

**MINES AND QUARRIES****GENERAL REPORT**

The following report summarises the principal results of the Censuses of 1930 and 1924 for the mining and quarrying group of trades, of which detailed particulars are given in the succeeding reports on individual trades. The particulars relate to the United Kingdom except where otherwise specified.

At the 1924 Census complete information was collected by the Census of Production Office but, in order to obviate the necessity for firms to furnish identical particulars to the Census of Production Office and to the Mines Department in respect of the year 1930, it was arranged that the annual return made to the Mines Department should serve also for the Census of Production. As this return did not include the whole of the information required for the purposes of the Census of Production, a supplementary form asking for the additional information (viz., cost of materials used, power equipment, and consumption of fuel) was issued to all firms that employed an average of more than ten persons. So far as output and employment are concerned, therefore, the particulars for 1930 on which the reports in this group are based are the same as those contained in the Tenth Annual Report of the Secretary for Mines. The latter report, however, covers all firms in Great Britain, irrespective of their size, and should be referred to for complete particulars of production and of persons employed in 1930 in Great Britain. Similar particulars in respect of Northern Ireland are contained in the report on the Mining and Quarrying Industries for 1930 published by the Ministry of Commerce.

With regard to employment in 1930, the normal requirement of the Census of Production was for \*detailed figures showing the numbers of operatives and of administrative, technical and clerical staff actually employed in the week ended 18th October, 1930, classified according to sex and age, together with particulars of the total number of operatives employed in a specified week of each month of 1930. The information collected by the Mines Department in respect of mines and quarries showed the total numbers of operatives and of salaried persons (including clerical staff) employed at a specified date in each of the first three quarters of the year, together with a detailed classification according to sex and age of the numbers employed on 13th December. It will thus be seen that the basis of the employment statistics in the Mines and Quarries group differs somewhat from that in the other groups of trades covered by the Census of Production, but the difference is not sufficiently important to impair comparability between the results for the Mines and Quarries group and those for other groups.

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\* See Introductory Notes (page xiii).

## Principal results

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

Trade		Gross output (selling value of products and value of work done)	Cost of materials used	Net output (excess of Col. (2) over Col. (3))	Average number of persons employed	Net output per person employed	Power available*
(1)		(2)	(3)	(4)	(5)	(6)	(7)
		£'000	£'000	£'000	No.	£	Th. H.P.
Coal Mines ...	1930	166,770	28,124	138,646	932,434	149	3,603·6
	1924	251,337	41,608	209,729	1,197,164§	175	3,612·9
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines†	1930	14,083	2,729	11,354	59,563	191	193·0
	1924	13,624	2,986	10,638	53,159	200	111·7
Metalliferous Mines and Quarries ...	1930	3,503	811	2,692	13,455	200	72·0
	1924	4,045	1,127	2,918	15,683	186	72·7
Slate Mines and Quarries ...	1930	1,738	114	1,624	9,868	165	20·8
	1924	2,161	152	2,009	9,968	202	16·1
Salt Mines, Brine Pits and Salt Works ...	1930	1,250	362	888	3,524	252	23·9
	1924	1,870	761	1,109	5,010	221	19·9
TOTAL—UNITED KINGDOM	1930	187,344	32,140	155,204	1,018,844	152	3,913·3
	1924	273,037	46,634	226,403	1,280,984	177	3,833·3
England and Wales ...	1930†	165,562	27,894	137,668	909,910	151	3,442·3
	1924	238,853	40,502	198,351	1,129,734	176	3,321·3
Scotland ...	1930†	21,606	4,203	17,403	107,509	162	468·8
	1924	34,005	6,092	27,913	150,209	186	510·5
Northern Ireland	1930	176	43	133	1,425	93	2·2
	1924	179	40	139	1,041	134	1·5

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

§ Number employed in week ended 18th October, 1924.

† Including particulars of all mining and quarrying industries in Northern Ireland. Separate particulars for the various classes of mines and quarries in Northern Ireland are not available for either year, but according to the published information, the bulk of the products raised consisted of non-metalliferous minerals.

‡ Owing to the possible disclosure of information relating to individual concerns, the particulars relating to Metalliferous Mines and Quarries in Scotland in 1930 have been included with those for England and Wales.

