

THE COKE AND BY-PRODUCTS AND MANUFACTURED FUEL TRADES

Note.—For information regarding the scope of the Census, instructions given to firms for making returns, and definitions of the terms used in this report, reference should be made to the Introductory Notes on pages v to xviii.

Introductory

These trades comprise firms that were engaged wholly or mainly in the manufacture of metallurgical coke and the distillation of coal tar products at collieries or blast furnaces† and in the production of manufactured fuel.

The following table shows the main results of the Censuses of 1930 and 1924 in respect of firms in Great Britain that employed an average of more than ten persons :—

Particulars	Unit	1930	1924
Value of goods made (Gross output)	£'000	16,962	26,178
Cost of materials used	"	13,249	18,978
Net output	"	3,713	7,200
Average number of persons employed	No.	16,638	20,180
Net output per person employed	£	223	357
Power available :—			
Prime movers	H.P.	64,730	86,740
Electric motors driven by purchased electricity	"	32,010	33,471
Number of returns	No.	130	174
Number of establishments	"	137	*

* Not available.

Deficiencies in 1930 aggregates.—The aggregate number of persons employed in 1930 by firms that stated that they employed not more than ten persons on the average was 104, the corresponding figure for 1924 being 136. The value of the gross output of the small firms in 1924 was £142,000, and particulars of the items included in this figure are given below :—

	£'000
Coke	107
	(59,000 tons)
Manufactured fuel	22
Other products	13
TOTAL	142

In addition, 2 firms to which schedules were sent at the 1930 Census furnished no information; these firms had small businesses and their omission has no appreciable effect on the results.

† Particulars of the output of coal tar products at tar distilleries and gas works are given, respectively, in the reports on the Chemicals, Dyestuffs and Drugs Trades (pages 271-6 of Part III) and on Gas Undertakings (pages 461-83 of the present volume).

Size of firms.—In the following table the main particulars recorded at the Census of 1930 are grouped according to the average numbers of persons shown in the returns:—

Size of firm (average numbers employed)	Number of returns	Gross output	Net output	Average number of persons employed	Net output per person employed
	No.	£'000	£'000	No.	£
11-24 ...	11	138	42	174	243
25-49 ...	19	650	162	671	241
50-99 ...	31	2,277	583	2,453	238
100-199 ...	52	7,527	1,721	7,326	235
200-299 ...	11	3,065	662	2,588	256
300 and over ...	6	3,305	543	3,426	159
TOTAL ...	130	16,962	3,713	16,638	223

Regional distribution.—In the following table the results recorded at the Censuses of 1930 and 1924 are grouped according to the principal areas* of Great Britain in which firms in this trade are situated:—

Area	Number of returns	Gross output	Net output	Average number of persons employed	Net output per person employed
	No.	£'000	£'000	No.	£
2 ...	1930 5 1924 10	484 1,361	118 340	527 1,164	223 292
3 ...	1930 40 1924 41	4,906 5,469	1,290 1,936	4,736 4,833	272 401
4 ...	1930 30 1924 43	5,875 9,418	992 2,299	5,185 6,250	191 368
5 ...	1930 5 1924 9	388 1,490	85 286	615 1,485	139 193
6 ...	1930 16 1924 21	2,193 2,959	541 721	2,326 2,335	232 309
7 and 8 ...	1930 21 1924 30	2,452 4,174	469 1,102	2,568 3,136	183 351
9 ...	1930 7 1924 13	271 944	106 364	281 728	378 500
10 ...	1930 6 1924 7	393 363	112 152	400 249	280 610
TOTAL {	1930 130 1924 174	16,962 26,178	3,713 7,200	16,638 20,180	223 357

Northern Ireland.—No production was recorded for Northern Ireland either in 1930 or in 1924 on schedules for the Coke and By-Products and Manufactured Fuel Trades.

* For particulars see page xviii.

Production

Principal products.—The following table shows the quantity and value of metallurgical coke, tar, pitch, and manufactured fuel made in 1930 and 1924 for sale:—

Kind of goods	1930						1924	
	Returned on schedules for						Total	
	The Coke and By-Products and Manufactured Fuel Trades			All trades				
	Quan- tity	Value	Ent- ries	Quan- tity	Value	Ent- ries	Quan- tity	Value
Metallurgical coke ...	Th. tons	£'000	No.	Th. tons	£'000	No.	Th. tons	£'000
	11,920	9,960	116	11,921	9,961	117	12,719	16,693
Tar:—				Th. galls.				
Crude ...				8,313	79	46		
				Th. tons			Th. galls.	
	437	641	88	1,829	1,824	675	37,054	932
				Th. galls.			Th. tons	
Refined ...				67,975	1,146	57	1,347	4,479
				Th. tons				
	96	256	27	394	1,208	170		
Total—Tar ...		897			4,257			5,411
Pitch ...	93	164	30	455	948	114	584	1,764
Manufactured fuel ...	1,134	1,172	11	1,134	1,172	11	1,256	1,753
Washed coal* ...	154	109	4	154	109	4	124	123
TOTAL—PRINCIPAL PRO- DUCTS...		12,302			16,447			25,744

* So far as separately recorded.

