1,770	7,212	245
	1924	*118*	*12,684*	*1,547*	*6,455*	*240*
3. The West Riding of Yorkshire and the City of York ...	1930	142	5,474	2,432	14,144	172
	1924	*186*	*4,882*	*2,430*	*13,674*	*178*
4. Northumberland, Durham and the Cleveland district of Yorkshire	1930	31	1,677	492	2,609	189
	1924	*35*	*3,641*	*781*	*3,413*	*229*
5. Warwickshire, Worcestershire and Staffordshire ...	1930	663	30,747	11,085	56,847	195
	1924	*844*	*34,469*	*12,808*	*62,451*	*205*
6. The rest of England (except Monmouthshire)	1930	64	3,080	821	4,292	191
	1924	*70*	*4,331*	*745*	*3,845*	*194*
7 and 8. Wales (including Monmouthshire)	1930	12	4,493	1,628	3,780	431
	1924	*20*	*6,140*	*1,708*	*5,455*	*313*
TOTAL— England and Wales ...	1930	1,262	105,018	22,652	105,725	214
	1924	*1,569*	*89,902*	*24,186*	*111,343*	*217*
9. Lanarkshire, Renfrewshire and Dumbartonshire ...	1930	45	1,073	335	2,102	159
	1924	*51*	*1,135*	*365*	*1,610*	*227*
10. The rest of Scotland	1930	26	1,415	572	1,672	342
	1924	*31*	*1,178*	*678*	*1,733*	*391*
TOTAL—Scotland ...	1930	71	2,488	907	3,774	240
	1924	*82*	*2,313*	*1,043*	*3,343*	*312*
TOTAL—Great Britain ...	1930	1,333	107,506	23,559	109,499	215
	1924	*1,651*	*92,215*	*25,229*	*114,686*	*220*
11. Northern Ireland ...	1930	12	84	37	219	169
	1924	*47*	*118*	*43*	*302*	*144*
TOTAL— UNITED KINGDOM	1930	1,345	107,590	23,596	109,718	215
	1924	*1,698*	*92,333*	*25,272*	*114,988*	*220*

Employment

The following table shows the average numbers of male and female operatives and administrative, technical and clerical staff in each of the Non-Ferrous Metal Trades in the two censal years.

Average numbers (excluding outworkers) employed in 1930 and 1924 in the several Non-Ferrous Metal Trades

Trade		Operatives		Administrative, technical and clerical staff		Total
		Males	Females	Males	Females	
Copper and Brass (Smelting, Rolling, etc.)	1930	20,476	965	2,224	822	24,487
	1924	*22,023*	*1,722*	*2,018*	*715*	*26,478*
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)	1930	17,206	2,025	2,367	713	22,311
	1924	*16,906*	*2,905*	*2,007*	*548*	*22,366*
Gold and Silver Refining...	1930	1,585	277	329	83	2,274
	1924	*1,192*	*246*	*259*	*81*	*1,778*
Finished Brass ...	1930	19,694	8,636	2,631	1,478	32,439
	1924	*19,595*	*8,975*	*2,415*	*1,350*	*32,335*
Plate and Jewellery ...	1930	10,916	10,303	2,158	2,024	25,401
	1924	*13,156*	*11,906*	*2,392*	*2,305*	*29,759*
Watch and Clock	1930	1,518	796	153	120	2,587
	1924	*1,208*	*479*	*168*	*115*	*1,970*
Non-Ferrous Metal Trades, Northern Ireland ...	1930	174	1	31	13	219
	1924	*233*	—	*55*	*14*	*302*
TOTAL— United Kingdom ...	1930	71,569	23,003	9,893	5,253	109,718
	1924	*74,313*	*26,233*	*9,314*	*5,128*	*114,988*
England and Wales ...	1930	68,278	22,801	9,523	5,123	105,725
	1924	*71,297*	*26,060*	*8,986*	*5,000*	*111,343*
Scotland	1930	3,117	201	339	117	3,774
	1924	*2,783*	*173*	*273*	*114*	*3,343*
Northern Ireland	1930	174	1	31	13	219
	1924	*233*	—	*55*	*14*	*302*