**Comparability of results.**—The 1930 figures for Non-Metalliferous Mines and Quarries are overstated in relation to those of 1924 for two reasons: (1) At the 1924 Census, cement manufacturers that owned quarries or workings made combined returns covering their cement works and their quarries on the schedule for the Cement Trade, whereas at the 1930 Census they made separate returns for their quarries, the number of persons employed in 1930 at the quarries concerned being 2,275; (2) At the 1924 Census, particulars relating to quarries owned by Local Authorities were included in the general returns furnished by those Authorities, while at the 1930 Census corresponding particulars were furnished separately on the form for Non-Metalliferous Mines and Quarries, the number of persons employed in 1930 at the quarries concerned being about 4,000.

The extent of the overstatement in the 1930 figure of employment amounts, therefore, to more than 6,000, or over 10 per cent. of the total recorded for Non-Metalliferous Mines and Quarries for that year. The effect on the comparability of the group aggregates is, however, not of great importance, the number of employees involved being less than 1 per cent. of the total number recorded for 1930 for the mining and quarrying group.

**Deficiencies due to the exclusion of small firms.**—The report on each trade contains a section setting out the numbers of persons reported to have been employed in 1930 and 1924 by firms employing not more than ten persons. The total number of persons employed by the small firms was 11,653 in 1930 and 6,016 in 1924. These figures represent 1·1 and 0·5 per cent. respectively of the aggregates recorded by all firms in the two years, and indicate that in the mining and quarrying industries as a whole the small firms are of little relative importance.

**Periods covered by returns.**—All returns for the year 1930 from firms engaged in the mining and quarrying trades related to the calendar year.

## Production

In relation to the number of persons employed, the value of the gross output of the extractive industries is necessarily lower than in industrial groups which work up purchased materials into more finished forms. The above table shows that the cost of all purchased materials used in production in 1930 amounted to £32,140,000, or only 17 per cent. of the total value of the products.

Comparison between the group aggregates in respect of both gross and net output is largely governed by the dominating figures for the coal mining industry. In money value, both the gross and

the net output aggregates for the group declined by about 32 per cent. from the 1924 totals, while those for Coal Mines were lower by rather more than one-third. The value of the net output in 1930 was lower than in 1924 in each of the other trades with the exception of Non-Metalliferous Mines and Quarries, and the apparent increase in this case is more than accounted for by the greater number of workings covered at the 1930 Census (see page 357).

The net output per person employed in the group as a whole was 14 per cent. lower in 1930 than in 1924, although an increase was recorded both for Metalliferous Mines and Quarries (8 per cent.) and for Salt Mines, Brine Pits and Salt Works (14 per cent.). The decline in the case of Coal Mines amounted to 15 per cent. The net output per employee was lower in 1930 than in 1924 in each of the three geographical divisions of the United Kingdom, the decrease being most marked in the case of Northern Ireland (31 per cent.).

In connection with the above comparisons between productivity per employee based on net output, the qualifications mentioned in the Introductory Notes (pages x-xi), and in particular the fact that the element of profit or loss is included in the net output should not be overlooked. It will be seen from the following paragraph that, in contrast with the recorded decrease in the net output per employee, a substantial increase took place in the estimated volume of production per person employed.

**Volume of production.**—The following table shows, for each principal class of minerals, the total output value recorded for the year 1930 and the result of a re-valuation of the output of similar products in 1924, based on the average values shown by the returns for 1930. These particulars relate only to production in Great Britain.

Kind of minerals	1930	1924		1930 as a percentage of 1924
	As returned	As returned	At 1930 average values	
	£'000	£'000	£'000	Per cent.
Coal ... ..	165,407	250,233	180,418	92
Non-metalliferous minerals, in- cluding oil shale...	14,188	13,773	12,404	114
Metalliferous ores ... ..	3,685	4,350	3,364	110
Slate ... ..	1,728	2,163	1,912	90
Salt ... ..	1,711	2,168	1,964	87
<b>TOTAL ... ..</b>	<b>186,719</b>	<b>272,687</b>	<b>200,062</b>	<b>93</b>

It appears from these estimates that the volume of production of all minerals declined by 7 per cent. in 1930, while the decline in the total net output of the group amounted to about 31 per cent. The value of the total output per head of all persons employed in this group averaged £184 in 1930 and the corresponding figure for 1924, calculated at 1930 prices, was £156. There was thus an increase of about 18 per cent. compared with 1924 in the estimated volume of production per employee whereas, on the basis of net output, the respective figures per employee show a decline in 1930 of 14 per cent.