Producers of tar were not required to state the quantities that were used in their own works for the making of by-products. The total quantity of crude tar produced cannot therefore be stated for either year. Some duplication may be involved in the output figures shown in the table, owing to the double record of tar sold in the crude state by the producing firm and in the refined state by the purchasing firm.

Coal tar products.—The following statement gives particulars of the output for sale of coal tar products at coke ovens in 1930 and 1924; for particulars of the total output of these products as returned on schedules for all trades reference should be made to the reports on the Fertiliser, etc., Trade† (for sulphate of ammonia and the Chemicals, Dyestuffs and Drugs Trades‡ (for the remaining products).

† See Part III, pages 304-5.

‡ See Part III, pages 271-6.

Kind of product	1930		1924	
	Quantity	Value	Quantity	Value
Sulphate of ammonia (20·6 per cent. nitrogen)	Th. tons	£'000	Th. tons	£'000
	176·1	1,001	186·2*	2,274
Benzol:—	Th. galls.		Th. galls.	
Crude	17,212	785	38,061†	1,830
Refined	20,662	1,506		
	Th. galls.		Th. cwts.	
Carbolic acid, crude (in terms of 60's)	131	13	27·1	20
Cresylic acid	206	19	‡	‡
			Th. galls.	
Naphtha (crude)	815	41	1,830	88
	Th. cwts.		Th. cwts.	
Naphthalene (crude), excluding naphthalene oil	170·3	35	191·5	54
	Th. galls.		Th. galls.	
Tar oil, creosote oil, anthracene oil and other heavy coal tar oils ...	15,380	183	17,756	524
Toluol (in terms of 90's)	839	75	320	25
Other tar distillation products (including anthracene) ... ..	...	22	...	195
TOTAL ... ..	...	3,680	...	5,010

* In terms of 21·1 per cent. nitrogen; equivalent to 190,700 tons in terms of 20·6 per cent. nitrogen.

† In terms of 50 per cent. benzol.

‡ Included in *other tar distillation products*.

Prices.—The average selling values of metallurgical coke, tar, pitch and manufactured fuel in 1930 and 1924, as calculated from the Census returns, are shown in the following table:—

Kind of goods	Average value		1930 as a percentage of 1924
	1930	1924	
	Shillings per ton	Shillings per ton	Per cent.
Metallurgical coke	16·7	26·3	63·5
Tar:—	Pence per gall.	Pence per gall.	
Returned in gallons:—			
Crude	2·29	3·85	63·7
Refined	4·05		
	Shillings per ton	Shillings per ton	
Returned in tons:—			
Crude	19·94	27·27	41·0
Refined	61·35		
Pitch	41·7	60·4	69·0
Manufactured fuel	20·7	27·9	74·2

Volume of production in 1930 and 1924.—The following table compares the volume of production in 1930 and 1924 of the goods included in the table of "Principal products" on page 267:—

Kind of goods	Total production			1930 as a percentage of 1924
	1930	1924		
	As returned	As returned	At 1930 average values	
	£'000	£'000	£'000	Per cent.
Metallurgical coke	9,961	16,693	10,600	94
Manufactured fuel	1,172	1,753	1,301	90
Tar	4,257	5,411	2,430	175
Pitch	948	1,764	1,217	78
Washed coal	109	123	88	124
TOTAL	16,447	25,744	15,636	105

Production, exports and imports.—The following table shows, in relation to production, the quantities of coke, manufactured fuel, etc., exported from the United Kingdom in 1930 and 1924, together with the quantities imported and retained. In view of the qualifications attaching to the output figures recorded for tar (see page 267), these figures are not included in the table.

Kind of goods	Production	Exports	Proportion of production exported	Retained imports	Avail-	Share
					able for use in the United Kingdom	of home market held by British products
	Th. tons	Th. tons	Per cent.	Th. tons	Th. tons	Per cent.
Metallurgical coke	1930 11,921	1,547	13·0	*	10,374	100·0
	1924 12,841	1,848	14·4	*	10,993	100·0
Coal tar... ..	1930 ...	62	...	1	...	...
	1924 ...	9	...	3	...	...
Pitch	1930 455	289	63·5	1	167	99·4
	1924 603	316	52·4	11	298	96·3
Manufactured fuel	1930 1,134	1,006†	88·7	‡	128	100·0
	1924 1,275	1,067†	83·7	‡	208	100·0

* Less than 500 tons.

