

THE NON-FERROUS METALS (SMELTING, ROLLING AND
CASTING) TRADES.

Contents.

	Page.
COPPER AND BRASS.	
INTRODUCTORY	362
Summary of results	362
Qualifications affecting comparisons	362
Value of output and cost of materials	363
PRODUCTION	363
Total make of copper and brass.. .. .	363
Production for sale	364
Other products	366
Work done for the trade	366
Value of output free from duplication	366
Cost of materials and work given out	367
Net output.. .. .	367
Exports and imports	367
EMPLOYMENT.. .. .	367
MECHANICAL POWER	368
LEAD, TIN, ZINC, ETC.	
INTRODUCTORY	369
Summary of results	369
Qualifications affecting comparisons	370
Value of output and cost of materials	370
Sectional results	371
PRODUCTION	371
Principal products	371
Other products	373
Work done on commission or for the trade	373
Lead :—	
Total make of pig lead	373
Production for sale or stock	374
Value of output free from duplication	375
Exports and imports	376
Tin :—	
Total make of tin	376
Production for sale or stock	377
Value of output free from duplication	378
Exports and imports	378

Contents—continued.

LEAD, TIN, ZINC, ETC.—continued.

PRODUCTION—continued.

	Page.
Zinc :—	
Total make of crude zinc	379
Production for sale or stock	380
Exports and imports	380
Aluminium :—	
Total make of aluminium	381
Production for sale or stock	381
Value of output free from duplication	382
Nickel :—	
Total make of nickel	383
Production for sale or stock	383
Value of output free from duplication	384
Exports and imports	384
White metal alloys :—	
Total make	385
Production for sale or stock	385
Exports and imports	386
Other non-ferrous metals :—	
Production for sale or stock	386
Value of output of Lead, Tin, Zinc, etc., Trades free from duplication	386
Cost of materials and work given out	387
Net output.. .. .	388
EMPLOYMENT.. .. .	388
MECHANICAL POWER	389
GOLD AND SILVER.	
INTRODUCTORY	390
Summary of results	390
Qualifications affecting comparisons	390
Value of output and cost of materials	390
PRODUCTION	391
Total output of gold, silver and platinum	391
Precious metals sold or added to stock.. .. .	392
Other products	393
Work done for the trade	393
Value of output free from duplication	393
Cost of materials and work given out	394
Net output.. .. .	394
Exports and imports	394
EMPLOYMENT.. .. .	395
MECHANICAL POWER	395
WAGES IN 1924 IN THE NON-FERROUS METALS (SMELTING, ETC.) TRADES AS A WHOLE	396
TABLES	397

I.—THE COPPER AND BRASS (SMELTING, ROLLING AND CASTING) TRADES.

Introductory.*

The tables on pages 397 to 404 include particulars received from firms in Great Britain and Northern Ireland whose business in 1924 consisted wholly or mainly in the smelting, rolling, and casting of copper and brass. Firms that were engaged mainly in the production of finished brass goods furnished returns on a separate schedule (see pages 405 to 416). The production of brass and copper wire is discussed in the Report on the Wire Drawing Trade (see page 100), as well as in this report. Brass made by engineering and other firms for the production of articles required in their operations is not included in the present report.

Summary of results.—The following table shows the main results of the Censuses of 1924, 1912, and 1907, comparisons between the figures for the three years being subject to the qualifications mentioned in the next paragraph:—

Particulars.	Unit.	1924.	1912.	1907.
Value of goods made and work done (Gross output)	£'000	23,611	19,098	17,285
Cost of materials used	"	17,212	15,788	14,321
Paid for work given out to other firms	"	80	29	34
Net output	"	6,319	3,281	2,930
Average number of persons employed	No.	27,460	26,553	21,448
Net output per person employed	£	230	124	137
Mechanical power available:—				
Prime movers	H.P.	39,148	47,229	43,853
Electric motors driven by purchased electricity	"	69,681	10,789	(not recorded)

Qualifications affecting comparisons.—In considering the above table and the other tables in this report which show figures for different censal years, the following qualifications should be borne in mind:—

(1) The comparability of figures relating to value or cost is affected by the changes which have taken place in the general purchasing power of money.

(2) The Censuses of 1907 and 1912 covered Great Britain and the whole of Ireland, but that of 1924 applied only to Great Britain and Northern Ireland. The output of non-ferrous metals was not shown separately in the published results of the Census of Production taken by the Government of the Irish Free State in respect of the year 1926. The production of such metals in Southern Ireland was probably quite unimportant and its exclusion from the aggregates for 1924 does not seriously affect the comparability of the figures.

* See also the Notes on pages vii to xv

(3) The Censuses of 1907 and 1924 extended to all firms, however small, but in 1912 firms employing not more than five persons (excluding the proprietors) were merely required to state the average number of persons employed by them in the year. According to the information so furnished, the number of persons employed in the establishments thus excluded was 805 or 3 per cent. of the number employed by the remaining firms, as shown in the above table.

Value of output and cost of materials.—The figures in the above table representing the value of goods made and work done and the cost of materials used, are the aggregates of the figures recorded by the firms that made the returns, and, for the reasons explained in paragraphs (i) and (ii) on pages xii and xiii, they over-state the value of the output of, and the cost of the materials used by, the Copper and Brass Trade considered as a whole. The matter is discussed on page 366, where it is estimated that the value, free from duplication of the output of the Copper and Brass Trade in 1924 lay between £21,000,000 and £22,000,000 and the cost of the materials purchased from sources outside the trade and worked up into its products lay between £14,800,000 and £15,700,000.

Production.

In addition to the output dealt with in this report, copper and brass and manufactures thereof, valued, on a cost basis, at £46,000 were produced by Railway companies* in 1924.

Total make of copper and brass.—The total production of unwrought copper, of copper in plates, sheets, strips, circles and discs, and of brass in plates, sheets, strips, circles and discs, is shown below. Particulars of exports and imports are also given for purposes of comparison:—

Copper and brass.	Production.		Exports.	Net imports.
	By copper and brass smelters.	By firms in all trades.		
	Tons.	Tons.	Tons.	Tons.
Unwrought copper in bars, blocks, slabs, ingots and cakes	37,680	38,200	5,770	125,860
Wrought copper in plates, sheets, strips, circles and discs	29,560	29,690	11,850	470
Brass in sheets, strips, circles and discs ..	41,690	42,680	18,060	450

Of the 38,200 tons of unwrought copper produced in the United Kingdom, a part appears to have been smelted, mainly from imported ores, and a part represents imported copper refined in the United Kingdom.

The total quantity of unwrought copper produced in the United Kingdom in 1907 was returned as 55,400 tons, while retained imports

* Such production falls within the scope of the report on Public Utility Services which forms part of a separate volume.

of unwrought and part-wrought copper were 65,855 tons; British exports of unwrought copper were 25,210 tons. Inclusive of imported copper refined in the United Kingdom, British production was 31 per cent. less in 1924 than in 1907.

The total make of sheets, strips, etc., of brass and other alloys of copper was returned as 42,680 tons, while the quantity made for sale or stock was 39,300 tons, so that 3,380 tons were used for further manufacture in the works where the sheets, etc., were made. The quantity exported was 18,060 tons and the net imports 450 tons. There was thus available 21,690 tons for use, in addition to the 3,380 tons mentioned above.

It is possible that some small amount of duplication may exist within the amounts shown for unwrought copper (e.g. between ingots and bars) and for wrought copper (e.g. between sheets and tubes), but no information is available for estimating the extent of such duplication.

The total production of ingot brass cannot be determined since the response to the voluntary question on this subject was not sufficiently general to serve for the construction of an estimate.

Examination of the individual returns made on schedules for the Copper and Brass Trade showed that half the value of "other manufactures of brass and other alloys of copper (including ingot brass)" related to rough castings made by small firms, chiefly from scrap, for sale to finished brass manufacturers, and that the other half was mainly composed of brass, bronze, gun-metal, and other ingots for sale to engineers, etc.

Production for sale.—The following table affords a comparison of the output for sale of the principal products of the Copper and Brass (Smelting, etc.) Trades for 1924, 1912, and 1907, as returned on schedules for all trades.

Kind of goods.	1924.		1912.		1907.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Copper :—	Th. tons.	£'000	Th. tons.	£'000	Th. tons.	£'000
Unwrought (bars, blocks, slabs, ingots, cakes) ..	26.7	1,872	51.0	3,739	57.6	4,909
Wrought (plates, sheets, rods, wire, tubes, etc.) ..	96.5	9,172	..	6,556	..	6,497
	..	706*	..	..	..	..
Copper sulphate ..	38.0	801	55.9	1,252	63.0	1,553
Brass and other alloys of copper (excluding nickel alloys) :—						
Sheets, strip, rods, wire, tubes {	146.5	12,866	..	8,223	..	8,348
	..	1,406	..	..	..	..
TOTAL VALUE ..	..	26,823	..	19,770	..	21,307

* Returned by value only.

More detailed particulars regarding the output in 1924 for sale are given in the following table :—

Kind of goods.	Returned on schedules for			
	The Copper and Brass (Smelting, etc.) Trades.		All trades (including the other sections of the Non-Ferrous Metals Trades).	
	Quantity.	Value.	Quantity.	Value.
Copper :—	Th. tons.	£'000	Th. tons.	£'000
Unwrought in bars, blocks, slabs, etc.	26.2	1,836	26.7	1,872
Wrought :—				
Plates, sheets, strips, circles and discs	29.1	2,706	29.2	2,724
Rods, straight or in coils	5.8	527	10.7	887
Wire in coils :—				
Circular, under No. 20 gauge ..	1.9	197	6.4	631
Circular, No. 20 gauge and over ..	13.5	1,197	30.8	2,742
Other than circular	0.1	11	2.2	205
TOTAL—Wire	15.5	1,405	39.4†	3,578
Tubes :—				
Solid drawn	10.9	1,313	11.0	1,334
Other sorts	0.2	44	0.4	70
TOTAL—Tubes	11.1	1,357	11.4	1,404
Other copper manufactures including copper sulphate :—				
Quantity stated	11.7	707	43.8	1,380
Quantity not stated .. ..	..	179	..	706
TOTAL—Copper and Manufactures .. ..	..	8,717	..	12,551
Brass and other alloys of copper (except nickel alloys) :—				
Sheets, strip, circles and discs ..	38.3	3,236	39.3	3,335
Wire :—				
Circular, under No. 20 gauge ..	0.6	67	1.7	233
Circular, No. 20 gauge and over ..	8.5	798	8.6	810
Other than circular	1.1	125	1.2	143
TOTAL—Wire	10.2	990	11.5†	1,186
Rods in straight lengths	29.5	2,032	30.2	2,096
Tubes :—				
Solid drawn	10.8	1,361	11.0	1,396
Brazed	1.5	216	1.5	216
TOTAL—Tubes	12.3	1,577	12.5	1,612
Ingot brass and other brass manufactures	50.0	4,109	53.0	4,637
			..	1,406*
TOTAL—Brass and other alloys of copper .. ..	..	11,944	..	14,272
TOTAL—COPPER AND BRASS ..	..	20,661	..	26,823

* Returned by value only.

† For particulars of the total production of brass and copper wire reference should be made to the report on the Wire Drawing Trade, page 100.

An output of copper and brass scrap was also returned on schedules for the Copper and Brass Trade in 1924, as follows :—

Copper and scale	3,700 tons, valued at	£150,000.
Brass and alloys	7,900 tons, valued at	£329,000.