### Number of mines and quarries

The following table shows the number of mines and quarries covered by the results for 1930, and the total number of returns received for 1930 and 1924. Firms owning more than one mine or quarry in the same Census area were given the option of furnishing a combined return covering the area as a whole, subject to the general requirement of a separate return for each of the five classes of production specified in the table. The number of mines and quarries covered was thus greater than the number of returns received.

Trade	1930		1924
	Number of mines and quarries	Number of returns	Number of returns
Coal Mines ... ..	1,792	1,373	1,188
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines ... ..	1,550	1,335	980
Metalliferous Mines and Quarries ... ..	128	103	108
Slate Mines and Quarries ... ..	61	59	59
Salt Mines, Brine Pits and Salt Works...	25	23	30
<b>TOTAL ... ..</b>	<b>3,556</b>	<b>2,893</b>	<b>2,365</b>

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

## Size of firms.

In the following table the main particulars recorded at the Census of 1930 for these trades are grouped according to the average numbers of persons shown in the returns. The particulars are confined to firms in Great Britain.

Size of firm (average numbers employed)	Number of returns	Gross output	Cost of materials	Net output	Average number of persons employed	Net output per person employed
	No.	£'000	£'000	£'000	No.	£
11—24 ...	860	2,867	442	2,425	14,281	170
25—49 ...	565	4,643	839	3,804	19,494	195
50—99 ...	321	5,123	1,085	4,038	22,112	183
100—199 ...	259	8,109	1,728	6,381	36,801	173
200—299 ...	107	4,885	952	3,933	26,204	150
300—399 ...	110	7,685	1,491	6,194	38,848	159
400—499 ...	85	7,241	1,234	6,007	37,918	158
500—749 ...	148	15,932	2,878	13,054	89,388	146
750—999 ...	127	19,367	3,388	15,979	111,179	144
1,000—1,499 ...	126	26,594	4,587	22,007	154,052	143
1,500 and over ...	185	84,722	13,473	71,249	467,142	153
<b>TOTAL ...</b>	<b>2,893</b>	<b>187,168</b>	<b>32,097</b>	<b>155,071</b>	<b>1,017,419</b>	<b>152</b>

A considerably greater proportion of large-scale concerns is found in the mining and quarrying industries than in other groups, about one-fifth of all returns made for 1930 being from firms that employed 500 or more workpeople. The average number of employees recorded in each return was 352. Net output per employee in the four smallest size groups (£180) was considerably higher than the average for the remaining groups (£150). This result was due chiefly to the fact that these four groups cover a relatively large proportion of Metalliferous and Non-Metalliferous Mines and Quarries and Salt Mines, in which the average net output per head was considerably higher than that recorded for Coal Mines. The figures of net output per head in the larger size groups are dominated by the coal mining industry and the variations from one group to another conform fairly closely to those recorded for that trade.

The following table shows the variations in net output per employee for each trade in the group:—

## Net output per person employed

Size of firm (average numbers employed)	Coal Mines	Non- Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines	Metalliferous Mines and Quarries	Slate Mines and Quarries	Salt Mines, Brine Pits and Salt Works
	£	£	£	£	£
11—24 ...	124	181	260	108	} 351
25—49 ...	138	209	239	143	
50—99 ...	148	198	203	155	
100—199 ...	155	205	198	145	} 180
200—299 ...	149	149	145	—	
300—399 ...	150	250	196	144	
400—499 ...	151	} 130	281	} 179	} 258
500—749 ...	145		157		
750—999 ...	144		—		
1,000—1,499 ...	143	—	—	—	} —
1,500 and over ...	152	—	—	—	
<b>TOTAL ...</b>	<b>149</b>	<b>193</b>	<b>200</b>	<b>165</b>	<b>252</b>

## Regional distribution

In the following table the principal aggregates for the group as a whole, as recorded at the Censuses of 1930 and 1924, are grouped according to the areas into which the United Kingdom has been sub-divided:—

Area	Number of returns	Gross output	Net output	Average number of persons em- ployed	Net output per person em- ployed
	No.	£'000	£'000	No.	£
1. Greater London ...	46	771	662	1,547	428
1924	8	114	92	320	288
2. Lancashire with North Cheshire and the Glossop and New Mills District of Derbyshire* ...	266	13,799	11,224	83,391	135
1924	279	33,698	27,855	167,741	166
3. The West Riding of Yorkshire and the City of York ...	302	30,657	26,138	175,673	149
1924	282	42,077	35,785	192,153	186
4. Northumberland, Durham and the Cleveland district of Yorkshire ...	307	32,498	26,887	186,643	144
1924	242	47,350	39,271	229,204	171