† Excluding manufactured fuel shipped for the use of steamers.

‡ The retained imports of manufactured fuel (245 tons in 1930 and 387 tons in 1924) are understood to consist largely of fuel not made from coal.

Other products.—In addition to the output shown in the tables on pages 267 and 268, the following goods were produced in 1930 and 1924 by firms that made their returns on schedules for the

Coke and By-Products and Manufactured Fuel Trades. These goods are dealt with in the reports on those trades in which the principal output was recorded.

Kind of goods	1930		1924	
	Quantity	Value	Quantity	Value
Gas sold	Mill. cu. ft.	£'000	Mill. cu. ft.	£'000
	35,597·6	721	11,765·3	283
	*	52	*	132
Electricity sold	Mill. B.T.U.		Mill. B.T.U.	
	17·8	51	26·0	89
Waste heat sold		44		41
Chemical manufactures		72		49
Other goods		36		133
TOTAL		976		727

* Quantity not stated.

Waste products sold.—A total of £4,000 was recorded for 1930 in respect of sales of waste products (spent oils, slurry, coal residue, etc.) by firms in the Coke and By-Products and Manufactured Fuel Trades. No corresponding total was returned for 1924.

Employment and Wages

Employment.—The following table shows the average numbers of persons employed in 1930 and 1924:—

Persons employed	Males		Females		Total	
	Under 18	All ages	Under 18	All ages	Under 18	All ages
	1930					
Operatives (average for the year)	359	15,454	6	34	365	15,488
Administrative, technical and clerical staff (as at 18th October)	82	1,098	5	52	87	1,150
TOTAL	441	16,552	11	86	452	16,638
1924						
Operatives (average for the year)	505	18,921	14	51	519	18,972
Administrative, technical and clerical staff (as at 18th October)	67	1,164	2	44	69	1,208
TOTAL	572	20,085	16	95	588	20,180

Wages.—The available information as to the amount of wages paid in 1930 and 1924 is given on pages 210 and 211.

Power

The following table shows the capacity of prime movers, electric generators and electric motors ordinarily in use and in reserve or idle in 1930 and 1924. As a result of comparisons between the returns for the two years, certain defects in the particulars furnished in the Final Report on the 1924 Census have been brought to light and the figures now given should be regarded as substituting those previously published.

Power equipment	1930			1924		
	Ordinarily in use	In reserve or idle	Total	Ordinarily in use	In reserve or idle	Total
PRIME MOVERS						
Reciprocating steam engines	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
26,365	10,376	36,741	30,568	10,507	41,075	
Steam turbines	12,580	10,009	22,589	21,546	9,999	31,545
Internal combustion engines:—						
Gas	4,086	1,231	5,317	9,925	4,170	14,095
Petrol, kerosene, or other light oils	8	—	8	5	—	5
Heavy oils	50	—	50	20	—	20
Other prime movers	—	25	25	—	—	—
TOTAL	43,089	21,641	64,730	62,064	24,676	86,740
ELECTRIC GENERATORS						
Driven by	Kw.	Kw.	Kw.	Kw.	Kw.	Kw.
Reciprocating steam engines	5,055	5,077	10,132	6,396	4,895	11,291
Steam turbines	6,903	5,479	12,382	13,810	8,550	22,360
Internal combustion engines:—						
Gas	2,904	923	3,827	5,173	955	6,128
Heavy oils	10	—	10	—	—	—
TOTAL	14,872	11,479	26,351	25,379	14,400	39,779
ELECTRIC MOTORS						
Driven by	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Electricity generated in same works	12,230	5,034	17,264	14,821	5,006	19,827
Electricity generated in other works under same ownership	38,804	8,616	47,420	27,256	6,022	33,278
Purchased electricity	26,502	5,508	32,010	27,015	6,456	33,471
TOTAL	77,536	19,158	96,694	69,092	17,484	86,576

Where coke ovens were operated in conjunction with blast furnaces and steel works, or collieries, the power requirements for the whole undertaking were frequently supplied from a central power station. In such cases it was impracticable to apportion precisely the total capacity of the prime movers and the electric

generators at the central station between the various works to which electricity was supplied, and the particulars were therefore returned for the unit as a whole on the schedule for one of the trades concerned (usually that for blast furnaces). As a rule, however, firms were in a position to state for each works the capacity of the electric motors driven by electricity supplied from the central station.

