

CHAPTER IV.

COAL.

INTRODUCTION.

This report is arranged in four parts. Part I treats of the industry as a whole; Part II covers Pennsylvania anthracite; Part III deals with bituminous coal; and Part IV presents a comprehensive summary of the general statistics obtained by the census of coal mines, from which the special tables of Parts I, II, and III are derived.

Definitions and explanations.—In order that the text and tables of this report may be entirely clear, the following definitions and explanations are submitted:

Scope of census.—The statistics of coal refer to the United States exclusive of all outlying possessions. The Thirteenth Census did not extend to the Philippine Islands, and in the other noncontiguous territory of the United States no coal was mined, except in Alaska, where five producing mines reported an output of 3,464 tons, valued at \$16,450. Owing to the incompleteness of the reports, no other data can be given for the Alaskan coal mines, and the items just given are not included in any subsequent table or statement.

The census returns cover two general classes of operations: First, those which produced coal during the year 1909, and second, those which were in course of development but did not produce coal during that year. The tables of Parts I, II, and III deal with producing enterprises only; the statistics of nonproducing mines are given in the detailed table in Part IV.

Small bituminous mines producing less than 1,000 tons each and mines idle during the entire year 1909 were omitted from the census.

Period covered.—The returns of all anthracite producers cover the calendar year 1909. Those of bituminous producers cover the calendar year 1909, or the business year which corresponded most nearly to that calendar year. This gives a report of a full year's operations for all mines except those which were shut down during a portion of the year, in which case, of course, the returns cover only a part of a year's operations.

Coal mining and coke manufacture at the mines.—Many bituminous mines are operated directly in connection with coke manufacture at the mines. It was the intention in such cases to secure separate reports for coal mining and for coke making. Many operators, however, did not segregate their reports, but rendered one combined report for both enterprises, on the ground that these activities were so closely related as to render separate reports difficult and possibly inaccurate. In view of this condition of the returns, the statistics of bituminous coal mining have in general been arranged in two groups: First, statistics which relate solely to mines at which no coke was made; second, statistics which cover all those enterprises where both operations were conducted. This is done, not only to secure greater accuracy, but to give figures which reflect the actual conditions of operation for the industry. In order to present data comparable with those of preceding census reports, figures are presented in a few tables for all mines as mines, the data having been adjusted, as explained in connection with the tables, to exclude the items attributable to the manufacture of coke.

In the statistics for enterprises engaged both in coal mining and in coke making there is a certain unavoidable lack of uniformity. It was intended to have these figures cover only mines at which coke was made during the year 1909, but occasionally an operator rendered a single combined report covering several mines, one or more

of which were operated with coke production and one or more without coke production; hence a few mines without coke ovens were necessarily included in the statistics of the coke-making group.

In each of the three states, Illinois, Indiana, and Ohio, a single operator made coke at a mine, but the entire quantity produced in these states was too small to justify separate presentation, and it has not been included in any part of this report.

Number of operators.—In determining the number of operators, subsidiary companies have not been considered separate operators, but each holding or owning company, together with all its subsidiary concerns, has been counted as one operator.

Coal land controlled.—The acreage of coal land shown covers the holdings of none but operating concerns, and therefore is exclusive of the lands of nonoperating holders. Since producers reported their total holdings, the acreage given necessarily includes large areas held in reserve for future development.

Pennsylvania anthracite operators reported 10,975 acres of coal land sublet to each other, which was reported twice in the total holdings reported by all operators. This duplication has been eliminated from the total acreage shown for Pennsylvania anthracite, but can not be eliminated from the subtotals given for owned and leased acreage, since the lessors did not report the form of tenure by which they controlled the land reported sublet.

Capital.—Operators were required to report the total amount of capital, both owned and borrowed, which they had invested in the business on the last day of the business year. This includes the operator's investment in property owned, together with cash on hand, operating accounts, and bills receivable. The value of lands, buildings, and equipment held under lease is not included in the amount reported, but the capital reported does cover the value of the leases themselves. Owing to diverse methods of book-keeping in use by different companies, to the fact that some operators apparently reported capital stock at its par value instead of actual capital invested, and to the further fact that in some cases the returns include investments in large areas of reserve coal lands, the statistics of capital lack uniformity and can be used only to show very general conditions.

Expenses.—The expenses reported include all direct expenses of operation and development. Interest payments and dividend disbursements are not included, nor has any allowance been made for depreciation. In coal mining, depreciation is of two kinds: (1) The gradual destruction of the investment in coal lands, due to the mining out of the coal; (2) the gradual destruction of the investment in the development of the mine, due not only to the deterioration of inside and outside equipment and construction, but also to the fact that shafts, slopes, entries, etc., have no value after the coal is exhausted. Depreciation of the first kind, for mines operated on leased lands, is fully covered in the census returns by the royalties paid and included in the expenses reported by the operators; but for mines operated on lands owned by the operators it is not covered by any item in the expenses reported to the census. For the second kind of depreciation no allowance as such has been included in the expenses reported, but it should be borne in mind that the mine operators did include expenditures for permanent improvements, betterments, and replacements made during the year, which may offset the depreciation of this second kind. The total amount thus expended and included in the total expenses reported by anthracite operators was \$6,060,000. Bituminous operators reported a total of \$14,152,000 for "cost of development work," but many operators carried no separate account

of such expenditures, nor was there uniformity of method among those who did. Accordingly, the amount actually expended at bituminous mines for this purpose may have been considerably greater than the above total.

Both gross and net expenses are shown for anthracite. The gross expenses given involve a certain amount of duplication, as explained in the paragraph on "Wages."

Salaries.—Except as explained in the following paragraph on "Administrative expenses of general offices," the amount of salaries shown includes all payments to officials, superintendents, managers, and salaried employees in general offices, as well as the payments to salaried employees at the mines.

Administrative expenses of general offices.—Occasionally a company operating bituminous mines in more than one state reported as a total the expenses of its general office and did not apportion these expenses among its different mines or even among the different states covered by its operations. States affected by returns of this kind from bituminous mine operators were Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Ohio, Oklahoma, Pennsylvania, Texas, Washington, West Virginia, and Wyoming. In order to show the total expenses for the mines of the states mentioned it was necessary to distribute these administrative expenses among these states by estimate. It was not thought desirable, however, to include under the heading of "Salaries" the salary payments thus distributed, since the employees of general offices to whom these salaries were paid could not be similarly distributed by states. Accordingly, the distribution was made as follows: The total expenses of each general office were apportioned as a single item among the mines of that company in the proportion which the total expenses as separately reported for each mine bore to the aggregate for all the mines of the company, and the amount so assigned to each mine was included in "Miscellaneous expenses." In consequence, the total amount of salaries appearing as such in the statistics of bituminous coal for the several states mentioned is slightly less than it should be, while the total for miscellaneous expenses is correspondingly exaggerated. However, these apportioned items are relatively small, so that the items for each state are approximately correct, and, in the totals for the United States, the general office employees, their salaries, and other general office expenditures, are included under the proper headings. The condition herein noted applies only to the statistics of bituminous coal in tables of Part III and Part IV.

Wages.—The wages shown in the tables of this report for the year 1909 are the gross earnings of the men. The census schedule of inquiries for mines called for the amount of net wages; that is, the amount remaining after deductions had been made from gross earnings on account of blacksmithing, explosives, oil, etc., furnished the employees by the operators, and also called for the amount of such deductions made. Deductions aggregating \$12,108,000 were reported by bituminous operators, but examination of the returns showed that the practice as to entries under this heading, and consequently as to the reporting of net wages, was not uniform. It was evident that uniform data for wages at bituminous mines could be secured only by using gross earnings, and this figure was obtained, where not directly given, by adding together the net wages and the amount of deductions reported, which gave the original gross earnings. For the sake of uniformity the returns of anthracite operators were treated in the same manner, and hence gross earnings constitute the "Wages" shown in all the tables of this report. However, the total gross expenses thus obtained for anthracite mines involve a certain amount of duplication, due to the fact that the cost of explosives and oil afterwards sold to employees for mining purposes is included in the cost of supplies reported by the operators, while at the same time the wages shown are the gross earnings of the men before any deductions had been

made for these supplies. In order to eliminate this duplication, the amount deducted by the operators from the gross earnings of their employees on this account, namely, \$4,872,913, has been subtracted from the gross expenses to give net expenses.

Supplies.—This item includes the cost of all mine supplies used during the year, of fuel charged to operating expenses, and of power rented. In addition to the coal used at the mines and charged to operating expenses, a quantity—some of it refuse—was burned under the boilers; to this coal no value was assigned by the operators. The cost of supplies given does not include any estimated value for this coal.

The cost of supplies reported by anthracite operators includes the cost of mining supplies afterwards sold to employees, with deduction from wages in payment therefor. There is thus a duplication in gross expenses, which has been eliminated in the item of net expenses shown in the tables. To a slight extent, a similar condition exists in the returns of bituminous operators, as explained in connection with Table 51.

In the statistics of mines at which coke was manufactured, the value of coal charged into the ovens has not been included in the cost of supplies, except in the case of a small quantity purchased from other operators, nor has the value of the coal made into coke been included in the total value of products. Duplication of expenses and of value of products is thus avoided.

Miscellaneous expenses.—Except as already explained under "Administrative expenses of general offices," the figures for miscellaneous expenses include taxes, cost of contract work, rent of offices, use of patents, insurance, ordinary repairs to buildings and machinery, advertising, damages, traveling expenses, and all other sundry expenses.

Use of long and short tons.—In all the tables of Part I, Part III, and Part IV, the quantities of anthracite and bituminous coal and of coke are given in tons of 2,000 pounds; but in all the tables of Part II, which deals with Pennsylvania anthracite, the long ton of 2,240 pounds is used.

Value of products.—The schedules called for the value of the products at the mines. However, the value reported was not always the actual value which would have resulted from sale in the open market, since a considerable part of the output of coal and coke was produced by operators closely affiliated with various industrial enterprises, and the value reported by such operators may have been a matter of intercorporate accounting rather than an expression of market value. Furthermore, the total value of products reported includes the value of that portion of the coal used at the mines for steam and heat to which a value was assigned by the operators and which was charged to operating expenses, but not all operators assign a value to such coal.

The total value of products for coal mining combined with coke manufacture has been obtained by adding together the value of coal sold, or used for fuel in other departments of the producing concerns, of coal used at the mines for steam and heat and charged to operating expenses, and of coke produced, together with the value of all by-products. This excludes the value of the coal coked at the mines, and avoids duplication of value of products.

Persons engaged in the industry.—The statistics of the number of proprietors and firm members, salaried employees, and wage earners are based on the returns for December 15, 1909, or the nearest representative day. The number of wage earners reported includes bosses performing work similar to that of men over whom they had charge, but foremen whose duties were wholly supervisory are included among salaried employees.

Primary horsepower.—The figures given under this heading represent the total primary power used by the operators. The horsepower of electric motors run by current generated by the primary power of the mine operators is not included, since this would obviously result in duplication.

PART I.—THE INDUSTRY AS A WHOLE.

GENERAL SUMMARY FOR THE UNITED STATES.

Table 1 summarizes the more important statistics of producing coal mines in 1909 for the entire United States. It relates only to mines which reported in full all the important items requested; a few other mines with a small production of coal (about 2,000,000 tons), which did not furnish full statistics as to value, expenses, or some other items, or were operated by penal institutions, are not included in this table.¹

SUMMARY FOR PRODUCING MINES: 1909.

[Statistics of nonproducing mines are given only in Table 62.]

Table 1	Total.	Anthracite.	BITUMINOUS.		
			Total.	Mines without coke manufacture.	Mines with coke manufacture.
Number of operators.....	3,695	192	3,503	3,322	151
Number of mines.....	6,436	423	6,013	5,365	648
Acres of coal land controlled.....	6,847,545	1,274,359	6,573,186	4,883,967	1,689,219
Owned.....	4,732,556	183,144	4,549,412	3,225,778	1,323,634
Held under lease.....	2,125,964	102,190	2,023,774	1,658,189	365,585
Capital.....	\$1,309,125,161	\$246,923,078	\$1,062,197,083	\$667,357,137	\$364,839,946
Gross expenses.....	¹ \$535,231,493	\$139,324,467	² \$395,907,026	\$301,451,896	³ \$94,455,130
Net expenses.....	(\$)	\$4,872,913	(\$)	(\$)	(\$)
Products.....	\$530,358,580	\$134,451,554	\$395,907,026	\$301,451,896	\$94,455,130
Tons (2,000 pounds)—					
Coal, including that made into coke at mines.....	457,833,640	80,968,130	376,865,510	280,652,040	96,213,470
Coal, excluding that made into coke at mines.....	407,761,037	80,968,130	326,792,907	280,652,040	46,140,867
Coke made at mines.....	32,450,482	—	32,450,482	—	32,450,482
Value at mines of all products.....	\$577,142,935	\$149,180,471	\$427,962,464	\$315,894,965	\$112,067,529
Coal for sale or use as fuel.....	⁴ \$509,232,811	\$149,180,471	⁴ \$360,052,340	\$315,659,346	⁴ \$44,392,994
Coke made at mines.....	\$67,483,162	—	\$67,483,162	—	\$67,483,162
Other products.....	\$426,962	—	\$426,962	\$235,589	\$191,373
Persons engaged in industry.....	770,681	178,004	592,677	453,473	139,204
Proprietors and firm members.....	3,927	188	3,739	3,648	91
Salaried employees.....	23,461	4,312	19,149	14,411	4,738
Wage earners (number employed Dec. 15, 1909, or nearest representative day).....	743,293	173,504	569,789	435,414	134,375
Primary horsepower.....	1,904,154	676,753	1,227,401	910,778	316,623
Gross expenses by items:					
Services.....	\$412,898,346	\$96,900,963	\$315,997,383	\$244,695,955	\$71,401,428
Salaries.....	26,394,199	4,583,304	21,810,895	16,601,064	5,209,831
Wages.....	386,514,147	92,317,659	294,196,488	228,084,891	66,101,597
Supplies.....	¹ 74,706,613	26,697,968	² 48,008,647	34,392,734	13,615,913
Royalties.....	20,063,227	7,980,739	12,082,488	9,715,232	2,367,256
Miscellaneous.....	27,563,307	7,744,799	19,818,508	12,747,975	7,070,533

¹ The total acreage of anthracite land is exclusive of a duplication of 10,975 acres in figures for owned and leased acreage. See page 181.

² Includes \$433,801 worth of coal purchased for coking at mines.

³ Expenses reported for bituminous mines are approximately net expenses. As to possible slight duplication in expenses for bituminous mines, see remarks preceding Table 51.

⁴ \$41,281,055 worth of bituminous coal was made into coke at mines.

The total production of coal in 1909, in round numbers, as shown in Table 2, was 460,049,000 tons. The total tonnage of bituminous coal was 378,975,000 and the total tonnage of anthracite 81,074,000. The mines covered by Table 1 produced 457,834,000 tons, of which 407,761,000 tons were produced for sale or for use as fuel, and 50,073,000 tons (of bituminous coal) were converted into coke at the mines, producing 32,450,000 tons of coke. The total value of all products of the industry (including only the mines

covered by Table 1) was \$577,143,000; and the total net expenses of coal mining and coke manufacture at the mines were \$530,359,000, of which about four-fifths was for wages and salaries. The number of wage earners employed at mines with complete reports was 743,293.

The relation between expenses and value of products is more fully discussed in connection with the separate analyses of the statistics for anthracite and bituminous coal, respectively.

¹ Number of operators and of mines.—The number of producing operators given in Table 1, namely, 3,695, is exclusive of 3 anthracite and 93 bituminous operators who furnished incomplete reports and of 2 state penal institutions. In addition to these there were 6 anthracite and 38 bituminous operators of nonproducing mines; that is, mines in course of development but which produced no coal during 1909. However, of these latter 44 operators, 3 anthracite and 8 bituminous operators also reported producing mines, and hence were included in the above total of 3,695, so that, excluding these 11 duplications and including the remaining 33 concerns reporting nonproducing mines, the 96 furnishing incomplete reports, and the 2 penal institutions, the total number of operators in 1909, both producing and nonproducing, covered by the census was 3,826, of which 198 were anthracite and 3,628 bituminous operators. In this grand total there is a slight duplication, due to

the fact that a few companies having both anthracite and bituminous mines have been counted in the total of each of these classes and hence have been duplicated in the above grand total of all classes, but the duplication is too slight to be of any material significance.

In Table 1 the number of producing mines given, 6,436, is exclusive of 7 anthracite and 113 bituminous enterprises for which incomplete reports were received, and of 2 bituminous mines operated by state penal institutions. However, in Tables 2, 4, 5, and 7, covering the entire coal production reported in 1909, as pointed out by accompanying footnotes and explanations, the output and value of coal from these 122 enterprises have been included in the totals given for the various states and for the United States. The number of anthracite mines given, 423, is made up of 308 mines proper, 52 washeries, and 63 river dredges.

GEOGRAPHICAL DISTRIBUTION OF COAL MINING: 1909.

Producing fields of the United States.—The map on the opposite page shows the general localities from which anthracite, bituminous, and subbituminous and lignite coals were mined in 1909. Various coal bearing areas with no output in that year are not shown on this map.

Anthracite is produced almost exclusively in a comparatively small area in eastern Pennsylvania. The most important bituminous field is the Appalachian, extending from western Pennsylvania and eastern Ohio southwestward as far as Alabama; the next most important is that embracing a large part of Illinois, southwestern Indiana, and part of western Kentucky. The large areas shown in North Dakota and the Rocky Mountain states are mainly of lignite and subbituminous coal. Although the map indicates a productive area in South Dakota, coal mining there in 1909 was confined to a few small local "banks" not covered by the census.

Production, by geographic divisions and leading states.¹—The following table gives the total reported production and value of coal in the different geographic divisions and in the leading coal producing states. It includes coal made into coke at the mines, with a value assigned to it either by the operators or by the Census Bureau. The table also includes coal produced by mines operated by penal institutions, and by mines furnishing incomplete reports as to expenses, etc., which were not covered by Table 1. The statistics for the South Atlantic, East South Central, and West South Central divisions are combined, and also those for the two western divisions, in order to avoid disclosing the operations of individual concerns in certain states.

Statistics for the geographic divisions of the country have less significance in the case of mining than in the case of agriculture or manufactures. The divisions named include, respectively, the following coal producing states: The Middle Atlantic—Pennsylvania; the East North Central—Ohio, Indiana, Illinois, and Michigan; the West North Central—Iowa, Missouri, North Dakota, and Kansas; the Southern divisions—Maryland, Virginia, West Virginia, Georgia, Kentucky,

Tennessee, Alabama, Arkansas, Oklahoma, and Texas; the Western divisions—Montana, Idaho, Wyoming, Colorado, New Mexico, Utah, Washington, Oregon, and California.

The table shows the marked preeminence of Pennsylvania among the coal mining states. In 1909 Pennsylvania produced nearly half the total coal output of the United States. The anthracite industry was practically confined to this state, and its bituminous tonnage was greater than that of any other three states combined. Next in order were West Virginia, Illinois, and Ohio. Together these four states mined 75.9 per cent of the total coal production of the United States.

[Includes coal made into coke at the mines.]

	COAL PRODUCED. ¹		VALUE OF COAL AT MINES. ¹	
	Tons (in thousands).	Per cent of total.	Total (in thousands).	Per cent of total.
United States.....	460,049	100.0	\$552,895	100.0
Anthracite.....	81,074	17.6	149,251	27.0
Bituminous.....	378,975	82.4	403,644	73.0
GEOGRAPHIC DIVISIONS:				
Middle Atlantic.....	218,622	47.5	278,826	50.4
Anthracite.....	80,987	17.6	149,028	27.0
Bituminous.....	137,635	29.9	129,798	23.5
East North Central.....	95,278	20.7	99,249	18.0
West North Central.....	18,692	4.1	29,187	5.3
Southern divisions ²	98,972	21.5	99,641	18.0
Western divisions ³	28,485	6.2	45,992	8.3
Anthracite.....	87	(⁴)	223	(⁴)
Bituminous.....	28,398	6.2	45,769	8.3
LEADING STATES:				
Pennsylvania.....	218,622	47.5	278,826	50.4
Anthracite.....	80,987	17.6	149,028	27.0
Bituminous.....	137,635	29.9	129,798	23.5
West Virginia.....	51,823	11.3	44,668	8.1
Illinois.....	50,896	11.1	53,429	9.7
Ohio.....	27,863	6.1	27,628	5.0
Indiana.....	14,735	3.2	14,996	2.7
Alabama.....	13,692	3.0	16,197	2.9
Colorado (bituminous).....	10,643	2.3	14,104	2.6
Kentucky.....	10,583	2.3	9,960	1.8
Iowa.....	7,732	1.7	12,693	2.3
Kansas.....	6,970	1.5	10,008	1.8
Wyoming.....	6,427	1.4	9,874	1.8
Tennessee.....	6,350	1.4	6,860	1.2

¹ Includes the production of mines for which incomplete reports were received, and of mines operated by penal institutions.

² Includes the South Atlantic, East South Central, and West South Central divisions.

³ Includes the Mountain and Pacific divisions.

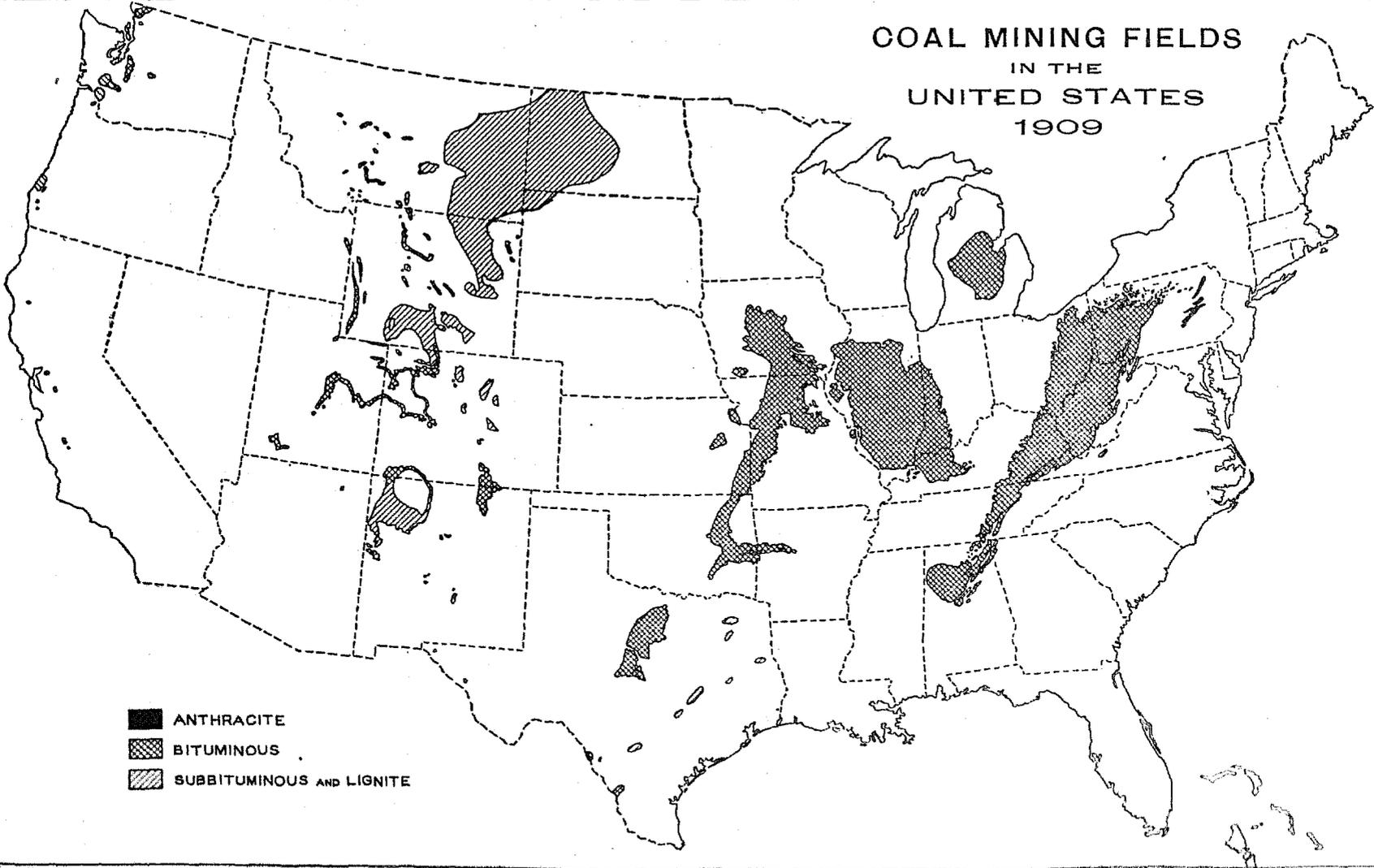
⁴ Less than one-tenth of 1 per cent.

Statistics of coal mining by geologic regions.—Table 3 (p. 186) summarizes the principal statistics of coal mining in the different geologic regions as designated by the United States Geological Survey. In this table the figures have been adjusted to give statistics of coal mining only, by deducting the capital, expenses, wage earners, and value of products attributable to the manufacture of coke at the mines. In large part the estimates of the numbers and amounts to be deducted on this account were made by the operators themselves; the few remaining estimates were made by the Bureau of the Census. The statistics relate to the same mines covered by Table 1, namely, those furnishing complete reports.

¹ Although the returns of production and value of coal in 1909 were secured by the Bureau of the Census for the United States Geological Survey, it will be observed that the figures in the table vary slightly from similar statistics of coal mining published by the Geological Survey. This is due, first, to the fact that the returns tabulated by the Geological Survey include those of numerous bituminous mines with an output of less than 1,000 tons for the year, while such mines were excluded from the statistics of the Bureau of the Census; second, to the fact that in the statistics of the Geological Survey the data for output and value of anthracite coal in Colorado and New Mexico are included with those for bituminous coal, while the census figures include this coal with anthracite; and, third, to the fact that errors in the reports of a few operators were discovered and corrected by the Bureau of the Census after the publication of the report of the Geological Survey for 1909.

COAL MINING FIELDS
IN THE
UNITED STATES
1909

- ANTHRACITE
- ▨ BITUMINOUS
- ▧ SUBBITUMINOUS AND LIGNITE



MINES AND QUARRIES.

STATISTICS OF COAL MINES, BY GEOLOGIC REGIONS: 1909.

[Data relating to coke manufacture at the mines are excluded, partly by estimate.]