Other products.—In addition to the output of copper and brass discussed in the preceding section, firms that made their returns on schedules for the Copper and Brass (Smelting, etc.) Trades recorded in 1924 an output of other goods which, being of kinds mainly produced in other trades, are dealt with in the reports on those trades. These goods are shown in the following table, together with the corresponding particulars for 1912 and 1907 :—

Kind of goods.	1924.	1912.	1907.
Finished brass goods	341	540	52
Metals other than copper and brass and manufactures thereof	1,413	590	524
Scrap (other than copper and brass) and waste..	217	22	10
Other goods	134	311	216
TOTAL	2,105	1,463	802

Work done for the trade.—The amount recorded by firms that made their returns on schedules for the Copper and Brass (Smelting, etc.) Trades as received for work done for the trade in 1924 was £366 000. This work consisted of casting and rolling, coppersmiths' and braziers' work, repair work, etc. The corresponding totals for 1912 and 1907 were £419,000 and £306 000 respectively.

Value of output free from duplication.—The gross value of the goods manufactured by firms whose returns were made on schedules for the Copper and Brass Trade was returned as £23,611,000 for 1924, but a considerable amount of duplication is involved in this aggregate. Of the various kinds of goods manufactured by firms that made their returns on schedules for the Copper and Brass Trades, the quantities that were sold to other firms that also furnished returns on those schedules cannot be determined with any great degree of precision and it is possible that a large part of some of the goods which appear to have been duplicated may have been added to makers' stocks or sold to makers of brass and other alloys or to makers of copper sulphate whose returns were furnished on schedules other than those for the Copper and Brass Trades. Further, account has to be taken of the possible duplication (£80,000) involved in respect of the amount paid for work given out to other firms. The duplication involved in the total through these sales and purchases may be roughly estimated as lying between £1,500,000 and £2,500,000. The value, free from duplication, of the output in 1924 of the firms whose returns were made on schedules for the Copper and Brass Trades may thus be expressed as a sum lying between £21,000,000 and £22,000,000. The corresponding figure for 1907 lay between £14,710,000 and £16,210,000.

Cost of materials and work given out.—The cost of materials used by firms that made their returns on schedules for the Copper and Brass (Smelting, etc.) Trades was returned as £17,212,000 for 1924, a sum which, by the exclusion of purchases of the products of other firms in the same trades, is reduced to a figure lying between £14,800,000 and £15,700,000.

The amount paid to other firms for work given out to them was £80,000 in 1924, £29,000 in 1912 and £34,000 in 1907.

Net output.—The net output in 1924 of the firms that made their returns on schedules for the Copper and Brass (Smelting, etc.) Trades (whose gross output was valued at £23,611,000) was £6,319,000, that sum representing, without duplication, the total amount by which the value, as delivered, of the aggregate output exceeded the cost, as purchased, of the materials used and the amount paid to other firms for work given out to them.

The net output per head of persons employed in the censal year 1924 was £230, as compared with £124 in 1912 and £137 in 1907.

Exports and imports.—The exports and retained imports of copper in plates, sheets, etc., and of brass in sheets, strips, etc., have been given above. The following table shows the exports and retained imports of rods, wire and tubes of copper and of brass :—

Kind of goods.	Exports.	Net imports.
Wrought copper :—	tons.	tons.
Rods	1,350	20,280
Wire	11,041	5,093
Tubes	1,587	658
Brass and other alloys :—		
Rods	2,062	121
Wire	2,490	812
Tubes	3,180	98

Imports are of considerable importance only in the case of copper rods and copper wire. In 1907 retained imports were: copper, part-wrought, 2,509 tons; other copper manufactures £715,000; brass and manufactures thereof, 2,600 tons. British exports in that year were: copper wrought or manufactured, 24,308 tons; brass 11,525 tons.

Employment.

The following table sets out certain particulars regarding employment in the Copper and Brass (Smelting, etc.) Trades in 1924, together with those relating to the two previous censal years. For the purpose of this comparison, the average numbers of operatives of each sex returned for 1924 have been divided between the two age-groups in the proportions shown by the data relating to the week ended 18th October.

Average number.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
1924.						
Operatives	2,292	22,699	392	1,737	2,684	24,436
Administrative, etc. ..	206	2,283	99	741	305	3,024
TOTAL	2,498	24,982	491	2,478	2,989	27,460
1912.						
Wage earners	2,881	23,003	771	1,587	3,652	24,590
Salaried	185	1,753	46	210	231	1,963
TOTAL	3,066	24,756	817	1,797	3,883	26,553
1907.						
Wage earners	2,418	19,309	142	647	2,560	19,956
Salaried	122	1,339	27	153	149	1,492
TOTAL	2,540	20,648	169	800	2,709	21,448

The numbers of operatives recorded month by month in 1924 ranged from 621 above the average, in September, to 783 below the average, in January.

Mechanical Power.

Information regarding the power equipment of the Copper and Brass (Smelting, etc.) Trades is given in the following table, which sets out the particulars for the three censal years relating to the capacity and kinds of *prime movers* and the capacity of *electric generators* installed.

Power equipment.	1924.			1912.	1907.
	Ordinarily in use.	In reserve or idle.	Total.	Total.	Total.
PRIME MOVERS :—	H.P.	H.P.	H.P.	H.P.	H.P.
Reciprocating steam engines	24,033	3,039	27,072	41,212	39,642
Steam turbines	1,830	1,455	3,285	872	450
Gas engines	6,635	2,009	8,644	4,823	3,484
Petrol and light oil engines	48	4	52	75	
Heavy oil engines	38	40	78	247	
Water power	17	—	17		
TOTAL	32,601	6,547	39,148	47,229	43,853
ELECTRIC GENERATORS :—	Kw.	Kw.	Kw.	Kw.	Kw.
Driven by—					
Reciprocating steam engines	6,170	1,685	7,855	7,126	6,678
Steam turbines	1,372	1,086	2,458	650	402
Gas engines	1,598	1,118	2,716	1,227	282
Petrol and light oil engines	—	—	—		
Heavy oil engines	—	—	—		
Water power	—	—	—		
TOTAL	9,140	3,889	13,029	9,003	7,362

The capacity of *electric motors* recorded in 1924 and in 1912 was as shown below :—

Electric motors.	1924.			1912.
	Ordinarily in use.	In reserve or idle.	Total.	Total.
Driven by—	H.P.	H.P.	H.P.	H.P.
Electricity generated in own works ..	19,683	901	20,584	8,307
Purchased electricity	58,219	11,462	69,681	10,789

Corresponding information was not required for 1907. The total number of Board of Trade units of electricity purchased for power and lighting purposes in that year was returned as 883,000.

II.—THE LEAD, TIN, ZINC, ETC. (SMELTING, ROLLING AND CASTING) TRADES.

Introductory.*

The tables on pages 397 to 404 include particulars received from firms in Great Britain and Northern Ireland whose business in 1924 consisted wholly or mainly in the smelting, rolling and casting of non-ferrous metals (except gold, silver, platinum, copper and brass). The chief metals covered are lead, tin, zinc, aluminium, nickel and white metal alloys.

The number of separate returns received on schedules for the Lead, Tin, Zinc, etc. Trades in 1924 was 289. About 160 firms to which schedules were sent did not furnish returns but these firms for the most part had very small establishments and they include a number which ceased operations before the end of the censal year. On the basis of the information available it is estimated that these firms did not employ more than 500 persons in all and that their total net output was probably not in excess of £75,000.

Summary of results.—The following table shows the main results of the Censuses of 1924, 1912, and 1907, comparisons between the figures for the three years being subject to the qualifications mentioned in the next paragraph.

* See also the Notes on pages vii—xv.

Particulars.	Unit.	1924.	1912.	1907.
Value of goods made and work done (Gross output)	£'000	32,081	11,828	8,985
Cost of materials used	"	25,853	10,245	7,878
Paid for work given out to other firms	"	44	10	10
Net output	"	6,184	1,573	1,097
Average number of persons employed	No.	21,690	10,386	8,233
Net output per person employed	£	285	151	133
Mechanical power available :—				
Prime movers	H.P.	66,932	24,470	18,498
Electric motors driven by purchased electricity	"	38,707	8,265	(not recorded)

Qualifications affecting comparisons.—In considering the above table and the other tables in this report which show figures for different censal years, the following qualifications should be borne in mind :—

(1) The comparability of figures relating to value or cost is affected by the changes which have taken place in the general purchasing power of money.

(2) The Censuses of 1907 and 1912 covered Great Britain and the whole of Ireland, but that of 1924 applied only to Great Britain and Northern Ireland. The exclusion of Southern Ireland in 1924 does not affect the comparability of the figures. In the reports on the Census of Production taken by the Government of the Irish Free State in respect of the year 1926, the output of the Lead, Tin, Zinc, etc. Trades in that year was not shown separately and it was not likely to have been large.

(3) The Censuses of 1907 and 1924 extended to all firms, however small, but in 1912 firms employing not more than five persons (excluding the 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 establishments thus excluded was 247 or 2·4 per cent. of the number employed by the remaining firms, as shewn in the above table.

Value of output and cost of materials.—The figures in the above table representing the value of goods made and work done and the cost of materials used are the aggregates of the figures recorded by the firms that made returns, and, for the reasons explained in paragraphs (i) and (ii) on pages xii and xiii, they overstate the value of the output of, and the cost of the materials used by, the Lead, Tin, Zinc, etc. Trades considered as a whole. The matter is discussed on pages 386 and 387, where it is estimated that the value, free from duplication, of the output of the Lead, Tin, Zinc, etc. Trades lay

between £27,000,000 and £31,350,000, and the cost of the materials purchased from sources outside these trades and worked up into their products lay between £20,700,000 and £25,000,000.

Sectional results.—The relative importance of the various sections of the Lead, Tin, Zinc, etc. Trades in 1924 will be seen from the following table, which shows, for each of the sections in question, separate results corresponding to those given in the preceding table :—

Firms mainly engaged in the smelting, rolling or casting of	Gross output.	Value of products of metal specified.*	Net output.	Average number of persons employed.	Net output per person employed.	Mechanical power available.†
	£'000	£'000	£'000	No.	£	H.P.
Lead	9,848	8,245	1,629	6,124	266	(a) 5,182 (b) 16,981
Tin	11,117	10,610	683	1,717	397	(a) 1,438 (b) 4,543
Zinc	1,833	1,689	475	2,146	221	(a) 2,772 (b) 1,248
Aluminium	4,078	3,767	1,557	6,791	229	(a) 51,240 (b) 6,090
Nickel and nickel alloys	3,235	1,923	1,201	2,892	415	(a) 6,093 (b) 6,836
White metal alloys ..	1,445	1,116	451	1,429	315	(a) 166 (b) 1,523
Other non-ferrous metals	525	338	188	591	318	(a) 41 (b) 1,486
TOTAL	32,081	27,688	6,184	21,690	285	(a) 66,932 (b) 38,707

* Excluding scrap, concentrates, waste, etc.

† (a) Prime movers ; (b) electric motors driven by purchased electricity.

Production.

In addition to the output dealt with in this report, pig lead and other non-ferrous metals, valued, on a cost basis, at £5,000, was produced in 1924 by Railway companies.*

Principal products.

The following table affords a comparison between the values and, where available, the quantities of the principal products of the Lead, Tin, Zinc, etc. Trades, made for sale or for stock, in 1924, 1912 and 1907, the figures for each year being inclusive of the output of similar products returned on schedules for other trades.

* Such production falls within the scope of the report on Public Utility Services which forms part of a separate volume.