The particulars given above should not, therefore, be regarded as expressing the full capacity of the prime movers and electric generators actually used or available for the purposes of coke oven production, either in 1930 or in 1924. As regards electric motors driven by electricity "generated in own works," the particulars given for 1930 probably approximate closely to the total capacity at coke ovens; but at the Census of 1924 firms were not required to state separately the capacity of motors which were driven by current generated at another of their works, and in the case of the composite undertakings referred to above the method of recording such motors was not uniform, some being shown as driven by electricity generated in the same works and some as driven by purchased electricity. These factors considerably affect the comparability of the figures given for the two years in respect of the three specified categories of electric motors.

Consumption of fuel

Many firms that used waste heat, generated in the processes of coke production, as the means of driving engines found it impracticable to assign a definite proportion of their total coal consumption to power as distinct from process purposes. According to the Annual Report of the Secretary for Mines, the total quantity of coal carbonised at coke ovens, and used in the production of manufactured fuel, in 1930 amounted to 18,280,000 tons. The amount required as engine fuel is unlikely to have exceeded 80,000 tons.

Particulars of the total quantities of coal and coke used were supplied by firms representing nearly 56 per cent. of the total net output, the amounts returned being about 9,147,000 tons of coal and 90,000 tons of coke. Some part of the difference apparent between the figures for coal as returned to the Census of Production and as returned to the Mines Department may be due to the Census figures not relating wholly to the calendar year. The amount of coke recorded was probably produced by the firms themselves and should not be taken as additional to the total for coal.

The quantities of electricity recorded as used in 1930 were as follows:—

	B.T.U. (Kw.-hrs.) '000
Electricity used for all purposes:—	
Generated in same works	27,759
Generated in other works under same ownership	75,372
Purchased	43,166
TOTAL—Electricity	146,297

TABLES

I. Summary of results

Particulars	Unit	England and Wales	Scotland	Great Britain
Value of goods made (Gross output) ...	£'000	16,298	664	16,962
Cost of materials used	"	12,803	446	13,249
Net output	"	3,495	218	3,713
Average number of persons employed...	No.	15,957	681	16,638
Net output per person employed ...	£	219	321	223
Power available:—				
Prime movers	H.P.	60,145	4,585	64,730
Electric motors driven by purchased electricity	"	31,597	413	32,010

II. Production

Kind of goods made	Unit	England and Wales	Scotland	Great Britain
Metallurgical coke	<i>Th. tons</i> £'000	11,513 9,592	407 368	11,920 9,960
Tar:—				
Crude	<i>Th. tons</i> £'000	* *	* *	437 641
Refined	<i>Th. tons</i> £'000	* *	* *	96 256
Pitch	<i>Th. tons</i> £'000	86 154	7 10	93 164
By-products:—				
Sulphate of ammonia (20.6 per cent. nitrogen)	<i>Th. tons</i> £'000	168.8 961	7.3 40	176.1 1,001
Benzol:—				
Crude	<i>Th. galls.</i> £'000	16,614 756	598 29	17,212 785
Refined	<i>Th. galls.</i> £'000	* *	* *	20,662 1,506
Carbolic acid, crude (in terms of 60's)	<i>Th. galls.</i> £'000	131 13	— —	131 13
Cresylic acid	<i>Th. galls.</i> £'000	206 19	— —	206 19
Naphtha (crude)	<i>Th. galls.</i> £'000	815 41	— —	815 41
Naphthalene (crude), excluding naphthalene oil	<i>Th. cwt.</i> £'000	* *	* *	170.3 35
Tar oil, creosote oil, anthracene oil, and other heavy coal tar oils ...	<i>Th. galls.</i> £'000	14,252 169	1,128 14	15,380 183
Toluol (in terms of 90's)	<i>Th. galls.</i> £'000	839 75	— —	839 75
Other tar distillation products (including anthracene)	£'000	22	—	22

Kind of goods made	Unit	England and Wales	Scotland	Great Britain
Manufactured fuel	<i>Th. tons</i>	*	*	1,134
	£'000	*	*	1,172
Washed coal	<i>Th. tons</i>	*	*	154
	£'000	*	*	109
Waste products (including spent-oils, slurry, coal residue, etc.)	£'000	—	—	4
Chemical manufactures	£'000	72	—	72
Gas supplied to other undertakings of the firm or to outside consumers	<i>Mill. cub. ft.</i>	*	*	35,597·6
	£'000	*	*	721
	£'000	*	*	52
Electricity supplied to other undertakings of the firm or to outside consumers	<i>Mill. B.T.U.</i>	*	*	17·8
	£'000	*	*	51
Waste heat sold	£'000	*	*	44
Other goods	£'000	36	—	36
TOTAL VALUE OF GOODS MADE (GROSS OUTPUT)	£'000	16,298	664	16,962

* Owing to the possible disclosure of information relating to individual firms, separate particulars for England and Wales and for Scotland cannot be given.