REGION.	Number of mines.	Acres of coal land controlled.	Capital.	Total expenses (net).	PRODUCTS.			Number of wage earners.	Total primary horse-power.
					Total value. ¹	Tons of coal (2,000 lbs.).	Value of coal at mines.		
United States.....	6,436	6,847,545	\$1,207,217,543	\$512,610,836	\$550,757,948	457,833,640	\$550,513,866	716,415	1,904,154
Appalachian.....	3,962	4,979,766	938,481,026	357,466,476	387,260,562	330,906,966	387,106,050	507,418	1,447,300
Anthracite.....	² 420	273,499	246,713,318	134,245,600	148,957,894	80,881,106	148,957,894	173,263	676,128
Bituminous.....	3,482	4,706,267	691,767,708	223,220,876	238,311,668	250,025,860	238,148,162	334,155	771,172
Northern Interior.....	28	23,135	6,805,156	2,985,802	3,173,102	1,772,315	3,175,102	3,572	7,912
Eastern Interior.....	1,094	873,539	126,309,739	71,687,451	72,773,372	70,959,640	72,709,238	106,412	239,922
Western and Southwestern Interior.....	953	522,636	33,631,095	41,288,146	41,228,426	25,529,540	41,222,394	58,450	93,704
Rocky Mountain, Northern Great Plains, and Pacific Coast.....	459	448,469	90,204,647	39,182,961	46,311,486	28,665,179	46,301,076	40,563	115,256
Anthracite.....	3	890	214,700	205,954	222,577	87,024	222,577	241	625
Bituminous.....	456	447,609	89,989,887	38,977,007	46,088,909	28,578,155	46,078,499	40,322	114,631

¹ Includes value of minor products.² Includes \$11,725,820 which can not be distributed among the Eastern Interior, Western and Southwestern Interior, and Rocky Mountain, Northern Great Plains, and Pacific Coast regions.³ Includes 52 washeries and 63 river dredges.

The Appalachian region includes Alabama, Georgia, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and eastern Kentucky; the Northern Interior region, Michigan; the Eastern Interior region, Illinois, Indiana, and western Kentucky; the Western and Southwestern Interior regions, which here also include a relatively small output of lignite from the Gulf fields of Texas, embrace Arkansas, Iowa, Kansas, Missouri, Oklahoma, and Texas; and the Rocky Mountain, Northern Great Plains, and Pacific Coast regions include California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, Utah, Washington, and Wyoming.

The Appalachian region reported 72.7 per cent of the total coal land held by mine operators, 70.8 per cent of the total number of wage earners employed, and 72.3 per cent of the total output of coal. Two-thirds of the output of bituminous coal and practically the entire production of anthracite came from this field. Although not shown by this table,

the manufacture of coke at the mines was also far more important here than in any other region. Of the total output of coke made at the mines, namely, 32,450,482 tons, valued at \$67,483,162, 30,717,145 tons, valued at \$61,697,177, were produced in the Appalachian field. Practically all the remainder of the coke made at the mines was manufactured in the Rocky Mountain and Pacific Coast fields.

While the figures given for total expenses and for average expenses per ton require some qualification (see remarks preceding Table 51), they clearly indicate higher average expenses per ton in the northern and western producing regions than in the eastern. This is due, not to greater difficulties of mining, but to the differences in wages and in the cost of mine supplies.

The acreage of coal land given in Table 3 is only the acreage held by active mine operators and by no means approaches the total area underlain by workable coal deposits in these various regions.

PROGRESS OF THE COAL MINING INDUSTRY.

Comparative production by geographic divisions and leading states: 1909, 1902, and 1889.—The next table gives the total quantity and value of the coal produced in the different geographic divisions and the leading states for the years 1909, 1902, and 1889. For 1909 it includes mines operated by penal institutions and mines furnishing incomplete reports; it covers coal made into coke at the mines, as well as that produced for sale or for use as fuel. In 1889 small local mines, such as were omitted from the census of 1909, were canvassed and data with reference to the quantity and value of coal produced were secured, and are here included, although other statistical data were not secured regarding such mines. However, their total production was not great enough to affect the comparability of the statistics appreciably.

The table shows the great development of the coal mining industry from 1889 to 1909. The total output was 141,230,000 tons in 1889 and 460,049,000 tons in

1909, an increase of 318,819,000 tons, or 225.7 per cent. By far the greater part of this increase was in the bituminous production, which rose from 95,629,000 tons to 378,975,000 tons, an increase of 296.3 per cent. In Pennsylvania the increase in the bituminous output was 101,461,000 tons, in West Virginia 45,591,000 tons, in Illinois 38,792,000 tons, and in Ohio 17,886,000 tons, or 280 per cent, 732 per cent, 320 per cent, and 179 per cent, respectively.

The decrease of 9.2 per cent in Pennsylvania anthracite production from 1889 to 1902, as well as a part of the increase of 95.7 per cent from 1902 to 1909, is accounted for by the prolonged strike in 1902, which greatly curtailed the output of the collieries for that year. The progress of this industry is much better indicated by a comparison of the figures of 1889 and 1909; between these years the increase in production was 35,442,000 tons, or 77.8 per cent, and in value, \$83,306,000, or 126.8 per cent.

PRODUCTION AND VALUE OF COAL FOR GEOGRAPHIC DIVISIONS AND FOR THE LEADING STATES: 1909, 1902, AND 1889.

[Includes coal made into coke at the mines.]

	TONS OF COAL (IN THOUSANDS).			VALUE OF COAL AT MINES (IN THOUSANDS).			INCREASE, ² TONS.				INCREASE, VALUE.			
	1909 ¹	1902	1889	1909 ¹	1902	1889	1902-1909		1889-1902		1902-1909		1889-1902	
							Amount (in thousands).	Per cent.	Amount (in thousands).	Per cent.	Amount (in thousands).	Per cent.	Amount (in thousands).	Per cent.
United States	460,049	301,588	141,230	\$552,895	\$367,013	\$160,226	158,461	52.5	160,358	113.5	\$185,882	50.6	\$206,787	129.1
Anthracite.....	81,074	41,468	45,601	149,251	76,174	65,880	39,606	95.5	-4,133	-9.1	73,077	95.9	10,294	15.6
Bituminous.....	378,975	260,120	95,629	403,644	290,839	94,346	118,855	45.7	164,491	172.0	112,805	38.8	196,493	208.3
GEOGRAPHIC DIVISIONS:														
New England.....			2			6			(3)	(3)			(3)	(3)
Anthracite.....			2			6			(3)	(3)			(3)	(3)
Middle Atlantic.....	218,622	139,948	81,719	278,826	182,206	93,075	78,674	56.2	58,229	71.3	96,620	53.0	88,531	94.5
Anthracite.....	80,987	41,374	45,545	149,028	76,174	65,722	39,613	95.7	-4,171	-9.2	72,854	95.6	10,452	15.9
Bituminous.....	137,635	98,574	36,174	129,798	106,032	27,953	39,061	39.6	62,400	172.5	23,766	22.4	78,079	279.3
East North Central.....	95,278	66,870	24,994	99,249	72,952	24,113	28,408	42.5	41,876	167.5	26,297	36.0	48,839	202.5
Anthracite.....	18,692	15,287	8,904	29,157	21,224	12,249	3,405	22.3	6,383	71.7	7,963	37.5	8,975	73.3
Bituminous.....	76,586	51,583	16,090	70,092	51,728	11,864	25,003	42.5	35,493	167.5	18,334	28.3	39,864	173.5
West North Central.....	18,692	15,287	8,904	29,157	21,224	12,249	3,405	22.3	6,383	71.7	7,963	37.5	8,975	73.3
Southern divisions ⁴	98,972	60,634	19,323	99,641	66,264	19,482	38,338	63.2	41,311	213.8	33,377	50.4	46,782	240.1
Anthracite.....	28,485	18,849	6,288	45,902	24,367	10,701	9,636	51.1	12,561	199.8	21,625	88.7	13,666	127.7
Bituminous.....	70,487	41,785	13,035	53,739	41,897	11,742	28,702	63.2	28,750	167.5	11,752	31.9	33,116	173.5
LEADING STATES:														
Pennsylvania.....	218,622	139,948	81,719	278,826	182,206	93,075	78,674	56.2	58,229	71.3	96,620	53.0	88,531	94.5
Anthracite.....	80,987	41,374	45,545	149,028	76,174	65,722	39,613	95.7	-4,171	-9.2	72,854	95.6	10,452	15.9
Bituminous.....	137,635	98,574	36,174	129,798	106,032	27,953	39,061	39.6	62,400	172.5	23,766	22.4	78,079	279.3
West Virginia.....	51,823	24,571	6,232	44,668	24,749	5,087	27,252	110.9	18,339	294.3	19,919	80.5	10,662	356.5
Illinois.....	50,896	32,939	12,104	53,429	33,946	11,755	17,957	54.5	20,835	172.1	19,483	57.4	22,191	188.8
Ohio.....	27,833	23,520	9,977	27,628	26,054	9,355	4,343	18.5	13,543	135.7	6,741	2.5	17,599	188.1
Indiana.....	14,735	9,446	2,845	14,996	10,400	2,888	5,289	56.0	6,601	232.0	4,596	44.2	7,512	260.1
Alabama.....	13,692	10,355	3,573	16,197	12,420	3,961	3,337	32.2	6,782	189.8	3,777	30.4	8,459	213.6
Colorado (bituminous).....	10,643	7,349	2,544	14,104	10,400	8,338	3,294	44.8	4,805	188.9	5,766	69.2	4,494	116.9
Kentucky.....	10,583	6,767	2,400	9,960	6,667	2,374	3,816	56.4	4,367	182.0	3,293	49.4	4,293	150.8
Iowa.....	7,732	5,905	4,095	12,693	8,660	5,427	1,827	30.9	1,810	44.2	4,093	46.6	3,223	59.6
Kansas.....	6,970	5,266	2,221	10,008	6,863	3,297	1,704	32.4	3,045	137.1	3,145	45.8	3,566	108.2
Wyoming.....	6,427	4,429	1,359	9,874	5,236	1,749	1,998	45.1	3,040	218.9	4,638	83.6	3,487	199.4
Tennessee.....	6,350	4,353	1,926	6,569	5,400	2,338	1,967	44.9	2,467	127.6	1,469	27.2	3,062	131.0

¹ Includes production of mines for which incomplete reports were received and of mines operated by penal institutions.
² A minus sign (-) denotes decrease.
³ None produced in 1902.
⁴ Includes the South Atlantic, East South Central, and West South Central divisions.

⁵ Includes the Mountain and Pacific divisions.
⁶ Value given for bituminous includes value of anthracite.
⁷ Not computed. See Note 6.
⁸ Estimated value of anthracite has been deducted from figures published in 1902.

Comparative production by geologic regions: 1909 and 1889.¹—The following table gives the quantity and value of the coal produced in the different geologic regions for 1909 and 1889. The table includes the coal reported by penal institutions and by mines for which incomplete reports were received.

[Includes coal made into coke at the mines.]

REGION.	TONS OF COAL (IN THOUSANDS).			VALUE AT MINES (IN THOUSANDS).			AVERAGE VALUE PER TON.	
	1909 ¹	1889	Per cent of increase.	1909 ¹	1889	Per cent of increase.	1909	1889
							\$1.20	\$1.13
United States	460,049	141,230	225.7	\$552,895	\$160,226	245.1	\$1.20	\$1.13
Anthracite.....	81,074	45,601	77.8	149,251	65,880	126.5	1.84	1.44
Bituminous.....	378,975	95,629	296.3	403,644	94,346	327.8	1.07	0.99
Appalachian.....	332,479	108,569	206.2	388,541	119,305	225.7	1.17	1.10
Anthracite.....	80,987	45,547	77.8	149,028	65,728	126.7	1.84	1.44
Bituminous.....	251,492	63,022	299.1	239,513	53,577	347.0	0.95	0.85
Northern Interior.....	1,783	68	2,522.1	3,195	115	2,678.3	1.79	1.69
Eastern Interior.....	71,297	16,240	339.0	73,150	15,796	363.1	1.03	0.97
Western and Southwestern Interior.....	25,623	10,036	155.3	41,433	14,268	190.4	1.62	1.42
Rocky Mountain, Northern Great Plains, and Pacific Coast.....	28,867	6,317	357.0	46,576	10,742	333.6	1.61	1.70
Anthracite.....	87	54	61.1	223	152	46.7	2.56	2.81
Bituminous.....	28,780	6,263	359.5	46,353	10,590	337.7	1.61	1.69

¹ Includes production of mines operated by penal institutions and of mines for which incomplete reports were received.

Of the total increase of 318,819,000 tons in output between 1889 and 1909, 223,910,000 tons, or seven-

¹ For statement of area included in each region, see discussion following Table 3.

tenths, represents the increase in the Appalachian region. In bituminous coal the increase in this region was 188,470,000 tons, out of a total increase for the United States of 283,346,000 tons. While the greatest absolute increase took place in the Appalachian region, greater percentages of increase are shown for every other field except the Western and Southwestern Interior regions. In the Northern Interior region almost the entire development of the industry has been accomplished in the 20 years covered by the table. The somewhat slower growth of the industry in the Western and Southwestern Interior fields is accounted for by the fact that these fields serve markets, largely rural, in which coal consumption has not increased so rapidly as in the markets supplied by the other regions.

It will be noted that the average value per ton has increased in every region except the Rocky Mountain, Northern Great Plains, and Pacific Coast. For the entire country the increase for bituminous coal was from \$0.99 in 1889 to \$1.07 in 1909; in the Appalachian field, the most important, the average value of bituminous coal was \$0.85 per ton in 1889 and \$0.95 in 1909, and that of anthracite, \$1.44 and \$1.84, respectively. In general, the increases in average values may be ascribed to higher wages and greater cost of mine supplies. The decrease in average values in the far western fields is discussed in connection with Table 36.

Comparative statistics for the United States: 1909 and 1889.—Table 6 gives the chief items from the census returns for 1909 and 1889 which are comparable or which can be so adjusted as to be comparable. The statistics for 1909 have been made to relate solely to coal mining by deducting (see explanation accompanying Table 3) the capital, total expenses, wages, cost of supplies, and value of products attributable to coke manufacture, and by adding the tonnage and value of coal made into coke at the mines. All the data for 1909 are exclusive of those for mines with incomplete reports and for penal institutions.

The tonnage and value of coal shown for 1889 include the quantity and value of the output of many small "banks" or local mines, which are not included in the number of mines given or in the statistics of acreage, capital, or expenses. However, the total output of these mines was very small, so that the average expense per ton, although based on the output of all mines and the expenses of only part of them, is substantially comparable with that for 1909.

Salaries of foremen, totaling \$3,510,543, have been deducted from the wages published in the 1889 statistics, since in 1909 the payments to inside and outside foremen were included in salaries.

It is also to be observed that the acreage given in the table covers all lands controlled by operators, both coal bearing and noncoal bearing. In 1889 the holdings of coal land were not reported separately from those of other land, and hence to obtain comparable data it is necessary to include the holdings of noncoal bearing lands in the figures for 1909. However, this does not materially affect the value of the figures for comparative purposes, since the control of barren land is often necessary for the development of coal deposits, and since nearly 85 per cent of the total land shown for 1909 was reported as coal bearing and much of the remainder, although not fully prospected, is known to be underlaid with coal measures, which may eventually prove workable.

The figures for total expenses for the two census years are not strictly comparable, because the 1889 schedule called for the inclusion in miscellaneous expenses of interest on borrowed money, while the schedule for 1909 excluded interest payments. However, the amount of interest included in the returns for 1889 was doubtless so small as not to affect the total expenses appreciably. For all coal mines, both anthracite and bituminous, the amount expended for miscellaneous expenses in 1909—not shown separately in the table—was \$45,742, 610, of which \$20,016,639 was for royalties and \$3,893,257 for contract work. The balance (\$21,832,714) covered taxes, rent of offices, use of patents, insurance, ordinary repairs of buildings and machinery, and all other sundry expenses. In 1889 the miscellaneous expenses amounted to \$18,576,762, of which \$3,155,171 was for contract work. The remaining \$15,421,591 included not only interest and sundry

expenses similar to those covered in 1909, but royalties as well. The item of interest in 1889 must therefore have been small as compared with total expenses.

In considering the total expenses and the average expenses per ton, the remarks on page 181 under "Expenses" as to the significance of the data should be borne in mind.

COMPARATIVE SUMMARY FOR COAL MINES: 1909 AND 1889.

[Statistics relating to coke manufacture at mines excluded, partly by estimate.]

Table 6	1909	1889	INCREASE.	
			Amount.	Per cent.
All mines				
Number of mines.....	1 6,436	2 2,564	3,872	151.0
Acreage of coal and other land controlled.....	3 8,182,749	1,741,491	6,452,947	370.5
Owned.....	5,952,110	1,248,373	4,703,737	376.8
Held under lease.....	2,242,328	493,118	1,749,210	354.7
Capital.....	\$1,207,217,543	\$342,757,929	\$864,459,614	252.2
Expenses (gross), total.....	\$517,483,749	\$146,536,280	\$370,947,469	253.1
Wages.....	\$374,696,545	\$103,428,515	\$271,270,030	262.3
Supplies.....	\$72,043,898	\$18,828,590	\$53,215,308	282.6
Coal produced, including coal coked at mines:				
Tons (2,000 pounds).....	457,833,640	141,229,513	316,604,127	224.2
Value at mines.....	\$550,513,866	\$160,226,323	\$390,287,543	243.6
Anthracite				
Number of mines.....	1 423	2 346	77	22.3
Acreage of coal and other land controlled.....	3 465,134	214,558	262,265	122.2
Owned.....	316,867	107,362	209,505	195.1
Held under lease.....	159,956	107,196	52,760	49.2
Capital.....	\$246,928,078	\$162,035,610	\$84,892,468	52.4
Expenses (gross), total.....	\$139,324,467	\$61,212,087	\$78,112,380	127.6
Wages.....	\$92,317,659	\$37,854,273	\$54,463,386	143.9
Supplies.....	\$26,697,966	\$10,834,380	\$15,863,586	146.4
Average expenses per ton, total.....	\$1.72	\$1.34	\$0.38	28.4
Wages.....	\$1.14	\$0.83	\$0.31	37.3
Supplies.....	\$0.33	\$0.24	\$0.09	37.5
Coal produced:				
Tons (2,000 pounds).....	80,968,130	45,600,487	35,367,643	77.6
Value at mines.....	\$149,180,471	\$65,879,514	\$83,300,957	126.4
Average value per ton.....	\$1.84	\$1.44	\$0.40	27.8
Bituminous				
Number of mines.....	6,013	2 2,218	3,795	171.1
Acreage of coal and other land controlled.....	7,717,615	1,526,933	6,190,682	405.4
Owned.....	5,635,243	1,141,011	4,494,232	393.9
Held under lease.....	2,082,372	385,922	1,696,450	439.6
Capital.....	\$960,289,465	\$180,722,319	\$779,567,146	431.4
Expenses (gross), total.....	\$378,159,282	\$85,324,193	\$292,835,089	343.2
Wages.....	\$282,378,886	\$65,572,242	\$216,806,644	330.6
Supplies.....	\$45,345,932	\$7,994,210	\$37,351,722	467.2
Average expenses per ton, total.....	\$1.00	\$0.89	\$0.11	12.4
Wages.....	\$0.75	\$0.69	\$0.06	8.7
Supplies.....	\$0.12	\$0.08	\$0.04	50.0
Coal produced, including coal coked at mines:				
Tons (2,000 pounds).....	376,865,510	95,629,026	281,236,484	294.1
Value at mines.....	\$401,333,395	\$94,346,809	\$306,986,586	325.4
Average value per ton.....	\$1.06	\$0.99	\$0.07	7.1

¹ Includes 52 washeries and 63 river dredges.

² The figures representing the number of mines in 1889 are exclusive of 9,969 small mines—49 anthracite and 9,920 bituminous—the quantity and value of whose products are included in the tonnage and value of coal produced (forming about 2 per cent of the total), but for which no other statistics are available.

³ The total acreage of anthracite land (coal and other land combined) is exclusive of a duplication of 11,689 acres in figures for owned and leased acreage. See page 181.

⁴ No value was assigned to anthracite coal used for fuel at the mines in 1889.

The capital invested in coal mines and the output and value of coal produced were more than three times as great in 1909 as in 1889, and the acreage of land controlled was more than four times as great. By far the greater part of this development took place in bituminous mining, which is explained by the fact that the anthracite deposits are narrowly limited in extent, while the great area covered by the bituminous fields has permitted wide extension of the industry.

The growth of bituminous mining has involved—first, an increase in the number of mines operated and in the acreage of land brought under development, and second, an increase in the output of the individual mine, while that of anthracite mining has involved chiefly an increase in the output of the individual colliery. For bituminous coal in 1889 the average output per mine, exclusive of small local "banks," was, in round numbers, 42,000 short tons, as compared with 63,000 in 1909, an increase of about 50 per cent. In the anthracite industry this increase was much greater. In 1889 the average output for each anthracite mine was about 132,000 short tons, as compared with about 191,000 tons in 1909, if the entire number of enterprises (423) given in the above table be taken as a basis. However, if the comparison be restricted to mines proper, by eliminating the production of the 115 washeries and river dredges included in the data for 1909, the number of anthracite mines shows a decline from 346 in 1889 to 308 in 1909, while the average output per mine shows an increase from 132,000 tons to nearly 250,000 tons, or approximately 90 per cent.

In 1889 lands owned comprised 74.7 per cent of the total acreage controlled by the operators of bituminous mines, while the corresponding proportion in 1909 was 73 per cent. On the other hand, in the case of anthracite mining the proportion of the land owned by operators was decidedly higher in 1909 than in 1889. In 1889 about half the holdings of anthracite land reported were owned by the operators, while in 1909 about two-thirds were owned. This change may be explained in part by the fact that leased tracts have usually been worked out more rapidly than owned lands, since on leased holdings royalties must be paid whether coal is mined or not.

In general, from 1889 to 1909 both the average expense of production and the average value of coal increased. This is especially true of anthracite. In 1889 the average expense reported per short ton of anthracite was \$1.34, as compared with \$1.72 in 1909, while the average value per short ton was \$1.44, as compared with \$1.84 in 1909 (see remarks under Table 22). The increase in expense thus amounted to \$0.38 per ton and the difference in value to \$0.40 per ton. The average amount paid out in wages increased \$0.31 per ton. The increase in average expense may have been due in part to higher rates of wages, but was doubtless also due in part to the greater difficulty of mining measures deeper and thinner than were generally worked in 1889. For bituminous coal the average expense per short ton reported in 1889 was \$0.89, as compared with \$1 in 1909. This increased expense is attributable mainly to increased rates of wages and the higher cost of mine supplies.

Population and coal production: 1849-1909.—The following table compares the growth of population with the increase in the output of coal during each decade from 1849 to 1909.

YEAR.	POPULATION. ¹		COAL PRODUCTION.		
	Number.	Per cent of increase over preceding census.	Quantity (ton of 2,000 pounds).	Per cent of increase over preceding census.	Tons per capita.
1849.....	23,101,876	.....	6,445,681	.....	0.28
1859.....	31,443,321	35.6	14,333,922	122.4	0.46
1869.....	38,558,371	22.6	36,807,333	156.8	0.95
1879.....	50,155,783	30.1	71,481,570	94.2	1.43
1889.....	62,947,714	25.5	141,229,513	97.6	2.24
1899.....	76,694,575	20.7	253,741,192	79.7	3.34
1909.....	91,972,266	21.0	460,048,585	81.3	5.00

¹ Population is for the year following that covered by the statistics for coal.

² From the report of the Geological Survey.

³ Includes the production of mines operated by penal institutions, of mines for which incomplete reports were received, and of coal coked at the mines.

This table shows an enormous increase in the production of coal, as compared with the increase in population. In 1849 only about one-fourth of a ton was produced per capita, as compared with 5 tons per capita 60 years later. While the population of the country in 1909 was less than four times that in 1849, the production of coal was more than seventy times that in the earlier year. Even in the later periods, when the quantity of coal mined had reached large proportions, the increase in coal production was very rapid. From 1889 to 1899, and again from 1899 to 1909, coal output increased nearly four times as rapidly as population. These comparative figures reflect the industrial expansion of the nation.

Comparative statistics of engines and power: 1909 and 1902.—The next table shows the total primary horsepower, the number and horsepower of steam engines, and the number and horsepower of electric motors used in anthracite and bituminous producing coal mines in 1909 and 1902. The total primary horsepower given represents that of steam engines owned by the operators, plus that of motors operated by purchased electric current, plus an insignificant amount of power of other kinds, not shown separately. The statistics include the power used in coke manufacture at the bituminous mines, which, however, was comparatively unimportant in amount.

The total primary horsepower used in the anthracite mines increased 62.5 per cent between 1902 and 1909, while that used in the bituminous mines increased 149 per cent in the same period. Most of the primary power used in the coal mines is that of steam engines. The bituminous mines reported 25,294 horsepower of primary electric power (motors operated by purchased current) in 1909, however, or more than 11 times as much as in 1902. The anthracite mines reported no power of this kind in 1902 and only 1,410 horsepower in 1909. Of the miscellaneous primary power included in the totals for 1909, but not shown separately in the table, gas engines furnished 3,101 horsepower—2,329 for the bituminous mines and 772 for the anthracite—and water wheels furnished 348 horsepower, all of which was used in the bituminous mines.

MINES AND QUARRIES.

COMPARATIVE STATISTICS OF ENGINES AND POWER: 1909 AND 1902.

Table 8

CLASS OF MINES.	Census.	Primary horsepower, total.	STEAM ENGINES.			ELECTRIC MOTORS.			
			Number.	Horsepower.	Total horsepower.	Run by current generated by operator.		Run by purchased current.	
						Number.	Horsepower.	Horsepower.	Per cent of total primary power.
Total.....	1909 1902	1,904,154 909,160	19,318 11,142	1,874,001 904,305	402,090 73,849	10,869 1,400	375,386 71,682	26,704 2,167	1.4 0.2
Per cent of increase.....		109.4	73.4	107.2	444.5	676.4	423.7	1,132.3	.....
Anthracite (Pennsylvania).....	1909 1902	676,128 416,012	7,507 4,629	673,946 415,827	47,498 5,755	1,132 78	46,088 5,755	1,410	0.2
Per cent of increase.....		62.5	63.5	62.1	.....	1,376.9	700.8	.....	.....
Bituminous.....	1909 1902	1,228,026 493,148	11,751 6,513	1,200,055 488,478	354,592 68,094	9,717 1,322	329,298 65,927	25,294 2,167	2.1 0.4
Per cent of increase.....		149.0	80.4	145.7	420.7	635.0	399.5	1,067.2	.....

¹ Thirteen steam engines of 625 horsepower, reported by anthracite mines outside of Pennsylvania, are included in the figures for bituminous mines.