Area	Number of returns	Gross output	Net output	Average number of persons employed	Net output per person employed	
				No.	£	
5. Warwickshire, Worcestershire and Staffordshire ...	1930	180	13,920	11,524	77,402	149
	1924	149	20,036	16,653	98,087	170
6. The rest of England (except Monmouthshire) ...	1930	819	34,023	28,436	182,516	156
	1924	618	35,981	29,996	159,608	188
7. Glamorganshire, Monmouthshire and Carmarthenshire* ...	1930	324	34,983	28,603	174,521	164
	1924	331	52,400	42,644	244,719	174
8. The rest of Wales ...	1930	136	4,911	4,194	28,217	149
	1924	131	7,197	6,055	37,902	160
TOTAL—England and Wales ...	1930	2,380	165,562	137,668	909,910	151
	1924	2,040	238,853	198,351	1,129,734	176
9. Lanarkshire, Renfrewshire and Dumbartonshire* ...	1930	164	7,239	5,917	35,545	166
	1924	122	12,724	10,509	57,756	182
10. The rest of Scotland*	1930	349	14,367	11,486	71,964	159
	1924	203	21,281	17,404	92,453	188
TOTAL—Scotland*	1930	513	21,606	17,403	107,509	162
	1924	325	34,005	27,913	150,209	186
TOTAL—Great Britain ...	1930	2,893	187,168	155,071	1,017,419	152
	1924	2,365	272,858	226,264	1,279,943	177
11. Northern Ireland ...	1930	71	176	133	1,425	93
	1924	89	179	139	1,041	134
TOTAL—UNITED KINGDOM	1930	2,964	187,344	155,204	1,018,844	152
	1924	2,454	273,037	226,403	1,280,984	177

\* Owing to possible disclosure of information relating to individual firms, the particulars relating to Metalliferous Mines in Scotland and Area 2 have been included with Area 7 for 1930. Similarly Area 2 is included with Area 7 for 1924.

### Employment

The following table shows the average numbers of male and female operatives and administrative, technical and clerical staff employed at mines and quarries in the two censal years:—

### Average numbers employed at Mines and Quarries in 1930 and 1924

Trade	Operatives		Administrative, technical and clerical staff		Total	
	Males	Females	Males	Females		
Coal Mines ...	1930	912,240	3,311	16,171	712	932,434
	1924*	1,170,203	4,987	20,654	1,320	1,197,164
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines† ...	1930	56,985	65	2,234	279	59,563
	1924	50,215	61	2,577	306	53,159
Metalliferous Mines and Quarries ...	1930	13,061	20	359	15	13,455
	1924	15,118	29	515	21	15,683
Slate Mines and Quarries ...	1930	9,618	2	243	5	9,868
	1924	9,668	—	291	9	9,968
Salt Mines, Brine Pits and Salt Works ...	1930	2,897	450	157	20	3,524
	1924	4,095	534	324	57	5,010
TOTAL—UNITED KINGDOM	1930	994,801	3,848	19,164	1,031	1,018,844
	1924	1,249,299	5,611	24,361	1,713	1,280,984
England and Wales ...	1930‡	888,929	2,839	17,348	794	909,910
	1924	1,103,510	3,205	21,697	1,322	1,129,734
Scotland ...	1930‡	104,536	1,007	1,738	228	107,509
	1924	144,859	2,397	2,571	382	150,209
Northern Ireland ...	1930	1,336	2	78	9	1,425
	1924	930	9	93	9	1,041

\* Numbers employed in week ended 18th October, 1924.

† See footnote (†) to table on page 356.

‡ See footnote (‡) to table on page 356.

**Distribution by status.**—The total number of operatives, as shown in the above table, decreased between 1924 and 1930 by 256,261 (20 per cent.) and that of administrative, technical and clerical staff by 5,879 (23 per cent.). In three cases there was a considerable decline in the number of operatives employed in 1930, viz., in Coal Mines, 22 per cent.; Salt Mines, etc., 28 per cent.; and Metalliferous Mines and Quarries, 14 per cent. Employment in the production of slate showed no marked change and if allowance is made for the wider field covered at the 1930 Census in the case of Non-Metalliferous Mines and Quarries (see page 357) the number of operatives employed in this trade was also substantially the same in both years. The number of administrative, technical and clerical staff in each trade was lower in 1930 than in 1924.