Kind of goods made.	1924.		1912.		1907.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
Lead :—	Th. tons	£'000	Th. tons	£'000	Th. tons	£'000	
Pig	50.3	1,713	102.6	1,841	111.0	2,087	
Manufactures {	Quantity stated ..	125.8	5,332	129.3	2,661	130.0	2,678
	Quantity not stated	494	..	76	..	116
White lead	38.7	1,646	34.8	779	36.0	765	
TOTAL VALUE—Lead	..	9,185	..	5,357	..	5,646	
Tin (excluding solder) :—							
Unwrought (including ingots, blocks, bars, etc.)	38.5	9,480	19.6	4,069	13.1	2,195	
Manufactures .. .. .	..	520	..	198	..	37
TOTAL VALUE—Tin	..	10,000	..	4,267	..	2,232	
Zinc or spelter :—							
Crude, in cakes	62.0	2,089	46.9	1,278	48.0	1,216	
Manufactures (including sheets, etc.) .. .. .	..	248	..	196	..	291
TOTAL VALUE—Zinc	..	2,337	..	1,474	..	1,507	
White metal alloys :—							
Anti-friction	5.2	816	..	209	..	69	
Other sorts .. .. .	..	791	..	893	..	282
TOTAL VALUE—White metal alloys	..	1,607	..	1,102	..	351	
Other non-ferrous metals and alloys, including aluminium, antimony, nickel, etc. (except gold, silver, platinum, copper and brass) .. .. .	..	8,020	..	1,028	..	1,480
Solder, other than brass	8.7	1,173	..	906	..	519	
solder .. .. .	..	137*	..	86†	..	24†
Scrap metal .. .. .	..	..	..	..	..	..
TOTAL VALUE	..	32,459	..	14,220	..	11,759	

*Returned on schedules for the Lead, Tin, Zinc, etc. Trades only.

†Described as *waste products*.

The aggregate values of products manufactured in 1924, as shown above, include the following amounts returned on schedules for trades other than those dealt with in the present report: lead and lead products, £746,000; tin and tin products, £32,000; zinc and zinc products, £508,000; white metal alloys, £9,000; other non-ferrous metals and alloys, £980,000; or, in all, £2,275,000 out of the total of £32,459,000 shown above.

More detailed particulars regarding the output in 1924 are given later, in the sections which deal with individual metals or groups of metals.

Other products.

In addition to the products included in the above table, firms that made their returns on schedules for the Lead, Tin, Zinc, etc. Trades recorded an output of other goods as shown below. These goods, being of kinds mainly produced by other trades are dealt with in the reports on those trades :—

Kind of goods.	1924.	1912.	1907.
	£'000	£'000	£'000
Copper, brass, precious metals and manufactures thereof	1,649	258	275
Iron and steel manufactures	112	—	26
Other metal products, including scrap of copper, brass, iron and steel, concentrates, residues, etc.	634	171	43
Other goods	420	18	130
TOTAL	2,815	447	474

Work done on commission or for the trade.

The amount recorded as received for rolling, casting and other work done for the trade in 1924 by firms that made their returns on schedules for the Lead, Tin, Zinc, etc. Trades was £234,000, including £46,000 returned on schedules for the other Non-ferrous Metals (Smelting, etc.) Trades. The corresponding figures for 1912 and 1907 were £123,000 and £107,000 respectively.

Lead.

Total make of pig lead.—According to the Annual Report of the Secretary for Mines, 14,294 tons of dressed lead ore were raised in the United Kingdom in 1924, of which 7,855 tons were exported, leaving 6,439 tons to be smelted in the United Kingdom. It is there estimated that the metal content of British ore was 80 per cent. less 5 per cent. loss in smelting, but, as there was an excess of exports over production amounting to 1,087 tons in 1925, it cannot be assumed that all the ore raised and not exported in 1924 was smelted in that year. The retained imports of foreign ore in 1924 were 5,180 tons, of lower average value than exported British ore, the metal content being about 3,300 tons. British smelter production from native and imported ores in 1924 is estimated by the Imperial Mineral Resources Bureau of the Imperial Institute at 5,300 tons, or less than one-half of one per cent. of the world's estimated smelter production of 1,330,000 tons in that year.

Firms were required to state their total production of pig lead, whether sold as such or used by them in further manufacture, and the make so recorded was 61,540 tons, i.e., 57,580 tons by lead-smelting, refining and casting firms, 3,410 tons by manufacturers of other non-ferrous metals and 550 tons by firms in other trades. Deducting the 5,300 tons smelted in the United Kingdom and 1,700

tons identified by examination of the individual returns as made from re-smelted scrap, there remain 54,540 tons produced either by re-melting imported (or native) lead or from scrap. The retained imports of pig lead in that year were 223,670 tons, and warehouse stocks of lead were reduced by 1,130 tons in the course of the year. British exports of pig lead in 1924 were 9,450 tons. Out of the total of 61,540 tons of pig lead smelted or re-melted in 1924 in the United Kingdom, 11,260 tons were used by the makers in their own works, i.e., 11,250 tons by lead firms and 10 tons by firms mainly handling other non-ferrous metals.

The total quantity of pig lead made in the United Kingdom in 1907 was estimated to be 141,000 tons, i.e., 19,000 tons from British ore, 8,000 tons from imported ore, and 114,000 tons from scrap or re-melted imported pig lead.

Of the more important uses of lead, some are shown in the table below and, in addition, the quantities used in the manufacture of white lead, red and orange lead and litharge would amount to about 60,000 tons. Lead is also used in coating terne plates, in manufacturing solder, for electrical storage batteries, for coating insulated wire and for many other purposes.

Production for sale or stock.—The output for sale or stock of pig and sheet lead and lead manufactures in 1924 is set out in the following table, the output of firms mainly engaged in the smelting of lead being distinguished from that of other firms that made their returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades and of firms that made their returns on schedules for other trades:—

Lead and lead manufactures.	Value of output returned		
	By lead smelters and manufacturers.	On all schedules for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Lead:—			
Pig	1,583	1,695	1,713
(Tons)	(46,330)	(49,730)	(50,280)
Sheet	1,717	1,720	1,720
(Tons)	(42,490)	(42,530)	(42,530)
Pipes	2,234	2,255	2,395
(Tons)	(52,230)	(52,650)	(55,910)
Foil	259	259	259
(Tons)	(5,050)	(5,050)	(5,050)
White lead	1,175	1,175	1,646
(Tons)	(27,520)	(27,520)	(38,670)
Other manufactures	904	933	958
{ Quantity stated	(21,150)	(21,550)	(22,320)
{ Quantity not stated	373	402	494
TOTAL VALUE	8,245	8,439	9,185

Of the total value of lead and lead manufactures, firms chiefly engaged in the smelting, etc., of lead accounted for over 89 per cent. The gross output of these firms was valued at £9,848,000, of which lead and lead manufactures accounted for £8,245,000, or nearly 84 per cent., thus indicating a high degree of specialisation in this branch of the non-ferrous metal industry.

As already stated there was a fall in the production of pig lead in the United Kingdom from 141,000 tons in 1907 to 61,540 tons in 1924, or by 56·4 per cent. Sheet lead, pipes, foil, and other manufactures (except white lead) were not shown separately in 1907 but the total weight returned was 130,000 tons plus the weight (unstated) of manufactures valued at £116,000 or under 4·2 per cent. of the total value of manufactures. For 1924 the corresponding weight was 125,810 tons plus the weight (unstated) of sheet lead and other manufactures valued at £494,000 or 8·5 per cent. of the whole. There would thus appear to have been a slight increase in the volume of production of the secondary manufactures of lead.

The total make of white lead in 1924 as returned on schedules for all trades (including that used by the makers in the manufacture of paints) was returned as 41,600 tons; in 1907 the estimated total make was 50,000 tons.

Value of output free from duplication.—The value of the gross output of the firms mainly engaged in the smelting, casting, and rolling of lead was returned as £9,848,000, but in this sum there is some duplication. The chief source is in the sale by the makers of some part of the pig lead produced (and not exported) to rolling and casting firms that made their returns on the same schedule, but it is not possible to say how far such sales took place or how far the pig lead in question was sold out of the trade to electricians, white lead manufacturers, builders, etc. The value at works of the pig lead made for sale by smelters and refiners of lead was £1,583,000 and the exports of lead produced in the United Kingdom were valued in 1924 at £307,000 f.o.b., part of which may represent lead produced by firms other than those mainly engaged in lead smelting and refining, whose output of lead was valued at £130,000. Firms making foil, seals, capsules, tanks, and other manufactures, to the value of £140,000, also purchased their supplies of sheet lead (to the value of perhaps £110,000), but whether that lead was of British make (and, if so, whether its value formed part of the sum of £130,000 mentioned above) or was imported it is impossible to determine. All that can be said is that the amount of duplication in respect of goods purchased by some lead manufacturers from other lead manufacturers cannot have exceeded about £1,400,000. About £1,000 may also have been duplicated in respect of work given out. The output of the firms whose main business was the smelting, casting, and rolling of lead may, therefore, be estimated as lying between £8,450,000 and £9,850,000.

Exports and imports.—The following table compares the production of the main classes of lead manufactures in 1924 with the exports and the retained imports:—

Lead and lead manufactures.	Production.	Exports.	Net imports.		Share of home market held by British-made products.
	Tons.	Tons.	Tons.	Tons.	
Pig lead	61,540	9,450	169,130*	221,220	23·5
Sheet lead	42,700	5,530	4,320	41,490	89·6
Lead pipes	55,910	1,380	1,560	56,090	97·2
Lead foil	5,050	20	30	5,060	99·4
White lead (dry)	41,600	8,820	6,630	39,410	83·2
Red and orange lead	13,600	7,320	1,750	8,030	78·2
Litharge	12,120	2,100	330	10,350	96·8

* Net imports 223,670 tons, less remelted lead 54,540 tons: any loss in remelting is neglected here.

The net imports of pig and sheet lead in 1907 (when they were not shown separately) were 191,400 tons; in 1924, they were 228,000 tons, an increase of 19·1 per cent. Retained imports of white lead amounted to 14,820 tons in 1907 and to 6,630 tons in 1924. No other manufactures of lead were specified in the earlier year. Exports of pig lead were 27,020 tons in 1907, exports of "manufactures" 16,350 tons, and exports of white lead 19,980 tons.

Tin.

Total make of tin.—Tin smelters were required to state their total make of tin in blocks, ingots, bars and slabs and the quantity so returned for 1924 was 38,470 tons, i.e. 38,440 tons by firms whose main business was the treatment of tin and 30 tons by firms mainly concerned with other non-ferrous metals. The total make returned in 1907 was 13,100 tons, or little more than a third of the total make in 1924. British ore raised and retained in the United Kingdom in 1924 was 3,187 tons of estimated 56 per cent. metal content. Retained imports included South American ore and concentrates, 46,930 tons; Nigerian ore, etc., 8,803 tons; and ore, etc., consigned from other countries, 3,237 tons.

The metallic contents of the Bolivian concentrates were formerly estimated at 60 per cent., but the assessment of the Bolivian export duty on metal content instead of at a flat rate has shown a content approximating to 55 per cent.* The Nigerian concentrates are taken by some authorities† at an average metal content of 70 per cent., by others‡ at 73 per cent. On the basis of 55 per cent. for South American and 70 per cent. for Nigerian concentrates, and taking the

* The Mineral Industry during 1925, page 661, and The Mineral Industry during 1926, page 589.

† The Mineral Industry during 1926, page 669.

‡ Tin: World Statistics, 1929.

metallic content of ore and concentrates consigned from other countries as averaging 60 per cent., the metal content of the tin ore and concentrates available in the United Kingdom in 1924 was 35,701 tons, a figure substantially in agreement with the 36,000 tons shown in the Report of the Imperial Institute* as the approximate production.

It should be noted, further, that the imports of tin ores and concentrates were increasing in the period 1923–25, and that, in particular, the imports during the later months of 1923 were less than those of the same months of 1924. The figures given above for imports in 1924 exaggerate, consequently, the quantity of ore available for smelting in the year 1924, unless there had been an accumulation of ores from the imports of years before 1924 which were smelted in that year.

The reported production in 1924 was thus in excess of the calculated metallic content of the ore supplies of the year by approximately 2,800 tons. How far this difference is to be attributed to the use of accumulated supplies of ores, to the re-melting of imported unwrought tin, to the double record of the same tin at different stages of manufacture, or to secondary tin recovered from scrap there is not sufficient information to show. It appears unlikely that the estimates of the metal content of the different ores can have been erroneous in the degree necessary to reconcile the calculated supply with the total returned to the Census, the difference being in excess of 7 per cent.