Nearly all electric motors used at the mines were run by current generated by the mine operators themselves. The use of such motors shows a marked in-

crease from 1902 to 1909, their total horsepower increasing in this period from 71,682 to 375,386. Much the greater number were reported by bituminous mines.

CHARACTER OF ORGANIZATION.

General summary.—The relative importance of the different forms of organization is shown in the following table, which gives for individuals, firms, corporations, and other organizations the number of operators, the number of mines, the number of wage earners em-

ployed, the tonnage of coal mined (including that for conversion into coke), and the total value of coal, coke, and other products reported. The statistics do not cover the few mines with incomplete reports or those operated by penal institutions.

PRINCIPAL STATISTICS FOR OPERATORS OF COAL MINES CLASSIFIED ACCORDING TO CHARACTER OF ORGANIZATION: 1909.

Table 9

CHARACTER OF ORGANIZATION.	TOTAL.					ANTHRACITE.					BITUMINOUS.				
	Number of operators.	Number of mines.	Number of wage earners.	Tons of coal, including coal coked at mines (in thousands).	Value of products (in thousands).	Number of operators.	Number of mines.	Number of wage earners.	Tons of coal (in thousands).	Value of products (in thousands).	Number of operators.	Number of mines.	Number of wage earners.	Tons of coal, including coal coked at mines (in thousands).	Value of products (in thousands).
All classes.....	3,695	6,436	743,293	457,834	\$577,143	192	423	173,504	80,968	\$149,180	3,503	6,013	569,789	376,866	\$427,962
Individual.....	1,058	1,195	17,475	8,812	10,490	37	38	308	216	283	1,021	1,157	17,167	8,596	10,207
Firm.....	664	805	24,699	12,999	17,111	44	54	6,872	3,662	5,754	620	751	17,827	9,337	11,357
Corporation.....	1,942	4,303	695,985	422,940	544,886	105	325	164,499	76,327	141,554	1,837	4,068	531,486	356,613	403,331
Other.....	31	43	5,134	3,083	4,656	6	6	1,825	763	1,589	25	237	3,309	2,320	3,067
Per cent of total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Individual.....	28.6	18.6	2.4	1.9	1.8	19.3	9.0	0.2	0.3	0.2	29.1	19.2	3.0	2.3	2.4
Firm.....	18.0	12.5	3.3	2.8	3.0	22.9	12.8	4.0	4.5	3.9	17.7	12.5	3.1	2.5	2.7
Corporation.....	52.6	68.3	93.6	94.6	94.4	54.7	76.8	94.8	94.3	94.9	52.4	67.7	93.3	94.6	94.2
Other.....	0.8	0.7	0.7	0.7	0.8	3.1	1.4	1.1	0.9	1.1	0.7	0.6	0.6	0.6	0.7
Average per operator.....			201	124	156			904	422	777			163	108	122
Individual.....			17	8	10			8	6	8			17	8	10
Firm.....			37	20	26			156	83	131			29	15	18
Corporation.....			358	223	281			1,567	727	1,348			289	194	220
Other.....			166	99	150			304	127	265			132	93	123

¹ Comprises 2 mines operated by estates and 4 operated by limited partnerships, combined in order to avoid disclosing individual operations.
² Includes 21 mines operated by cooperative companies.

The table shows the predominance of the corporate form of organization among the producers of coal. The 1,942 corporations comprised 52.6 per cent of the total number of concerns reporting, operated 68.3 per cent of the total number of mines, employed 93.6 per cent of the wage earners in the industry, and produced 94.6 per cent of the entire quantity of coal mined. While there were also 1,058 individual operators, 664

firms, and 31 others reporting, nearly all of these were relatively small concerns. For corporations the average production per operator was about 223,000 tons, for firms 20,000 tons, and for individuals 8,000 tons.

Detailed statement for incorporated and unincorporated operators.—The following table gives somewhat more detailed statistics for incorporated and unincorporated operators in 1909.

STATISTICS FOR OPERATORS CLASSIFIED AS INCORPORATED OR UNINCORPORATED: 1909.

Table 10	BITUMINOUS.				ANTHRACITE.	
	Mines without coke manufacture.		Mines with coke manufacture.		Incorporated operators.	Unincorporated operators.
	Incorporated operators.	Unincorporated operators.	Incorporated operators.	Unincorporated operators.		
Number of mines.....	3,488	1,897	600	48	325	98
Number of operators.....	1,070	1,646	161	20	105	87
Capital.....	\$681,353,862	\$16,003,275	\$345,521,191	\$19,318,755	\$241,638,086	\$5,289,992
Net expenses.....	\$284,333,940	\$17,117,950	\$90,837,416	\$3,617,714	\$127,586,768	\$6,864,786
Salaries.....	\$15,883,421	\$617,643	\$5,059,504	\$240,327	\$4,363,423	\$219,881
Wages.....	\$214,680,729	\$13,414,162	\$63,425,551	\$2,670,046	\$87,736,209	\$4,581,450
Persons engaged in industry.....	416,061	37,412	133,618	5,586	168,009	9,395
Proprietors and firm members.....		3,648		91		188
Performing manual labor.....		1,709		4		72
Salaried officers of corporations.....	1,994	11	306	24	171	
Superintendents and managers.....	3,760	428	1,293	85	887	69
Clerks and other salaried employees.....	7,895	323	2,945	105	3,052	133
Wage earners.....	402,412	33,002	129,074	5,301	164,499	9,005
Products:						
Quantities (tons of 2,000 pounds)—						
Coal, total production.....	264,121,957	10,530,083	92,490,571	3,722,899	78,326,564	4,641,566
Coal (exclusive of coal made into coke).....	264,121,957	10,530,083	45,957,497	183,370	76,326,564	4,641,566
Coke made at mines.....			30,038,884	2,411,598		
Value at mines.....	\$296,081,343	\$19,813,592	\$107,249,662	\$4,817,867	\$141,554,636	\$7,625,835
Coal (exclusive of coal made into coke).....	\$295,875,314	\$19,784,032	\$44,219,327	\$173,667	\$141,554,636	\$7,625,835
Coke made at mines.....			\$62,838,962	\$4,644,200		
Other products.....	\$200,029	\$29,560	\$191,373			
Average per ton:						
Net expenses.....	\$1.08	\$1.04			\$1.67	\$1.48
Salaries.....	0.00	0.04			0.06	0.05
Wages.....	0.81	0.81			1.15	0.99

¹ Gross expenses were reported as follows: Incorporated operators, \$132,210,139; unincorporated operators, \$7,114,328.
² Salaried officials of cooperative associations, limited partnerships, etc.

In considering the average expenses per ton shown in the table the remarks on page 181 as to the limitations of the data should be borne in mind. Moreover, the average expenses per ton for incorporated and unincorporated producers are not strictly comparable, owing to the fact that such supervisory services as are performed for corporations by salaried officers or managers are in part performed for unincorporated producers by proprietors and firm members, many of whom receive no salaries for these services, but look to the profits of the enterprise for their compensation. Indeed, a considerable number of such proprietors and firm members were returned as performing manual labor at their mines, although the expenses reported included no wage payments for this labor. While the salary payments averaged \$0.06 per ton for anthracite produced by corporations and \$0.05 per ton for the output of other concerns, the latter figure would be materially higher if an allowance were made for the supervisory services of proprietors and firm members of unincorporated enterprises, especially in view of the fact that the latter

were, as a rule, conducted on a much smaller scale than those under corporate ownership, so that the services of the proprietors would have to be apportioned to a smaller output.

The average wage payment per ton for anthracite produced by corporations was \$1.15, as compared with \$0.99 for the output of other concerns, but the latter figure includes no valuation for the services of the 72 proprietors who performed manual labor; moreover, the production of the unincorporated concerns contained a higher proportion of output from culm banks, which was recovered at a comparatively low wage cost, and in turn was of lower value. (See Table 28.) A comparison between bituminous mines under corporate and other forms of ownership can properly be attempted only for those without coke manufacture. For such mines the wage payment averaged \$0.81 per ton for each class of ownership, but the fact that the unincorporated concerns reported 1,709 proprietors performing manual labor, for which no wages were included in the expenses returned, must be considered in this connection.

INDUSTRIAL AFFILIATIONS OF OPERATORS.

Numerous manufacturing, transportation, and other industrial enterprises which consume large quantities of coal either operate their own mines or, through the ownership of securities, are affiliated with coal mining companies. The conditions of marketing, and hence of producing, coal may be affected by this relationship. In the first place, the values assigned to coal by producers thus affiliated may bear little relation to market prices. In the second place, the coal mining subsidiaries of industrial concerns are assured

of a demand for a more or less definite tonnage, are free from the uncertainty of disposing profitably of their output in competitive markets, and accordingly may operate their mines on a larger scale and with greater regularity. On the other hand, coal producers not thus connected are assured of no market for their output beyond the terms of the contracts they may have, are often subjected to rigorous competition in the open market, and in consequence their mines must often be operated on a smaller scale and with less

regularity. In order to obtain statistics bearing on this relationship, all operators have been classified according to their industrial affiliation—so far as definitely known—as connected with iron and steel concerns, with other industrial concerns, or with railroads, respectively, or as unaffiliated. No mining enterprise was assigned to any of the first three groups except on official information. Railroads interested in coal mining companies through the ownership of securities report such ownership to the Interstate Commerce Commission, and these reports were used to determine what operators were affiliated with railroads. Any coal mining companies controlled by railroads in ways not reported to the Interstate Commerce Commission have, therefore, been included with unaffiliated operators in this classification. The control of coal mines by iron and steel and other industrial concerns was determined from the census reports of such companies for their coal mining operations and by correspondence with them. It is probable that some mines classified as unaffiliated for lack of definite information were, as a matter of fact, controlled directly or indirectly by industrial concerns. The following table gives the production of coal in 1909 by operators classified as above outlined; it does

not cover the few mines with incomplete reports, nor those operated by penal institutions.

COAL PRODUCTION OF OPERATORS CLASSIFIED ACCORDING TO THEIR INDUSTRIAL AFFILIATIONS: 1909.

AFFILIATION OF OPERATORS.	TONS OF COAL PRODUCED (2,000 POUNDS).		
	Total.	Anthracite.	Bituminous.
Total.....	457,833,640	80,968,130	376,865,510
Affiliated with—			
Iron and steel companies.....	46,587,216	.....	46,587,216
Other industrial companies.....	45,376,419	.....	45,376,419
Railroad companies.....	121,985,188	61,170,097	60,815,091
Unaffiliated.....	243,884,817	19,798,033	224,086,784

The table shows that of the entire output of coal in 1909 nearly one-half was mined by operators known to be closely affiliated with railroads or industrial concerns. Producers connected with railroads mined more than one-fourth of the total coal production, and more than three-fourths of the total in the case of anthracite. The coal mining subsidiaries of iron and steel companies produced about one-tenth of the total tonnage, and those of other industrial concerns nearly as much. These figures show that the large consumers of coal have quite commonly taken measures to secure their own supplies of fuel. (See also Tables 23, 45, and 47.)

SCALE OF PRODUCTION.

The scale of production in coal mining may be considered in two aspects: First, that of the individual mine; and, second, that of the operator. The fact that many operators rendered combined reports for all their mines—though, of course, stating the number of mines covered—instead of a separate report for each, made impossible any complete classification of mines according to output, so that only general information is available as to average size of the individual mine, based on the entire number of mines reported and the entire output.

Size of mines.—While the size of both anthracite and bituminous mines varies widely, yet, broadly speaking, the scale of operations is much larger in the former than in the latter. While many bituminous mines in 1909 produced more than 250,000 tons each, and some exceeded 500,000 tons, the average for all bituminous mines covered by the census was only about 63,000 (short) tons, and for all "commercial" mines—that is, mines selling in general markets—only about 76,000 tons. If the very small local mines were included, which were not canvassed because their aggregate production is negligible, the average would be much lower. On the other hand, the average output of anthracite mines in 1909 (not counting washeries and river dredges) was nearly 250,000 (short)

tons. By far the greater part of the anthracite mined is produced by comparatively large collieries. The limited area of the anthracite deposits and the depth of the measures encourage the concentration of production in large collieries, while the wide extent of the bituminous fields, the cheapness of great areas of coal land, and the general accessibility of the deposits favor the opening of many small mines. As shown by Table 6, the average size of mines, both bituminous and anthracite, has increased materially since 1889.

Classification of operators according to value of products.—Three classifications of operators have been made to show the size of the producing organizations in coal mining. The first classifies operators according to value of products, the second according to the number of wage earners employed, and the third according to the acreage of land controlled.

The next table gives for 1909 the number of operators classified according to the value of product per operator (based on all products, including coke made at the mines), together with the total value of products for each class. Penal institutions and mines with incomplete reports are excluded.

This classification shows a marked degree of control by large producing organizations. Of the total value of products for all operators, namely, \$577,143,000,

the 85 concerns each having products valued at \$1,000,000 or over together reported \$348,496,000, or about 60 per cent. At the other extreme, the 2,979 operators each having products valued at less than \$100,000 together reported but \$56,485,000, or less than 10 per cent of the total. In the anthracite industry 9 producing concerns, each having a value of product exceeding \$5,000,000, together reported nearly three-fourths of the total value of anthracite. Among the bituminous mining organizations, the 10 each reporting products valued at \$5,000,000 or over together reported one-fourth of the total value of products, while the 68 operators each having products valued at \$1,000,000 or over together contributed more than half the total. In this industry production is relatively much less closely concentrated in the hands of great companies than in anthracite mining.

VALUE OF ALL PRODUCTS (INCLUDING COKE) PER OPERATOR.	TOTAL.		ANTHRACITE.		BITUMINOUS.	
	Number of operators.	Value of all products.	Number of operators.	Value of products.	Number of operators.	Value of all products (including coke).
Total	3,695	\$577,142,935	192	\$149,180,471	3,503	\$427,862,464
Less than \$10,000 ¹	1,666	6,407,712	69	172,699	1,597	6,235,013
\$10,000 to \$100,000 ²	1,313	50,077,098	52	2,364,432	1,261	47,712,666
\$100,000 to \$500,000.....	561	125,783,899	39	10,871,318	522	114,912,581
\$500,000 to \$1,000,000.....	70	46,377,776	15	10,149,104	55	36,228,672
\$1,000,000 to \$5,000,000.....	66	132,499,197	8	17,651,088	58	114,848,109
\$5,000,000 and over.....	19	215,997,253	9	107,971,830	10	108,025,423
Per cent of total	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$10,000.....	45.1	1.1	35.9	0.1	45.6	1.5
\$10,000 to \$100,000.....	35.5	8.7	27.1	1.6	36.0	11.1
\$100,000 to \$500,000.....	15.2	21.8	20.3	7.3	14.9	28.9
\$500,000 to \$1,000,000.....	1.9	8.0	7.8	6.8	1.6	8.5
\$1,000,000 to \$5,000,000.....	1.8	23.0	4.2	11.8	1.6	28.8
\$5,000,000 and over.....	0.5	37.4	4.7	72.4	0.3	25.2

¹ Includes 1 anthracite operator with a product valued at more than \$10,000, in order to avoid disclosing individual operations.
² Includes 1 anthracite operator with a product valued at more than \$100,000.

Classification of operators according to the number of wage earners employed.—The following table gives the number of operators in 1909, classified according to the number of wage earners employed per operator (including those employed in coke manufacture at the mines), together with the number of wage earners employed by each group. Penal institutions, operators failing to make complete reports, and operators employing no wage earners directly, are excluded.

The classification indicates the importance of the larger coal mining companies as employers of labor. The 22 concerns, each of which employed more than 5,000 wage earners, together reported over 269,000 employees, or an average of more than 12,000 each, and the employees of these 22 companies constituted more than one-third of all the wage earners reported. Of these 22 operators, 10 were anthracite producers, and their total of 134,000 wage earners constituted more than three-fourths of all the men employed in the anthracite industry. Among the bituminous operators, 77 with more than 1,000 wage earners each, together reported 274,596 wage earners, or nearly half the total for the industry.

NUMBER OF WAGE EARNERS (ALL CLASSES) EMPLOYED PER OPERATOR.	NUMBER.		PER CENT OF TOTAL.	
	Operators.	Wage earners (including those making coke at mines).	Operators.	Wage earners (including those making coke at mines).
Total, all classes	13,638	743,293	100.0	100.0
20 or less.....	1,606	12,704	44.1	1.7
21 to 50.....	594	19,600	16.3	2.6
51 to 100.....	485	35,279	13.3	4.7
101 to 500.....	² 737	168,605	20.3	22.7
501 to 1,000.....	121	85,374	3.3	11.5
1,001 to 5,000.....	73	152,149	2.0	20.5
Over 5,000.....	22	269,522	0.6	36.3
Anthracite, all classes	1,185	173,504	100.0	100.0
20 or less.....	67	419	36.2	0.2
21 to 50.....	19	612	10.3	0.4
51 to 100.....	19	1,459	10.3	0.8
101 to 500.....	² 44	² 12,082	23.8	7.0
501 to 1,000.....	18	11,857	9.7	6.8
1,001 to 5,000.....	8	13,061	4.3	7.5
Over 5,000.....	10	134,014	5.4	77.2
Bituminous, all classes	13,453	569,789	100.0	100.0
20 or less.....	1,539	12,345	44.6	2.2
21 to 50.....	575	18,988	16.7	3.3
51 to 100.....	466	33,820	13.5	5.9
101 to 500.....	693	156,523	20.1	27.5
501 to 1,000.....	103	73,517	3.0	12.9
1,001 to 5,000.....	65	139,088	1.9	24.4
Over 5,000.....	12	135,508	0.3	23.8

¹ Six anthracite and 50 bituminous operators reported no labor hired directly, and one anthracite operator failed to report the number of wage earners.
² Includes two operators employing less than 100 wage earners, in order to avoid disclosure of individual operations.

Classification of operators according to the number of acres of land controlled.—The table below gives the number of operators in 1909 holding specified areas of land, together with the total holdings of each group. River dredge operators, washery operators reporting only culm banks held, and mine operators failing to report acreage, are excluded. Not only coal land, but timber tracts and other holdings are included. However, the bituminous operators held relatively little noncoal bearing land, and the Pennsylvania anthracite operators, who reported a considerable proportion of barren acreage, are classified in Table 26 according to their holdings of coal land.

ACRES OF LAND (COAL AND OTHER) PER OPERATOR.	NUMBER.		PER CENT OF TOTAL.	
	Operators.	Acres of coal and other land controlled.	Operators.	Acres of coal and other land controlled.
Total, all classes	13,593	2,213,767	100.0	100.0
Less than 100 acres.....	1,275	49,939	35.5	0.6
100 to 1,000 acres.....	1,485	564,151	41.3	6.9
1,000 to 10,000 acres.....	703	1,956,755	19.6	23.8
10,000 to 100,000 acres ²	119	2,956,532	3.3	36.0
100,000 acres and over.....	11	2,686,390	0.3	32.7
Anthracite, all classes	1,137	2,476,759	100.0	100.0
Less than 100 acres.....	47	1,693	34.3	0.4
100 to 1,000 acres.....	55	19,801	40.1	4.2
1,000 to 10,000 acres.....	27	61,803	19.7	13.0
10,000 to 100,000 acres ²	8	393,462	5.8	82.5
Bituminous, all classes	13,456	2,737,008	100.0	100.0
Less than 100 acres.....	1,228	48,246	35.5	0.6
100 to 1,000 acres.....	1,430	544,350	41.4	7.0
1,000 to 10,000 acres.....	676	1,894,952	19.6	24.5
10,000 to 100,000 acres.....	111	2,563,070	3.2	33.1
100,000 acres and over.....	11	2,686,390	0.3	34.7

¹ Fifty-five operators of anthracite washeries and river dredges are excluded together with 47 bituminous operators who failed to report acreage controlled.
² Sixty-four acres of farm lands reported by operators of river dredges are excluded and a duplication of 31,082 acres is included, of which 11,689 acres are in the anthracite total and 19,393 acres in the bituminous. See Introduction.
³ Includes 1 operator reporting more than 100,000 acres, in order to avoid the disclosure of individual operations.

The table shows that 11 concerns, each of which reported 100,000 acres and over, together held nearly 2,700,000 acres, or almost one-third of the total acreage reported by all operators in the United States; and that 130 operators, each reporting 10,000 acres and over, together held over 5,600,000 acres, or more than two-thirds of the total acreage reported. At the other extreme, 1,275 operators, each reporting less than 100 acres, while comprising more than one-third of the total number of operators, together held less than 50,000 acres, an insignificant fraction of the total.

The control of anthracite land is far more concentrated than that of bituminous. The significance of the difference in degree of concentration of tenure is not fully indicated by a comparison of the percentages in the table, since the total area of all anthracite deposits is small and no extensive new fields are known which may be exploited by new operating companies, while, on the contrary, there are great areas of bituminous coal, entirely undeveloped and not controlled by any present operators, upon which thousands of new mines may be opened in the future by new mining companies.

DISTRIBUTION OF EXPENSES.

The distribution of the total reported expenses for 1909 among the several items is shown by the following table of percentages. The absolute numbers are given in Table 1. As to the significance of total reported expenses see the remarks on page 181 under "Expenses."

coal. This item covered 66.3 per cent of the total (gross) expenses reported for the anthracite industry in 1909 and 74.4 per cent of the total for the bituminous.

The next largest item is cost of supplies, including fuel and rent of power. The cost of colliery supplies constitutes a much higher percentage of expenses for anthracite operators than for bituminous. This would remain true even after deducting the cost of explosives and oil sold to miners, which is included in the total cost of supplies reported by anthracite operators. This higher percentage is explained by the fact that the methods of mining and preparing coal are more costly for anthracite than for bituminous. The higher percentage for supplies at mines with coke manufacture than for mines without coke production is due to the fact that the cost of supplies reported by the former group of mines includes the cost of coke yard and oven supplies.

The greater proportionate payment for royalties in anthracite as compared with bituminous mining is of course due, primarily, to the higher rate of royalty prevailing in the anthracite fields.

Table 15

CLASS OF EXPENSES.	PER CENT OF TOTAL REPORTED EXPENSES.				
	All mines. ¹	An-thra-cite.	Bituminous. ¹		
			Total.	Mines with-out coke manu-facture.	Mines with coke manu-facture.
Total (gross expenses).....	100.0	100.0	100.0	100.0	100.0
Salaries.....	4.9	3.3	5.5	5.5	5.6
Wages.....	72.3	66.3	74.4	75.7	70.3
Supplies.....	13.9	19.2	12.0	11.4	14.0
Royalties.....	3.8	5.7	3.1	3.2	2.5
Miscellaneous.....	5.2	5.5	5.0	4.2	7.5

¹ The cost of coal purchased for coking at the mines has not been considered in calculating these percentages.

From these figures it is apparent that wages constitute by far the greater part of the expense of mining

PERSONS ENGAGED IN THE INDUSTRY.

Occupational status: 1909.—The following table (which excludes penal institutions and the few mines with incomplete reports) shows the occupational status of the persons engaged in coal mining, including those employed in coke manufacture at the mines. The statistics for wage earners relate to December 15, 1909, or the nearest representative day. The relation between this number and the average number employed

for the year is discussed in connection with Table 18. As shown by the table, in 1909 wage earners constituted 96.4 per cent of the total number of persons engaged in the industry. In view of the large scale of production prevailing, the methods of mine operation, and the simplicity of the marketing branch of the business, the small proportion of persons other than wage earners is only to be expected. The num-

ber of proprietors and firm members reported as performing manual labor, 1,785, represents mainly those interested in little local bituminous mines employing few or no wage earners.

the nearest representative day. For mines with coke manufacture the data include wage earners engaged in coke making. Penal institutions and mines with incomplete reports are not considered in this table.

The table gives a total of 743,000 wage earners employed in coal mining and coke manufacture at the mines in 1909. Of this total, 173,000 were employed in the anthracite and 570,000 in the bituminous industry. About 600,000 wage earners, or four-fifths of the total, were employed below ground and about 143,000 or one-fifth, above ground. Of those below ground, 475,000 were in bituminous mines and 125,000 in anthracite; while, of those outside the mines, 94,000 were bituminous employees and 49,000 were anthracite. However, this total of outside bituminous wage earners includes 27,000 coke employees; if these are deducted, it appears that 12.4 per cent of the bituminous mine workers were employed above ground and 87.6 per cent below ground, while the corresponding percentages for anthracite workers were 28.1 and 71.9, respectively. The higher proportion of outside employees in the anthracite as compared with the bituminous industry is chiefly due to the relatively greater amount of labor expended in crushing, cleaning, and preparing anthracite for market.

Table 16

OCCUPATIONAL CLASS.	NUMBER.			PER CENT DISTRIBUTION.		
	Total.	Anthracite.	Bituminous (including coke manufacture at mines).	Total.	Anthracite.	Bituminous.
All classes.....	770,681	178,004	592,677	100.0	100.0	100.0
Proprietors and firm members.....	3,927	185	3,739	0.5	0.1	0.6
Officers of corporations.....	2,480	171	2,315	0.3	0.1	0.4
Superintendents and managers.....	6,522	956	5,566	0.8	0.5	0.9
Clerks and other salaried employees.....	14,453	3,185	11,268	1.9	1.8	1.9
Wage earners, number Dec. 15, 1909, or nearest representative day....	743,293	173,504	569,789	96.4	97.5	96.1
Proprietors and firm members performing manual labor (included above).....	1,785	72	1,713	.....	.....	.....

Classification of wage earners according to occupation.—The following table gives the number and percentage of wage earners employed in various occupations outside and inside, December 15, 1909, or

Table 17

CLASS OF WAGE EARNERS.	TOTAL.		ANTHRACITE.		BITUMINOUS.					
	Number.	Per cent of total.	Number.	Per cent of total.	Total.		Mines without coke manufacture.		Mines with coke manufacture.	
					Number.	Per cent of total.	Number.	Per cent of total.	Number.	Per cent of total.
All classes.....	743,293	100.0	173,504	100.0	569,789	100.0	435,414	100.0	134,375	100.0
Outside.....	142,843	19.2	48,753	28.1	94,090	16.5	51,260	11.8	42,830	31.9
Inside.....	600,450	80.8	124,751	71.9	475,699	83.5	384,154	88.2	91,545	68.1
Engineers, firemen, and mechanics.....	42,098	5.7	12,272	7.1	29,826	5.2	22,154	5.1	7,672	5.7
Outside.....	34,141	4.6	9,752	5.6	24,389	4.3	18,051	4.1	6,338	4.7
Inside.....	7,957	1.1	2,520	1.5	5,437	0.9	4,103	0.9	1,334	1.0
Miners and miners' helpers (all inside).....	407,179	62.9	83,156	47.9	324,023	67.4	314,226	72.2	69,797	51.9
Other wage earners 16 years of age and over.....	227,048	30.5	74,829	43.1	152,219	26.7	96,576	22.2	55,643	41.4
Outside.....	104,651	14.1	35,767	20.6	68,884	12.1	32,804	7.5	36,080	26.9
Inside.....	122,397	16.5	39,062	22.5	83,335	14.6	63,772	14.6	19,563	14.6
Boys under 16 years of age.....	6,968	0.9	3,247	1.9	3,721	0.7	2,458	0.6	1,263	0.9
Outside.....	4,051	0.5	3,234	1.9	817	0.1	405	0.1	412	0.3
Inside.....	2,917	0.4	13	(¹)	2,904	0.5	2,053	0.5	851	0.6

¹ Less than one-tenth of 1 per cent.