III. Employment

A.—NUMBERS EMPLOYED IN WEEK ENDED 18TH OCTOBER, 1930

Persons employed	Males		Females		Males and females	
	Under 18	All ages	Under 18	All ages	Under 18	All ages
<i>England and Wales:—</i>						
Operatives	305	13,977	2	18	307	13,995
Administrative, etc.*	80	1,069	4	48	84	1,117
TOTAL	385	15,046	6	66	391	15,112
<i>Scotland:—</i>						
Operatives	32	547	4	14	36	561
Administrative, etc.*	2	29	1	4	3	33
TOTAL	34	576	5	18	39	594
<i>Great Britain:—</i>						
Operatives	337	14,524	6	32	343	14,556
Administrative, etc.*	82	1,098	5	52	87	1,150
TOTAL	419	15,622	11	84	430	15,706

* Administrative, technical and clerical staff.

B.—OPERATIVES EMPLOYED IN ONE WEEK IN EACH MONTH OF 1930

Week ended	Males and females			Week ended	Males and females		
	England and Wales	Scotland	Great Britain		England and Wales	Scotland	Great Britain
Jan. 18 ...	16,307	715	17,022	July 19 ...	14,161	662	14,823
Feb. 15 ...	16,133	717	16,850	Aug. 16 ...	13,622	609	14,231
Mar. 15 ...	16,088	703	16,791	Sept. 13 ...	13,756	594	14,350
April 12 ...	15,675	714	16,389	Oct. 18 ...	13,995	561	14,556
May 17 ...	15,515	693	16,208	Nov. 15 ...	14,007	564	14,571
June 21 ...	15,120	699	15,819	Dec. 13 ...	13,701	545	14,246
AVERAGE FOR THE TWELVE MONTHS					14,840	648	15,488

IV. Power

PARTICULARS OF PRIME MOVERS, ELECTRIC GENERATORS AND ELECTRIC MOTORS

Power equipment	England and Wales		Scotland		Great Britain	
	Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle
PRIME MOVERS						
Reciprocating steam engines	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Steam turbines	23,914	10,070	2,451	306	26,365	10,376
Internal combustion engines:—						
Gas	4,086	1,231	—	—	4,086	1,231
Petrol, kerosene, or other light oils	8	—	—	—	8	—
Heavy oils	50	—	—	—	50	—
Other	—	25	—	—	—	25
TOTAL	39,530	20,615	3,559	1,026	43,089	21,641
TOTAL OF PRIME MOVERS INSTALLED	60,145		4,585		64,730	
ELECTRIC GENERATORS						
Driven by	Kw.	Kw.	Kw.	Kw.	Kw.	Kw.
Reciprocating steam engines	4,987	4,990	68	87	5,055	5,077
Steam turbines	6,403	5,179	500	300	6,903	5,479
Internal combustion engines:—						
Gas	2,904	923	—	—	2,904	923
Heavy oils	10	—	—	—	10	—
TOTAL	14,304	11,092	568	387	14,872	11,479
TOTAL OF ELECTRIC GENERATORS INSTALLED	25,396		955		26,351	

Power equipment	England and Wales		Scotland		Great Britain	
	Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle	Ordinarily in use	In reserve or idle
ELECTRIC MOTORS	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
Driven by						
Electricity generated in same works ...	11,928	4,984	302	50	12,230	5,034
Electricity generated in other works under same ownership ...	37,301	7,812	1,503	804	38,804	8,616
Purchased electricity ...	26,283	5,314	219	194	26,502	5,508
TOTAL ...	75,512	18,110	2,024	1,048	77,536	19,158
TOTAL OF ELECTRIC MOTORS INSTALLED	93,622		3,072		96,694	

V. Consumption of fuel

Kind of fuel used	England and Wales	Scotland	Great Britain
	Tons	Tons	Tons
Coal used for power* ...	73,000	7,000	80,000
	B.T.U. (Kw.-hrs.) '000	B.T.U. (Kw.-hrs.) '000	B.T.U. (Kw.-hrs.) '000
Electricity used for all purposes :—			
Generated in same works ...	27,488	271	27,759
Generated in other works under same ownership ...	72,767	2,605	75,372
Purchased ...	42,496	670	43,166
TOTAL—Electricity ...	142,751	3,546	146,297

* Estimated. See page 272.