On the basis of the returns to the Census, the total quantity of tin available in the United Kingdom in 1924 was 38,470 tons from the smelters together with 5,888 tons of imported blocks, ingots, bars and slabs, after allowing for re-exports, and less 18,104 tons of British smelted tin exported, or 26,254 tons in all. The quantity available in 1907 was 21,457 tons, viz., 13,100 tons smelted in the United Kingdom plus 17,033 tons net imports, less 8,674 tons British exports. The total available increased by nearly 22·4 per cent., but the proportion of the total that was smelted in the United Kingdom rose from 20·6 per cent. to 77·6 per cent.

Out of the 26,254 tons of tin available in 1924 additions to warehouse stocks accounted for 1,349 tons, leaving 24,905 tons for consumption. The chief use of tin is in coating steel plates and sheets and the output of nearly 750,000 tons of tinned plates and sheets in 1924 would, it is understood, require about 13,500 tons of tin.

Production for sale or stock.—The output for sale or stock of tin, tin solder and other manufactures of tin in 1924 is set out in the

* The Mineral Industry of the British Empire and Foreign Countries, 1926.

following table, the output of firms mainly engaged in producing these classes of goods being distinguished from that of other firms that made their returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades, and of firms that made their returns on schedules for other trades :—

Tin and tin manufactures.	Value of output returned		
	By tin smelters and manufacturers.	On all schedules for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Tin :—			
Blocks, ingots, bars and slabs	9,476	9,480	9,480
(Tons)	(38,440)	(38,470)	(38,470)
Solder	985	1,172	1,173
(Tons)	(7,360)	(8,710)	(8,710)*
Foil	123	311	317
(Tons)	(380)	(930)	(950)
Other manufactures :—			
Quantity stated	26	128	128
(Tons)	(170)	(510)	(510)
Quantity not stated	—	50	75
TOTAL VALUE	10,610	11,141	11,173

* The weight of the output recorded on schedules for other trades was negligible.

Of the total value of the tin and tin manufactures, firms mainly engaged in the smelting, etc., of tin accounted for nearly 95 per cent. The gross output of these figures was valued at £11,117,000, of which tin and tin manufactures accounted for £10,610,000, or over 95 per cent. The degree of specialisation in this branch of the non-ferrous metal industry was thus very high.

Value of output free from duplication.—The value of the gross output returned by firms mainly tin smelters and manufacturers was £11,117,000, and there is not much duplication in this total. The chief items involved are solder made by firms that did not smelt, £536,000, tin foil £123,000, and other manufactures, £98,000, and the cost of the tin required for these was probably about £400,000. It cannot be said whether this tin was purchased from British smelters or from importers, and the value of the output of the group of tin smelters and makers of solder, etc., is thus estimated as lying between £10,710,000 and £11,110,000, free from duplication.

Exports and imports.—The export and import trade in unwrought tin has already been dealt with. Manufactures of tin were not separately specified in the Import and Export List in 1907 or in 1912, but in 1924 1,079 tons of soft solder were exported, while the retained imports amounted to 148 tons: exports of tinfoil were 445 tons and retained imports 401 tons.

Zinc.

Total make of crude zinc.—Zinc smelters were required to state their total make of crude zinc, whether used by them in their own works or not. The aggregate returned was 62,060 tons, namely, 45,440 tons by firms whose main business was zinc smelting, 1,910 tons by makers of other non-ferrous metals, and 14,710 tons by firms in other trades, mainly zinc recovered from the wastes of galvanizing plant. The smelter production of zinc in the United Kingdom in 1924 has been stated* as 38,000 tons. This quantity, however, refers only to metal directly smelted from ores and concentrates, and does not include the recovered zinc mentioned above. According to the Fifth Annual Report of the Secretary for Mines 2,317 tons of dressed zinc ore, containing 45 per cent. of metal, were raised in the United Kingdom in 1924, of which 1,817 tons were exported, leaving 500 tons of which the metal equivalent, allowing for loss in smelting, would be less than 200 tons. Retained imports of Australian sulphide concentrates were 116,496 tons, and retained imports of other zinc ores and zinc ashes were 3,928 tons. The estimate of the London Metal Exchange for the zinc production of the United Kingdom in 1924 was 37,700 tons, and that of the American Bureau of Metal Statistics was 38,500 tons. There was recorded in 1924 an export of 10,732 tons of *other sorts* of zinc ore (i.e., excluding sulphides, blends and sulphide concentrates).

Deducting the 6,146 tons of British made zinc exported in 1924 from the output of 62,060 tons reported to the Census Office, and adding the net imports, 118,541 tons, the total supply is calculated as 174,455 tons. This total involves duplication to the extent to which any imported zinc that was remelted or refined in the United Kingdom was included in the 62,060 tons returned to the Census. The corresponding figure for 1907 cannot now be precisely calculated, but it included 35,300 tons of British smelter production, 89,000 tons of retained imports, and 12,700 tons which were, in part, recovered from galvanisers' dross, etc., and, in part, remelted from imported spelter. The total of these items is 137,000 tons. The quantity available in 1924 was thus greater than the quantity available in 1907 by roughly 20 to 30 per cent., according to the extent to which the output in either year included imported zinc remelted in the United Kingdom.

The chief use of zinc is for galvanising, and the 709,900 tons of galvanised sheets and 28,600 tons of galvanised hollow-ware that were produced in 1924 would require, at an average coating of 11 per cent., about 73,000 tons of zinc. A considerable proportion of the output of 333,000 tons of iron and steel wire was also galvanised either as wire or as netting, and would require more zinc

* "The Mineral Industry of the British Empire and Foreign Countries", published by the Imperial Institute (page 327 of the edition for 1926).

in proportion to weight than in the case of sheets, but no information as to the quantity galvanised is available. British exports of zinc were 5,185 tons in 1907 and 6,146 tons in 1924.

Production for sale or stock.—The output for sale or stock of zinc and zinc manufactures in 1924 is set out in the following table, the output of firms mainly engaged in zinc smelting being distinguished from that of other firms that made their returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades and of firms that made their returns on schedules for other trades :—

Zinc and zinc manufactures.	Value of output returned		
	By zinc smelters and manufacturers.	On all schedules for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Zinc :—			
Crude (cakes, etc.)	1,543	1,604	2,089
(Tons)	(45,440)	(47,280)	(61,990)*
Sheet and other manufactures	146	225	248
(Tons)	(3,390)	(4,880)	†
TOTAL VALUE	1,689	1,829	2,337

* The crude zinc returned on schedules for trades other than the Non-ferrous Metals Trades (14,710 tons) consisted mainly of recovered zinc (see page 379).

† The output recorded on schedules for other trades was returned by value only.

Of the total value of zinc and zinc manufactures, firms mainly engaged in the smelting of zinc accounted for over 73 per cent. The gross output of these firms was valued at £1,833,000, of which zinc and zinc products accounted for £1,689,000, or over 92 per cent., specialisation within this branch of the non-ferrous metal industry thus being very high.

Sheet zinc cannot be shown separately from other manufactures of zinc without disclosing particulars relating to individual firms. The main production of zinc oxide is carried on not by smelters but by chemical firms and is dealt with in the report on the Chemical Trades.* The crude zinc (14,710 tons) made by firms outside the Non-ferrous Metals Trades was mainly recovered from galvanisers' dross and waste.

Examination of the individual returns shows that the gross output (£1,833,000) of zinc smelters was free from duplication.

Exports and imports.—Exports of wrought zinc in 1924 were not large—1,539 tons of rolled sheets and 222 tons of other manufactures—but the retained imports were substantial, being 15,030 tons of rolled sheets, plates, and discs (excluding printing plates) and 1,808 tons

* This report forms part of a separate volume.

of other manufactures. In 1907 sheet zinc and manufactures were grouped together and the retained imports amounted to 19,417 tons. There was thus a fall of 13·3 per cent in the combined net imports between 1907 and 1924. British exports of zinc sheets and manufactures in 1907 were 1,368 tons.

Aluminium.

Total make of aluminium.—Apart from the recovery of aluminium from scrap the production of the crude metal from bauxite is confined to two companies and, consequently, the total make as returned to the census cannot be stated without disclosing the output of those companies. The estimated production of crude aluminium in the United Kingdom in 1924 has been published as 8,000 tons.* Retained imports of bauxite in 1924 amounted to 77,946 tons, and 5,158 tons were raised in Northern Ireland, making 83,104 tons available in all. Assuming an average content of about 60 per cent., the aggregate quantity of alumina extractable from the bauxite available in 1924 would be about 50,000 tons.

From the records available, the quantity of crude aluminium available for use in 1924 was about 15,140 tons, i.e. production, 8,500 tons (8,000 tons as estimated by the Imperial Institute, plus 500 tons recovered from scrap), less 2,966 tons exported, plus 9,605 tons of retained imports. Allowing for additions to makers' stocks and for manufactures of aluminium, it is estimated that there was either a duplication of 3,300 tons of British-made plates, sheets, etc., or part of that quantity was purchased as materials of manufacture out of the net imports of 2,607 tons of plates, sheets, etc. In either case, there was a balance, the amount of which depends on the choice among the named possibilities, of British-made plates, sheets, etc., available for use in other industries, chiefly in the construction of motor cars, aeroplanes, and airships, either as aluminium or as duralumin or other alloys.

The manufacture of aluminium is a new industry and its output was not recorded separately in 1907, nor were the imports and exports separately specified in that year.

Production for sale or stock.—The output for sale or stock of aluminium and manufactures thereof in 1924 is shown in the following table, the output of firms mainly engaged in the extraction, rolling and casting of aluminium being distinguished from that of other firms that made their returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades and of firms that made their returns on schedules for other trades. For the reasons already stated the output of crude aluminium sold or added to stock cannot be shown separately.

* The Mineral Industry of the British Empire and Foreign Countries. (Imperial Institute.)

Aluminium and manufactures.	Value of output returned		
	By smelters, etc., of aluminium.	On all schedule for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Aluminium in ingots, blocks, billets, plates, bars, wire, tubes, etc. (Tons)	2,107 (16,429)	2,408 (18,916)	2,475 (19,335)
Hollow-ware (vats, tanks, etc., for industrial purposes, and domestic hollow-ware) :—			
Quantity stated (Tons)	39 (132)	40 (136)	405 (1,092)
Quantity not stated	—	—	265
Other manufactures of aluminium :—			
Quantity stated (Tons)	1,621 (7,698)	1,685 (8,086)	1,753 (8,337)
Quantity not stated	—	—	129
TOTAL VALUE	3,767	4,133	5,027

Of the total value of aluminium and manufactures thereof, firms that were mainly engaged in the reduction, rolling and casting of aluminium accounted for 75 per cent. The gross output of these firms was valued at £4,078,000, of which aluminium and aluminium manufactures accounted for £3,767,000, or over 92 per cent., showing a high degree of specialisation.

Value of output free from duplication.—In the above gross total of £4,078,000 returned as the value of the output of those firms that were mainly engaged in the extraction, rolling and casting of aluminium, there is duplication in respect of crude aluminium returned in ingots, and crude aluminium converted from ingots into billets and bars, rolled into plates, sheets, etc., or made into castings, and some quantity of rolled aluminium further manufactured. Examination of the individual returns shows that, after allowing for exports (2,966 tons) of crude aluminium and certain known additions to stocks, crude and semi-crude aluminium, to the value of about £1,094,000, was either sold to firms whose returns are included with those of the first group shown on the above table or to outside firms, the range of duplication being from £422,000 to £1,094,000. In addition, it is possible, as mentioned above, that 3,300 tons of plates, sheets, etc., valued at about £537,000, were used in the production of other manufactures. The duplication may properly be expressed as lying between £422,000 and £1,630,000, and a small amount of possible duplication (£5,000) is also involved in the amount received for repairs and work done for the trade. On this basis the output of the firms mainly engaged in the production of aluminium and its manufactures may be expressed as lying between £2,450,000 and £3,650,000 free from duplication.