Miners and miners' helpers in the anthracite industry constitute a smaller part, while engineers, firemen, and mechanics, and other employees 16 years of age and over, constitute a larger part of the total than the corresponding classes in bituminous mines. This is more clearly shown if the comparison is limited to the inside men. Of the total number of inside wage earners, miners and their helpers constituted in anthracite mines, 66.7 per cent, and in bituminous mines, 80.7 per cent; engineers, firemen, etc., 2 per cent and 1.1 per cent, respectively; other wage earners 16 years and over, 31.3 per cent and 17.5 per cent. This difference

in the composition of the inside forces of the two classes of mines reflects the larger scale of production, the further division of labor, and the greater complexity of organization in the anthracite mines, as compared with the bituminous.

Boys under 16 years of age constituted less than 1 per cent of all wage earners employed in the coal mining industry as a whole. Nearly half those reported were employed in the anthracite collieries, practically all above ground, while of those employed by bituminous operators by far the greater number were working below ground.

Wage earners employed, by months.¹—The following table gives the number of wage earners employed on the 15th day of each month during the year 1909. Penal institutions and incomplete reports are excluded from this table.

In general, the smaller number of wage earners employed in the spring and early summer months, reflects the seasonal fluctuation in the consumption of coal. In this respect the anthracite industry shows much greater steadiness of employment than the bituminous, with the number employed in the minimum month, August, equaling 95.8 per cent of the number in March, the maximum month. The anthracite pro-

ducers obtain this regularity of operation partly by reducing the price of anthracite in the spring, in order to induce consumers to buy and store their supplies in the warmer months, and partly by storing large quantities of coal themselves. No such action is ordinarily taken by bituminous producers and the operation of their mines is more irregular. In this regard the mines combining coal mining and coke manufacture have an advantage over those without coke manufacture, since the consumption of furnace and foundry coke is not subject to seasonal fluctuations such as affect the use of coal for fuel, and, normally, the coke making mines operate more regularly.

MONTH.	Aggregate.		Anthracite.		Bituminous.					
	Number.	Per cent of maximum.	Number.	Per cent of maximum.	Total.		Mines without coke manufacture.		Mines with coke manufacture.	
					Number.	Per cent of maximum.	Number.	Per cent of maximum.	Number.	Per cent of maximum.
January.....	691,244	94.8	172,847	99.9	518,397	92.6	394,661	93.0	123,736	91.2
February.....	686,322	94.1	172,505	99.7	513,817	91.7	390,332	92.0	123,485	91.0
March.....	679,791	93.2	173,025	100.0	506,766	90.5	383,093	90.2	123,763	91.2
April.....	649,870	89.1	168,009	97.1	481,861	86.0	361,899	85.3	119,962	88.4
May.....	646,592	88.7	168,137	97.2	478,455	85.4	359,174	84.6	119,281	87.9
June.....	652,894	89.5	168,964	97.7	483,930	86.4	362,893	85.5	121,037	89.2
July.....	659,434	90.4	167,425	96.8	492,009	87.8	369,599	87.1	122,410	90.2
August.....	667,146	91.5	165,740	95.8	501,406	89.5	377,174	88.9	124,232	91.6
September.....	685,234	94.0	166,003	95.9	519,231	92.7	393,150	92.6	126,081	92.9
October.....	704,939	96.7	169,961	98.2	534,978	95.5	405,772	95.6	129,206	95.2
November.....	720,341	98.8	170,601	98.6	549,740	98.2	418,401	98.6	131,339	96.8
December.....	729,273	100.0	169,184	97.8	560,089	100.0	424,407	100.0	135,682	100.0

In 1909, in the bituminous industry, the maximum number of men, 560,089, was employed in December, and the minimum, 478,455, equal to 85.4 per cent of the maximum, in May. The number employed in December was considerably larger than the number employed in January, although the latter was also a month of heavy coal consumption and normally should have about equaled December in numbers employed. In January, however, the industry had not yet fully recovered from the preceding financial depression, while in December demand and output had much increased. This change in conditions is further shown

by the fact that the mines with coke production had relatively fewer men working at the beginning of the year than the mines without coke production. The operation of many of these mines depends chiefly on the demand for coke from iron and steel manufacturing enterprises, which are usually affected greatly by any industrial disturbance. The anthracite collieries show no such difference in numbers employed between the beginning and the end of 1909, since this industry depends chiefly on consumption for domestic purposes, which is little affected by industrial depression.

Hours of labor.—The following classification gives for 1909 the number of mines operated specified numbers of hours per day or per shift, and the per cent of wage earners employed in mines of each class. River dredges, penal institutions, mines employing no wage earners, and mines with incomplete reports are excluded. The wage earners employed in coke manufacture at mines are included in calculating the percentages of wage earners given.

This classification is based on the normal hours of operation per day or per shift, and occasional departures from this standard have not been considered. The percentages shown in the last three columns indicate the distribution of the total number of wage earners among mines of the different classes. In this

¹ The table gives a total of 729,273 wage earners employed December 15, 1909, while Table 16, showing the specific occupations, gives a total of 743,293 wage earners employed on December 15, 1909, or the nearest representative day. This difference of 14,020, or less than 2 per cent, is due to the fact that these figures were obtained from two separate inquiries on the census schedule. The first of these inquiries asked for the specific classes of wage earners employed on December 15, or the nearest representative day. If the mine was not operated on December 15, or was running under abnormal conditions, then in answer to this inquiry the operator reported the number of men employed on the nearest day when conditions were normal. The second inquiry asked for the number of wage earners on the 15th day of each month, which might or might not be a normal day. In all other tables in this section giving statistics of wage earners the number obtained from the occupational inquiry has been used, since it is considered that this number more closely approximates the true total of wage earners depending upon the industry for a livelihood than does the number actually employed on any one day.

connection it must be distinctly understood that the census inquiry asked only the prevailing hours of labor for the mine, and took no account of exceptions in the nature of employment of some wage earners for more or fewer hours than those of the bulk of employees. Sometimes one class of wage earners has regularly a different working time from that of another class. However, the table may be taken as indicating approximately the actual distribution of wage earners according to the number of hours worked per day.

The classification shows that practically all wage earners in anthracite mines in 1909 were working on a 9-hour basis. This corresponds to the terms of the agreement between the operators and the mine workers. In the bituminous industry nearly three-fifths of all wage earners reported were employed at mines operated 8 hours per day, about one-fourth at mines operated 10 hours per day, and about one-eighth at mines

operated 9 hours per day. No mines were reported in operation 11 hours per day, and less than 1 per cent of the total number of wage earners were working at mines operated 12 hours per day.

MINES CLASSIFIED ACCORDING TO HOURS OF OPERATION PER DAY OR PER SHIFT: 1909.

NUMBER OF HOURS MINES WERE NORMALLY OPERATED PER DAY OR PER SHIFT.	NUMBER OF MINES.			PER CENT OF MINES.			PER CENT OF WAGE EARNERS EMPLOYED IN MINES WITH PREVAILING HOURS SPECIFIED.		
	Total.	An-thra-cite.	Bi-tumi-nous.	Total.	An-thra-cite.	Bi-tumi-nous.	Total.	An-thra-cite.	Bi-tumi-nous.
Total.....	6,338	360	5,978	100.0	100.0	100.0	100.0	100.0	100.0
Less than 8 hours.....	88	3	85	1.1	0.8	1.1	0.4	0.3	0.4
8 hours.....	3,757	10	3,747	59.3	2.8	62.7	45.2	1.4	58.5
9 hours.....	1,146	336	810	18.1	93.3	13.5	33.4	98.0	13.8
10 hours.....	1,279	9	1,270	20.2	2.5	21.2	19.5	0.3	25.4
12 hours.....	9	—	9	0.1	—	0.2	0.7	—	0.9
Not specified.....	79	2	77	1.2	0.6	1.3	0.8	(*)	1.1

* Less than one-tenth of 1 per cent.

POWER.

The following table shows the number and total horsepower of engines, water wheels, and other motors used in 1909. So-called "rented power" represents that of electric motors, usually owned by the mine operator, which are run by current furnished by some outside concern. The table does not cover the few mines with incomplete reports or those operated by penal institutions. The statistics for mines with coke manufacture include power used in the coke business, which, however, is small in amount.

The total primary horsepower for the industry in 1909 was 1,904,154, of which 676,753 was reported for anthracite and 1,227,401 for bituminous mines. Practically all power used was owned, the horsepower of electric motors operated by purchased current amounting to only 1.4 per cent of the total primary power used. Nearly all the primary power was generated by steam engines. The number of electric motors in use at the mines, most of which are operated by current generated by the mine operators themselves, is large.

The anthracite operators use relatively much more power than the bituminous. The average primary power per mine for anthracite mines exclusive of the small river dredges in 1909 was 1,877 horsepower; for bituminous mines without coke manufacture, 231 horsepower; and for those with coke manufacture, 494 horsepower. The higher figure for anthracite is due not only to the fact that the average output of coal per mine is much greater than for bituminous mines; but is also attributable to the greater depth and extent of the mine workings and the greater vol-

ume of water to be pumped, and to the further fact that the method of crushing, screening, and washing anthracite requires relatively far more power than is similarly used at bituminous mines. The high average per mine for mines making coke, as compared with mines without coke manufacture, is due chiefly to their larger scale of production, and only in small degree to the additional power required by the coke yards.

KIND.	Total.	An-thra-cite.	BITUMINOUS.		
			Total.	Mines without coke manuf-acture.	Mines with coke manuf-acture.
Primary horsepower, total.....	1,904,154	676,753	1,227,401	910,778	316,623
Owned.....	1,877,450	675,343	1,202,107	896,365	305,742
Rented.....	26,704	1,410	25,294	14,413	10,881
Owned power:					
Steam engines—					
Number.....	19,318	7,580	11,738	9,309	2,429
Horsepower.....	1,874,001	674,571	1,199,430	894,070	305,360
Gas engines—					
Number.....	374	25	349	333	16
Horsepower.....	3,101	772	2,329	2,232	97
Water wheels—					
Number.....	7	—	7	5	2
Horsepower.....	334	—	334	59	275
Water motors—					
Number.....	2	—	2	1	1
Horsepower.....	14	—	14	4	10
Rented power—electric motors run by purchased current:					
Number.....	872	32	840	517	323
Horsepower.....	26,704	1,410	25,294	14,413	10,881
Average primary horsepower per mine ¹	385	1,877	268	231	494
Electric motors run by current generated by operator (secondary power)—					
Number.....	10,869	1,152	9,717	6,665	3,052
Horsepower.....	375,386	46,068	329,298	212,610	116,688

¹ Excludes Pennsylvania anthracite river dredges and bituminous mines operated without mechanical power.

PART II.—PENNSYLVANIA ANTHRACITE COAL.

INTRODUCTION.

This section deals with the statistics of Pennsylvania anthracite coal. Anthracite is also mined in the Rocky Mountain fields, but their output in 1909 was very small, and the separate statistics for the industry there are confined to the figures given in the detailed table, Part IV. The tables of this section cover only producing operations; the statistics of nonproducing collieries are given in Table 62.

Location of the anthracite deposits.—The anthracite coal of Pennsylvania is produced in the northeastern part of the state, in the counties of Carbon, Columbia, Dauphin, Lackawanna, Luzerne, Northumberland, Schuylkill, Sullivan, Susquehanna, and Wayne. About 85 per cent of the output comes from Lackawanna, Luzerne, and Schuylkill Counties. The deposits are divided into three general producing regions. The Upper Region, except some small outlying deposits in Sullivan County, extends from northeast to southwest in a narrow belt coinciding roughly with the valleys of the Lackawanna and Susquehanna Rivers, from near Forest City to the vicinity of Shickshinny, and contains about 176 square miles. The Middle Region extends approximately east and west through Columbia, Schuylkill, Luzerne, and Northumberland Counties, the coal occurring in several irregular valleys containing about 127 square miles of productive measures. The Southern Region embraces about 180 square miles in Carbon, Schuylkill, and Dauphin Counties. (See map on page 203.)

Methods of production.—Anthracite coal is now recovered by three methods: Mining, washing culm banks, and dredging from stream beds. The culm banks are dumps of slate and dirt from the mines,

containing more or less coal. These were formerly considered valueless, but in recent years it has been found profitable to recover the coal contained by washing. In 1909 more than 4,300,000 tons of coal were thus obtained. The coal dredged from the streams comes from old culm banks that have been partially washed away. The action of the flowing water has effected a natural separation of the coal from its accompanying refuse, and where this coal has been deposited along the stream beds it can be recovered by dredging. The total quantity so recovered is not large, and in fact the industry is confined to small operators supplying chiefly local markets. Dredging is necessarily dependent on the seasons and the stage of the rivers. Statistics of these dredge operators are not included in any of the tables for Pennsylvania anthracite, except Table 21.

Number of collieries.—The word "colliery" is used in this chapter to designate a single producing unit. If the coal from several mine openings was prepared at one breaker, this has been counted as one colliery. Each washery operated independently of fresh mine production, that is, recovering coal from culm banks, has been counted as a colliery, but washeries operated as a part of the equipment for cleaning freshly mined coal have not been counted separately. Of the 357 collieries reported in Table 21, 52 were washeries recovering coal from culm piles independently of fresh mine production and 305 were breakers at active mines. In addition, incomplete reports were received for 3 mines and 4 washeries, which have not been included in any of the tables of this section.

GENERAL SUMMARY: 1909.

The general statistics of the Pennsylvania anthracite industry for the calendar year 1909 may be found in

Table 62. The following table summarizes the more important details:

Table 21	Total.	Collieries. ¹	River dredges. ²	Total.	Collieries. ¹	River dredges. ²
Number of operators.....	189	139	50	Number of wage earners.....	173,263	165
Number of collieries or dredges.....	420	357	63	Total primary horsepower.....	676,128	932
Acres of coal land controlled.....	* 273,499	* 273,499	.....	Gross expenses by items:		
Owned.....	183,044	183,044		Services.....	\$96,742,305	\$32,106
Held under lease.....	101,430	101,430		Salaries.....	4,572,489	2,924
Capital.....	\$246,713,318	\$246,599,761	\$113,557	Wages.....	92,169,906	29,132
Total gross expenses.....	\$139,110,444	\$139,048,811	\$61,633	Supplies.....	26,662,088	21,315
Deduct charges to miners for explosives, oil, and blacksmithing.....	\$4,864,844	\$4,864,844		Fuel and rent of power.....	3,189,279	5,371
Total net expenses.....	\$134,245,600	\$134,183,967	\$61,633	Other.....	23,472,869	15,944
Coal:				Royalties.....	7,969,785	2,576
Total tons produced (2,240 pounds).....	72,215,373	72,169,034	106,239	Miscellaneous.....	7,736,176	5,636
Value at mines.....	\$148,957,894	\$148,866,422	\$91,472			
Total tons marketed.....	64,524,303	64,419,923	104,379			
Value at mines.....	\$145,880,526	\$145,791,493	\$89,033			

¹ Exclusive of 3 operators with 3 mines and 4 washeries, producing 94,871 tons, valued at \$69,848, for which capital, number of employees, and operating expenses were not reported.

² Statistics of river dredges are not included in any subsequent table of Part II.

* The total is exclusive of a duplication of 10,975 acres in figures for owned and leased acreage. See page 181, "Coal land controlled."

The total production of Pennsylvania anthracite in 1909 was 72,310,144 long tons, of which the concerns covered by the above table produced 72,215,273 tons, while 94,871 tons were reported by operators who furnished incomplete reports. Of the total shown in the table 67,776,000 tons (in round numbers) were the product of mines proper, 4,333,000 tons that of

washeries not connected with mines, and 106,000 tons that of river dredges. The total value reported for these 72,215,273 tons was \$148,957,894 and the total gross expenses were \$139,110,444, of which 66.3 per cent was for wages. The number of wage earners employed was 173,263, and the operators used a total of 676,000 primary horsepower.

PROGRESS OF THE INDUSTRY.

In Table 22 the recent progress of the anthracite industry is shown by various items selected from the census returns of 1889 and 1909, which have been rendered comparable by the following adjustments: 19 idle collieries and 49 small local operations have been deducted from the total number of collieries given for 1889; the salaries paid to foremen have been deducted from the wages for 1889, since in 1909 the payments to such foremen were included in salaries. The cost of fuel was included in the cost of supplies for 1909 but not for 1889; but no adjustment has been made on this account because in 1889 the refuse coal burned beneath the boilers was unmarketable, while in 1909 the conditions of preparing and selling anthracite had so changed that such refuse had a distinct value, and most companies were charging to operating expenses the value of coal used for power.

from \$1.77 to \$2.26. The total reported expenses increased 127.5 per cent, while wage payments increased 144 per cent and the cost of colliery supplies 146.2 per cent. At the same time the average expense per ton also materially increased. Considering the entire production, both the tonnage marketed and that consumed at the collieries, the average gross expense per ton reported in 1889 was \$1.50, while in 1909, for all collieries, it was \$1.93. But in 1909, 4,333,000 tons of coal were produced from culm banks, while practically none was so produced in 1889. Table 28, which gives separate statistics for mines as distinguished from washeries, shows that the average gross expense per ton mined in 1909 was \$2.03, or \$0.53 more than in 1889. The increase in the cost of production, however, was probably even greater, since in 1909 the tonnage reported included small sizes of coal which in 1889 were not marketable and were not included, while for both years the expenses reported, of course, necessarily included the expense of producing the entire output, both of salable and unsalable sizes. This increase has all been in wage payments and cost of supplies, and, speaking broadly, is accounted for by the greater expense of working deeper deposits and measures generally thinner than in 1889, and by advances in the rates of wages and the prices of colliery supplies.

COMPARATIVE STATISTICS OF PENNSYLVANIA ANTHRACITE COLLIERIES: 1909 AND 1889.

Table 22.	1909	1889	INCREASE.	
			Amount.	Per cent.
Number of collieries.....	357	343	14	4.1
Acres of coal and other land controlled.....				
Owned.....	246,210	213,938	250,272	117.0
Held under lease.....	316,711	107,282	209,499	195.2
Capital.....	159,188	106,656	52,532	49.3
Owned.....	\$246,599,761	\$161,784,473	\$84,815,288	52.4
Gross expenses.....	\$139,048,811	\$61,109,958	\$77,938,853	127.5
Wages.....	\$92,140,724	\$37,768,431	\$54,372,293	144.0
Colliery supplies.....	\$26,640,773	\$10,822,363	\$15,818,410	146.2
Tons of coal marketed (2,240 pounds).....	64,419,923	37,146,456	27,273,467	73.4
Value at mines of coal marketed.....	\$145,791,493	\$65,721,578	\$80,069,915	121.8

¹ Exclusive of 19 which were idle during the year, 49 small diggings and washeries supplying local trade, and 18 new establishments in course of construction.

² The total is exclusive of a duplication of 11,689 acres in figures for owned and leased acreage. See page 181, "Coal land controlled."

The quantity of anthracite marketed increased from 37,146,000 long tons in 1889 to 64,420,000 in 1909, or 73.4 per cent. The value of the coal marketed increased 121.8 per cent, the average value per ton rising

The number of collieries operated increased but little. Indeed, if the 52 washeries recovering coal from culm banks in 1909 are excluded, there were but 305 mines proper, as compared with 343 in 1889. The average output per mine has largely increased. If comparison is restricted to mines proper by excluding from the figures for 1909 the 4,333,000 long tons recovered by washeries, the average production per mine in 1909 (including the coal used for steam and heat, as well as that marketed) was about 222,000 tons, as compared with about 118,000 tons in 1889.

RAILWAY AFFILIATION OF OPERATORS.

The affiliation of coal producers with railways, by affecting the distribution and consumption of their product, may also influence materially the conditions of operation. The following table gives the principal statistics of anthracite operators classified according to their affiliation with railways. This classification, as stated in connection with Table 11, was based on official information.

The 11 coal mining concerns affiliated with railroads reported 84.4 per cent of the total coal land in 1909, 75.7 per cent of the total output of anthracite, and 78.2 per cent of the total number of wage earners reported for the industry. Their average acreage of coal land controlled per operator was more than 20,000 acres, as compared with an average of less than 350 acres for the unaffiliated operators, and their average

annual output per operator was nearly 5,000,000 tons, as compared with less than 140,000 tons for the other operators. The difference in the size of the collieries of the two groups is indicated by the fact that these 11 concerns, affiliated with the anthracite carrying

railroads, show an average of 645 men employed and over 260,000 tons of coal produced per colliery, as compared with 256 men employed and less than 120,000 tons of coal produced per colliery by the unaffiliated operators.

STATISTICS OF PENNSYLVANIA ANTHRACITE OPERATORS AFFILIATED AND UNAFFILIATED WITH RAILROADS: 1909.

Table 23	AFFILIATED WITH RAILROADS			UNAFFILIATED OPERATORS			
	Total.	Operators affiliated with railroads.	Unaffiliated operators.	Total.	Operators affiliated with railroads.	Unaffiliated operators.	
Number of operators.....	139	11	128	Total tons (2,240 pounds) of coal produced.....	72,109,034	54,616,158	17,492,876
Number of collieries (including washeries).....	357	210	147	Loaded at mines for shipment.....	62,630,012	47,617,579	15,012,433
Acres of coal land controlled ¹	273,499	230,739	42,760	Sold locally.....	1,789,911	960,589	829,322
Owned.....	183,044	180,567	2,477	Used at mines for steam and heat.....	7,689,111	6,037,990	1,651,121
Held under lease.....	101,430	61,129	40,301	Total value of coal at mines.....	\$148,866,422	\$113,779,555	\$35,086,867
Leased by operators to each other.....	10,975	10,957	18	Employees:			
Capital.....	\$246,599,761	\$218,198,695	\$28,401,066	Salaried.....	4,297	3,262	1,035
Gross expenses.....	\$139,048,811	\$106,493,484	\$32,555,327	Wage earners.....	173,098	135,407	37,691
Deduct charges to miners for explosives, oil, and blacksmithing.....	\$4,864,844	\$3,862,611	\$1,002,233	Outside.....	48,505	35,713	12,792
Net expenses.....	\$134,183,967	\$102,636,873	\$31,553,094	Inside.....	124,593	99,694	24,899
Royalties.....	\$7,967,209	\$4,219,299	\$3,747,910	Total primary horsepower.....	675,196	539,365	135,831

¹Total is exclusive of duplication of acreage leased by operators to each other. See page 181, "Coal land controlled."

SCALE OF PRODUCTION.

Tables 12, 13, and 14 of Part I give statistics relating to the size of anthracite operating organizations, but include the Rocky Mountain anthracite mines and the Pennsylvania river dredges as well as the anthracite collieries proper; furthermore, Table 14 classifies operators on the basis of all land controlled. The following tables, classifying operators according to value of products and number of wage earners, not only confine the statistics to Pennsylvania colliery operators, but distinguish the operators as affiliated and unaffiliated with railroads; while the table classifying operators according to acreage controlled is based on holdings of coal land exclusive of barren areas.

Classification of operators according to value of coal produced: 1909.—Of the 139 anthracite operators in Pennsylvania in 1909, exclusive of those operating dredges, 19 produced less than \$10,000 worth of products each; 49, from \$10,000 to \$100,000; 39, from \$100,000 to \$500,000; 15, from \$500,000 to \$1,000,000; 8, from \$1,000,000 to \$5,000,000; and 9, \$5,000,000 or more. The following table distinguishes the 139 operators according as they are affiliated or unaffiliated with railroads, and classifies those of each group according to the value of coal produced per operator:

Table 24	OPERATORS AFFILIATED WITH RAILROADS.		UNAFFILIATED OPERATORS.	
	Number of operators.	Value of coal produced.	Number of operators.	Value of coal produced.
Total.....	11	\$113,779,555	128	\$35,086,867
Less than \$10,000.....			19	81,227
\$10,000 to \$100,000.....			49	2,141,855
\$100,000 to \$1,000,000.....			54	21,020,422
Over \$1,000,000.....	11	113,779,555	6	11,843,363

Each of the companies affiliated with railroads reported an output valued at more than \$1,000,000, and the average value of coal per company was more than

\$10,000,000. On the other hand, only 6 of the 128 unaffiliated operators reported an output valued at more than \$1,000,000, and the average value of coal for these 6 operators was less than \$2,000,000 each.

Classification of operators according to number of wage earners employed: 1909.—Table 13 gives the number of anthracite operators in the United States as a whole employing specified numbers of wage earners, together with the number of wage earners employed by each group. Table 25 presents a similar classification for Pennsylvania anthracite operators affiliated with railroads, and unaffiliated respectively. The river dredges, included in Table 13, are excluded from this table.

Table 25	OPERATORS AFFILIATED WITH RAILROADS.		UNAFFILIATED OPERATORS.	
	Number of operators.	Number of wage earners.	Number of operators.	Number of wage earners.
Total.....	11	135,407	128	37,691
100 or less.....			62	2,325
101 to 500.....			41	11,841
501 to 1,000.....			18	11,857
Over 1,000.....	11	135,407	7	11,668

All of the 11 operators connected with railroads were in the class of employers reporting more than 1,000 wage earners, with the average number employed per company exceeding 12,000 men. Among the unaffiliated operators, 7 reported more than 1,000 wage earners each, but the great majority of unaffiliated operators were relatively small employers of labor.

Classification of operators according to number of acres of coal land controlled: 1909.—The following table gives the principal facts regarding the control of coal lands and the accompanying coal production for Pennsyl-

vania anthracite operators holding specified areas. Thirteen operators who reported their entire production from washing culm piles have been excluded from this table.

Table 26

	NUMBER OF ACRES OF COAL LAND CONTROLLED PER OPERATOR.				
	Total.	Less than 100 acres.	100 to 1,000 acres.	1,000 to 10,000 acres.	10,000 acres and over.
Number of operators.....	126	42	62	16	6
Acres of coal land controlled ¹	273,499	1,468	22,721	38,328	210,982
Owned.....	183,044	149	1,259	12,753	168,853
Held under lease.....	101,430	1,319	21,480	26,289	52,342
Average number of acres per operator.....	2,171	35	366	2,396	35,164
Total tons of coal produced (2,240 pounds).....	68,558,720	663,366	10,474,306	13,295,247	44,125,801
Average per operator.....	544,117	15,794	168,940	830,953	7,354,300
Average per acre controlled.....	251	452	461	347	209
Tons sold locally.....	1,616,495	219,336	263,995	327,556	805,614
Per cent of total output.....	2.4	33.1	2.5	2.5	1.8

¹ Exclusive of duplication of land leased by operators to each other. (See Table 21.)