Distribution by age.—The following table classifies by age the numbers of persons (excluding outworkers) of each class recorded as employed in the various Non-Ferrous Metal Trades in the weeks ended 18th October, 1930 and 1924 :—

Number of persons (excluding outworkers) employed in the weeks ended 18th October, 1930 and 1924

Trade		Operatives				Administrative, technical and clerical staff			
		Males		Females		Males		Females	
		Under 18	Total	Under 18	Total	Under 18	Total	Under 18	Total
		No.	No.	No.	No.	No.	No.	No.	No.
Copper and Brass (Smelting, Rolling, etc.) ...	1930	1,634	19,383	185	913	154	2,224	109	822
	1924	*2,182*	*22,305*	*401*	*1,764*	*200*	*2,018*	*97*	*715*
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.) ...	1930	1,253	16,080	565	1,893	196	2,367	103	713
	1924	*1,574*	*17,166*	*774*	*2,886*	*142*	*2,007*	*70*	*548*

Trade		Operatives				Administrative, technical and clerical staff			
		Males		Females		Males		Females	
		Under 18	Total	Under 18	Total	Under 18	Total	Under 18	Total
		No.	No.	No.	No.	No.	No.	No.	No.
Gold and Silver Refining ...	1930	165	1,611	65	281	7	329	1	83
	1924	*129*	*1,196*	*43*	*244*	*4*	*259*	*4*	*81*
Finished Brass	1930	3,536	19,480	2,291	8,542	209	2,631	325	1,478
	1924	*3,890*	*19,920*	*2,700*	*9,301*	*220*	*2,415*	*299*	*1,350*
Plate and Jewellery	1930	1,174	11,088	2,675	10,463	108	2,158	413	2,024
	1924	*1,626*	*13,436*	*3,242*	*12,433*	*171*	*2,392*	*410*	*2,305*
Watch and Clock	1930	234	1,544	292	809	9	153	21	120
	1924	*142*	*1,213*	*185*	*486*	*1*	*168*	*26*	*115*
Non - Ferrous Metal Trades, Northern Ireland ...	1930	28	170	—	1	5	31	2	13
	1924	*35*	*225*	—	—	*5*	*55*	*3*	*14*
TOTAL ...	1930	8,024	69,356	6,073	22,902	688	9,893	974	5,253
	1924	*9,578*	*75,461*	*7,345*	*27,114*	*743*	*9,314*	*909*	*5,128*

Monthly fluctuations in employment.—Firms were required to state the actual numbers of operatives employed in the middle week of each month of the periods covered by their returns, and the following table shows the monthly aggregates for each of the trades in the non-ferrous metal group :—

Operative staff (excluding outworkers) in the Non-Ferrous Metal Trades in 1930 and 1924

Middle week in	1930		1924
	Total number	Number employed by firms furnishing returns in respect of the twelve months ended December*	Total number
(1)	(2)	(3)	(4)
January	98,009	66,872	97,699
February	97,585	66,585	98,298
March	96,654	65,954	98,954
April	96,702	65,546	99,466
May	96,411	65,517	99,809
June	95,303	64,722	100,002
July	93,615	63,725	100,170
August	92,039	62,369	99,768
September	92,652	62,515	101,813
October	92,258	61,594	102,575
November	92,170	61,764	103,851
December	91,461	61,193	104,155
AVERAGE FOR THE TWELVE MONTHS	94,572	64,030	100,546

* Great Britain only.

Outworkers.—Employment of outworkers in Great Britain was confined to two trades in this group, and the particulars recorded are shown in the table below together with information regarding Northern Ireland.