**Distribution by sex.**—The number of female operatives employed in the group as a whole was negligible in both years. Of the individual trades, only one, viz., Salt Mines, Brine Pits and Salt Works, gave employment to any appreciable proportion of females; all of these were engaged in the later processes of salt refining and packing. The proportion of females in the administrative, technical

and clerical staff was much lower in this group than in any other industrial group, being between 6 and 7 per cent. in 1924 and 5 per cent. in 1930.

**Distribution by age.**—The following table classifies by age the numbers of persons of each class recorded as employed in the Mines and Quarries Group in the weeks ended 13th December, 1930, and 18th October, 1924 :—

*Number of persons employed in the weeks ended 13th December, 1930, and 18th October, 1924*

Trade	Operatives				Administrative, technical and clerical staff			
	Males		Females		Males		Females	
	Under 16	All ages	Under 16	All ages	Under 16	All ages	Under 16	All ages
Coal Mines	1930 36,191	889,425	267	3,228	287	16,171	17	712
	1924 71,898	1,170,203	476	4,987	703	20,654	39	1,320
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines	1930 851*	55,466	3	63	56	2,234	8	279
	1924 1,181†	51,245	3	62	76	2,577	12	306
Metalliferous Mines and Quarries	1930 204	10,253	—	16	5	359	—	15
	1924 325	14,946	2	29	12	515	2	21
Slate Mines and Quarries	1930 185	9,549	—	2	—	243	—	5
	1924 562	9,858	—	—	3	291	1	9
Salt Mines, Brine Pits and Salt Works	1930 37‡	2,866	3‡	449	1	157	—	20
	1924 3§	4,153	—§	546	—§	324	—	57
TOTAL	1930 37,468	967,559	273	3,758	349	19,164	25	1,031
	1924 73,969	1,250,405	481	5,624	794	24,361	54	1,713

\* Not including any of the 106 male operatives recorded as being "under 18 years of age."

† The under-ground staff at oil shale mines in 1924 was not classified according to age and has been treated as being "over 16"; this figure is therefore defective to the extent that any of the 3,484 operatives concerned were under the age of 16.

‡ See footnote (†) to table on page 356.

§ Not including any of the 60 operatives (22 males and 38 females) recorded as being "under 18 years of age."

§ Not including any of the 279 operatives (197 males and 82 females) and 14 male administrative, etc., staff recorded as being "under 18 years of age."

The age-division generally adopted for the Census of Production was 18 years, but in the case of Mines and Quarries the division was made at 16 years, that being the classification used for the purposes of other statutory inquiries relating to mining and quarrying employment. For the year 1930 the numbers of employees between the ages of 16 and 18 years were ascertained and are shown below for each trade.

*Number of persons between the ages of 16 and 18 years employed in the week ended 13th December, 1930*

Trade	Operatives			Administrative, technical and clerical staff		
	Males	Females	Total	Males	Females	Total
	Coal Mines ... ..	52,618	603	53,221	551	66
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines ...	1,641*	5	1,646*	78	16	94
Metalliferous Mines and Quarries ... ..	406	1	407	9	—	9
Slate Mines and Quarries ...	447	—	447	2	1	3
Salt Mines, Brine Pits and Salt Works ... ..	98†	41†	139†	5	2	7
TOTAL ... ..	55,210	650	55,860	645	85	730

\* Including 106 male operatives returned as "under 18 years of age."

† Including 60 operatives (22 males and 38 females) returned as "under 18 years of age."

### Wages

The table on pages 366 and 367 summarises the information available as to the amount of wages paid in the mining and quarrying industries in the years 1930 and 1924. The figures given for Coal Mines are based on information contained in the Annual Report of the Secretary for Mines. Those for other mines and quarries were ascertained by the Ministry of Labour as the result of voluntary inquiries into wages and hours of labour in the United Kingdom. Owing to various causes, including the fact that certain firms owning several mines and quarries made combined returns to one Department and separate returns to the other, it was not possible to obtain comparable particulars in respect of all firms that furnished particulars of wages to the Ministry of Labour.