The above figures are of particular interest because the acreage of anthracite land is very limited and is practically all covered by the table. The tabulation shows that six large concerns controlled more than three-fourths of all the anthracite land reported. That they hold a considerable part of this area in reserve is clearly shown by a comparison of the average actual output of coal per acre controlled for the various groups. This average for the six largest holders

was 209 tons per acre, or less than half as much as for the two groups of smallest holders, whose limited acreage precluded the holding of reserve areas.¹ The figures show not only greatly concentrated control of the anthracite deposits, but also show that the small and medium sized concerns are mining out their deposits much more rapidly than the largest concerns, so that increased concentration of the industry may occur in the future. Furthermore, the larger operators hold their lands chiefly through direct ownership, while all the other groups report much the greater portion of their acreage held under lease.

The table also indicates the importance to the small land holders of local sales of coal. The 42 operators each with less than 100 acres of coal land were limited by their restricted acreage to an average annual output of less than 16,000 tons each; but they were able to sell about one-third of their output locally. Much of this coal was retailed and brought better prices than could be secured for coal shipped to distant markets. This is of material assistance to these operators in offsetting the greater cost of small-scale production. The local markets, however, are by no means abandoned to these small operators by the large producers. On the contrary, of the total coal marketed locally, the 22 largest operators sold nearly three-fourths, though such local sales formed only a small proportion of their total output.

EXPENSES.

The analytical figures for the distribution of expenses at the anthracite collieries are presented in three tables. The first covers all classes of collieries combined, the second gives separate figures for mines and for washeries, and the third deals with royalties.

Distribution of expenses for all collieries: 1909.—The following table shows for all anthracite collieries, the average expenses per ton, and the percentage of gross expenses formed by the several items:

Table 27

	Average expense per ton.	Per cent of total gross expenses.
Total net expenses.....	\$1.86	.....
Total gross expenses.....	1.93	100.0
Salaries.....	0.06	3.3
Wages.....	1.28	66.3
Supplies.....	0.57	19.2
Royalties.....	0.11	5.7
Miscellaneous.....	0.11	5.6

It will be noted from the above figures that the chief element of expense is services, salaries and wages together amounting to \$1.34 per ton and comprising 69.6 per cent of the reported gross expenses in 1909. The next largest item was colliery supplies, including the cost of fuel and power. The average gross expense for this item was \$0.37 per ton. As explained in the remarks under "Wages" and "Supplies" on

page 182, the operators' net cost of supplies was somewhat less than the above amount.

The average cost per ton given for royalties, \$0.11, must not be taken as the average rate of royalty, since the foregoing figure is computed from the total output of anthracite, but on the greater part of this total, namely, the coal produced from lands owned by operators, no royalty was paid. (See Table 29.)

Expenses and related data for mines and for washeries.—The expense of producing anthracite from mines is much greater than the expense of recovering coal by washing culm banks. In order to give separate data for these two kinds of operations, the following table has been prepared summarizing the principal statistics relating to expenses for mines and for washeries which were recovering coal from culm piles, independently of fresh mine production. As explained in the footnote on the following page, certain operations have necessarily

¹ This average output per acre disregards variations in the original coal contents of the land and differences in the methods of mining. Variations in the thickness of the coal measures might readily cause considerable difference in the average output per acre, but in general the lands of the small holders are not underlain by more productive coal measures than the lands of the large holders, so that the differences in the averages quoted above can not be attributed to this cause. Furthermore, the mining methods of the large operators are certainly not inferior to those of the small operators, and hence the smaller average output per acre for the large producers can not be accounted for in this manner.

been excluded from the table, and certain administrative expenses (relatively small in amount) have been apportioned to the mines and the washeries by estimate.¹

	Mines.	Washeries.
Number of collieries.....	272	43
Total gross expense.....	\$114,613,120	\$1,324,325
Less charges to miners for explosives, oil, and blacksmithing.....	\$4,165,815	\$251
Total net expense.....	\$110,447,305	\$1,324,074
Tons (2,240 pounds) of coal produced.....	56,536,922	3,550,314
Value at mines.....	\$121,248,435	\$2,274,004
Wage earners, number.....	144,639	1,712
Outside.....	38,244	1,712
Engineers, firemen, and mechanics.....	7,278	248
Others, 16 years and over.....	27,862	1,440
Boys under 16 years.....	3,104	24
Inside.....	106,395	.....
Engineers, firemen, and mechanics.....	1,987	.....
Miners.....	39,934	.....
Miners' helpers.....	32,588	.....
Others, 16 years and over.....	31,873	.....
Boys under 16 years.....	13	.....
Total primary horsepower.....	574,390	11,584
Gross expense by items:		
Salaries.....	\$77,029,135	\$728,106
Wages.....	2,046,249	53,413
Supplies.....	74,982,886	674,693
Fuel and rent of power.....	21,864,411	387,657
Other.....	2,501,620	91,375
Royalties.....	19,362,791	296,282
Miscellaneous.....	7,187,342	122,938
Taxes, contract work, and sundries.....	8,532,232	85,624
Apportioned administrative expenses.....	3,211,123	57,775
	5,321,169	27,849
Average value of coal per ton at collieries.....	\$2.14	\$0.64
Average net expense per ton.....	1.95	0.37
Average gross expense per ton.....	2.03	0.37
Salaries.....	0.06	0.02
Wages.....	1.34	0.19
Supplies.....	0.39	0.11
Royalties.....	0.13	0.03
Miscellaneous.....	0.11	0.02

¹ Exclusive of 1,466 wage earners employed on general work who could not be distributed, but the wages of these men were part of the administrative expenses apportioned.

² Includes the average amount of general office salaries and wages per ton.

The more general statistics as to the employment of persons in anthracite collieries have already been presented in Table 16. Additional details are given in the following tables.

¹ In 1909, 52 washeries were operated independently of fresh mine production, but the table deals with only 43 of these washeries. This is due to the fact that the reports for 9 washeries were combined by the operators with the reports for 33 mines, and of course these operations covered by combined reports were necessarily excluded from this analysis. Accordingly, 9 washeries with a total production of 862,912 tons and 33 mines with a total production of 11,159,786 tons have been excluded from the table. However, the number of operations and the total tonnage covered by the table are sufficiently large to give representative figures for each class of producing units.

Miscellaneous expenses given in this table include certain administrative expenses. These were salaries and other general office expenses reported by various companies as a total. In all other anthracite tables, which show expenses for the industry as a whole, these expenses could be and have been included under the proper heads of salaries, wages, taxes, rent of offices, etc., but in this table based on individual collieries it was necessary to distribute such general office expenses reported in toto for the company to the several collieries, in order that no part of the expenses should be omitted. For this purpose these administrative expenses were distributed in the proportion which the total expense of each colliery bore to the total expense of the company. While this method lowers in this table the total amount of salaries and wages reported as such, and increases the total amount of miscellaneous expense by an equal amount, as compared with other tables for anthracite, the total expenses as shown are substantially correct for the collieries covered by the table. Moreover, in the lower part of the table the average amounts of salaries and wages per ton have been calculated to include these general office salaries and wages, so that the averages shown approximate the actual average amounts and proportions of the various items given.

This table shows an average gross expense for coal recovered by washeries of \$0.37 per ton, as compared with \$2.03 per ton for coal produced from mines. This low average expense for washeries is to be expected, since the recovery of coal from culm banks is largely mechanical, and few employees are needed. The average value of the washery product is likewise much below that of the mine output, which is due to the fact that most of the washery coal is of smaller, less valuable sizes.

Royalty payments: 1909.—The following table gives data regarding royalties:

	Tons of coal from leased land (2,240 pounds).	Royalty payments.	Average royalty per ton.
Total, all collieries.....	15,705,262	\$3,691,544	\$0.24
Mines.....	14,929,912	3,595,366	0.24
Washeries.....	775,350	96,178	0.12

This table does not cover all mines and washeries operating under lease, since the reports of some operators did not specify the tonnage of coal produced under lease with the royalty payments therefor, but the tonnage covered is sufficiently large to show prevailing conditions.

The rates of anthracite royalties vary according to the sizes of coal produced. The table shows that for coal from mines the average rate was about \$0.24 per ton, and for coal washed from culm banks, with the greater proportion of small sizes, about \$0.12 per ton.

WAGE EARNERS.

Employment of wage earners above and below ground for different classes of collieries: 1909.—At some collieries washeries are used as part of the breaker equipment for cleaning coal from the mines, while at other collieries the coal is cleaned by other means. This difference in equipment affects the employment of labor in the breakers. The following table, giving the number and per cent of wage earners employed outside and inside the mines for different classes of collieries, presents data bearing on this subject:²

	Collieries without washeries.	Collieries with washeries.	Washeries.
Wage earners, number, Dec. 15, 1909, or nearest representative day.....			
Outside.....	112,834	31,805	1,712
Inside.....	31,242	7,002	1,712
Per cent of total.....	81,592	24,803	.....
Outside.....	100.0	100.0	100.0
Inside.....	27.7	22.0	100.0
	72.3	78.0	.....

The table shows that in 1909 the collieries using washeries in the breakers employed but 22 per cent of their wage earners above ground as compared with 27.7 per cent thus employed in collieries cleaning coal by other means. While some other factors may also

² The figures in this table are exclusive of the employees of the collieries omitted from Table 28, as explained in connection therewith.

contribute to this result, the primary cause is doubtless the reduction in the number of breaker employees through the use of washeries.

Number of days collieries were operated: 1909.¹—The following table gives the number of collieries which were operated specified numbers of days during the year 1909.

The table indicates the irregularity of employment in the anthracite collieries from day to day. Of the total number reported, 30.5 per cent were in operation more than 240 days, 54.9 per cent more than 210 days, and 74.2 per cent more than 180 days. Except

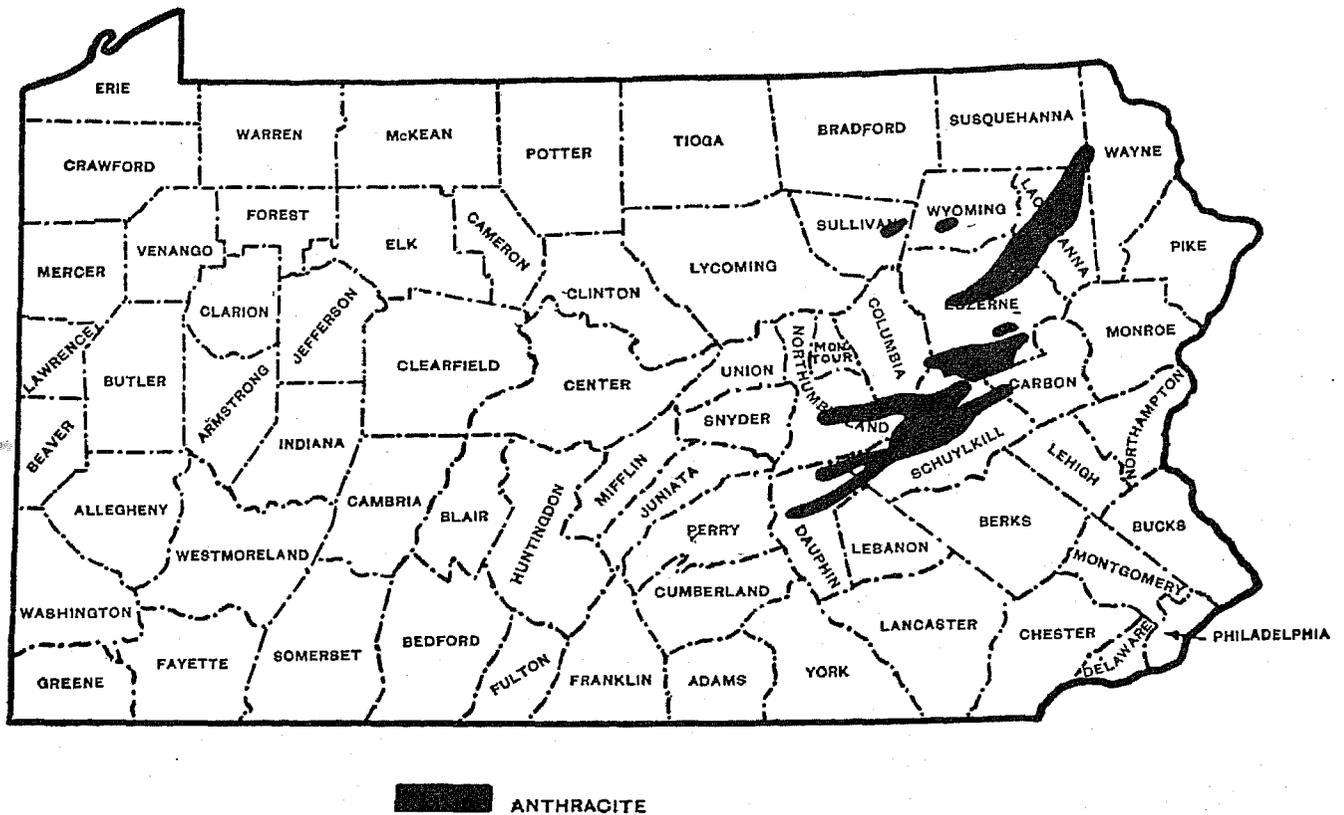
¹ By agreement between the operators and their employees the anthracite collieries were operated on a 9-hour day basis.

in a few cases time was not lost in one continuous period of nonoperation, but the breakers were shut down for a day or two at more or less frequent intervals to permit repairs, to restrict output, or for other reasons. This feature of operation is not peculiar to anthracite, but is true generally of the entire coal mining industry.

Table 31

NUMBER OF DAYS IN OPERATION.	Number of collieries.	NUMBER OF DAYS IN OPERATION.	Number of collieries.
Total.....	357	181 to 210.....	69
30 or less.....	5	211 to 240.....	87
31 to 60.....	3	241 to 270.....	54
61 to 90.....	8	271 to 300.....	42
91 to 120.....	14	301 to 330.....	12
121 to 150.....	27	331 to 365.....	1
151 to 180.....	34	Time not specified.....	1

MAP SHOWING ANTHRACITE FIELDS OF PENNSYLVANIA.



PART III.—BITUMINOUS COAL.

GENERAL SUMMARY: 1909.

Statistics for mines with and without coke manufacture, by states.—Table 32 summarizes for the year 1909 the more important statistics of the bituminous coal industry as conducted in the various states, dis-

tinguishing mines operating coke ovens from those without such manufacture. For total production and value of bituminous coal for each state, including coal used for making coke, see Table 33.

SUMMARY OF STATISTICS FOR BITUMINOUS COAL MINES, DISTINGUISHING THOSE WITH AND WITHOUT COKE MANUFACTURE, BY STATES: 1909.

STATE.	Number of mines.	Acres of coal land controlled.	Capital.	Expenses.	PRODUCTS.				Number of wage earners.	Primary horse-power.	Number of mining machines.	Number of completed coke ovens.	
					Value of all products.	Coal, exclusive of coal made into coke.		Coke made at mines.					
						Tons (2,000 lbs.).	Value at mines.	Tons (2,000 lbs.).					Value at mines.
All mines: United States...	6,013	6,573,186	\$1,062,197,083	\$395,907,026	\$427,962,464	326,792,907	\$360,052,340	32,450,482	\$67,483,162	569,789	1,227,401	13,585	86,341
MINES WITHOUT COKE MANUFACTURE.													
United States.....	5,365	4,883,967	\$697,357,137	\$301,451,896	\$15,894,935	280,652,040	\$15,659,346			435,414	910,778	11,502	
Alabama.....	187	231,765	19,632,647	7,806,117	8,125,811	6,515,922	8,114,565			11,721	18,776	182	
Arkansas.....	69	54,359	2,256,942	4,630,526	3,508,590	2,373,619	3,508,490			5,462	10,508	12	
Colorado.....	140	65,047	18,046,502	9,394,037	10,208,042	6,994,746	10,208,042			10,368	27,310	258	
Illinois.....	631	552,396	75,257,667	51,697,504	53,030,545	50,570,593	52,999,918			74,445	166,174	1,372	
Indiana.....	322	140,244	35,937,961	14,906,831	15,018,123	14,723,231	14,984,616			22,357	45,910	672	
Iowa.....	311	70,192	7,212,033	12,816,076	12,682,106	7,725,679	12,679,225			17,623	19,118	7	
Kansas.....	202	80,459	6,262,203	9,778,297	9,835,614	6,895,660	9,835,567			12,791	19,707	16	
Kentucky.....	299	332,084	22,807,715	9,140,144	9,006,946	9,386,178	9,005,539			17,935	38,409	783	
Maryland.....	70	68,220	22,871,130	3,941,359	4,483,137	4,001,272	4,445,041			5,798	9,845	39	
Michigan.....	28	23,135	6,865,156	2,985,802	3,175,102	1,772,315	3,175,102			3,572	7,912	115	
Missouri.....	220	116,108	5,650,407	5,715,727	5,881,034	3,596,691	5,879,972			9,526	11,898	103	
North Dakota.....	53	10,356	1,023,278	523,410	563,212	364,536	563,212			857	2,025	20	
Ohio.....	640	408,336	64,131,141	27,153,497	27,353,663	27,518,764	27,274,403			44,405	97,422	1,537	
Oklahoma.....	104	75,744	5,672,886	6,535,441	6,185,078	3,113,149	6,184,420			8,814	26,316	34	
Oregon.....	9	3,122	642,410	238,446	225,026	83,704	225,026			251	1,109	27	
Pennsylvania.....	1,179	1,338,003	227,745,738	79,351,941	85,773,883	85,103,949	85,749,052			116,074	238,250	4,471	
Tennessee.....	129	329,650	9,830,983	5,185,588	5,130,791	4,637,257	5,130,791			8,470	11,580	167	
Texas.....	47	125,774	5,894,893	2,812,079	3,136,004	1,824,742	3,134,720			4,234	6,217	11	
Virginia.....	44	35,190	21,846,844	1,628,096	1,379,924	1,490,135	1,379,924			3,061	5,214	57	
Washington.....	51	83,313	13,040,936	6,205,090	8,915,528	3,496,242	8,915,528			5,857	16,252	18	
West Virginia.....	479	565,457	77,677,068	24,327,363	23,330,421	27,166,831	23,330,248			36,463	79,238	1,357	
Wyoming.....	65	64,783	7,609,229	8,146,526	9,721,134	6,294,596	9,721,134			7,839	25,071	121	
All other states ¹	106	112,230	21,210,879	7,532,199	9,225,221	4,982,209	9,214,811			7,491	23,477	93	
MINES WITH COKE MANUFACTURE.													
United States.....	648	1,689,219	\$364,839,946	\$94,455,130	\$112,067,529	46,140,867	\$44,392,994	32,450,482	\$67,483,162	134,375	318,623	2,083	86,341
Alabama.....	36	367,494	39,969,749	\$9,062,318	10,333,622	2,396,543	2,662,911	2,883,774	7,670,711	11,758	35,308	118	8,607
Colorado.....	15	27,895	12,488,341	\$4,885,458	5,574,155	1,991,393	2,275,494	1,061,868	3,296,590	5,093	6,735	1	3,281
Kentucky.....	11	32,585	1,892,818	1,031,805	996,535	1,069,769	515,902	38,503	80,633	1,720	5,905	124	374
Pennsylvania.....	340	335,534	189,851,892	\$48,809,122	61,692,534	18,425,118	17,596,627	22,499,706	43,937,062	68,334	166,404	1,254	49,510
Connellsville district	238	116,520	127,652,905	34,120,088	46,908,398	\$8,622,591	7,747,190	20,207,354	39,141,363	46,735	111,192	470	42,777
Tennessee.....	13	129,274	10,498,083	\$1,673,616	1,557,663	620,381	971,978	213,759	585,685	2,684	4,495	24	1,457
Virginia.....	41	134,106	20,490,378	\$3,658,824	3,608,404	1,546,223	1,397,041	1,264,213	2,211,363	6,981	11,416	55	5,130
Washington.....	3	5,298	758,544	328,074	311,265	35,263	70,661	42,980	240,604	298	560		185
West Virginia.....	182	569,028	71,125,226	21,142,396	23,599,171	18,106,306	16,466,779	3,809,028	7,132,392	33,203	76,338	503	15,966
All other states ²	17	88,005	17,764,915	\$3,863,517	4,394,180	1,575,851	2,065,601	636,651	2,328,122	4,304	9,462	4	1,831

¹ The total includes \$18,229,388 which can not be distributed among the individual states. The states to which the item relates are Arkansas, Illinois, Indiana, Iowa, Kansas, Missouri, Montana, Oklahoma, Pennsylvania, Washington, West Virginia, and Wyoming. See footnote to Capital, Table C2.

² The total includes \$433,861 cost of coal purchased for coking at mines, made up of \$128,176 in Alabama, \$261,475 in Colorado, \$27,504 in Pennsylvania, and \$16,346 in Tennessee.

³ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

⁴ There were 30,107,187 tons of coal, valued at \$23,015,677, made into coke at mines.

⁵ Includes Georgia, Montana, New Mexico, and Utah.

In round numbers the total quantity of bituminous coal produced in 1909 by all mines covered by the census was 378,975,000 tons (see Table 2), of which 376,865,510 tons were produced by the mines covered

by the table given above (mines with complete reports). Of this quantity, 326,792,907 tons were produced for shipment or use as fuel, and 50,072,603 tons for conversion into coke at the mines, from which

¹ No statistics of mines operated by penal institutions, nor of mines furnishing incomplete reports are included in any table of Part III. The product of these mines is included in Tables 2, 4, 5, and 7, Part I.

32,450,482 tons of coke were made. The total value of the coal shipped or used as fuel, of the coke made at the mines, and of sundry by-products, was \$427,962,464, and the total expenses reported were \$395,907,026. Mines with coke manufacture reported 23.9 per cent of the total expenses and 26.2 per cent of the total value of products. Among the states with coke made at the mines Pennsylvania, West Virginia, and Alabama lead, with 22,499,706 tons of coke, valued at \$43,937,062; 3,809,028 tons, valued at \$7,132,392; and 2,883,774 tons, valued at \$7,670,711, respectively. By far the most important coking region is the Connellsville district of Pennsylvania, which produced 20,207,354 tons, valued at \$39,141,363.

In the United States as a whole the total expenses reported for mines without coke manufacture amounted in 1909 to \$301,451,896, and the total value of products to \$315,894,935, showing a difference of only \$14,443,039, or about 5 cents per ton of coal produced. In Arkansas, Iowa, Kentucky, Oklahoma, Oregon, Tennessee, Virginia, and West Virginia the expenses reported exceeded the value of products.

For mines with coke manufacture the total reported expenses amounted to \$94,455,130, and the value of products to \$112,067,529, showing a difference of \$17,612,399. In Kentucky, Tennessee, Virginia, and Washington the expenses reported by mines of this class exceeded the value of products reported.

These data can not be taken as showing accurately the amount of profit or loss in the coal mining industry of the several states, but they do seem to indicate clearly that in many states the industry obtains only

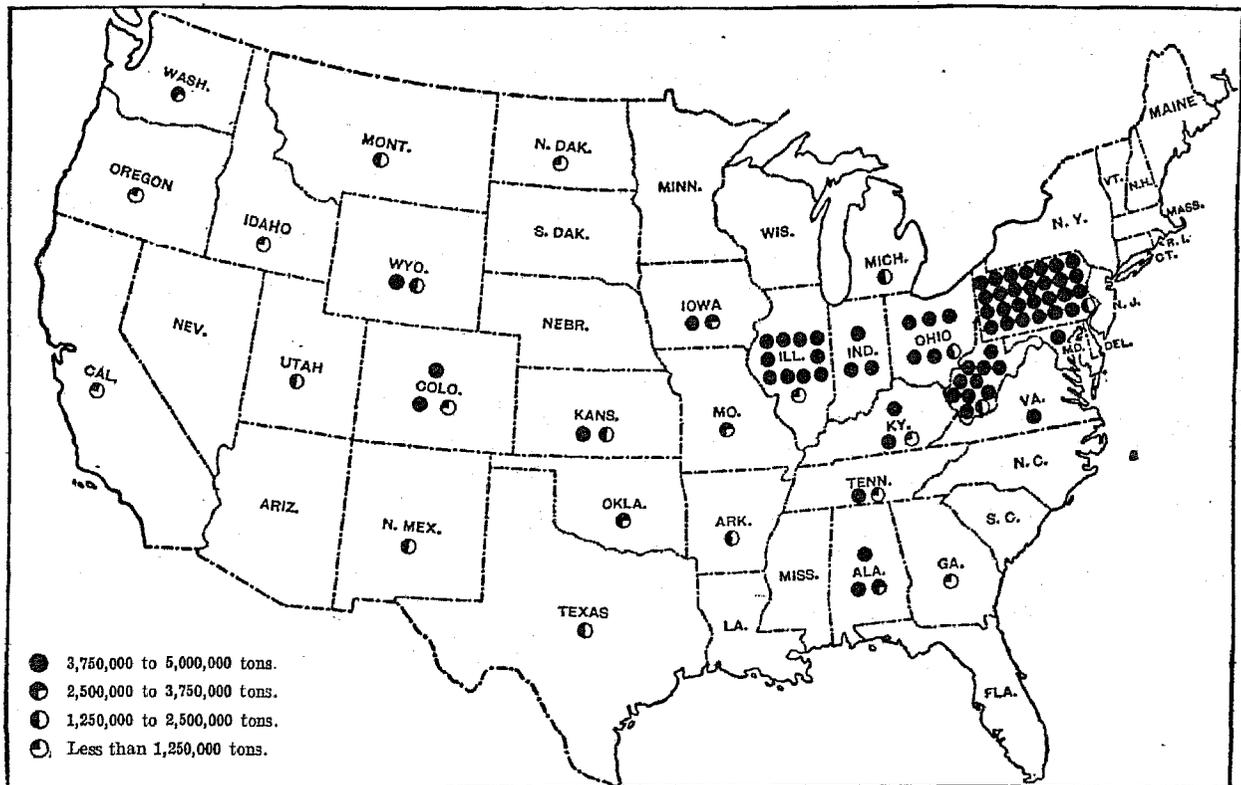
a very low rate of profit, if any. The remarks made on page 181 of this report as to the significance of the reported expenses, and particularly with reference to the matter of depreciation and of development work, should be carefully considered in connection with these statistics. While charges for permanent improvements not properly assignable to the operations of the current year have been included in the returns of the mine operators, it is uncertain whether the expenses of this character are sufficient in general to offset depreciation, for which, as such, no charge has been included in the expenses reported.