Nickel.

Total make of nickel.—As crude nickel (in pellets, cubes, etc.) is produced by only one company in the United Kingdom, the total make cannot be stated, and no estimate of the production is published by the Imperial Institute. The metal is extracted from copper-nickel ore and matte imported from Canada, and, according to the Canadian Trade Accounts, the nickel content of the ore and matte exported from Canada to the United Kingdom in the two years ended 31st March, 1924, and 31st March, 1925, was respectively 8,820 tons and 9,705 tons. It is not to be concluded, however, that these quantities correspond to the weights of metal extracted in those periods, for there is reason to believe that there was some stocking of imported ore and matte. Besides being used in the production of nickel manufactures and alloys, the metal is used in the manufacture of nickel oxide, which is included in a general group of unspecified chemicals in the report on the Chemical Trades, which forms part of a separate volume.

In 1924, exports of crude nickel in pellets, cubes, rondels, etc., from the United Kingdom were 5,843 tons, but a considerable part of these exports would appear to have been manufactured prior to 1924: retained imports were 167 tons. The manufacture of nickel, like that of aluminium, being a new industry in the United Kingdom, the production was not shown separately in 1907, nor were imports and exports of nickel specified separately in the Import and Export List.

Production for sale or stock.—The output for sale or stock of nickel, nickel alloys, and manufactures of nickel and alloys in 1924 is shown in the following table, the output of the firms mainly engaged in the production of these products being distinguished from that of other firms that made returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades, and of firms that made returns on schedules for other trades. For the reason already stated, it is not possible to show separately crude nickel, wrought nickel and manufactures of nickel :—

Nickel and nickel manufactures.	Value of output returned		
	By firms chiefly makers of nickel and alloys.	On all schedules for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Nickel unwrought, wrought and manufactures thereof (Tons)	1,169 (10,390)	1,182 (10,450)	1,183 (10,450)*
Nickel alloys :—			
Ingots, sheet, strip, wire, etc. (Tons)	645 (4,290)	786 (5,310)	792 (5,350)
Tubes and other manufactures (Tons)	109 (1,160)	152 (1,400)	157 (1,450)
TOTAL VALUE	1,923	2,120	2,132

* The weight of the output recorded on schedules for other trades was not stated: it is not likely to have been sufficiently large to alter the figure shown.

Of the total value of nickel and nickel manufactures, firms mainly concerned in the making of these products accounted for 90 per cent. The gross output of these firms was valued at £3,235,000, of which nickel and nickel products accounted for £1,923,000, or nearly 60 per cent.

Value of output free from duplication.—The value, £3,235,000, of the gross output of the group of nickel and alloy manufacturers contains a good deal of duplication. Within the first heading of *nickel, unwrought, wrought and manufactures thereof*, the only duplication is that arising from the purchase of metal by rollers of plates, sheets, etc., to the value of about £65,000, part of which may have come out of the net imports of 167 tons valued at £22,000 c.i.f. The remainder of the nickel, unwrought or wrought, was sold to firms outside the trade or to manufacturers of nickel alloys.

The total make of nickel alloys, including alloys used in further manufacture, was returned as 5,880 tons, of which 4,700 tons were returned by the main group of manufacturers, 1,140 tons by other makers of non-ferrous metals, and 40 tons by firms in other trades. The nature of the alloys was not specified, but the average value at factory of crude nickel was about £136 per ton. Taking the average proportion of nickel in these alloys as between 40 and 60 per cent., the duplication involved in the manufacture of 4,700 tons of alloys (including 410 tons used in further manufacture by the makers) would be from £256,000 to £384,000. A further duplication may arise in respect of the cost of alloys purchased by manufacturers of other goods who did not themselves make alloys, but such purchases may have been made from importers. Duplication may also be involved to the extent of £33,000, the amount recorded as paid for work given out to other firms.

The value of the output of the main group of manufacturers of nickel and alloys may be estimated, free from duplication, at a sum lying between £2,750,000 and £2,930,000.

Exports and imports.—Exports and imports of crude nickel have already been stated. Other particulars for 1924 are as follows :—

	Exports.	Retained imports.
	Tons.	Tons.
Nickel plates, sheets and anodes ..	138	50
Other nickel manufactures ..	56	10
Nickel alloys (ingots, sheet, strip, wire, etc.)	602	496
Manufactures of nickel alloys ..	£37,500	£34,800

The imported and exported alloys were of nearly the same average value per ton.

White Metal Alloys.

Total make.—Firms were required to state their total make of anti-friction metal and type-metal and the aggregates returned were :—Anti-friction metal, 5,680 tons, of which 3,980 tons were returned by firms chiefly engaged in making white metal alloys ; and type-metal, 6,150 tons, of which 3,970 tons were returned by white metal alloy manufacturers. About 510 tons of anti-friction metal made by the firms mainly engaged in its manufacture were used in the production of other goods in the same works.

Production for sale or stock.—The output for sale or stock of white metal alloys and manufactures thereof in 1924 is shown in the following table, the output of the firms chiefly engaged in making such products being distinguished from that of other firms that made returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades and of firms that made their returns on other trades :—

White metal alloys and manufactures.	Value of output returned		
	By firms chiefly makers of white metal alloys.	On all schedules for the Non- ferrous Metal Trades.	On schedules for all trades.
Anti-friction metal	£'000 545	£'000 816	£'000 816
(Tons)	(3,470)	(5,170)	(5,170)
Type metal	186	273	273
(Tons)	(3,800)	(5,980)	(5,980)
Other white metal alloys (except soft solder) :—			
Quantity stated	51	175	181
(Tons)	(1,170)	(2,630)	(2,720)
Quantity not stated	72	72	74
Finished white metal goods	262	262	263
TOTAL VALUE	1,116	1,598	1,607

Of the total value of white metal alloys and manufactures thereof, the firms that were mainly makers of these products accounted for nearly 70 per cent. The gross output of these firms was valued at £1,445,000 of which white metal alloys and manufactures accounted for £1,116,000, or over 77 per cent.

The value of the anti-friction metal returned in 1907 as made for sale or stock was £69,000 and that of other white metal alloys, £282,000. Even after allowing for changes in the level of prices there was apparently a considerable increase in the production of white metal alloys in 1924.

Examination of the individual returns suggests that there was no serious duplication in the gross total shown above.

Exports and imports.—Exports and imports of white metal alloys were not shown separately in 1907. In 1924 they were as follows :—

	<i>Retained</i>	
	<i>Exports.</i>	<i>imports.</i>
	tons.	tons.
Anti-friction metal	1,979	100
Type metal	855	72
Other white metal alloys (except soft solder)	546	531

Other non-ferrous metals.

Production for sale or stock.—The following table shows the output for sale or stock in 1924 of antimony, tungsten, arsenic, bismuth, cobalt, magnesium, mercury, and other minor non-ferrous metals and manufactures thereof, distinguishing the output of those firms mainly engaged in the making of these products from that of other firms that made their returns on schedules for the Non-ferrous Metals (Smelting, etc.) Trades and of firms that made their returns on schedules for other trades :—

Kind of goods.	Value of output returned		
	By firms mainly producing tungsten, antimony, etc.	On all schedules for the Non-ferrous Metals Trades.	On schedules for all trades.
	£'000	£'000	£'000
Tungsten in all forms, except ferro-tungsten (<i>Th. lb.</i>)	103 (712·0)	103 (712·0)	116 (712·5)
Antimony, bismuth, cobalt, magnesium, mercury, etc. and manufactures thereof	235	444	504
Other non-ferrous metals or alloys ..	—	240	241
TOTAL VALUE	338	787	861

Of the total value of the output of the metals and manufactures dealt with above, firms chiefly engaged in manufacturing such products accounted for over 39 per cent. The gross output of these firms was valued at £525,000.

There is no duplication in the output of this group of firms.

According to the Fourth Annual Report of the Secretary for Mines (1924) 1·69 tons of tungsten ores valued at £29 per ton at mine were raised in the United Kingdom in 1924, their metallic content being expressed as 68 per cent. of tungstic oxide.

The tungsten concentrates imported into the United Kingdom in 1924 and retained were 1,178 tons valued at £50,112, or £42·5 per ton.

Value of output of Lead, Tin, Zinc, etc. Trades, free from duplication.

The gross output of this group of trades was returned as £32,081,000 for 1924, and in the foregoing pages calculations have been made as to the approximate amount of duplication within each specialised

trade, the elimination of which has given the following figures of output for each trade :—

Trade.	Output. £'000
Lead	8,450— 9,850
Tin	10,710—11,110
Zinc	1,833
Aluminium	2,450— 3,650
Nickel and nickel alloys	2,750— 2,930
White metal alloys	1,445
Other metals	525
Total	28,163—31,343

There remains, however, the possibility of duplication between metal sold in a crude form by the firms that produced it to manufacturers in another of the group of trades covered by this report. Thus, for example, lead smelting firms whose whole output is included in the figure of £8,450,000—£9,850,000 shown above returned an output of tin manufactures made from imported tin or from tin purchased from firms of tin smelters, etc., whose output is included in the figure of £10,710,000 to £11,110,000. Examination of the returns shows that purchases of this kind may have occurred up to a sum lying between £1,000,000 and £1,200,000, and the metals represented may have been purchased either from importers or from British smelters. The output, free from duplication, of this group of trades, taken as a whole, may, therefore, be estimated as lying between £27,000,000 and £31,350,000. The corresponding net figure for 1907 was estimated as lying between £9,749,000 and £10,436,000.

Cost of materials and work given out.

The cost of the materials used by this group of trades was returned as £25,853,000 for 1924. Eliminating purchases between firms mainly occupied in dealing with one kind of metal, the following statement is obtained as to the cost of materials used in each of the seven divisions into which the group of trades has been divided :—

Trade.	<i>Cost of materials purchased from outside the trade.</i> £'000.
Lead	6,730— 8,130
Tin	10,030—10,430
Zinc	1,358
Aluminium	890— 2,090
Nickel and nickel alloys	1,550— 1,700
White metal alloys	994
Other metals	337
Total	21,889—25,039

Allowing again for the possible purchase by firms in one of the above trades from firms in the other trades of materials which, however, may equally have been purchased from importers, the range of the possible cost of materials purchased from outside this group of trades taken as a whole may be estimated as lying between £20,700,000 and £25,000,000; the corresponding figure for 1907 was estimated as lying between £6,696,000 and £7,834,000.

The amount paid to other firms for work given out to them was returned as £44,000 in 1924 and £10,000 in 1907.

Net output.

The net output in 1924 of the firms that made their returns on schedules for the Lead, Tin, Zinc, etc. (Smelting, Rolling and Casting) Trades (whose gross output was valued at £32,081,000) was £6,184,000, that sum representing, without duplication, the total amount by which the value, as delivered, of the aggregate output exceeded the cost, as purchased, of the materials used and the amount paid to other firms for work given out to them.

The net output per head of persons employed in the censal year 1924 was £285, as compared with £151 in 1912 and £133 in 1907.

Employment.

The following table sets out certain particulars regarding employment in the Lead, Tin, Zinc, etc. (Smelting, Rolling and Casting) Trades in 1924, together with those relating to the two previous censal years. For the purpose of this comparison, the average numbers of operatives of each sex returned for 1924 have been divided between the two age-groups in the proportions shown by the data relating to the week ended 18th October.