Trade *	Firms furnishing			
	Operative staff employed			
	During week ended 13th Dec., 1930 and 18th Oct., 1924 (1)	Proportion of trade (2)	Average during year (3)	Proportion of trade (4)
	No.	Per cent.	No.	Per cent.
Coal Mines ... .. { 1930	†	—	875,067*	95.6
... .. { 1924	†	—	1,094,959*	93.2
Non-Metalliferous (except Slate) Mines and Quarries † ... .. { 1930	25,946	50.4	26,824	50.5
... .. { 1924	26,585	57.7	†	—
Metalliferous Mines and Quarries ... .. { 1930	5,345	52.0	6,493	49.6
... .. { 1924	9,377	62.6	†	—
Slate Mines and Quarries... { 1930	5,407	56.6	5,402	56.2
... .. { 1924	3,421	34.7	†	—
TOTAL ... .. { 1930	...	...	913,786	92.2
... .. { 1924	...	...	†	—

\* Totals given in the Annual Report of the Secretary for Mines. The percentage figures in column 4 represent the proportion which these totals form of the numbers of operatives recorded for Census of Production purposes, i.e., excluding firms employing not more than ten persons.

Trade	returns of wages				
	Net output		Wages paid		Trade
	Gross output	Amount	Proportion of trade	Amount	
	(5)	(6)	(7)	(8)	(9)
	£'000	£'000	Per cent.	£'000	Per cent.
1930	†	132,546	95.6	99,678	75.2
1924	†	195,467	93.2	151,356	77.4
1930	6,770	5,391	50.2	3,689	68.4
1924	†	5,344	55.6	3,458	64.7
1930	2,030	1,534	57.0	835	54.4
1924	†	1,791	61.4	1,120	62.5
1930	1,038	971	59.8	604	62.3
1924	†	628	31.2	449	71.5
1930	†	140,442	91.4	104,806	74.6
1924	†	203,230	90.6	156,383	76.9

† Details not available.

‡ Excluding Oil Shale Mines.

In Coal Mines the proportion which wages form of net output decreased slightly in 1930, but in other mining and quarrying industries as a whole the proportion remained substantially unchanged at about 65 per cent., or appreciably less than for Coal Mines, in which wages formed 77·4 per cent. of net output in 1924 and 75·2 per cent. in 1930. Average earnings in Coal Mines decreased from £138 per operative in 1924 to £114 in 1930. As regards other mines and quarries, if the variation between employment on the 18th October, 1924, and the average over the whole year is assumed to have been the same for the firms that furnished wages particulars as for other firms, average earnings increased from £129 per operative in 1924 to £132 in 1930.

### Power

The particulars recorded at the Censuses of 1930 and 1924 in respect of power installed and employed at mines and quarries are shown in the following table:—

*Power ordinarily in use and not in use at Mines and Quarries in 1930 and 1924*

Type	Capacity ordinarily in use		Capacity in reserve or idle		Proportion in reserve or idle	
	1930	1924	1930	1924	1930	1924
	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.	Per cent.	Per cent.
<b>PRIME MOVERS</b>						
Reciprocating steam engines ... ..	1,977·9	2,193·7	316·8	273·2	13·8	11·1
Steam turbines ... ..	657·4	589·1	217·7	154·7	24·9	20·8
Internal combustion engines:—						
Gas ... ..	35·7	39·7	7·6	7·9	17·5	16·5
Petrol, kerosene, or other light oils ... ..	9·5	8·4	1·6	0·8	14·1	8·2
Heavy oils ... ..	39·2	9·0	2·6	0·6	6·2	6·7
Water engines ... ..	6·4	4·2	0·5	0·8	8·0	15·0
Other ... ..	1·1	23·8	0·1	4·8	10·9	16·8
<b>TOTAL—Prime movers</b>	<b>2,727·2</b>	<b>2,867·9</b>	<b>546·9</b>	<b>442·8</b>	<b>16·7</b>	<b>13·4</b>
	Th. Kw.	Th. Kw.	Th. Kw.	Th. Kw.		
<b>ELECTRIC GENERATORS</b>						
Driven by						
Reciprocating steam engines ... ..	130·5	169·1	95·7	98·7	42·3	36·9
Steam turbines ... ..	414·0	392·4	162·1	126·0	28·1	24·3
Internal combustion engines:—						
Gas ... ..	11·2	11·3	3·7	4·4	25·1	28·1
Petrol, kerosene, or other light oils ... ..	0·1	0·1	0·3	0·3	64·2	68·1
Heavy oils ... ..	7·9	1·0	0·7	*	8·8	3·0
Water engines ... ..	2·6	1·1	0·1	*	5·7	0·2
<b>TOTAL—Electric generators ... ..</b>	<b>566·3</b>	<b>575·0</b>	<b>262·6</b>	<b>229·4</b>	<b>31·7</b>	<b>28·5</b>