Among other reasons why the statistics in this table do not furnish conclusive evidence as to profits in the coal industry is the fact that a large proportion of the coal and coke is produced by mines affiliated with railway companies and other industrial concerns, and the value of coal or coke reported by them in many cases is fixed at an arbitrary figure which may be higher or lower than the current market prices.

It should also be noted that many mine operators make a considerable profit by renting houses and selling merchandise to their employees. The Bureau of the Census corresponded with many operators whose returns showed an excess of expenses over the value of products, and not a few of them stated that, while there was a loss in their coal mining business proper, this was more than counterbalanced by profits from selling merchandise and renting houses.

Relative production, by states: 1909.—The relative importance of the different states as producers of bituminous coal is indicated by the map below.

RELATIVE PRODUCTION OF BITUMINOUS COAL, BY STATES: 1909.



Coal mining exclusive of coke manufacture at the mines, by states.—In order to present data comparable with previous census reports the following table has been adjusted to cover coal mining only, by deducting from the figures given in the preceding table the estimated capital, expenses, number of salaried

employees and wage earners, and the reported value of products, assignable to the manufacture of coke at the mines. Most of these estimates of numbers and amounts to be deducted on account of coke manufacture were made by the operators themselves, and the remainder were made by the Bureau of the Census.

STATISTICS FOR BITUMINOUS COAL MINES, EXCLUDING (PARTLY BY ESTIMATE) ITEMS RELATING TO COKE MANUFACTURE, BY STATES: 1909.

STATE	Number of operators.	Capital.	EXPENSES.							Number of salaried employees.	Number of wage earners.	COAL PRODUCED, INCLUDING COAL COKED AT MINES.	
			Total.	Salaries.	Wages.	Supplies.	Royalties.	Miscellaneous expenses.	Value, including minor products. ¹			Tons (2,000 pounds).	
United States.....	23,503	\$960,289,465	\$378,159,282	\$20,417,392	\$282,378,886	\$45,345,932	\$12,035,900	\$17,981,172	17,793	542,911	\$401,577,477	376,865,510	
Alabama.....	112	43,337,899	15,361,842	1,118,008	10,035,850	2,165,618	223,933	1,918,433	1,153	29,914	16,185,524	13,676,561	
Arkansas.....	44	2,256,942	3,630,526	1,166,067	2,788,127	362,212	163,896	180,224	5,178	5,462	3,508,590	2,373,619	
Colorado.....	89	25,491,031	13,153,671	4,662,201	9,776,702	1,749,382	430,136	4,541,250	5,498	14,447	14,104,268	10,642,868	
Illinois.....	470	75,257,667	51,697,504	2,083,668	41,991,246	4,944,371	744,860	1,933,359	1,788	74,445	53,030,545	50,570,503	
Indiana.....	223	35,937,961	14,906,831	4,604,111	12,273,544	1,108,974	240,494	4,589,708	550	22,357	15,018,123	14,723,231	
Iowa.....	258	7,212,033	12,816,076	4,468,169	10,383,672	1,330,436	322,673	4,811,126	5,411	17,623	12,682,106	7,725,679	
Kansas.....	118	6,262,203	9,778,297	4,284,523	8,106,670	609,521	266,545	4,509,038	6,300	12,791	9,835,614	6,895,660	
Kentucky.....	240	24,508,593	10,127,987	4,787,205	7,122,050	1,189,022	325,239	4,704,465	8,855	19,583	9,940,485	10,561,276	
Maryland.....	40	22,871,136	3,941,359	4,222,116	2,713,294	408,227	95,757	4,501,965	243	5,798	4,483,137	4,001,272	
Michigan.....	15	6,865,156	2,985,802	125,140	2,207,272	325,517	61,555	206,318	106	3,572	3,175,102	1,772,315	
Missouri.....	173	5,650,407	5,715,727	4,209,230	4,695,972	397,068	160,182	4,253,275	2,221	9,526	5,881,034	3,596,691	
North Dakota.....	52	1,023,278	523,410	60,069	357,221	75,187	10,647	4,208,286	46	857	563,212	364,536	
Ohio.....	441	64,131,141	27,153,497	1,367,036	20,922,039	2,681,231	892,398	1,290,743	1,220	44,405	27,353,663	27,518,764	
Oklahoma.....	59	5,672,896	6,535,441	4,802,330	4,803,392	912,614	209,651	4,247,454	275	8,814	6,185,078	3,113,149	
Oregon.....	8	642,410	238,246	11,714	152,845	62,590	438	10,659	11	251	225,026	83,704	
Pennsylvania.....	659	358,698,722	117,443,350	4,427,150	86,191,515	15,855,616	3,950,876	4,618,193	4,716	168,513	129,545,547	137,304,760	
Connellsville dist.....	70	78,517,182	24,966,514	1,203,489	17,683,509	4,043,656	469,879	1,565,981	1,046	32,715	30,770,903	38,729,778	
Tennessee.....	85	19,471,452	6,691,432	547,534	4,751,419	665,884	404,429	322,216	535	10,832	6,545,515	5,972,930	
Texas.....	29	5,894,898	2,812,079	177,103	2,126,043	334,867	36,247	1,37,819	174	4,234	3,136,004	1,824,742	
Virginia.....	42	36,189,055	4,392,440	278,099	2,689,685	685,830	251,824	487,002	243	8,480	4,336,185	4,949,341	
Washington.....	32	13,663,880	6,474,630	4,239,502	4,991,561	861,700	103,330	4,278,537	181	6,094	9,139,707	3,601,213	
West Virginia.....	307	136,244,496	43,024,716	2,742,374	29,420,055	5,503,192	2,870,850	2,428,245	2,451	64,780	44,344,067	51,495,666	
Wyoming.....	35	7,609,229	8,146,526	411,569	5,508,248	1,435,465	104,908	4,386,336	243	7,839	9,721,134	6,294,596	
All other states.....	84	37,167,662	10,001,843	597,118	8,040,458	1,531,358	105,032	327,877	392	11,294	12,634,811	7,802,434	

¹ Value of minor products for the United States was \$244,082.

² Exclusive of 136 operators duplicated in the numbers given for the various states.

³ The total includes \$18,229,388 which can not be distributed among the individual states; the states to which the item relates are Arkansas, Illinois, Indiana, Iowa, Kansas, Missouri, Montana, Oklahoma, Pennsylvania, Washington, West Virginia, and Wyoming.

⁴ The United States total for salaries includes \$1,523,356, paid to employees of general offices, which, for the reasons given on page 182 under "Administrative expenses of general offices," have been included in the statistics of the separate states, not under the heading of "Salaries," but under "Miscellaneous expenses;" the states affected by this arrangement are Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Ohio, Oklahoma, Pennsylvania, Texas, Washington, West Virginia, and Wyoming.

⁵ The total includes 1,003 salaried employees who could not be distributed by states for the reasons given on page 182 under "Administrative expenses of general offices;" the states affected are Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Montana, Ohio, Oklahoma, Pennsylvania, Texas, Washington, West Virginia, and Wyoming.

⁶ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

In considering the relation between the total reported expenses, as shown in this table, and the value of products, the comments made in connection with the preceding table should be borne in mind. Moreover, the fact should be noted that in states where some of the mines made coke the amount of expenses shown as attributable to mine operation proper involves an element of estimate, while the total value assigned to the coal produced by such mines is in some cases arbitrary and scarcely in conformity with market prices.

Statistics of different kinds of bituminous coal: 1909.—The following table summarizes the principal statistics for bituminous coal mines classified according to the kind of coal produced. Data relating to coke manufacture at the mines have been excluded

in the manner already described, so that the figures shown for bituminous proper involve a certain amount of estimate.

[Data relating to coke manufacture at mines excluded, partly by estimate.]

Table 34	Bituminous proper. ¹	Subbituminous and lignite.	Semianthracite.	Cannel.
Number of mines.....	5,769	183	49	12
Acres of coal land controlled.....	6,431,661	83,505	45,467	12,553
Owned.....	4,476,148	52,876	10,472	9,916
Held under lease.....	1,955,513	30,629	34,995	2,637
Total expenses.....	\$365,681,773	\$9,458,880	\$2,581,593	\$237,031
Average per ton.....	\$1.00	\$1.27	\$1.21	\$1.21
Salaries.....	\$18,161,403	\$574,150	\$132,125	\$26,358
Wages.....	\$273,376,688	\$6,945,855	\$1,885,375	\$170,368
Supplies.....	\$43,747,667	\$1,272,802	\$306,945	\$18,613
Royalties.....	\$11,669,891	\$237,321	\$118,011	\$10,677
Miscellaneous.....	\$18,926,224	\$428,752	\$138,542	\$11,010
Tons of coal produced (2,000 lbs.).....	\$367,417,737	7,450,426	1,793,011	195,336
Value of coal at mines.....	\$87,047,709	\$11,198,568	\$2,831,959	\$264,859
Average per ton.....	\$1.05	\$1.50	\$1.59	\$1.30
Number of wage earners.....	523,468	10,478	3,569	396

¹ Includes bituminous, semibituminous, splint, and block coal.

The table does not show precisely the tonnage of the different kinds of coal, owing to the fact that a few companies producing chiefly bituminous coal proper, with a small output of other kinds, returned one combined report for all their operations. Under such conditions it was necessary to include the entire production under the heading of bituminous coal proper.

The table shows the marked predominance of the bituminous proper, under which heading are also included semibituminous, block, and splint coal. This type, with the exception of a little semianthracite and cannel coal, includes the entire production of the Eastern states. Most of the subbituminous and lignite coal is produced in Colorado, Montana, New Mexico, North Dakota, Texas, Utah, Washington, and Wyoming. More than 24 per cent of the combined output of these states in 1909 was of this class, but nearly all of their remaining production was bituminous proper.

The output of semianthracite is restricted by limited deposits. Nearly the entire production in 1909 came from Arkansas, such coal constituting more than one-half the total output of that state. Small quantities were also produced in Colorado, Oklahoma, Utah, and Virginia. Cannel coal occurs only in occasional small deposits. Kentucky, Ohio, Pennsylvania, and West Virginia were the chief producing states.

In considering the statistics in this table as to value of coal and expenses the comments in connection with the two preceding tables should be borne in mind. Furthermore, the variations in average value per ton

shown by the table do not reflect similar differences in the quality of these coals, nor do the variations in average expenses conform to corresponding differences in physical conditions of mining. The average values per ton in 1909 were as follows: Semianthracite, \$1.58; subbituminous and lignite, \$1.50; cannel, \$1.30; and bituminous proper, \$1.05. Semianthracite and cannel are superior domestic fuels and under similar conditions command better prices than bituminous proper, but subbituminous and lignite are inferior to bituminous proper, and their higher average value is due primarily to the fact that these coals are produced in Western states where higher prices are realized for coal generally than in the eastern fields of great bituminous production. In the Western states producing both kinds of coal the average value per ton for bituminous proper was about \$0.17 more than for subbituminous and lignite.

The average reported expenses per ton are as follows: Semianthracite, \$1.44; subbituminous and lignite, \$1.27; cannel, \$1.21; and bituminous proper, \$1. As compared with bituminous proper, the higher averages for semianthracite and cannel may be due to natural conditions of mining; that is, the working of thinner measures, justified by the higher prices which can be realized for these coals; but the higher average expense shown for subbituminous and lignite is due not to any such conditions as these, but to the uniformly higher cost of production in the West as compared with the East. In the Western states concerned the average expense for bituminous proper was \$0.17 per ton higher than for subbituminous and lignite.

PROGRESS OF THE INDUSTRY.

Comparative statistics, by states: 1909 and 1889.—The following table gives comparative statistics of capital, total expenses, wages, supplies, and contract work, and of the tonnage and value of coal produced in 1909 and 1889. The figures in this table have been adjusted (as explained in connection with Table 6) to give comparable statistics for these two years. The data for the manufacture of coke at the mines have been excluded, partly by estimate, in the manner already described. The remarks as to expenses and value of coal made in connection with Tables 32 and 33 should be borne in mind.

The table shows marked progress in the industry in the period covered. For the United States as a

whole, the output increased 294.1 per cent and its value 325.4 per cent. At the same time, the total expenses increased 343.2 per cent, the wage payments 330.6 per cent, and the cost of supplies 467.2 per cent.

Among the states showing an increase in output exceeding 500 per cent, namely, Arkansas, Michigan, North Dakota, Texas, and West Virginia, the latter is the only one which is an important coal producer. In the other states named coal mining was in an incipient stage 20 years ago. The greatest absolute increase in output is found in Pennsylvania, 101,100,000 tons (in round numbers); in West Virginia, 45,300,000 tons; in Illinois, 38,500,000 tons; and in Ohio, 17,500,000 tons.

MINES AND QUARRIES.

COMPARATIVE STATISTICS FOR BITUMINOUS COAL MINES, BY STATES: 1909 AND 1889.

[Data relating to coke manufacture at mines excluded, partly by estimate.]

STATE.	Census.	Capital.	EXPENSES.				COAL PRODUCED (INCLUDING COAL COKED AT MINES).		PER CENT OF INCREASE.					
			Total.	Wages.	Supplies.	Contract work. ¹	Tons (2,000 pounds).	Value at mines.	Capital.	Expenses.			Coal produced.	
										Total.	Wages.	Supplies.	Tons.	Value at mines.
United States...	1909	\$960,289,465	\$378,159,282	\$282,378,886	\$45,345,932	\$2,134,569	376,865,510	\$401,333,395	431.4	343.2	330.6	467.2	294.1	325.4
	1889	180,722,319	85,324,193	65,572,242	7,994,210	822,051	95,629,026	94,346,809						
Alabama.....	1909	43,337,899	15,361,842	10,035,850	2,165,618	751,384	13,676,561	16,174,278	245.7	312.2	227.6	728.1	282.8	308.3
	1889	12,535,194	3,726,939	3,063,059	261,512	36,524	3,572,953	3,961,491						
Arkansas.....	1909	2,256,942	3,630,526	2,758,127	362,212	26,511	2,373,619	3,508,490	(*)	1,076.0	1,052.2	825.0	749.0	786.3
	1889	1,289,751	308,711	239,385	.....	.....	279,524	395,836						
Colorado.....	1909	25,491,031	13,159,671	9,776,702	1,749,382	9,139	10,642,868	14,104,268	102.1	256.1	282.8	256.9	318.3	266.9
	1889	12,611,849	3,695,298	2,653,850	490,152	91,689	2,544,144	3,843,992						
Illinois.....	1909	75,257,667	51,697,504	41,991,246	4,944,371	51,480	50,570,503	52,999,918	(*)	398.7	417.7	411.3	317.8	350.9
	1889	17,630,351	10,366,069	8,111,253	966,927	26,662	12,104,272	11,755,203						
Indiana.....	1909	35,937,961	14,906,831	12,273,544	1,198,974	10,674	14,723,231	14,984,616	(*)	477.4	500.0	397.3	417.5	418.9
	1889	3,435,703	2,581,669	2,045,641	241,094	5,807	2,845,057	2,887,552						
Iowa.....	1909	7,212,033	12,816,076	10,383,672	1,330,436	38,266	7,725,679	12,679,225	(*)	170.8	180.5	272.6	88.6	133.7
	1889	6,279,179	4,732,950	3,701,331	357,033	65,194	4,095,358	5,426,509						
Kansas.....	1909	6,262,203	9,778,297	8,106,670	609,521	49,793	6,895,680	9,835,567	(*)	258.1	273.7	131.9	210.3	197.9
	1889	3,488,539	2,730,782	2,169,137	262,820	6,330	2,222,443	3,301,788						
Kentucky.....	1909	24,508,533	10,127,987	7,122,056	1,189,022	86,660	10,561,276	9,939,078	272.4	369.6	349.5	401.0	340.1	318.6
	1889	6,581,380	2,150,548	1,584,400	237,321	45,099	2,399,755	2,374,339						
Maryland.....	1909	22,871,136	3,941,359	2,713,294	408,227	1,653	4,001,272	4,445,041	26.9	91.2	62.6	100.9	36.1	76.6
	1889	18,029,367	2,061,058	1,668,847	203,155	5,763	2,939,715	2,517,474						
Michigan.....	1909	6,865,156	2,985,802	2,267,272	325,517	2,203	1,772,315	3,175,102	13,727.1	2,525.7	2,562.4	3,483.0	2,528.3	2,660.7
	1889	49,050	113,714	85,158	.....	.....	67,431	115,011						
Missouri.....	1909	5,850,407	5,715,727	4,695,972	397,068	23,903	3,596,691	5,870,972	(*)	100.8	98.7	119.1	40.6	69.0
	1889	3,992,293	2,846,137	2,363,300	181,218	18,779	2,557,823	3,479,057						
North Dakota.....	1909	1,023,278	523,410	357,221	75,187	1,325	364,536	563,212	1,436.9	2,307.6	2,336.0	2,492.7	1,161.1	1,259.4
	1889	66,580	21,740	14,664	.....	.....	28,907	41,431						
Ohio.....	1909	64,131,141	27,153,497	20,922,039	2,681,281	52,854	27,518,764	27,274,403	357.5	229.8	222.8	372.0	175.8	191.5
	1889	14,018,286	8,232,183	6,482,215	568,020	58,767	9,976,787	9,355,400						
Oklahoma.....	1909	5,672,886	6,535,441	4,803,392	912,614	22,266	3,113,149	6,184,420	(*)	457.2	434.0	1,608.9	313.5	367.2
	1889	1,492,009	1,172,821	899,592	53,404	20,000	752,832	1,323,507						
Pennsylvania.....	1909	358,698,722	117,443,350	86,191,515	15,855,616	789,234	137,304,760	129,512,680	(*)	352.1	337.8	562.5	279.6	363.3
	1889	53,322,330	25,977,106	19,686,240	2,393,386	282,222	36,174,089	27,953,315						
Tennessee.....	1909	19,471,452	6,691,482	4,751,419	665,884	6,036	5,972,930	6,548,515	346.3	216.6	218.9	145.4	210.2	180.1
	1889	4,362,711	2,113,292	1,490,034	271,300	13,324	1,925,689	2,338,309						
Texas.....	1909	5,864,898	2,812,079	2,126,043	334,867	21,214	1,824,742	3,134,720	1,518.1	767.5	775.8	516.3	1,323.2	820.3
	1889	307,355	324,157	242,762	54,333	.....	128,216	340,620						
Virginia.....	1909	36,199,055	4,392,440	2,689,685	635,830	114,453	4,949,341	4,336,185	3,328.6	543.7	356.5	1,366.9	471.7	439.0
	1889	1,055,516	682,408	589,236	46,754	932	865,786	804,475						
Washington.....	1909	13,663,880	6,474,630	4,991,561	861,700	10,162	3,601,213	9,139,707	(*)	187.2	204.7	200.0	249.4	281.9
	1889	3,186,441	2,254,486	1,637,960	287,211	9,296	1,030,578	2,393,238						
West Virginia.....	1909	136,244,496	43,024,716	29,420,055	5,563,192	62,279	51,495,666	44,343,894	(*)	788.6	719.0	1,102.6	726.3	771.8
	1889	10,508,050	4,841,796	3,592,292	462,591	47,099	6,231,880	5,086,584						
Wyoming.....	1909	7,609,229	8,146,526	5,808,248	1,435,465	10,644	6,294,596	9,721,134	(*)	346.6	284.4	538.5	353.2	455.9
	1889	2,239,252	1,823,956	1,511,117	234,804	7,881	1,388,947	1,748,617						
All other states ²	1909	37,810,072	10,840,089	8,193,303	1,593,945	12,436	7,886,138	12,848,970	790.8	323.4	345.1	319.5	426.9	342.7
	1889	4,244,603	2,580,373	1,840,769	379,942	80,683	1,496,760	2,902,461						

¹ A small amount of contract work reported from the general offices of a few companies with mines in more than one state could not be distributed as such to the various states and has been omitted from the total given for this item in 1909. However, since the amount so omitted was less than 3 per cent of the total shown, this omission does not materially affect the value of the figures for comparative purposes.

² The total for 1909 includes \$13,229,388 which can not be distributed among the individual states; the item relates to Arkansas, Illinois, Indiana, Iowa, Kansas, Missouri, Montana, Oklahoma, Pennsylvania, Washington, West Virginia, and Wyoming. The increase in the combined capital for these states was 530.6 per cent.

³ See Note 2.

⁴ Includes Nebraska in 1889.

⁵ Includes California, Georgia, Idaho, Montana, New Mexico, Oregon, and Utah in 1909; California, Georgia, Montana, New Mexico, North Carolina, Oregon, and Utah in 1889.

Table 36, derived from the preceding table, shows average expenses and average values per ton, by states, for 1909 and 1889.

In several states the average value per ton decreased, notably in Texas, where the average fell from \$2.66 per ton in 1889 to \$1.72 in 1909, but during the same period the average wage cost decreased from \$1.89 to \$1.17 per ton and the cost of supplies from \$0.42 to \$0.18 per ton. In Colorado, the value

decreased from \$1.51 per ton in 1889 to \$1.33 in 1909, the wage cost decreased from \$1 to \$0.92 and the cost of supplies from \$0.19 to \$0.16 per ton. The decrease in average wage payments per ton and the accompanying decrease in average cost and value per ton in these Western states are probably due in part to the greater scale of production now prevailing, and in part to the relatively greater supply of labor now available for coal mining.

STATE.	AVERAGE EXPENSES PER TON.						AVERAGE VALUE PER TON OF COAL.		STATE.	AVERAGE EXPENSES PER TON.						AVERAGE VALUE PER TON OF COAL.	
	Total.		Wages.		Supplies.		1909	1889		Total.		Wages.		Supplies.		1909	1889
	1909	1889	1909	1889	1909	1889				1909	1889	1909	1889	1909	1889		
United States.....	\$1.00	\$0.89	\$0.75	\$0.69	\$0.12	\$0.08	\$1.06	\$0.99	North Dakota.....	\$1.44	\$0.75	\$0.98	\$0.51	\$0.21	\$0.10	\$1.55	\$1.43
Alabama.....	1.12	1.04	0.73	0.86	0.16	0.07	1.18	1.11	Ohio.....	0.99	0.83	0.76	0.65	0.10	0.06	0.99	0.94
Arkansas.....	1.53	1.10	1.16	0.86	0.15	0.14	1.48	1.42	Oklahoma.....	2.10	1.56	1.54	1.19	0.29	0.07	1.99	1.76
Colorado.....	1.24	1.45	0.92	1.00	0.16	0.19	1.33	1.51	Pennsylvania.....	0.86	0.72	0.63	0.54	0.12	0.07	0.94	0.77
Illinois.....	1.02	0.86	0.83	0.67	0.10	0.08	1.05	0.97	Tennessee.....	1.12	1.10	0.80	0.77	0.11	0.14	1.10	1.21
Indiana.....	1.01	0.91	0.83	0.72	0.08	0.08	1.02	1.02	Texas.....	1.54	2.53	1.17	1.89	0.18	0.42	1.72	2.66
Iowa.....	1.66	1.16	1.34	0.90	0.17	0.09	1.64	1.33	Virginia.....	0.89	0.79	0.54	0.68	0.14	0.05	0.88	0.93
Kansas ¹	1.42	1.23	1.18	0.98	0.09	0.12	1.43	1.49	Washington.....	1.80	2.19	1.39	1.59	0.24	0.28	2.54	2.32
Kentucky.....	0.96	0.90	0.67	0.66	0.11	0.10	0.94	0.99	West Virginia.....	0.84	0.78	0.57	0.58	0.11	0.07	0.86	0.82
Maryland.....	0.99	0.70	0.68	0.57	0.10	0.07	1.11	0.86	Wyoming.....	1.29	1.31	0.92	1.09	0.23	0.16	1.54	1.26
Michigan.....	1.68	1.69	1.28	1.26	0.18	0.13	1.79	1.71	All other states ²	1.37	1.71	1.04	1.23	0.20	0.25	1.63	1.94
Missouri.....	1.59	1.11	1.31	0.92	0.11	0.07	1.63	1.36									

¹ Includes Nebraska in 1889.

² Includes California, Georgia, Idaho, Montana, New Mexico, Oregon, and Utah in 1909; California, Georgia, Montana, New Mexico, North Carolina, Oregon, and Utah in 1889.

STATISTICS OF LAND HELD BY OPERATORS.

Extent of holdings.—While a few of the 3,503 operators of the mines covered by the general tables failed to report their land holdings, 3,456 of these operators reported 6,573,186 acres of coal land and 1,144,429 acres of other land, making a total for the entire United States of 7,717,615 acres controlled. The average holding of coal land per operator was about

1,900 acres, but excluding small local mines from consideration, the average for commercial producers was about 2,700 acres. The great variations in the extent of the holdings of single operators are shown by Tables 14 and 50. The following table gives, by states, the acreage of coal land owned and held under lease by operators, respectively, with percentages:

COAL LAND CONTROLLED BY OPERATORS OF BITUMINOUS COAL MINES: 1909.