Average number.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
1924.						
Operatives	1,471	16,400	716	2,745	2,187	19,145
Administrative, etc. ..	139	2,001	70	544	209	2,545
TOTAL	1,610	18,401	786	3,289	2,396	21,690
1912.						
Wage earners	678	8,114	554	1,277	1,232	9,391
Salaried	78	896	15	99	93	995
TOTAL	756	9,010	569	1,376	1,325	10,386
1907.						
Wage earners	485	6,437	345	972	830	7,409
Salaried	55	767	10	57	65	824
TOTAL	540	7,204	355	1,029	895	8,233

The numbers of operatives recorded month by month in 1924 ranged from 552 below the average, in January, to 853 above the average, in December.

Mechanical power.

Information regarding the power equipment of the Lead, Tin, Zinc, etc., Trades is given in the following table, which sets out the particulars for the three censal years relating to the capacity and kinds of *prime movers* and the capacity of *electric generators* installed.

Power equipment.	1924.			1912.	1907.
	Ordinarily in use.	In reserve or idle.	Total.	Total.	Total.
PRIME MOVERS.					
Reciprocating steam engines	H.P.	H.P.	H.P.	H.P.	H.P.
Steam turbines	13,252	2,952	16,204	8,893	8,538
Gas engines	—	—	—	—	20
Petrol and light oil engines ..	1,607	1,030	2,637	1,740	2,589
Heavy oil engines	30	—	30	22	
Water power	—	50	50	—	
TOTAL	47,861	150	48,011	13,815	7,351
TOTAL	62,750	4,182	66,932	24,470	18,498
ELECTRIC GENERATORS.					
Driven by :—	Kw.	Kw.	Kw.	Kw.	Kw.
Reciprocating steam engines	5,580	1,964	7,544	1,594	621
Gas engines	192	591	783	9,531	5,676
Petrol and light oil engines ..	—	—	—		
Heavy oil engines	—	35	35		
Water power	30,929	29	30,958	—	—
TOTAL	36,701	2,619	39,320	11,125	6,297

The capacity of *electric motors* at factories in 1924 and in 1912 was as shown below :—

Electric motors.	1924.			1912.
	Ordinarily in use.	In reserve or idle.	Total.	Total.
Driven by :—	H.P.	H.P.	H.P.	H.P.
Electricity generated in own works ..	15,211	2,064	17,275	2,567
Purchased electricity	34,828	3,879	38,707	8,265

Corresponding information was not required for 1907. The total number of Board of Trade units of electricity purchased for power and lighting purposes in that year was returned as 279,000.

III.—THE GOLD AND SILVER REFINING TRADE.

Introductory.*

The tables on pages 397 to 404 include particulars received from firms in Great Britain whose business in 1924 consisted wholly or mainly in the refining, casting and rolling of gold and silver. The number of such separate returns was 54. Production was mainly confined to England and Wales, and no output was recorded for Northern Ireland in 1924 nor for Ireland in 1912 and 1907.

Summary of results.—The following table shows the main results of the Censuses of 1924, 1912 and 1907, comparisons between the figures for the three years being subject to the qualifications mentioned in the next paragraph. The particulars shown for 1912 cover the whole of the Gold and Silver Refining Trade in that year, no firms engaged in that trade having claimed the exemption from giving detailed returns which was offered to firms employing five persons or less.

Particulars.	Unit.	1924.	1912.	1907.
Value of goods made and work done (gross output)	£'000	15,956	58,501	51,226
Cost of materials used	"	14,932	57,830	50,780
Paid for work given out to other firms ..	"	10	19	15
Net output	"	1,014	652	431
Average number of persons employed ..	No.	1,931	2,450	2,187
Net output per person employed ..	£	523	261	197
Mechanical power available :—				
Prime movers	H.P.	332	1,747	1,648
Electric motors driven by purchased electricity	"	4,966	2,684	(not recorded)

Qualifications affecting comparisons.—In considering the above table and the other tables in this report which show figures for different censal years, it should be borne in mind that :—

(1) The comparability of figures relating to the cost of materials and net output is affected by the changes which have taken place in the general purchasing power of money.

(2) In 1907 and 1912 certain lead smelting firms were grouped in the Gold and Silver Refining Trade on account of the high value of the output of silver extracted by them from argentiferous lead. In 1924 that output was relatively small, and the extracting firms were accordingly classed with other lead smelting firms (see pages 373 to 376).

Value of output and cost of materials.—The figures in the above table representing the value of goods made and work done and the cost of materials used, are the aggregates of the figures recorded by

* See also the Notes on pages vii—xv.

the firms that made returns, and, for the reasons explained in paragraphs (i) and (ii) on pages xii and xiii, they overstate the value of the output of, and the cost of the materials used by, the Gold and Silver Refining Trade considered as a whole. The matter is discussed on page 393, where it is estimated that the value, free from duplication, of the output of the Gold and Silver Refining Trade in 1924 lay between £15,100,000 and £15,400,000, and the cost of the materials purchased from sources outside that trade and worked up into its products lay between £14,100,000 and £14,400,000.

Production.

Total output of refined gold, silver and platinum.—Firms were required to state the total quantities of precious metals extracted or refined by them in 1924, whether these were used by them in further manufacture or not. The following table shows the aggregates of the quantities returned :—

Refined metals.	Returned on schedules for		
	The Gold and Silver Refining Trade.	Other trades.	All trades.
	Oz. Troy.	Oz. Troy.	Oz. Troy.
Gold	1,730,124	9,254	1,739,378
Silver	36,808,355	1,579,778	38,388,133
Platinum	46,153	8,899	55,052

Of the quantities shown above the refiners used in their own works 106,393 oz. of gold, 2,048,855 oz. of silver, and 192 oz. of platinum, the remainder being sold or added to stock. In 1907 refining firms were not required to state the total quantities of precious metals refined by them.

The silver included in the above table was not all of the same fineness, as the following table indicates :—

Grade of refined silver.	Returned on schedules for		
	The Gold and Silver Refining Trade.	Other trades.	All trades.
	Oz. Troy.	Oz. Troy.	Oz. Troy.
Used in firm's own works	2,048,855	—	2,048,855
Sold or added to stock :—			
36 <i>d.</i> per oz. and upwards	8,153,452	1,431,831	9,585,283
35 <i>d.</i> per oz.	55,188	91,018	146,206
33 <i>d.</i> to 34·5 <i>d.</i> per oz.	26,550,860	56,929	26,607,789
TOTAL	36,808,355	1,579,778	38,388,133

As the price of silver varied but little in the course of 1924, the silver priced at 36*d.* per oz. and upwards was probably *fine* silver (998) and that priced at 34·5*d.* or less was probably of *standard* fineness (925); the position of the 35*d.* per oz. silver is doubtful. From the character of the firms in the Gold and Silver Refining Trade handling the silver of standard fineness it seems probable that about 90 per cent. of the output of this fineness was sold to the silver-using trades or added to stocks, the remainder being sold to firms making fine silver.

Precious metals sold or added to stock.—The following statement affords for 1924, 1912 and 1907, a comparison of the main products of the Gold and Silver Refining Trade as returned on schedules for all trades :—

Precious metals.	1924.		1912.	1907.
	Returned on schedules for			
	The Gold and Silver Refining Trade.	All trades (including other sections of the Non-ferrous Metals Trades).	Total.	Total.
	£'000	£'000	£'000	£'000
Gold :—				
Refined	7,599	7,640	49,171	41,993
<i>(Th. oz. Troy)</i>	<i>(1,623·7)</i>	<i>(1,633·0)</i>	<i>(11,581)</i>	<i>(10,368)</i>
Leaf	157	157	374	661
<i>(Millions)</i>	<i>(43·1)</i>	<i>(43·1)</i>		
Manufactures	711	866		
<i>(Th. oz. Troy)</i>	<i>(517·8)</i>	*		
TOTAL VALUE—Gold ..	8,467	8,663	49,545	42,654
Silver :—				
Refined	5,013	5,254	5,800	6,079
<i>(Th. oz. Troy)</i>	<i>(34,765)</i>	<i>(36,344)</i>	<i>(44,612)</i>	<i>(43,979)</i>
Manufactures	664	667	612	593
<i>(Th. oz. Troy)</i>	<i>(4,102)</i>	<i>(4,118)</i>	—	—
TOTAL VALUE—Silver ..	5,677	5,921	6,412	6,672
Platinum :—				
Refined	1,182	1,388	745	274
<i>(Th. oz. Troy)</i>	<i>(46·0)</i>	<i>(54·9)</i>		
Dental and alloys	47†	47†		
TOTAL VALUE—Platinum	1,229	1,435	745	274
Other precious metals (including unrefined gold, silver and platinum)	374	652	—	—
Scrap, sweepings, etc.	23	23	350	178
TOTAL	15,770	16,694	57,052	49,778

* No weight was stated for the manufactures (valued at £155,000) returned on schedules for other trades.

† Platinum valued at £14,000 was stated to weigh 1,350 oz. Troy; for the remainder no weight was given.

Compared with 1907 and 1912 there was a very large reduction in 1924 in the output of gold. As regards silver, comparison between the figures for 1907 and 1924 may be misleading, since the figures for the earlier year include some silver bought and re-sold by bullion dealers.

Other products.—In addition to the precious metals shown in the table above, firms that made their returns on schedules for the Gold and Silver Refining Trade recorded an output of other goods which, being of kinds mainly produced by other trades, are dealt with in the reports on those trades. These goods are set out below and the corresponding figures for 1907 and 1912 are also shown :—

	1924.	1912.	1907.
	£'000	£'000	£'000
Non-ferrous metals and alloys, including copper sulphate ..	127	1,866	2,319
Other goods made	7	60	82
Total	134	1,926	2,401

The large amounts shown for 1907 and 1912 for non-ferrous metals and alloys relate mainly to lead produced by firms engaged in the extraction of silver from argentiferous lead; as already stated, the returns of those firms were, in 1924, included with the lead smelting group (pages 373 to 376).

Work done for the trade.—The amount recorded as received for work done for the trade in 1924 by firms that made their returns on Schedules for the Gold and Silver Refining Trade was £52,000, of which £27,000 was for rolling. The corresponding total for 1907 was £23,000, of which £10,000 was for rolling, and that for 1912, £14,000.

Value of output free from duplication.—The unrefined gold and unrefined silver returned on schedules for the Gold and Silver Refining Trade were most probably all sold to refining firms, and their value is thus duplicated. There is also possible duplication in respect of silver refined by one firm and sold to another firm in the same trade, in respect of gold used in the production of gold leaf, in respect of precious metals used in making alloys and manufactures by firms that were not refiners, and in respect of scrap and sweepings sold to refiners. From a scrutiny of the separate returns it is estimated that the possible amount of duplication involved in all these items was between £550,000 and £850,000. There may also have been duplication to the extent of £10,000 in respect of work given out to other firms.

The value of the gross output returned on schedules for the Gold and Silver Refining Trade was £15,952,000, and it may thus be estimated that the value, free from duplication, of the output of this trade in 1924 lay between £15,100,000 and £15,400,000.

Cost of materials and work given out.—The cost of the materials used by firms that made their returns on schedules for the Gold and Silver Refining Trade was returned as £14,932,000 for 1924, a sum which, by the exclusion of purchases from other firms in the same trade, is reduced to an amount lying between £14,100,000 and £14,400,000.

The amount paid to other firms for work given out to them was £10,000 in 1924, £19,000 in 1912 and £15,000 in 1907.

Net output.—The net output in 1924 of the firms that made their returns on schedules for the Gold and Silver Refining Trade (whose gross output was valued at £15,956,000) was £1,014,000, that sum representing, without duplication, the total amount by which the value, as delivered, of the aggregate output exceeded the cost, as purchased, of the materials used and the amount paid to other firms for work given out to them.

The net output per head of persons employed in the censal year 1924 was £523, as compared with £261 in 1912 and £197 in 1907.