Type	Capacity ordinarily in use		Capacity in reserve or idle		Proportion in reserve or idle	
	1930	1924	1930	1924	1930	1924
	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.	Per cent.	Per cent.
<b>ELECTRIC MOTORS</b>						
Driven by						
Electricity generated in same works ... ..	924·0	939·8	135·0	154·3	12·7	14·1
Electricity generated in other works under same ownership ... ..	333·7	104·7	40·3	10·3	10·8	8·9
Purchased electricity... ..	550·0	462·5	89·2	60·1	14·0	11·5
<b>TOTAL—Electric motors</b>	<b>1,807·7</b>	<b>1,507·0</b>	<b>264·5</b>	<b>224·7</b>	<b>12·8</b>	<b>13·0</b>

\* Less than 50 kw.

The power generated by prime movers is required partly for direct application and partly for driving generators for the production of electrical energy. The electrical energy so produced may be used either for the purpose of driving electric motors or for heating, lighting and process purposes. Particulars of the power applied mechanically (i.e. directly) and electrically are given in the table on page 371.

No marked change took place between 1924 and 1930 in the total capacity of the prime movers in use, but there was a considerable increase in 1930 in the use of heavy oil engines and the capacity of steam turbines was greater by about 11 per cent. Variations of a generally similar kind occurred in the electric generator equipment. The capacity of all electric motors in use was 20 per cent. greater in 1930 than in 1924, motors driven by electricity generated in firms' own works and those driven by purchased electricity increasing in approximately equal degree.

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

The particulars furnished by each of the mining and quarrying industries in respect of prime movers, electric generators and electric motors installed are shown for each year in the following table:—



## Power available in 1930 and 1924

Trade	Prime movers	Electric generators	Electric motors				All electric motors
			Driven by electricity			Purchased	
			Generated in same works	Generated in other works under same ownership			
	Th. H.P.	Th. Kw.	Th. H.P.	Th. H.P.	Th. H.P.	Th. H.P.	
Coal Mines ...	1930 3,067.0 1924 3,138.7	780.2 773.8	1,013.8 1,055.4	362.5 115.0	536.6 474.2	1,912.9 1,644.6	
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines† ...	1930 132.7 1924 96.3	25.8 12.9	29.6 24.7	8.5 —	60.3 15.4	98.4 40.1	
Metalliferous Mines and Quarries ...	1930 42.7 1924 50.2	6.3 5.3	5.5 8.0	3.0 —	29.3 22.5	37.8 30.5	
Slate Mines and Quarries ...	1930 8.6 1924 6.3	2.3 1.1	3.7 1.7	—	12.2 9.8	15.9 11.5	
Salt Mines, Brine Pits and Salt Works ...	1930 23.1 1924 19.2	14.3 11.3	6.4 4.3	—	0.8 0.7	7.2 5.0	
TOTAL—United Kingdom	1930 3,274.1 1924 3,310.7	828.9 804.4	1,059.0 1,094.1	374.0 115.0	639.2 522.6	2,072.2 1,731.7	
England and Wales	1930† 2,878.3 1924 2,860.8	708.8 680.5	867.9 860.7	288.0 73.2	564.0 460.5	1,719.9 1,394.4	
Scotland ...	1930‡ 393.6 1924 448.4	120.1 123.8	191.1 233.4	86.0 41.8	75.2 62.1	352.3 337.3	
Northern Ireland	1930 2.2 1924 1.5	* 0.1	* *	— —	— —	* *	

† See footnote (†) to table on page 356.

‡ See footnote (‡) to table on page 356.

\* Less than 50 h.p. or kw.

**Total power in use.**—The figures in the following table represent the estimated amount of power actually employed by each of the trades in this group in the two years. For the purpose of arriving at the power applied mechanically, the capacity of the prime movers required to drive electric generators has been calculated and deducted from the total capacity of the prime movers; the power applied electrically represents the capacity of electric motors driven by generators at firms' works added to that of motors driven by purchased electricity. As the basis for calculating the amount of the primary power that is converted into electrical energy, 746

kilowatts of electrical energy have been taken as equivalent to 1,000 horse-power of primary power and an average loss of ten per cent. in transmission has been allowed, except for steam turbines in which the loss is negligible. The power capacity recorded as "ordinarily in use" has been taken as the basis of the calculation in all cases.