STATE.	ACRES OF COAL LAND CONNECTED WITH—									PER CENT OF COAL LAND CONNECTED WITH—					
	All mines.			Mines without coke manufacture.			Mines with coke manufacture.			All mines.		Mines without coke manufacture.		Mines with coke manufacture.	
	Total.	Owued.	Held under lease.	Total.	Owued.	Held under lease.	Total.	Owued.	Held under lease.	Owued.	Held under lease.	Owued.	Held under lease.	Owued.	Held under lease.
United States.....	6,573,186	4,549,412	2,023,774	4,883,967	3,225,778	1,658,189	1,689,219	1,323,634	365,585	69.2	30.8	66.0	34.0	78.4	21.6
Alabama.....	599,259	525,355	73,904	231,765	160,261	71,504	367,494	365,094	2,400	87.7	12.3	69.1	30.9	99.3	0.7
Arkansas.....	54,369	23,885	30,474	54,359	23,885	30,474				43.9	56.1	43.9	56.1		
Colorado.....	92,742	65,101	27,641	65,047	41,226	23,821	27,895	23,875	4,020	70.0	30.0	63.4	36.6	85.6	14.4
Illinois.....	552,396	395,965	156,431	552,396	395,965	156,431				71.7	28.3	71.7	28.3		
Indiana.....	140,244	103,910	36,334	140,244	103,910	36,334				74.1	25.9	74.1	25.9		
Iowa.....	70,192	20,152	50,040	70,192	20,152	50,040				28.7	71.3	28.7	71.3		
Kansas.....	80,459	52,340	27,119	80,459	52,340	27,119				66.3	33.7	66.3	33.7		
Kentucky.....	364,689	247,006	117,683	332,084	214,421	117,663	32,585	32,585		67.7	32.3	64.6	35.4	100.0	
Maryland.....	68,220	63,596	4,624	68,220	63,596	4,624				93.2	6.8	93.2	6.8		
Michigan.....	23,135	3,696	19,439	23,135	3,696	19,439				16.0	84.0	16.0	84.0		
Missouri.....	116,108	70,805	45,303	116,108	70,805	45,303				61.0	39.0	61.0	39.0		
North Dakota.....	10,356	7,971	2,385	10,356	7,971	2,385				77.0	23.0	77.0	23.0		
Ohio.....	406,336	260,423	145,913	406,336	260,423	145,913				64.1	35.9	64.1	35.9		
Oklahoma.....	75,744	910	74,834	75,744	910	74,834				1.2	98.8	1.2	98.8		
Oregon.....	3,122	1,452	1,670	3,122	1,452	1,670				46.5	53.5	46.5	53.5		
Pennsylvania.....	1,673,537	1,321,981	351,556	1,338,003	1,050,246	287,757	335,534	271,735	63,799	79.0	21.0	78.5	21.5	81.0	19.0
Connellsville district ¹	116,520	98,228	18,292				116,520	98,228	18,292	84.3	15.7			84.3	15.7
Tennessee.....	458,924	353,954	104,970	329,650	232,680	96,970	129,274	121,274	8,000	77.1	22.9	70.6	29.4	93.8	6.2
Texas.....	125,774	104,513	21,261	125,774	104,513	21,261				83.1	16.9	83.1	16.9		
Virginia.....	169,296	85,217	84,079	35,190	11,353	23,837	134,106	73,864	60,242	50.3	49.7	32.3	67.7	55.1	44.9
Washington.....	88,611	67,635	20,976	83,313	66,295	17,018	5,298	1,340	3,958	76.3	23.7	79.6	20.4	25.3	74.7
West Virginia.....	1,134,455	583,263	551,222	565,457	215,401	350,056	569,028	367,862	201,166	51.4	48.6	38.1	61.9	64.6	35.4
Wyoming.....	64,783	50,024	14,759	64,783	50,024	14,759				77.2	22.8	77.2	22.8		
All other states ²	200,235	139,258	60,977	112,230	73,253	38,977	88,005	66,005	22,000	69.5	30.5	65.3	34.7	75.0	25.0

¹ Excludes the acreage of a few mines without coke manufacture in order to avoid disclosing individual operations.
² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

In the United States as a whole, 69.2 per cent of the coal land reported in 1909 was owned by the operators, while 30.8 per cent was held under lease. For mines without coke manufacture, 66 per cent was owned by operators, as compared with 78.4 per cent for mines with coke manufacture. This difference is due chiefly to the fact that the latter group includes many large companies with ample capital to permit the purchase of land. (See remarks following Table 49.)

The marked differences among the states with respect to the proportion of land owned and of land leased by mine operators can be attributed only to varying local conditions.

Production according to tenure of land, by states: 1909.—The following table gives, by states, the number of mines reported operated on land owned, on land held under lease, and on land partly owned and partly held under lease, together with the total output for each class of mines:

Table 38

STATE.	NUMBER OF MINES OPERATED ON LAND—			TOTAL TONS (2,000 POUNDS) OF COAL PRODUCED BY MINES OPERATED ON COAL LAND—		
	Owued.	Held under lease.	Partly owned and partly held under lease.	Owued.	Held under lease.	Partly owned and partly held under lease.
United States.....	2,229	2,410	1,383	165,161,940	82,800,403	128,903,167
Alabama.....	109	63	31	10,360,417	1,639,539	1,676,605
Arkansas.....	19	35	15	1,178,105	550,642	644,872
Colorado.....	48	54	53	1,999,949	1,660,106	6,982,813
Illinois.....	237	256	128	26,628,767	5,940,057	17,991,679
Indiana.....	147	115	60	7,220,506	2,506,029	4,996,696
Iowa.....	57	178	78	1,408,230	2,365,695	3,951,754
Kansas.....	56	121	25	3,185,115	1,868,893	1,841,652
Kentucky.....	144	121	45	5,597,607	3,056,051	1,907,618
Maryland.....	42	17	11	2,910,850	341,285	749,157
Michigan.....	3	2	23	9,987	(*)	1,762,328
Missouri.....	75	113	32	1,179,523	1,065,589	1,351,879
Montana.....	42	12	11	1,287,913	282,190	973,280
New Mexico.....	18	3	7	1,652,254	32,690	1,089,968
North Dakota.....	44	9	9	330,305	34,231	
Ohio.....	260	225	155	12,473,327	4,022,418	11,023,019
Oklahoma.....	6	94	4	50,394	2,906,888	155,867
Oregon.....	4	3	2	29,067	(*)	7,54,037
Pennsylvania.....	587	471	451	64,782,860	21,400,517	51,121,383
Tennessee.....	28	75	29	2,002,475	3,043,900	926,555
Texas.....	38	11	8	1,282,486	383,663	158,593
Utah.....	21	1	1	2,259,789	(*)	
Virginia.....	10	54	21	147,896	2,761,667	2,039,778
Washington.....	25	10	19	2,470,080	128,244	992,889
West Virginia.....	157	352	152	11,008,781	26,111,412	14,375,473
Wyoming.....	35	15	15	3,470,907	688,717	2,134,972
All other states.....	8			224,350		

* Includes tonnage of 1 mine operated on coal land held under lease, to avoid disclosing individual operations.

* Excludes 112,553 tons produced by 6 mines operated on coal land held under lease, to avoid disclosing output of individual operators.

* Includes tonnage of 5 mines operated on coal land held under lease.

* See Note 5.

* Includes tonnage of 2 mines operated on coal land held under lease.

* See Note 7.

* Includes tonnage of 3 mines operated on coal land held under lease.

* See Note 1.

* Includes California, Georgia, and Idaho.

Of the total production covered by the table, namely, 376,865,510 tons, 165,161,940 tons, or 43.8 per cent, was that of mines on land wholly owned by the operators; 82,800,403 tons, or 22 per cent, that of mines on land wholly leased; and 128,903,167 tons, or 34.2 per cent, that of mines on lands partly owned and partly leased by the operators. Although mines of the latter class did not report what part of the output came from owned and what part from leased land, it is probable that the greater portion was taken from

owned land. This is shown by the amount of royalties reported by these operators as paid on coal taken from leased tracts, which indicates that the coal mined from such lands was somewhat less than half the total production of these mines. (See Tables 33 and 55.) Consequently, of the total coal output of the United States in 1909, it may be said that between 60 and 65 per cent was mined from lands owned by the operators, while between 35 and 40 per cent was produced from leased holdings.

The table indicates that mines operated on land owned were usually larger than those operated on land held under lease by operators. In the United States, as a whole, the average output per mine for these two classes of mines was, respectively, 74,000 and 34,000 tons, while in Illinois these averages were 112,000 and 23,000 tons, in Ohio 48,000 and 18,000 tons, and in Pennsylvania 110,000 and 45,000 tons, respectively. This difference in size, however, is due not to the form of tenure, but to the fact that concerns able to purchase large holdings of coal lands outright usually have the capital also to open large mines.

Comparative statistics of holdings, by states: 1909 and 1889.—Table 39 shows, by states, the number of acres of land owned and the number held under lease by operators, for 1889 and 1909.

Inasmuch as the returns for 1889 did not distinguish between coal land and other land held by operators, it has been necessary, in order to present comparable data for 1909, to include not only coal land, but all land controlled by operators. However, more than 85 per cent of the acreage reported in 1909 was coal land, and much of the remainder is underlaid with coal measures which may eventually prove workable.

Table 39 COAL AND OTHER LAND CONTROLLED.

STATE.	COAL AND OTHER LAND CONTROLLED.						
	Total acres.			Acres owned.		Acres held under lease.	
	1909	1889	Per cent of increase.	1909	1889	1909	1889
United States.....	7,717,615	1,576,933	405.4	5,635,243	1,141,011	2,082,372	385,822
Alabama.....	716,244	222,749	248.5	701,790	216,129	74,454	6,620
Arkansas.....	54,680	7,064	220.5	24,137	15,969	30,549	1,095
Colorado.....	113,650	24,719	54.0	84,915	53,529	28,721	20,260
Illinois.....	585,300	14,740	205.3	424,739	161,468	160,622	30,272
Indiana.....	155,876	24,098	527.1	117,619	15,785	37,957	9,023
Iowa.....	77,700	4,682	101.1	26,771	24,239	51,025	14,443
Kansas.....	81,800	1,016	106.6	56,205	36,077	27,664	3,939
Kentucky.....	399,816	124,190	212.1	280,053	106,622	119,793	21,478
Maryland.....	92,814	24,520	83.7	88,129	48,100	4,685	2,420
Michigan.....	25,661	6224	6.2	6,222	142	19,439	480
Missouri.....	119,822	17,917	233.6	74,519	24,276	45,303	11,641
Montana.....	54,335	4,510	471.3	44,098	9,110	10,237	400
New Mexico.....	294,318	12,280	2,509.2	240,124	10,480	54,194	800
North Dakota.....	14,665	529	2,726.0	12,300	520	2,395	
Ohio.....	432,204	11,898	312.0	283,439	66,697	148,765	38,201
Oklahoma.....	82,504	1,766	458.7	910		81,594	14,766
Pennsylvania.....	1,965,568	21,536	751.5	1,604,753	132,811	360,815	98,025
Tennessee.....	661,507	12,912	394.0	548,247	78,289	113,260	55,623
Texas.....	139,642	780	621.0	108,132	1,000	21,931	3,780
Utah.....	27,541	310	366.0	27,341	5,910	200	
Virginia.....	170,479	1,690	863.7	86,282	13,900	84,197	3,790
Washington.....	95,107	2,198	323.2	76,271	20,322	21,896	2,876
West Virginia.....	1,176,860	17,521	994.5	611,023	61,531	565,837	45,990
Wyoming.....	79,098	13,760	430.7	55,744	13,360	15,164	
All other states.....	53,150	24,745	114.8	51,480	24,745	1,670	

* Includes Nebraska in 1889.

* Includes California, Georgia, Idaho, and Oregon in 1909; California, Georgia, Oregon, and North Carolina in 1889.

The table shows a remarkable increase in the total acreage of lands controlled by mine operators between 1889 and 1909. For the entire United States this increase was more than 400 per cent, and for many individual states it was much greater. This increase is due chiefly to the great development of the industry in these 20 years, but may in part indicate an increased practice of securing reserve lands for the future.

While, for the United States as a whole, the total acreage held under lease has increased but little more rapidly than the total acreage owned by operators, in a good many important states, notably Alabama, Illinois, Kentucky, and West Virginia, the area leased by operators increased far more than the acreage owned. In a few states, for example, Indiana, Ohio, Pennsylvania, and Tennessee, the opposite was the case.

MINES CLASSIFIED ACCORDING TO THE RELATION OF TOTAL EXPENSES TO VALUE OF PRODUCTS.

According to the relation of expenses to the value of products the coal mining enterprises reporting at the census of 1909 were classified as explained in the

text following Table 40. The table gives, by states, for 1909 the number and output of mines in "Class A," "Class B," and "Class C."

[See text below for explanation of classification.]

STATE.	NUMBER OF MINES.			TONS OF COAL PRODUCED BY MINES (2,000 POUNDS).						TONS OF COKE MADE AT MINES (2,000 POUNDS).					
	Class A.	Class B.	Class C.	Class A.	Class B.	Class C.	Per cent produced by mines.			Class A.	Class B.	Class C.	Per cent produced by mines.		
							Class A.	Class B.	Class C.				Class A.	Class B.	Class C.
All mines:															
United States	4,088	983	942	1 282,866,545	2 54,037,376	39,961,589	2 75.1	2 14.3	10.6	28,075,777	2,303,892	2,070,813	86.5	7.1	6.4
MINES WITHOUT COKE MANUFACTURE.															
United States	3,571	899	895	1 201,685,134	2 44,935,390	34,031,516	2 71.9	2 16.0	12.1						
Alabama	109	28	30	5,067,083	820,316	620,523	77.6	12.7	0.7						
Arkansas	32	19	18	1,075,722	889,034	408,863	45.3	37.5	17.2						
Colorado	94	12	34	4,832,791	426,035	1,735,930	69.1	6.1	24.8						
Illinois	408	140	83	32,382,460	12,104,725	5,993,309	64.0	24.1	11.9						
Indiana	224	54	44	8,084,863	3,420,509	2,608,799	59.0	23.3	17.7						
Iowa	236	30	45	4,558,946	900,501	2,206,232	59.0	12.4	28.6						
Kansas	125	58	19	4,390,216	2,005,820	409,615	63.7	29.1	7.2						
Kentucky	169	64	60	5,893,522	1,745,465	1,747,191	62.8	18.0	18.6						
Maryland	62	2	6	3,874,534	(*)	126,738	96.8	(*)	3.2						
Michigan	18		10	1,144,916		627,399	64.0		35.4						
Missouri	168	25	27	1,775,061	855,662	966,028	49.4	23.8	26.9						
North Dakota	39	1	13	280,251	(*)	75,285	79.3	(*)	20.7						
Ohio	451	116	73	18,342,526	7,083,559	2,092,670	66.7	25.7	7.0						
Oklahoma	42	33	29	1,454,089	1,002,020	657,040	46.7	32.2	21.1						
Oregon	5		4	30,512		53,192	36.5		63.5						
Pennsylvania	873	165	141	71,269,885	7,422,550	6,411,514	83.7	8.7	7.5						
Tennessee	62	27	40	3,123,127	630,365	897,765	67.1	13.7	19.3						
Texas	28	7	12	1,456,156	178,581	190,005	70.8	9.8	10.4						
Virginia	19	12	13	990,602	134,039	365,494	66.5	9.0	24.5						
Washington	29		22	3,054,024		441,618	87.4		12.6						
West Virginia	260	100	119	17,863,418	4,927,035	4,376,478	65.8	18.1	16.1						
Wyoming	51	4	10	5,896,150	215,105	183,341	93.7	3.4	2.9						
All other states 7	67	2	37	4,244,731	(*)	737,478	85.2	(*)	14.8						
MINES WITH COKE MANUFACTURE.															
United States	517	84	47	81,181,411	9,101,986	5,930,073	84.4	9.5	6.2	28,075,777	2,303,892	2,070,813	86.5	7.1	6.4
Colorado	15			3,948,112			100.0			1,061,868			100.0		
Pennsylvania	284	25	21	40,509,334	4,186,128	1,505,340	89.1	8.0	2.9	20,515,361	1,263,595	720,750	91.2	5.6	3.2
Connellsville district	220	5	13	37,389,151	918,927	891,700	96.5	0.9	2.6	19,858,382	226,274	592,608	96.0	1.1	2.9
West Virginia	151	21	10	20,935,504	2,020,853	1,372,378	88.1	8.3	5.6	3,139,341	417,007	258,680	82.3	11.0	6.8
All other states 8	67	38	16	10,088,461	2,895,005	3,052,346	62.9	18.1	19.0	3,365,207	622,690	1,091,983	66.2	12.3	21.5

1 Includes tonnage of 5 "Class B" mines.
 2 See Note 1.
 3 Includes tonnage of 2 "Class B" mines.

4 See Note 3.
 5 Includes tonnage of 1 "Class B" mine.
 6 See Note 5.

7 Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.
 8 Includes Alabama, Georgia, Kentucky, Montana, New Mexico, Tennessee, Utah, Virginia, and Washington.

The foregoing classification was made as follows: First, whenever a report showed an excess of value of products over all reported expenditures, including expenses of operation and outlays for development work (if any), the enterprise was placed in "Class A." Second, whenever a report showed expenditures greater than the value of products, and no expenses were reported for development work, the enterprise was placed

in "Class B." In all cases where there was doubt as to the accuracy of such a report the operator's attention was called to the fact that it showed an excess of expenses over value of products, a verification or correction was requested, and the enterprise covered by the report was then classified in accordance with the reply received. Third, those reports which showed an excess of expenditures over value of products, but stated that

a part of the expenditures were for development work, were placed in "Class C," no attempt being made, on account of the uncertainty as to the significance of the expenditure for development work, to determine whether the strictly operating expenses exceeded the value of products obtained or not. In each case the expenses and value of products of the coke business, where conducted in connection with mining, were taken into account in making the classification.

In considering this classification the discussion on page 181 regarding the difference between the expenses of mining as reported and the true cost of mining as determined by scientific methods of accounting, together with the remarks in connection with Table 32 should be borne in mind. With a proper allowance for depreciation some mines reporting a value of product in excess of the expenses reported might have been operated at a loss. On the other hand, some mine operators who lost on their mining business recouped themselves by profits from operating stores, renting houses, and from other nonmining business not covered by the returns.

Of the 6,013 mines covered by Table 40 it appears that 4,088, producing about three-fourths of the total

coal output, were in "Class A;" that is, their value of products exceeded their expenses as reported. Marked differences appear from state to state. In Maryland and Wyoming more than 90 per cent of the total coal output was produced by such mines, in Pennsylvania and Washington more than 85 per cent, and in Colorado, Texas, and West Virginia more than 75 per cent. On the other hand, in Arkansas, Missouri, Oklahoma, and Oregon less than half the tonnage produced was reported by mines at which the value of products exceeded the total reported expenses, but in Arkansas and Oklahoma there was some duplication of the expenses reported which may have materially affected this classification. (See remarks preceding Table 51.)

In general, a greater proportion of the mines operated in combination with coke manufacture are found in "Class A" than of the mines without coke ovens. Many of these coke-making mines operated under peculiarly favorable conditions. The majority were closely affiliated with large consumers of coke, and were thus enabled to operate more regularly and on a larger scale, while the output was doubtless often charged to the parent companies at values more or less independent of market prices.

METHODS OF MINE OPERATION.

Pick and machine mining.—In some mines practically the entire output of coal is machine mined, in others the entire output is pick mined, while in many the output is partly machine and partly pick mined.

The following table gives the total quantity and percentage of coal produced by machine and by pick mining in different states, and Table 53 gives additional data relating to this subject.

OUTPUT OF BITUMINOUS COAL MINES CLASSIFIED ACCORDING TO METHOD OF MINING, BY STATES: 1909.

STATE.	TONS (2,000 POUNDS) OF COAL PRODUCED AT—									PER CENT OF COAL PRODUCED AT—					
	All mines.			Mines without coke manufacture.			Mines with coke manufacture.			All mines.		Mines without coke manufacture.		Mines with coke manufacture.	
	Total.	By machine.	By pick.	Total.	By machine.	By pick.	Total.	By machine.	By pick.	By machine.	By pick.	By machine.	By pick.	By machine.	By pick.
United States.	376,865,510	144,775,410	232,090,100	280,652,040	122,831,301	157,770,739	96,213,470	21,894,109	74,319,361	38.4	61.6	46.8	56.2	22.8	77.2
Alabama.....	13,676,561	2,295,500	11,381,061	6,515,922	1,151,808	5,364,114	7,160,639	1,143,692	6,016,947	16.8	83.2	17.7	82.3	16.0	84.0
Arkansas.....	2,373,619	4,444	2,369,175	2,373,619	4,444	2,369,175	.....	.....	.....	0.2	99.8	0.2	99.8	.....	.....
Colorado.....	10,642,868	2,046,645	8,596,223	6,994,756	2,046,645	4,948,111	3,648,112	.....	3,648,112	19.2	80.8	29.3	70.7	.....	100.0
Illinois.....	50,570,503	18,140,591	32,429,912	50,570,503	18,140,591	32,429,912	.....	.....	.....	35.9	64.1	35.9	64.1	.....	.....
Indiana.....	14,723,231	7,450,091	7,273,140	14,723,231	7,450,091	7,273,140	.....	.....	.....	50.6	49.4	50.6	49.4	.....	.....
Iowa.....	7,725,679	8,414	7,717,265	7,725,679	8,414	7,717,265	.....	.....	.....	0.1	99.9	0.1	99.9	.....	.....
Kansas.....	6,895,660	54,976	6,840,684	6,895,660	54,976	6,840,684	.....	.....	.....	0.8	99.2	0.8	99.2	.....	.....
Kentucky.....	10,561,276	6,494,960	4,066,316	9,386,178	5,512,263	3,873,915	1,175,098	982,697	192,401	61.5	38.5	58.7	41.3	83.6	16.4
Maryland.....	4,001,272	117,568	3,883,704	4,001,272	117,568	3,883,704	.....	.....	.....	2.9	97.1	2.9	97.1	.....	.....
Michigan.....	1,772,315	628,211	1,144,104	1,772,315	628,211	1,144,104	.....	.....	.....	35.4	64.6	35.4	64.6	.....	.....
Missouri.....	3,596,691	798,378	2,797,313	3,596,691	798,378	2,797,313	.....	.....	.....	22.2	77.8	22.2	77.8	.....	.....
North Dakota.....	364,536	164,365	200,171	364,536	164,365	200,171	.....	.....	.....	45.1	54.9	45.1	54.9	.....	.....
Ohio.....	27,518,764	22,112,063	5,406,701	27,518,764	22,112,063	5,406,701	.....	.....	.....	80.4	19.6	80.4	19.6	.....	.....
Oklahoma.....	3,113,149	50,811	3,062,338	3,113,149	50,811	3,062,338	.....	.....	.....	1.6	98.4	1.6	98.4	.....	.....
Oregon.....	83,704	.....	83,704	83,704	.....	83,704	.....	.....	.....	26.3	73.7	26.3	73.7	.....	.....
Pennsylvania.....	137,304,760	57,574,954	79,729,806	85,103,949	46,873,329	38,230,620	52,200,811	10,701,625	41,499,186	41.9	58.1	55.1	44.9	20.5	79.5
Connellsville district ¹	38,729,778	4,065,186	34,664,592	.....	.....	.....	38,729,778	4,065,186	34,664,592	10.5	89.5	.....	.....	10.5	89.5
Tennessee.....	5,972,930	1,024,398	4,948,532	4,657,257	944,599	3,712,658	1,315,673	79,799	1,235,874	17.2	82.8	20.3	79.7	6.1	93.9
Texas.....	1,824,742	17,230	1,807,512	1,824,742	17,230	1,807,512	.....	.....	.....	0.9	99.1	0.9	99.1	.....	.....
Virginia.....	4,949,341	1,439,811	3,509,530	1,490,135	616,076	874,059	3,459,206	823,785	2,635,471	29.1	70.9	41.3	58.7	23.8	76.2
Washington.....	3,601,213	48,660	3,552,553	3,496,242	48,660	3,447,582	104,971	.....	104,971	1.4	98.6	1.4	98.6	.....	100.0
West Virginia.....	51,495,666	20,945,819	30,549,847	27,169,931	13,871,026	13,298,905	24,328,735	7,074,793	17,253,942	40.7	59.3	51.1	48.9	29.1	70.9
Wyoming.....	6,294,596	1,391,101	4,903,495	6,294,596	1,391,101	4,903,495	.....	.....	.....	22.1	77.9	22.1	77.9	.....	.....
All other states ²	7,802,434	1,943,890	5,858,544	4,982,209	856,122	4,126,087	2,820,225	1,087,768	1,732,457	24.9	75.1	17.2	82.8	33.6	61.4

¹ Exclusive of the tonnage of a few mines without coke manufacture in order to avoid disclosing individual operations.
² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

Although in some mines the condition of the roof and floor, and the structure of the coal measure itself may seriously affect, or even prevent the use of machines for undercutting and shearing coal, this is not the case in most mines now operating; and, speaking broadly, it may be said that the use of machines generally indicates more advanced and more efficient methods of mine operation.

While this table shows that 38.4 per cent of the total coal output of the United States in 1909 was machine mined, great differences appear from state to state. In Ohio 80.4 per cent, in Kentucky 61.5 per cent, and in Indiana 50.6 per cent of all coal was mined by machines. Although Pennsylvania shows the greatest absolute tonnage mined by machines, only 41.9 per cent of the state's total coal output was thus produced. In Arkansas, Iowa, Kansas, and Texas the proportion mined by machines was insignificant.

As a group the mines with coke ovens show only 22.8 per cent of their production machine mined, as compared with 43.8 per cent for the mines without coke manufacture. In the important Connellsville coke district of Pennsylvania only 10.5 per cent of the output of coal was machine mined, as compared with 55.1 per cent for the Pennsylvania mines without coke manufacture. This difference in the use of machines between mines with and those without coke manufacture is partly accounted for by the fact that mines which market a large part of their output of coal in the form of coke—including the less remunerative "slack"—are thereby often rendered less urgently in

need of introducing machines to lower operating costs and to decrease the percentage of "slack" produced, than are those mines which must market their entire output of coal as such, including the "slack."

Kind of mine opening.—Coal is produced from four general types of mine openings: Vertical shafts, slopes, horizontal or upward sloping drifts, and open cuts or strippings. Some mines have openings of two or more kinds. To some extent mine operation is affected by the kind of opening. For example, many drift mines of commercial importance are operated without the use of mechanical power, but no shaft mine thus operated can produce any considerable tonnage. Scores of drifts are self-draining, but in slope and shaft mines pumps are used to keep the workings clear of water. The initial cost of opening drifts is less than that for shafts, since the drift starts at once in the coal, while the shaft must first be sunk some distance through rock or other material. Since drifts open coal measures which have been partially eroded, and which outcrop along hill or mountain sides, the quantity of coal which can be mined through such an opening is often limited, and this may affect the size of the mine, but the size of slope or shaft mines may be less limited in this manner. Open cuts or strippings are quarries rather than true mines, since the entire overburden is removed before the coal is taken out.

The following table gives for various states the total quantity and percentage of coal produced from different openings, and Table 54 gives additional information relating to this subject.

OUTPUT OF BITUMINOUS COAL MINES CLASSIFIED ACCORDING TO KIND OF OPENING, BY STATES: 1909.