Average numbers of outworkers employed

Trade	1930			1924		
	Males	Females	Total	Males	Females	Total
Plate and Jewellery ...	517	127	644	844	246	1,090
Watch and Clock ...	25	—	25	2	1	3
Non - Ferrous Metal Trades, Northern Ireland	2	—	2	1	—	1
TOTAL	544	127	671	847	247	1,094

Wages

The table on pages 406 and 407 summarises the information available as to the amount of wages paid by firms in the Non-Ferrous Metal Trades in 1930 and 1924. The particulars of wages shown in column (8) are those ascertained by the Ministry of Labour as a result of the voluntary inquiries undertaken by that Ministry into wages and hours of labour in the United Kingdom. Owing, however, to various causes, including the fact that certain firms owning several establishments made combined returns to one Department and separate returns to the other, it has not been found practicable to secure comparable particulars in respect of all firms that furnished particulars of wages to the Ministry of Labour.

The numbers of operatives shown in columns (1) and (3) are those returned to the Census of Production as employed by the firms concerned in the weeks ended 18th October, 1930 and 1924, and the average during the year 1930 respectively. The amount of wages paid shown in column (8) was the aggregate returned to the Ministry of Labour in respect of the same firms. The proportion of each trade represented by the firms that furnished particulars of their wage bills is shown in columns (2) and (4) based on the numbers of operatives employed and in column (7) on net output. The average numbers of operatives employed during the year 1924, corresponding to those given in column (3) in respect of 1930, are not available.

The combined particulars given in the table for the Copper and Brass, the Lead, Tin, Aluminium, etc., and the Gold and Silver Refining Trades are not precisely comparable, as firms engaged in the production of type metal were classified in this group for 1930 and in the Typefounding, etc. Trade (Paper, Printing and Allied Trades) for 1924. The figures for the Finished Brass Trade for 1930 also include returns from certain firms that were classified in the Light Castings Trade for 1924.

The figures for both years relate to firms employing on an average more than ten persons during the respective years, and cover firms in Great Britain only.

Trade		Firms furnishing returns of wages: Operative staff employed: During week ended 18th October (1)	Proportion of trade (2)	Average during year (3)	Proportion of trade (4)	Gross output (5)	Net output: Amount (6)	Net output: Proportion of trade (7)	Wages paid: Amount (8)	Wages paid: Proportion of net output (9)	Trade
		No.	Per cent.	No.	Per cent.	£'000	£'000	Per cent.	£'000	Per cent.	
Copper and Brass (Smelting, Rolling, etc.) ...	1930	11,557	56·9	12,027	56·1	10,820	2,803	51·3	1,683	60·0	1930... Copper and Brass (Smelting, Rolling, etc).
Lead, Tin, Aluminium and other Non-ferrous Metals (Smelting, Rolling, etc.)	1930	8,336	46·4	8,915	46·4	16,147	3,805	61·5	1,336	35·1	1930... Lead, Tin, Aluminium and other Non-ferrous Metals (Smelting, Rolling, etc.)
Gold and Silver Refining ...	1930	1,170	61·8	1,157	62·1	37,181	451	40·6	170	37·7	1930.. Gold and Silver Refining.
Total	1930	21,063	52·4	22,099	52·0	64,148	7,059	55·3	3,189	45·2	1930 } ... Total.
	*1924**	*30,080*	*66·0*	†	—	†	*9,845*	*72·2*	*4,209*	*42·7*	*1924* }
Finished Brass	1930	14,307	51·1	14,518	51·2	5,107	2,808	49·1	1,780	63·4	1930 } ...Finished Brass.
	1924	*16,172*	*55·3*	†	—	†	*3,172*	*55·0*	*1,712*	*54·0*	*1924* }
Plate and Jewellery ...	1930	10,276	47·7	10,092	47·6	4,530	2,263	49·2	1,100	48·6	1930 } ...Plate and Jewellery.
	1924	*16,632*	*64·3*	†	—	†	*3,449*	*63·3*	*1,683*	*48·8*	*1924* }
Watch and Clock	1930	1,153	49·0	1,128	48·7	521	241	49·8	141	58·5	1930 } ...Watch and Clock.
	1924	*849*	*50·0*	†	—	†	*198*	*52·4*	*126*	*63·6*	*1924* }
TOTAL	1930	46,799	50·8	47,837	50·7	74,306	12,371	52·5	6,210	50·2	1930 } ... TOTAL.
	1924	*63,733*	*62·3*	†	—	†	*16,664*	*66·1*	*7,730*	*46·4*	*1924* }

* Separate particulars for the Copper and Brass, the Lead, Tin, etc. and the Gold and Silver Refining Trades are not available for the year 1924.