Exports and imports.—The exports and imports of refined gold and silver do not bear any relation to the output of British refiners. Retained imports of gold leaf in 1924 were 33·7 million leaves, valued at £81,790, c.i.f., or over 78 per cent. of the number produced in the United Kingdom. British exports were 1,436,000 leaves, valued at £4,800, f.o.b. In 1907 retained imports were 61·4 million leaves, but British exports were not recorded. The other manufactures of gold and silver were chiefly gold alloys and standard silver sheet and wire, which are not recorded separately in the Trade Returns.

The unrefined platinum produced in the United Kingdom in 1924 was extracted from imported concentrates or from scrap. Only 9,799 oz. Troy of unrefined platinum were imported into and retained in the United Kingdom in 1924.

The retained imports of refined platinum in that year amounted to 34,923 oz., and it is not known whether any part of this was further refined in the United Kingdom. It may be noted also that the retained imports of unrefined platinum in 1925 amounted to 57,523 oz. Troy, and that some of the Census returns related to periods ending in March or June, 1925.

Employment.

The following table sets out certain particulars regarding employment in the Gold and Silver Refining Trade in 1924 together with those relating to the two previous censal years. For the purpose of this comparison, the average numbers of operatives of each sex returned for 1924 have been divided between the two age-groups in the proportions shown by the data relating to the week ended 18th October.

Average number.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
1924.						
Operatives	144	1,263	46	279	190	1,542
Administrative, etc. ..	4	305	6	84	10	389
TOTAL	148	1,568	52	363	200	1,931
1907.						
Wage earners	84	1,808	18	71	102	1,879
Salaried	17	266	7	42	24	308
TOTAL	101	2,074	25	113	126	2,187

The numbers of operatives recorded month by month in 1924 ranged from 37 above the average, in January, to 53 below the average, in June.

Mechanical Power.

Information regarding the power equipment of the Gold and Silver Refining Trade is given in the following table which sets out, for the three censal years, particulars relating to the capacity and kinds of *prime movers* and the capacity of *electric generators* installed:—

Power equipment.	1924.			1912.	1907.
	Ordinarily in use.	In reserve or idle.	Total.	Total.	Total.
	H.P.	H.P.	H.P.	H.P.	H.P.
Prime movers :—					
Reciprocating steam engines ..	148	—	148	1,365	1,484
Gas engines	149	35	184	382	116*
Water power	—	—	—	—	48
TOTAL	297	35	332	1,747	1,648
	Kw.	Kw.	Kw.	Kw.	Kw.
Electric generators :—					
Driven by :—					
Reciprocating steam engines ..	—	—	—	29	43
Gas engines	—	—	—	44	—
TOTAL	—	—	—	73	43

* Returned as *internal combustion engines* (gas, oil, etc.).

The capacity of *electric motors* recorded in 1924 and 1912 was as shown below :—

Electric motors.	1924.			1912.
	Ordinarily in use.	In reserve or idle.	Total.	Total.
	H.P.	H.P.	H.P.	H.P.
Driven by :—				
Electricity generated in own works ..	—	—	—	337
Purchased electricity	4,466	500	4,966	2,684

Corresponding information was not required for 1907. The total number of Board of Trade units of electricity purchased for power and lighting purposes in that year was returned as 455,000.

Wages in 1924 in the Non-ferrous Metals (Smelting, etc.) Trades as a whole.

Under the Census of Production Act, 1906, the powers of the Board of Trade to require information do not extend to particulars of the amount of wages paid, and, consequently, no information on this head was secured in connexion with the Census of 1924. As a result however, of the voluntary enquiry undertaken by the Ministry of Labour into wages and hours in the United Kingdom in 1924, information was obtained as to the total wage-bill of a group of firms in the Non-ferrous Metals (Smelting, Rolling and Casting) Trades, that made returns both to the Ministry of Labour and to the Census of Production office. According to the Census records this group of firms employed, in the week ended 18th October, 1924, 30,080 operatives, or 66 per cent. of the total of 45,683 operatives for the trades as a whole, and their net output totalled £9,845,000 or 73 per cent. of the aggregate net output of £13,517,000 for the trades as a whole. The total wage-bill of these firms, as returned to the Ministry of Labour, was £4,209,000, representing about 43 per cent. of their aggregate net output.

TABLES.

I. Summary of results.

Particulars.	Unit.	England and Wales.	Scotland.	Great Britain.	Northern Ireland.
Value of goods made and work done (gross output)	£'000	69,476	2,079	71,555	93
Cost of materials used	"	56,682	1,244	57,926	71
Paid for work given out to other firms	"	131	3	134	—
Net output	"	12,663	832	13,495	22
Average number of persons employed	No.	48,786	2,145	50,931	150
Net output per person employed	£	260	388	265	147
Mechanical power available :—					
Prime movers	H.P.	65,574*	40,838	106,412*	*
Electric motors driven by purchased electricity	"	110,153*	3,201	113,354*	*

* In order to avoid the possible disclosure of information relating to individual firms, the particulars for Northern Ireland have been combined with those for England and Wales and for Great Britain.

II. Production.

A.—TOTAL MAKE OF CERTAIN NON-FERROUS METALS IN 1924 (AS RETURNED ON SCHEDULES FOR THE NON-FERROUS METALS (SMELTING, ETC.) TRADES).

Non-ferrous metals.	England and Wales.	Scotland.	Great Britain.†
	Tons.	Tons.	Tons.
Brass : Sheets and strip (including circles and discs)	42,226	—	42,226
Copper : Bars, blocks, slabs, etc.	*	*	37,810
Plates, sheets, strips, etc. (including circles and discs)	29,580	—	29,580
Lead : Pig	60,184	801	60,985
Sheet	*	*	42,695
White lead (basic carbonate)	Cwts. 564,984	—	Cwts. 564,984
Nickel alloys (ingots, sheet, strip, etc.)	Tons. *	*	Tons. 5,843
Tin : Soft solder	*	*	8,723
Blocks, ingots, etc.	*	*	38,465
Zinc : Crude (cakes, slabs, blocks, etc.)	46,102	1,250	47,352
Rolled sheets, plates and discs (excluding printing plates)	*	*	4,233
White metal alloys : Anti-friction metal	5,581	102	5,683
Type metal	*	—	6,138
Gold, refined, in bars	Th. oz. Troy. 1,739·4	—	Th. oz. Troy. 1,739·4
Silver, refined	38,197·2	—	38,197·2
Platinum, refined	55·1	—	55·1

* In order to avoid the possible disclosure of information relating to individual firms, figures are given only for Great Britain as a whole.

† No production of crude or semi-crude metal was recorded for Northern Ireland.

B.—OUTPUT SOLD OR ADDED TO STOCK AND WORK DONE.

Kind of goods made and work done.	Unit.	England and Wales and N.Ireland.†	Scotland.	United Kingdom.
Quantity and selling value.				
Brass and other alloys of copper :—				
Sheets and strip (including circles and discs)	Tons £'000	38,806 3,295	— —	38,806 3,295
Wire :—				
Circular { Under No. 20 gauge ..	Tons £'000	620 67	— —	620 67
section { No. 20 gauge and over	Tons £,000	8,563 807	— —	8,563 807
Other than circular	Tons £,000	1,090 126	— —	1,090 126
TOTAL—Wire	Tons £,000	10,273 1,000	— —	10,273 1,000
Rods in straight lengths	Tons £,000	* *	* *	30,236 2,096
Tubes :—				
Solid drawn	Tons £'000	10,866 1,369	— —	10,866 1,369
Brazed	Tons £,000	1,455 216	— —	1,455 216
†Other manufactures of brass and other alloys of copper (including ingot brass)	Tons £,000	48,005 4,064	4,672 333	52,677 4,397
TOTAL—Brass and other alloys of copper	Tons £'000	* *	* *	144,313 12,373
Copper :—				
Bars, blocks, slabs, ingots and cakes	Tons £'000	* *	* *	26,324 1,845
Plates, sheets, strips, etc. (including circles and discs)	Tons £'000	29,081 2,708	— —	29,081 2,708
Rods, in straight lengths or coils ..	Tons £,000	5,773 527	— —	5,773 527
Wire in coils (including uninsulated electric wire) :—				
Circular { Under No. 20 gauge ..	Tons £'000	1,935 197	— —	1,935 197
section { No. 20 gauge and over	Tons £'000	13,534 1,197	— —	13,534 1,197
Other than circular	Tons £'000	97 11	— —	97 11
TOTAL—Wire	Tons £'000	15,566 1,405	— —	15,566 1,405
Tubes :—				
Solid drawn	Tons £'000	10,849 1,313	— —	10,849 1,313
Other	Tons £'000	* *	* *	214 44
Other copper manufactures (including copper sulphate) { Quantity stated ..	Tons £'000	34,928 1,160	146 24	35,074 1,184
{ Quantity not stated	Tons £'000	123	57	180
TOTAL VALUE—Copper	£'000	* *	* *	9,206

*† See notes on page 402.

B.—OUTPUT SOLD OR ADDED TO STOCK AND WORK DONE—contd.

Kind of goods made and work done.	Unit.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
Quantity and selling value.				
Lead :—				
Pig	Tons £'000	48,931 1,668	801 27	49,732 1,695
Sheet	Tons £'000	* *	* *	42,530 1,720
†Pipes	Tons £'000	47,112 2,018	5,540 237	52,652 2,255
Foil	Tons £'000	5,049 259	— —	5,049 259
White lead (basic carbonate) ..	Cwts. £'000	550,364 1,175	— —	550,364 1,175
Other manufac- { Quantity stated ..	Tons £'000	20,480 882	1,065 51	21,545 933
tures { Quantity not stated	Tons £'000	402	—	402
TOTAL VALUE—Lead	£'000	* *	* *	8,439
Tin :—				
Solder, soft	Tons £'000	* *	* *	8,711 1,172
Blocks, ingots, bars and slabs ..	Tons £'000	* *	* *	38,465 9,480
Foil	Tons £'000	932 311	— —	932 311
Other manufac- { Quantity stated ..	Tons £'000	* *	* *	512 128
tures { Quantity not stated	Tons £'000	50	—	50
TOTAL VALUE—Tin	£'000	* *	* *	11,141
Zinc :—				
Crude (cakes, slabs, blocks, etc.)	Tons £,000	46,032 1,563	1,250 41	47,282 1,604
Rolled sheets, plates and discs (excluding printing plates)	Tons £,000	* *	* *	4,233 185
Other manufactures	Tons £'000	* *	* *	647 40
TOTAL—Zinc	Tons £'000	50,586 1,773	1,576 56	52,162 1,829
Aluminium :—				
Crude (ingots, blocks, billets, notch bars, sticks, wirebar, slabs, alloy and scrap) and plates, sheets, bars, sections, tubes, wire, strand, etc.	Tons £,000	* *	* *	18,916 2,408
Hollow-ware, domestic, and vats, tanks, etc., for industrial purposes	Tons £'000	* *	* *	136 40
†Other manufactures	Tons £'000	8,006 1,667	80 18	8,086 1,685
TOTAL—Aluminium	Tons £,000	* *	* *	27,138 4,133
Nickel (pellets, cubes, rondels, plates, sheets and other manufactures) ..	Tons £'000	* *	* *	10,447 1,182

*† See notes on page 402.