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

## Power in use in 1930 and 1924

Trade	Power applied mechanically	Power applied electrically	Total power	Per head of average number of operatives employed
	Th. H.P.	Th. H.P.	Th. H.P.	H.P.
Coal Mines ...	1930 1,826.2 1924 1,956.6	1,670.7 1,428.7	3,496.9 3,385.3	3.82 2.88
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines* ...	1930 86.7 1924 71.4	88.1 38.0	174.8 109.4	3.06 2.18
Metalliferous Mines and Quarries ...	1930 26.8 1924 35.3	29.4 25.7	56.2 61.0	4.30 4.03
Slate Mines and Quarries	1930 4.3 1924 3.8	13.7 10.7	18.0 14.5	1.87 1.51
Salt Mines, Brine Pits and Salt Works ...	1930 1.3 1924 2.9	5.8 3.9	7.1 6.8	2.14 1.47
TOTAL ...	1930 1,945.3 1924 2,070.0	1,807.7 1,507.0	3,753.0 3,577.0	3.76 2.85

\* See footnote (†) to table on page 356.

This table shows that power applied electrically in the mining and quarrying industries increased in 1930 by 20 per cent., each industry in the group showing an advance in this respect, while the amount of power applied mechanically declined by 6 per cent., due largely to a decrease in the coal mining industry. Power in use per operative employed increased generally, and, for the group as a whole, was 32 per cent. greater in 1930 than in 1924.

## Consumption of fuel

**Coal and coke.**—At the 1930 Census, all firms were required to state the total quantity of coal and coke used for generating power (i.e., for driving engines), and were also requested to furnish particulars of the amounts used for other purposes on a voluntary basis, as the provisions of the Census of Production Act do not enable the latter to be obtained compulsorily. A few firms found difficulty in furnishing trustworthy figures of the quantities used for these two categories separately, and, as appears from the table below, it was necessary to accept a certain number of inclusive quantity statements without distinction as to purpose. The following particulars relate only to firms in Great Britain.

## Coal and coke used

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

Trade	For power		For other purposes		Unclassified	
	Coal	Coke	Coal	Coke	Coal	Coke
Coal Mines— (1) <i>97.4</i> ; (2) <i>56.2</i> ...	12,319.8	218.7	871.5	15.3	129.6	5.4
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines— (1) <i>92.9</i> ; (2) <i>77.4</i> ...	243.0	2.5	308.0	33.9	30.1	0.9
Metalliferous Mines and Quarries— (1) <i>95.9</i> ; (2) <i>75.3</i> ...	151.6	0.1	82.4	0.5	11.1	—
Slate Mines and Quarries— (1) <i>90.1</i> ; (2) <i>90.1</i> ...	5.2	—	3.1	*	0.1	*
Salt Mines, Brine Pits and Salt Works— (1) <i>94.6</i> ; (2) <i>81.6</i> ...	25.8	0.3	292.0	2.6	27.3	*
<b>TOTAL</b> — (1) <i>97.3</i> ; (2) <i>58.6</i> ...	12,745.4	221.6	1,557.0	52.3	198.2	6.3

\* Less than 50 tons.

The total quantity of coal consumed at Mines and Quarries in 1930 for power purposes (driving engines) may be estimated at 13,100,000 tons, of which all but about 3 per cent. were used at coal mines; the total consumption of coke as engine fuel amounted to about 230,000 tons.

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

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

The following table shows for each of the mining and quarrying industries the total quantities of electricity used in 1930:—

## Electricity used

Trade	Electricity purchased	Electricity generated		Number of units generated per kilowatt of generators in use
		In same works	In other works owned by the firm	
	B.T.U. (Kw.-hrs.)	B.T.U. (Kw.-hrs.)	B.T.U. (Kw.-hrs.)	B.T.U. per Kw.
Coal Mines ... ..	643,693	1,592,454	444,106	2,975
Non-Metalliferous (except Slate) Mines and Quarries, including Oil Shale Mines ... ..	42,855	45,283	6,594	2,514
Metalliferous Mines and Quarries	31,735	9,287	2,418	2,277
Slate Mines and Quarries ...	6,037	3,246	—	1,502
Salt Mines, Brine Pits and Salt Works ... ..	741	11,779	—	1,732
<b>TOTAL</b> ... ..	725,061	1,662,049	453,118	2,935

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