† Not available.

Power

The particulars recorded in respect of power installed and employed in the non-ferrous metal group of trades are shown in the following table :—

Power ordinarily in use and not in use in the Non-Ferrous Metal Trades in 1930 and 1924

Type	Capacity ordinarily in use		Capacity in reserve or idle		Proportion in reserve or idle	
	1930	1924	1930	1924	1930	1924
PRIME MOVERS	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.	Per cent.	Per cent.
Reciprocating steam engines	28·5	37·4	9·1	6·1	24·3	14·0
Steam turbines ...	5·2	2·0	13·9	1·6	73·0	43·4
Internal combustion engines :—						
Gas	11·8	20·3	0·9	4·6	6·8	18·7
Petrol, kerosene or other light oils ...	0·2	*	0·1	*	19·9	6·7
Heavy oils	4·7	0·7	0·1	0·1	2·4	10·9
Water engines	36·1	47·9	5·7	0·2	13·7	0·3
TOTAL—Prime movers	86·5	108·3	29·8	12·6	25·7	10·4
ELECTRIC GENERATORS	Th. Kw.	Th. Kw.	Th. Kw.	Th. Kw.		
Driven by						
Reciprocating steam engines	8·4	12·0	5·3	3·7	39·0	23·5
Steam turbines ...	3·8	1·5	10·4	1·2	73·2	43·3
Internal combustion engines :—						
Gas	1·9	2·6	0·3	1·8	15·5	41·7
Petrol, kerosene or other light oils ...	*	—	—	—	—	—
Heavy oils	1·1	0·1	0·1	*	5·6	31·8
Water engines ...	24·1	30·9	3·7	*	13·2	0·1
TOTAL—						
Electric generators	39·3	47·1	19·8	6·7	33·5	12·5
ELECTRIC MOTORS	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.		
Driven by						
Electricity generated in same works ...	36·1	37·8	7·5	3·3	17·2	8·1
Electricity generated in other works under same ownership ...	0·4	—	—	—	—	—
Purchased electricity	183·5	122·2	26·2	18·9	12·5	13·4
TOTAL—						
Electric motors	220·0	160·0	33·7	22·2	13·3	12·2

* Less than 50 h.p. or kw.

The power generated by prime movers is required partly for direct application and partly for driving generators for the production of electrical energy. The electrical energy so produced may be used either for the purpose of driving electric motors or for heating, lighting and process purposes. Particulars of the power applied mechanically (i.e., directly) and electrically are given in the table on page 411.

At the 1930 Census, firms were definitely informed that obsolete engines should not be recorded in their returns, and as no similar instruction was given at the previous Census, the figures for reserve or idle plant in the two years may not be precisely comparable. In any case, however, the proportion of reserve or idle plant does not furnish a reliable measure of the activity of trade, as all engines that were in operation during the greater part of the period in which production was carried on were recorded as " ordinarily in use," irrespective of intermittent working.

The particulars furnished at the two Censuses by each of the trades included in the non-ferrous metal group, in respect of prime movers, electric generators and electric motors installed, are shown in the following table :—

Power available in 1930 and 1924

Trade		Prime movers	Electric generators	Electric motors			
				Driven by electricity			
				Generated in same works	Generated in other works under same ownership	Purchased	All electric motors
		Th. H.P.	Th. Kw.	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.
Copper and Brass (Smelting, Rolling, etc.)	1930	43·7	20·7	23·6	—	95·1	118·7
	1924	*37·4*	*13·0*	*21·8*	—	*69·3*	*91·1*
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)	1930	59·8	36·0	17·0	0·4	65·4	82·8
	1924	*67·1*	*39·4*	*17·4*	—	*38·4*	*55·8*
Gold and Silver Refining ...	1930	0·2	—	—	—	9·3	9·3
	1924	*0·4*	—	—	—	*4·1*	*4·1*