B.—OUTPUT SOLD OR ADDED TO STOCK AND WORK DONE—*contd.*

Kind of goods made and work done.	Unit.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
Quantity and selling value.				
Nickel alloys :—				
Ingots, sheet, strip, uncovered wire, etc. (including circles and discs)	Tons	*	*	5,309
	£'000	*	*	786
Manufactures (including tubes) ..	Tons	*	*	1,396
	£'000	*	*	152
TOTAL—Nickel and nickel alloys	Tons	*	*	17,152
	£,000	*	*	2,120
White metal alloys (i.e., alloys of tin, lead, zinc, antimony, etc., other than soft solder) :—				
Unwrought or partly wrought :—				
Anti-friction metal	Tons	5,072	102	5,174
	£'000	803	13	816
Type metal	Tons	*	*	5,976
	£'000	*	*	273
Other sorts { Quantity stated ..	Tons	2,632	—	2,632
	£'000	175	—	175
Quantity not stated	£'000	72	—	72
Finished goods of white metal ..	£'000	262	—	262
TOTAL VALUE—White metal alloys	£'000	*	*	1,598
Tungsten in all forms (except ferro-tungsten)	lb.	712,016	—	712,016
	£'000	103	—	103
Antimony (regulus and manufactures), bismuth (metal), cobalt (including alloys and manufactures), magnesium (metallic), mercury, etc.	£'000	444	—	444
Gold :—				
Refined, in bars	Th. oz.	1,633·0	—	1,633·0
	Troy	7,640	—	7,640
	£'000	*	*	43·1
Leaf	Millions	*	*	157
Other manufactures	Th. oz.	517·8	—	517·8
	Troy	711	—	711
	£'000	*	*	8,508
TOTAL VALUE—Gold	£'000	*	*	8,508
Silver :—				
Refined	Th. oz.	36,344	—	36,344
	Troy	5,254	—	5,254
	£'000	4,118	—	4,118
Manufactures	Th. oz.	667	—	667
	Troy	—	—	—
	£'000	—	—	—
TOTAL—Silver	Th. oz.	40,462	—	40,462
	Troy	5,921	—	5,921
	£'000	—	—	—
Platinum :—				
Refined	Th. oz.	54·9	—	54·9
	Troy	1,388	—	1,388
	£,000	—	—	—

*† See notes on page 402.

B.—OUTPUT SOLD OR ADDED TO STOCK AND WORK DONE—*contd.*

Kind of goods made and work done.	Unit.	England and Wales and N. Ireland.†	Scotland.	United Kingdom.
Quantity and selling value.				
Platinum— <i>continued.</i>				
Alloys (including dental platinum) { Quantity stated ..	Th. oz.	1·3	—	1·3
	Troy	—	—	—
	£'000	14	—	14
Quantity not stated	£'000	33	—	33
TOTAL VALUE—Platinum ..	£'000	1,435	—	1,435
Other precious metals (including unrefined gold, silver and platinum) { Quantity stated ..	Th. oz.	1,299	—	1,299
	Troy	353	—	353
	£'000	299	—	299
Quantity not stated	£'000	*	*	75
Other non-ferrous metals or alloys, not elsewhere specified :—				
Unwrought .. { Quantity stated ..	Tons	*	*	9
	£'000	*	*	17
Quantity not stated	£'000	*	*	700
Wrought or manufactured { Quantity stated ..	Tons	700	—	700
	£'000	173	—	173
Quantity not stated	£'000	*	*	310
Scrap metal and old metal fit only for re-manufacture :—				
†Copper and scale	Tons	*	*	4,421
	£'000	*	*	191
†Brass and other alloys of copper	Tons	9,798	594	10,392
	£'000	420	24	444
Other sorts .. { Quantity stated ..	Tons	6,023	1,762	7,785
	£'000	183	70	253
Quantity not stated	£'000	104	—	104
Concentrates, residues and grindings .. { Quantity stated ..	Tons	*	*	5,160
	£'000	*	*	96
Quantity not stated	£'000	*	*	59
Sweepings, etc., containing precious metals	£'000	23	—	23
Finished brass goods	£'000	328	14	342
Iron and steel :—				
Tubes { Quantity stated ..	Tons	1,192	—	1,192
	£'000	79	—	79
Quantity not stated	£'000	39	—	39
Manufactures .. { Quantity stated ..	Tons	3,000	—	3,000
	£'000	102	—	102
Quantity not stated	£'000	167	—	167
Scrap	£'000	179	—	179
Putty	£'000	9	—	9
Other goods made	£'000	537	7	544
TOTAL VALUE OF GOODS MADE	£'000	68,982	2,060	71,042
Amount received.				
†Repair work	£'000	103	19	122
Work done on commission or for the trade :—				
Casting—				
Brass and other alloys of copper ..	£'000	57	—	57
Nickel alloys	£'000	8	—	8
Other non-ferrous metals	£'000	8	—	8

*† See notes on page 402.

B.—OUTPUT SOLD OR ADDED TO STOCK AND WORK DONE—*contd.*

Kind of goods made and work done.	Unit.	Amount received.		
		England and Wales and N.Ireland.†	Scotland.	United Kingdom.
Work done on commission or for the trade— <i>continued.</i>				
Rolling—				
Copper	£'000	22	—	22
Brass	£'000	72	—	72
Nickel alloys	£'000	124	—	124
Rolling and drawing of other non-ferrous metals (including drawing of brass wire)	£'000	38	—	38
Refining	£'000	50	—	50
†Coppersmiths' and braziers' work	£'000	25	—	25
Other work	£'000	80	—	80
TOTAL VALUE OF REPAIR WORK AND WORK DONE FOR THE TRADE	£'000	587	19	606
TOTAL VALUE OF GOODS MADE AND WORK DONE (GROSS OUTPUT)	£'000	69,569	2,079	71,648

*In order to avoid the possible disclosure of information relating to individual firms, figures are given only for the United Kingdom as a whole.

†In order to avoid the possible disclosure of information relating to individual firms, the figures for Northern Ireland have been combined with those for England and Wales. The items concerned are also marked thus †.

III. Employment.

A.—NUMBERS EMPLOYED IN WEEK ENDED 18TH OCTOBER, 1924.

Kind of staff.	Males.		Females.		Males and females.	
	Under 18.	All ages.	Under 18.	All ages.	Under 18.	All ages.
<i>England and Wales :—</i>						
Operatives	3,793	39,008	1,118	4,629	4,911	43,637
Administrative, etc.*	336	4,363	165	1,298	501	5,661
TOTAL	4,129	43,371	1,283	5,927	5,412	49,298
<i>Scotland :—</i>						
Operatives	153	1,815	31	111	184	1,926
Administrative, etc.*	10	211	9	64	19	275
TOTAL	163	2,026	40	175	203	2,201
<i>Great Britain :—</i>						
Operatives	3,946	40,823	1,149	4,740	5,095	45,563
Administrative, etc. ..	346	4,574	174	1,362	520	5,936
TOTAL	4,292	45,397	1,323	6,102	5,615	51,499
<i>Northern Ireland :—</i>						
Operatives	14	120	—	—	14	120
Administrative, etc. ..	3	15	1	7	4	22
TOTAL	17	135	1	7	18	142
<i>United Kingdom :—</i>						
TOTAL	4,309	45,532	1,324	6,109	5,633	51,641

* Administrative, technical and clerical staff.

B.—OPERATIVES EMPLOYED IN ONE WEEK IN EACH MONTH OF 1924.

England and Wales. (Annual average : Males, 38,468 ; Females, 4,657 ; Total, 43,125.)

Week ended.	Males.	Females.	Total.	Week ended.	Males.	Females.	Total.
Jan. 12th ..	37,306	4,551	41,857	July 19th ..	38,245	4,712	42,957
Feb. 16th ..	37,794	4,613	42,407	Aug. 16th ..	38,442	4,687	43,129
Mar. 15th ..	38,247	4,651	42,898	Sept. 13th ..	39,123	4,588	43,711
Apl. 12th ..	38,436	4,693	43,129	Oct. 18th ..	39,008	4,629	43,637
May 17th ..	38,030	4,695	42,725	Nov. 15th ..	39,266	4,669	43,935
June 21st ..	37,973	4,711	42,684	Dec. 13th ..	39,741	4,691	44,432

Scotland. (Annual average : Males, 1,766 ; Females, 104 ; Total, 1,870.)

Week ended.	Males.	Females.	Total.	Week ended.	Males.	Females.	Total.
Jan. 12th ..	1,726	96	1,822	July 19th ..	1,676	98	1,774
Feb. 16th ..	1,755	96	1,851	Aug. 16th ..	1,734	101	1,835
Mar. 15th ..	1,763	99	1,862	Sept. 13th ..	1,761	99	1,860
Apl. 12th ..	1,740	100	1,840	Oct. 18th ..	1,815	111	1,926
May 17th ..	1,744	102	1,846	Nov. 15th ..	1,854	115	1,969
June 21st ..	1,737	103	1,840	Dec. 13th ..	1,888	124	2,012

Great Britain. (Annual average : Males, 40,234 ; Females, 4,761 ; Total, 44,995.)

Week ended.	Males.	Females.	Total.	Week ended.	Males.	Females.	Total.
Jan. 12th ..	39,032	4,647	43,679	July 19th ..	39,921	4,810	44,731
Feb. 16th ..	39,549	4,709	44,258	Aug. 16th ..	40,176	4,788	44,964
Mar. 15th ..	40,010	4,750	44,760	Sept. 13th ..	40,884	4,687	45,571
April 12th ..	40,176	4,793	44,969	Oct. 18th ..	40,823	4,740	45,563
May 17th ..	39,774	4,797	44,571	Nov. 15th ..	41,120	4,784	45,904
June 21st ..	39,710	4,814	44,524	Dec. 13th ..	41,629	4,815	46,444

(Northern Ireland. (Annual average : Males, 128 ; Females, — ; Total, 128.)

Week ended.	Males.	Females.	Total.	Week ended.	Males.	Females.	Total.
Jan. 12th ..	146	—	146	July 19th ..	122	—	122
Feb. 16th ..	133	—	133	Aug. 16th ..	124	—	124
Mar. 15th ..	127	—	127	Sept. 13th ..	117	—	117
April 12th ..	120	—	120	Oct. 18th ..	120	—	120
May 17th ..	149	—	149	Nov. 15th ..	128	—	128
June 21st ..	126	—	126	Dec. 13th ..	128	—	128

IV. Mechanical Power.

PARTICULARS OF PRIME MOVERS, ELECTRIC GENERATORS AND ELECTRIC MOTORS.

Power Equipment.	England and Wales and Northern Ireland.*		Scotland.		United Kingdom.	
	Ordinarily in use.	In reserve or idle.	Ordinarily in use.	In reserve or idle.	Ordinarily in use.	In reserve or idle.
PRIME MOVERS :—	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Reciprocating steam engines	36,792	5,946	641	45	37,433	5,991
Steam turbines	1,830	1,455	—	—	1,830	1,455
Gas engines	8,083	3,020	308	54	8,391	3,074
Petrol and light oil engines ..	78	4	—	—	78	4
Heavy oil engines	38	90	—	—	38	90
Water wheels and water turbines	8,238	—	39,640	150	47,878	150
TOTAL	55,059	10,515	40,589	249	95,648	10,764
TOTAL OF PRIME MOVERS INSTALLED	65,574		40,838		106,412	
ELECTRIC GENERATORS :—	Kw.	Kw.	Kw.	Kw.	Kw.	Kw.
Driven by—						
Reciprocating steam engines	11,750	3,649	—	—	11,750	3,649
Steam turbines	1,372	1,086	—	—	1,372	1,086
Gas engines	1,790	1,709	—	—	1,790	1,709
Heavy oil engines	—	35	—	—	—	35
Water power	6,117	—	24,812	29	30,929	29
TOTAL	21,029	6,479	24,812	29	45,841	6,508
TOTAL OF ELECTRIC GENERATORS INSTALLED	27,508		24,841		52,349	
ELECTRIC MOTORS :—	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Driven by—						
Electricity generated in own works	33,456	2,894	1,438	71	34,894	2,965
Purchased electricity	94,665	15,488	2,848	353	97,513	15,841

* Gas engines (ordinarily in use) of a capacity of 48 horse-power were recorded in Northern Ireland. The remaining power equipment in Northern Ireland consisted of petrol and light oil engines and electric motors driven by purchased electricity, but details cannot be given without disclosing information relating to individual firms.