Trade		Prime movers	Electric generators	Electric motors			
				Driven by electricity			All electric motors
				Generated in same works	Generated in other works under same ownership	Purchased	
		Th. H.P.	Th. Kw.	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.
Finished Brass ...	1930	8·7	2·1	2·7	*	21·5	24·2
	1924	*10·2*	*0·8*	*1·5*	—	*15·4*	*16·9*
Plate and Jewellery	1930	3·7	0·3	0·3	—	17·2	17·5
	1924	*5·6*	*0·5*	*0·3*	—	*13·1*	*13·4*
Watch and Clock ...	1930	0·1	*	*	—	1·1	1·1
	1924	*0·1*	*0·1*	*0·1*	—	*0·7*	*0·8*
Non-Ferrous Metal Trades, Northern Ireland ...	1930	0·1	—	—	—	0·1	0·1
	1924	*0·1*	—	—	—	*0·1*	*0·1*
TOTAL— UNITED KINGDOM	1930	116·3	59·1	43·6	0·4	209·7	253·7
	1924	*120·9*	*53·8*	*41·1*	—	*141·1*	*182·2*
England and Wales ...	1930	72·9	30·9	40·5	0·4	200·6	241·5
	1924	*79·6*	*28·9*	*39·6*	—	*137·1*	*176·7*
Scotland	1930	43·3	28·2	3·1	—	9·0	12·1
	1924	*41·2*	*24·9*	*1·5*	—	*3·9*	*5·4*
Northern Ireland ...	1930	0·1	—	—	—	0·1	0·1
	1924	*0·1*	—	—	—	*0·1*	*0·1*

* Less than 50 h.p. or kw.

Total power in use.—The figures in the following table represent the estimated amount of power actually employed by each of the Non-Ferrous Metal Trades in the two years. For the purpose of arriving at the power applied mechanically, the capacity of the prime movers required to drive electric generators has been calculated and deducted from the total capacity of the prime movers; the power applied electrically represents the capacity of electric motors driven by generators at firms' works added to that of motors driven by purchased electricity. As the basis for calculating the amount of the primary power that is converted into electrical energy, 746 kilowatts of electrical energy have been taken as equivalent to 1,000 horse-power of primary power and an average loss of ten per cent. in transmission has been allowed except for steam turbines, in which the loss is negligible. The power capacity recorded as "ordinarily in use" has been taken as the basis of the calculation in all cases.

The horse-power of motors designed to be driven by electricity generated in the same works may be greater than that of the prime movers used (or calculated in this manner to have been necessary) to drive them, since machines required for special processes are frequently equipped with individual motors which will only be in use on those occasions when the need for those processes arises. Further, the capacity measurement which firms were instructed to state was the effective horse-power which their engines could develop and this measurement does not necessarily represent the capacity at which the engines were normally operated. For these reasons, the figures given below should not be taken as providing more than a rough indication of the actual amount of power employed by any trade or of the degree of its electrification.

Power in use in 1930 and 1924

Trade		Power applied mechanically	Power applied electrically	Total power	Per head of average number of operatives employed
		Th. H.P.	Th. H.P.	Th. H.P.	H.P.
Copper and Brass (Smelting, Rolling, etc.) ...	1930	13·7	103·5	117·2	5·47
	1924	*17·5*	*79·2*	*96·7*	*4·07*
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.)	1930	5·9	69·2	75·1	3·90
	1924	*8·1*	*49·8*	*57·9*	*2·92*
Gold and Silver Refining ...	1930	0·3	8·3	8·6	4·61
	1924	*0·3*	*4·0*	*4·3*	*2·98*
Finished Brass	1930	5·4	22·4	27·8	0·98
	1924	*8·2*	*14·8*	*23·0*	*0·81*
Plate and Jewellery ...	1930	3·0	15·5	18·5	0·87
	1924	*4·2*	*11·4*	*15·6*	*0·63*
Watch and Clock	1930	*	1·0	1·0	0·44
	1924	*	*0·7*	*0·7*	*0·45*
Non-Ferrous Metal Trades, Northern Ireland ...	1930	0·1	0·1	0·2	0·94
	1924	*0·1*	*0·1*	*0·2*	*0·89*
TOTAL	1930	28·4	220·0	248·4	2·63
	1924	*38·4*	*160·0*	*198·4*	*1·97*

* Less than 50 h.p.

An increase in 1930 of nearly 38 per cent. in power applied electrically was accompanied by a decrease of about 26 per cent. in power applied mechanically, the total power in use being about 25 per cent. greater in the later year. With the minor exception of the Watch and Clock Trade, there was an increase in each trade in power used per head of the operatives employed, the increase being in most cases very substantial.

Consumption of fuel

Coal and coke.—At the 1930 Census, all firms were required to state the total quantity of coal and coke used for generating power (i.e., for driving engines), and were also requested to furnish particulars of the amounts used for other purposes on a voluntary basis, as the provisions of the Census of Production Act do not enable the latter to be obtained compulsorily.

Coal and Coke used

NOTE.—The figures in italics below the name of the trade indicate respectively (1) the percentage of the total capacity of steam engines in use represented by the firms that furnished separate particulars of coal and coke used for power and (2) the percentage of the total net output represented by the firms that furnished separate particulars of coal and coke used for other purposes.

Trade	For power		For other purposes		Unclassified	
	Coal	Coke	Coal	Coke	Coal	Coke
	Th. tons	Th. tons	Th. tons	Th. tons	Th. tons	Th. tons
Copper and Brass (Smelting, Rolling, etc.) ... ... *(1) 100·0; (2) 91·4*	61·5	0·3	169·5	70·1	—	—
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.) ... ... *(1) 98·3; (2) 96·1.*	60·3	0·9	265·3	33·4	2·8	1·5
Gold and Silver Refining *(1) 100·0; (2) 100·0.*	1·9	—	8·9	3·1	—	—
Finished Brass ... ... *(1) 100·0; (2) 96·8.*	6·4	0·2	8·1	20·5	—	—
Plate and Jewellery ... *(1) 100·0; (2) 100·0.*	2·0	0·1	9·9	3·2	—	—
Watch and Clock ... *(1) 100·0; (2) 100·0.*	0·1	—	0·1	0·2	—	—
TOTAL ... *(1) 99·5; (2) 96·2.*	132·2	1·5	461·8	130·5	2·8	1·5

No particulars of oil, gas or other fuel used were ascertained for the year 1930. At the Census of 1924, a voluntary inquiry was made as to the amounts of coal, coke, heavy and light oils, and gas consumed and reference should be made to the Final Report on that Census for particulars of the partial information supplied by each of the Non-Ferrous Metal Trades.

Electricity.—Particulars of the quantity of electricity used were required from all firms, electricity produced by their own generating plant being distinguished from that purchased from outside sources. No separate record of the purpose for which the current was used was obtained.

The following table shows for each of the Non-Ferrous Metal Trades the total quantities of electricity used in 1930 :—

Electricity used

Trade	Electricity purchased	Electricity generated		Number of units generated per kilowatt of generators in use
		In same works	In other works owned by the firm	
	B.T.U. (Kw.-hrs.) '000	B.T.U. (Kw.-hrs.) '000	B.T.U. (Kw.-hrs.) '000	B.T.U. per kw.
Copper and Brass (Smelting, Rolling, etc.)	51,863	17,028	—	1,925
Lead, Tin, Aluminium and other Non-Ferrous Metals (Smelting, Rolling, etc.) ...	218,140	165,498	363	5,789
Gold and Silver Refining ...	3,981	—	—	—
Finished Brass	16,373	2,251	16	1,461
Plate and Jewellery ...	10,388	135	—	398
Watch and Clock	895	3	—	146
TOTAL	301,640	184,915	379	4,737

The figures shown for current generated represent only the amounts generated *and used*, and fall short of the total output of current in cases where electricity was sold to outside consumers.