STATE.	TONS (2,000 POUNDS) OF COAL PRODUCED BY—						PER CENT FROM—				
	All mines.	Shaft mines.	Slope mines.	Drift mines.	Open cuts or strippings.	Mines with opening not specified or with two or more kinds.	Shaft mines.	Slope mines.	Drift mines.	Open cuts or strippings.	Mines with opening not specified or with two or more kinds.
United States.....	376,865,510	1132,128,764	62,959,748	156,855,362	2291,578	24,630,058	35.1	16.7	41.6	0.1	6.5
Arkansas.....	2,373,619	1,368,386	883,595	.....	.....	4121,638	57.7	37.2	.....	.....	5.1
Colorado.....	10,642,808	2,451,078	5,064,356	2,647,616	.....	479,818	23.0	47.6	24.9	.....	4.5
Illinois.....	50,570,503	48,780,105	540,393	529,564	70,570	649,871	96.6	1.1	1.0	0.1	1.3
Indiana.....	14,723,231	13,732,135	307,604	98,638	20,825	507,029	93.3	2.1	0.6	0.1	3.9
Iowa.....	7,723,679	5,737,697	224,484	81,246	.....	41,682,252	74.3	2.9	1.0	.....	21.8
Kansas.....	6,895,660	6,670,924	51,631	.....	93,342	79,763	96.7	0.7	.....	1.4	1.2
Kentucky.....	10,591,276	2,470,286	2,035,391	5,189,910	.....	4865,689	23.4	19.3	49.1	.....	8.2
Michigan.....	1,772,315	1,772,315	.....	.....	.....	.....	100.0	.....	.....	.....	.....
Missouri.....	3,596,691	2,890,940	232,213	219,637	58,256	195,625	80.4	6.5	6.1	1.6	5.4
Montana.....	2,543,383	197,757	1,134,171	1,073,766	.....	137,689	7.8	44.6	42.2	.....	5.4
New Mexico.....	2,774,912	.....	1,818,382	901,566	.....	454,964	.....	65.5	32.5	.....	2.0
Ohio.....	27,518,704	7,816,286	3,556,732	14,890,513	.....	1,735,233	28.4	12.9	52.3	.....	6.4
Oklahoma.....	3,113,149	1,294,103	1,412,634	20,443	27,320	338,649	41.6	45.4	0.7	0.9	11.5
Pennsylvania.....	137,304,760	31,237,388	27,595,960	70,117,374	.....	8,354,038	22.8	20.1	51.1	.....	6.1
Tennessee.....	5,972,930	.....	522,528	5,169,325	.....	281,077	.....	8.7	86.5	.....	4.7
Texas.....	1,824,742	1,408,924	276,823	.....	.....	138,095	77.2	15.2	.....	.....	7.6
Virginia.....	4,949,341	.....	114,291	3,906,467	.....	7928,583	.....	2.3	78.9	.....	18.8
Washington.....	3,601,213	.....	2,420,551	681,997	.....	4498,635	.....	67.2	18.9	.....	13.9
West Virginia.....	51,495,660	3,867,076	2,395,423	44,700,542	.....	532,625	7.5	4.7	86.8	.....	1.0
Wyoming.....	6,294,596	.....	4,149,128	1,490,536	.....	754,032	.....	65.0	22.1	.....	12.0
All other states.....	20,610,212	433,354	8,223,428	5,739,202	21,265	6,192,953	2.1	39.9	27.8	0.1	30.0

1 Includes the product of 1 slope mine and excludes 460,268 tons, the product of 5 shaft mines, in order that individual operations might not be disclosed.
 2 Excludes 17,834 tons, the product of 4 open cut mines, in order that individual operations might not be disclosed.
 3 Includes 460,286 tons, the product of 5 shaft mines, and 17,834 tons, the product of 4 open cut mines, in order that individual operations might not be disclosed.
 4 Includes the product of 1 open cut mine.
 5 Includes the product of 1 slope mine.
 6 Includes the product of 1 shaft mine.
 7 Includes the product of 2 shaft mines.
 8 Includes Alabama, California, Georgia, Idaho, Maryland, North Dakota, Oregon, and Utah.

In the United States as a whole drift mines have the greatest output, 41.6 per cent of the total, in 1909, shaft mines following with 35.1 per cent, and slope mines with 16.7 per cent. Drift mines are especially numerous in the Appalachian fields. Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia, each reported more than 50 per cent of its output produced from such openings, and these states together reported nearly 90 per cent of all the coal mined from drifts in the United States. The predominance of drifts in these states is explained by the fact that in the Appalachian region immense deposits of coal have been cut through in all directions by streams, while the measures are but little displaced from the horizontal, and consequently there are thousands of miles of outcrops on which drift mines may be opened.

Shaft mines characterize the states of the Eastern and Northern Interior and of the Western and Southwestern Interior regions. Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, and Texas, each reported more than 70 per cent of its output produced from such mines. In these states the coal measures generally lie at some distance below the surface, outcrops are few, and shafts are necessary for extensive development. The greater part of the small tonnage of open cuts or strippings was also produced in these states. These open cuts or strippings are made along

the outcrop of the coal, or where it lies near the surface, and the overburden is removed until its thickness limits the stripping. Although but a small aggregate tonnage was thus obtained in 1909, there is considerable coal available in many fields for such operations.

Slope mines are of two general types: Those which open on the outcrop of a pitching vein and follow the incline of the deposit, and those which first go through more or less rock and earth to reach a deposit which may be approximately horizontal. Slope mines of the first type are found chiefly in the Rocky Mountain and Pacific Coast states, where many coal measures with the inclosing strata have been much disturbed by folding and displacement. Slope mines of the second type are scattered through many states, slopes often taking the place of shafts where the distance to the underlying bed is not great.

The quantity of coal entered in the sixth column includes not only the output of mines the reports for which failed to specify the kind of opening, but also the production of such individual mines as have two or more openings of different kinds, and that of operators with several mines of different types covered by one combined report. The states included among "All other states" were those in which the proportion not specified was too large to justify separate presentation of the figures for the several classes.

DISPOSITION OF COAL.

A small part of the coal produced is used at the mines for steam and heat, a part is made into coke at the mines, a small part is sold locally, and the remainder is either used in the vicinity of the mines by the producing concerns in other departments of their business (manufacturing, transportation, etc.) or is shipped from the mines for such use or for sale. The following table gives, by states, the percentages disposed of in the four different ways above outlined. The absolute quantities appear in Table 62.

In the United States in 1909, 81.7 per cent of the total bituminous coal output was shipped from the mines for sale or was used as fuel in other departments by producers, 13.3 per cent was coked at the mines, and the remaining 5 per cent was either sold locally or used at the mines for steam and heat. For mines at which no coke was made 94.4 per cent was shipped away for sale or was used as fuel in other departments by the producers. For the mines at

which coke was manufactured 44.8 per cent of the output was disposed of similarly and 52 per cent was coked. Considerable variations appear among the states with reference to the disposition of coal by mines of this class. In the Connellsville district of Pennsylvania 77.7 per cent of the entire output of mines having coke ovens was coked at the mines and much of the remainder was coked elsewhere. On the other hand, in Kentucky, where coke manufacturing was merely incidental, in 1909, but 7.3 per cent of the output of mines with ovens was coked.

The table shows that of the total output of bituminous coal 2.5 per cent was burned at the mines for steam and heat. With the single exception of Oregon the variation from state to state in the percentage thus used was not large. The unusual proportion thus consumed in Oregon is accounted for by the fact that a considerable tonnage of refuse from washing coal for market was burned under the boilers.

BITUMINOUS COAL MINES—DISPOSITION OF OUTPUT, BY STATES: 1909.

Table 43

PER CENT OF TOTAL TONS OF OUTPUT FROM—

STATE.	All mines.				Mines without coke manufacture.			Mines with coke manufacture.			
	Loaded at mines for shipment or used in other departments by producers.	Sold locally.	Made into coke at mines.	Used at mines for steam and heat.	Loaded at mines for shipment or used in other departments by producers.	Sold locally.	Used at mines for steam and heat.	Loaded at mines for shipment or used in other departments by producers.	Sold locally.	Made into coke at mines.	Used at mines for steam and heat.
United States.....	81.7	2.5	13.3	2.5	94.4	3.1	2.5	44.8	0.8	52.0	2.4
Alabama.....	60.2	1.0	34.8	3.9	94.3	1.8	3.9	29.2	0.3	66.5	3.9
Arkansas.....	95.6	0.6	.....	3.8	95.6	0.6	3.8	.....	.....	.....	.....
Colorado.....	79.0	2.3	15.6	3.1	93.4	3.4	3.2	51.3	0.4	45.4	2.9
Illinois.....	92.2	5.0	.....	2.9	92.2	5.0	2.9	.....	.....	.....	.....
Indiana.....	91.6	5.5	.....	2.9	91.6	5.5	2.9	.....	.....	.....	.....
Iowa.....	88.5	8.8	.....	2.7	88.5	8.8	2.7	.....	.....	.....	.....
Kansas.....	95.4	2.5	.....	2.1	95.4	2.5	2.1	.....	.....	.....	.....
Kentucky.....	92.9	3.8	0.8	2.5	93.9	4.0	2.1	85.4	1.9	7.3	5.4
Maryland.....	97.9	0.9	.....	1.2	97.9	0.9	1.2	.....	.....	.....	.....
Michigan.....	90.9	5.1	.....	4.0	90.9	5.1	4.0	.....	.....	.....	.....
Missouri.....	90.0	8.2	.....	1.8	90.0	8.2	1.8	.....	.....	.....	.....
North Dakota.....	66.6	30.0	.....	3.4	66.6	30.0	3.4	.....	.....	.....	.....
Ohio.....	95.1	2.7	.....	2.2	95.1	2.7	2.2	.....	.....	.....	.....
Oklahoma.....	92.5	1.4	.....	6.1	92.5	1.4	6.1	.....	.....	.....	.....
Oregon.....	52.9	26.4	.....	20.7	52.9	26.4	20.7	.....	.....	.....	.....
Pennsylvania.....	71.7	1.5	24.6	2.2	95.9	2.0	2.1	32.3	0.8	64.7	2.2
Connellsville district ¹	19.3	0.8	77.7	2.2	.....	.....	.....	19.3	0.8	77.7	2.2
Tennessee.....	90.4	1.3	6.6	1.7	97.3	1.2	1.5	66.0	1.6	30.0	2.4
Texas.....	97.0	0.3	.....	2.6	97.0	0.3	2.6	.....	.....	.....	.....
Virginia.....	56.6	1.0	38.7	3.7	96.5	1.5	2.1	39.5	0.8	55.3	4.4
Washington.....	92.5	1.6	1.9	4.0	94.4	1.6	4.0	29.5	0.6	66.4	3.5
West Virginia.....	85.1	1.1	12.0	1.8	96.9	1.4	1.7	71.9	0.9	25.4	1.9
Wyoming.....	94.4	1.1	.....	4.5	94.4	1.1	4.5	.....	.....	.....	.....
All other states ²	78.9	2.0	15.9	3.2	93.1	2.8	4.1	53.7	0.5	44.1	1.8

¹ Exclusive of a few mines without coke manufacture, omitted to avoid disclosing individual operations.
² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

STATISTICS OF COMMERCIAL AND OF LOCAL OPERATORS.

The census of bituminous coal mines covered all operations with an output of 1,000 tons or more in 1909. Particular interest attaches to the statistics of producers for the general trade, who may be called commercial producers, as distinguished from local operators (shipping no coal, but catering entirely to local demand). Separate statistics for these two classes of operators for the United States as a whole are summarized in the following table. The commercial mines of course include many which do not produce primarily for sale in the open market, but whose product is largely used by railroads or industrial concerns controlling the mines.

While the table shows a total of 1,084 operators selling their entire output locally, it must be remembered that hundreds of such operators were not covered by the census because their output fell below 1,000 tons. These 1,084 operators constituted nearly one-third of the total number reporting and operated nearly one-fifth of all the mines covered, but their output, aggregating 3,678,000 tons, was only a fraction of the total for the industry.

Table 44

	All operators.	LOCAL OPERATORS.		COMMERCIAL OPERATORS.	
		Amount or number.	Per cent of total.	Amount or number.	Per cent of total.
Number of operators.....	3,503	1,084	30.9	2,419	69.1
Number of mines.....	6,013	1,131	18.8	4,882	81.2
Acres of land controlled.....	7,717,615	151,211	2.0	7,566,404	98.0
Total expenses.....	\$395,907,026	\$4,632,372	1.2	\$391,274,654	98.8
Exclusive of coking expenses (partly estimated).....	\$378,159,282	\$4,632,372	1.2	\$373,526,910	98.8
Average per ton of coal.....	\$1.00	\$1.26	.....	\$1.00	.....
Products, total value.....	\$427,962,464	\$5,490,440	1.3	\$422,472,024	98.7
Coal, exclusive of coal coked at mines—					
Tons (2,000 pounds).....	326,792,907	3,678,320	1.1	323,114,587	98.9
Value at mines.....	\$360,052,340	\$5,490,440	1.5	\$354,561,900	98.5
Coke made at mines—					
Tons (2,000 pounds).....	32,450,482	.....	.....	32,450,482	100.0
Value.....	\$67,483,162	.....	.....	\$67,483,162	100.0
Coal, including coal coked at mines—					
Tons (2,000 pounds).....	376,665,510	3,678,320	1.0	373,187,190	99.0
Value.....	\$401,333,395	\$5,490,440	1.4	\$395,842,955	98.6
Average per ton.....	\$1.06	\$1.49	.....	\$1.06	.....
Number of proprietors and firm members.....	3,739	1,601	42.8	2,138	57.2
Number of wage earners.....	569,789	9,072	1.6	560,717	98.4

¹ These operators were distributed among the several states, as follows: Alabama, 9; Arkansas, 1; California, 1; Colorado, 22; Idaho, 2; Illinois, 156; Indiana, 121; Iowa, 140; Kansas, 12; Kentucky, 49; Maryland, 11; Michigan, 3; Missouri, 58; Montana, 12; New Mexico, 2; North Dakota, 32; Ohio, 179; Oklahoma, 3; Oregon, 4; Pennsylvania, 191; Utah, 5; Virginia, 5; Washington, 2; West Virginia, 23; and Wyoming, 11.

The average expense of mine operation of these local producers was reported as \$1.26 per ton, as compared with \$1 per ton for the commercial mines (excluding coking expenses); but the true cost of production of these small operators was even higher than the figure given, since many proprietors and partners performed services, sometimes manual labor, at their mines for which no charges were included in the expenses re-

ported. These partners and proprietors looked to the profits of the business for their compensation, but in arriving at the average expenses of production, allowance should be made for these services. The relatively high average value per ton of coal reported for these mines, \$1.49, as compared with \$1.06 for the commercial operations, is explained by the fact that much of their output was retailed.

STATISTICS OF OPERATORS CLASSIFIED ACCORDING TO THEIR INDUSTRIAL AFFILIATION.

The following table gives statistics for operators in 1909 affiliated with railroads, with iron and steel companies, and with other industrial companies, and for operators without such affiliations, respectively. In order to render these figures fairly comparable, the operators selling only in local markets—small irregular producers—have been eliminated from the statistics of the unaffiliated group, leaving in this class only commercial operators. The classification throughout has been based on official information.¹ When this information was not conclusive the operator was classified as unaffiliated. Accordingly the actual number of affiliated operators is probably somewhat larger than shown by the table.

The relatively great importance of the operators affiliated with railroads and industrial concerns is shown by this table. Such affiliated operators in 1909 held nearly one-half the total acreage of lands reported by all commercial operators and produced more than two-fifths of the total coal output and more than three-fourths of the coke made at mines. The average output per operator for the unaffiliated operators was less than 100,000 tons, as compared with more than 1,800,000 tons for operators affiliated with railroad companies, nearly 1,300,000 tons for those affiliated with iron and steel companies, and more than 300,000 tons for those affiliated with other industrial companies. On the average, the individual mines of operators affiliated with railroad and industrial companies were also much larger than those of unaffiliated commercial operators.

Of the total tonnage of coke made at the mines in 1909, more than half was reported by operators affiliated with iron and steel companies. This showing is to be expected, since such concerns are the chief

consumers of coke, and their coal mines are operated mainly to furnish this fuel. Nearly 60 per cent of the total coal output of this group was coked at the mines and a considerable part of the remaining tonnage was coked by the parent companies after shipment to blast furnaces. As a class, the unaffiliated operators did not coke any considerable proportion of their coal at the mines; in the aggregate they used less than 6 per cent of their total output in making coke. Of course many of these operators were mining noncoking coals.

Table 45

	Total.	OPERATORS AFFILIATED WITH—			Unaffiliated commercial operators.
		Railroad companies.	Iron and steel companies.	Other industrial companies.	
Number of operators..	2,419	33	36	131	2,219
Number of mines.....	4,882	430	252	455	3,745
Acres of coal and other land controlled ¹	7,585,797	1,513,384	1,401,618	715,551	3,955,244
Per cent of total.....	100.0	20.0	18.5	9.4	52.1
Total expenses (including expenses of coke manufacture at mines) ²	\$391,274,654	\$65,626,550	\$47,203,171	\$47,226,716	\$231,218,217
Number of wage earners.....	560,717	93,692	62,806	63,490	340,729
Coal produced for use or sale as fuel:					
Tons (2,000 pounds).....	323,114,587	57,162,392	19,291,173	38,968,588	207,692,494
Value at mines ³	\$354,805,982	\$68,695,501	\$20,317,073	\$42,035,493	\$223,757,915
Coke made at mines:					
Tons (2,000 pounds).....	32,450,432	2,392,428	17,842,486	4,120,871	8,094,667
Value at mines ⁴	\$67,666,042	\$5,256,579	\$38,690,029	\$8,595,838	\$15,123,896
Coal produced, including coal coked at mines:					
Tons (2,000 pounds).....	373,187,190	60,815,091	46,587,216	45,376,419	220,408,464
Per cent of total.....	100.0	16.3	12.5	12.2	59.1
Value at mines ⁵	\$396,087,037	\$71,781,217	\$42,633,998	\$47,715,279	\$233,956,543
Average tons produced per operator.....	154,273	1,842,882	1,294,089	346,385	99,328
Average tons produced per mine.....	76,441	141,430	184,870	99,723	58,854

¹ Includes duplication of 19,393 acres sublet by operators to each other.

² Includes \$405,937, cost of coal purchased for coking at mines by operators affiliated with iron and steel companies, and \$27,304 by operators affiliated with other industrial companies.

³ Includes a small value of other products.

⁴ Includes value of by-products.

⁵ Includes a small value of other products but not that of coke.

SCALE OF PRODUCTION.

The scale of production prevailing in the bituminous coal mining industry is considered in two aspects: First, that of the individual mine, and, second, that of the operator.

Size of mines: 1909.—The size of bituminous mines varies widely. The annual output ranges from a few hundred tons in the case of some local "banks" to a

¹ For detailed explanation of the method of making this classification see remarks in connection with Table 11.

half million tons and more for the largest mines. The census did not cover mines with less than 1,000 tons of output in 1909. Mines producing 500,000 tons or more were relatively few, those exceeding 250,000 tons were much more numerous, while hundreds mined more than 100,000 tons; but by far the great majority were of smaller size.

Table 46 shows the average output per mine in 1909, by states.

Table 46

STATE.	AVERAGE OUTPUT OF COAL PER MINE (TONS OF 2,000 POUNDS).		
	All mines.	Mines without coke manufacture.	Mines with coke manufacture.
United States.....	62,675	52,312	148,478
Alabama.....	67,372	39,017	198,907
Arkansas.....	34,400	34,400	.....
Colorado.....	68,664	49,963	243,207
Illinois.....	89,143	89,143	.....
Indiana.....	45,724	45,724	.....
Iowa.....	24,841	24,841	.....
Kansas.....	34,137	34,137	.....
Kentucky.....	34,069	31,392	106,827
Maryland.....	57,161	57,161	.....
Michigan.....	63,297	63,297	.....
Missouri.....	16,349	16,349	.....
North Dakota.....	6,878	6,878	.....
Ohio.....	42,998	42,998	.....
Oklahoma.....	29,934	29,934	.....
Oregon.....	9,300	9,300	.....
Pennsylvania.....	90,991	72,183	158,184
Connellsville district ¹	162,730	.....	162,730
Tennessee.....	42,063	36,103	101,200
Texas.....	38,824	38,824	.....
Virginia.....	58,228	33,867	84,371
Washington.....	66,689	68,554	34,990
West Virginia.....	77,906	56,716	133,074
Wyoming.....	96,840	96,840	.....
All other states ²	63,434	47,002	165,896

¹ Exclusive of a few mines without coke manufacture, omitted to avoid disclosing individual operations.

² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

From this table it appears that for the United States, as a whole, the average output of all bituminous mines covered by the census in 1909 was 62,675 tons, but if the small local mines are excluded, the average for commercial mines was about 76,000

tons. (See Table 44.) Wyoming showed the highest average output per mine, followed by Pennsylvania and Illinois, while the output per mine in North Dakota and Oregon was much lower than in any of the other states separately named.

As a group the mines with coke manufacture produced on the average nearly three times as much coal per mine as those without coke manufacture, while the coke-making mines in Colorado had a greater average output per mine than the mines of either class in any of the other states listed in the table.

Although the size of mines may be determined by many conditions, the character of the deposit worked, the capital available, the market for the product, and the presence or absence of affiliation with railroads or industrial concerns are highly important factors.

Classification of operators according to value of products: 1909.—Table 12 classifies the organizations operating bituminous mines according to the value of products reported. Tables 47, 48, 49, and 50 show how the size of these organizations is affected, first, by the the industrial affiliation of operators, and second, by the presence or absence of coke manufacture at the mines. "Commercial" operators, in the sense used in Table 47 and elsewhere, are those producing coal for general markets; "local" operators, those producing only for local consumption.

Table 47

VALUE OF ALL PRODUCTS PER OPERATOR.	ALL OPERATORS.		OPERATORS AFFILIATED WITH RAILROADS AND INDUSTRIAL CONCERNS.				UNAFFILIATED COMMERCIAL OPERATORS.				UNAFFILIATED LOCAL OPERATORS.			
	Number.	Value of all products.	Operators.		Value of all products.		Operators.		Value of all products.		Operators.		Value of all products.	
			Number.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.	Number.	Per cent.	Amount.	Per cent.
All classes.....	3,503	\$427,962,464	200	100.0	\$183,590,213	100.0	2,219	100.0	\$238,881,811	100.0	1,084	100.0	\$5,490,440	100.0
Less than \$5,000.....	1,116	2,826,603	30	15.0	84,460	(1)	335	15.1	888,001	0.4	751	69.3	1,854,142	33.8
\$5,000 to \$10,000.....	481	3,408,410	15	7.5	117,838	0.1	247	11.1	1,827,276	0.8	219	20.2	1,463,296	26.7
\$10,000 to \$100,000.....	1,261	47,712,666	63	31.5	2,208,922	1.2	1,084	48.9	43,330,742	18.1	114	10.5	2,173,002	39.6
\$100,000 to \$1,000,000.....	577	151,141,253	50	25.0	15,550,531	8.5	527	23.7	135,590,722	56.8	.....	.....	.....	.....
\$1,000,000 and over ²	88	222,873,532	42	21.0	165,628,462	90.2	26	1.2	57,245,070	24.0	.....	.....	.....	.....

¹ Less than one-tenth of 1 per cent.

² Includes 10 operators each reporting products valued at \$5,000,000 and over which can not be shown by groups on account of the disclosure of individual operations. The total value of their products was \$108,025,423.

In connection with these statistics it should be borne in mind, as explained on page 181, that, when a parent company had several coal mining subsidiary companies, these subsidiaries have not been treated singly as separate operators, but have been considered together as one operator under the name of the parent company.

From Table 47 it is apparent that much greater operating organizations are found among companies affiliated with railroads and industrial concerns than among unaffiliated operators. In the entire industry 10 operators each reported products valued at more than \$5,000,000, and of this number, 8 were allied with outside enterprises. Sixty-eight operators reported products valued at more than \$1,000,000, and 42 of these were classed as having such affiliations. The average value of products per operator for the 200

producers with such connections was more than \$900,000, as compared with only about \$100,000 for the unaffiliated commercial operators. The coal mining companies affiliated with railroads reported an average value of products per company of more than \$2,000,000, as compared with average values of about \$1,600,000 and \$400,000, respectively, for the coal mining subsidiaries of iron and steel companies, and those of other industrial enterprises. (See Table 45.)

Among the affiliated operators those reporting products valued at more than \$1,000,000 each, constituted by far the chief producing group, and together reported 90 per cent of the total value shown for the affiliated producers. Among the unaffiliated commercial operators the chief producing group was composed of those whose products were valued at \$100,000 to \$1,000,000.

The table also shows the limitation usually imposed on the scale of operations by dependence on local markets. None of the unaffiliated operators selling exclusively in local markets reported products equaling \$100,000 in value and only 114 out of a total of 1,084 such operators reported products exceeding \$10,000 in value.

Table 48 shows, for 1909, the number of operators affiliated with railroads, iron and steel companies, and other industrial concerns, respectively, classified according to value of all products per operator.

VALUE OF ALL PRODUCTS PER OPERATOR.	NUMBER OF OPERATORS AFFILIATED WITH—		
	Railroad companies.	Iron and steel companies.	Other industrial companies.
All classes.....	33	36	131
Less than \$5,000.....			30
\$5,000 to \$10,000.....			15
\$10,000 to \$100,000.....	2	8	53
\$100,000 to \$1,000,000.....	10	19	21
\$1,000,000 and over ¹	21	9	12

¹ Includes 5 operators reporting products valued at \$5,000,000 and over.

Table 49 compares the size of the coal mining organizations which also manufactured coke at their mines with the size of those which did not make coke.

VALUE OF ALL PRODUCTS PER OPERATOR.	NUMBER OF OPERATORS—		
	Total.	Without coke manufacture at mines.	With coke manufacture at mines.
Total.....	3,503	3,322	181
Less than \$10,000.....	1,597	1,590	7
\$10,000 to \$100,000.....	1,261	1,212	49
\$100,000 to \$500,000.....	622	442	80
\$500,000 to \$1,000,000.....	55	40	15
\$1,000,000 to \$5,000,000.....	58	37	21
\$5,000,000 and over.....	10	1	9

Average expenses per ton of coal, by states.—Statistics showing, by states, the average expenditures per ton of coal produced are presented in two tables. The first table (51) covers all mines furnishing complete reports. The data have been adjusted to relate exclusively to coal mining by omitting the expenses attributable to the manufacture of coke at the mines. (See Table 33.) The second table (52) covers only those mines without coke manufacture which reported a value of product in excess of expenses and were classified in Table 40 as class A mines.

In connection with these tables the remarks under "Expenses" on page 181, as to depreciation and expenditures for mine development included in the expenses reported, must be taken into account.

For certain states the total average expenses per ton and the averages for supplies given in the table may be slightly in error. This is due to the fact that under cost of supplies some operators included the cost of mining supplies afterward sold to employees

The proportion of large organizations is much higher among operators combining coal mining with coke manufacture than among other operators. The growth of extensive organizations among the former has been fostered not only by close affiliation with large consumers of coal and coke, but also by the fact that the areas of good coking coal are of limited extent, are largely controlled by big companies, and few tracts are available for small operators, while, on the other hand, hundreds of thousands of acres of steam and domestic coal are available for cheaply opened small mines, and by the further fact that the heavy initial cost of beginning coke manufacture necessitates a larger scale of production.

Classification of operators according to acreage of land controlled: 1909.—The following table gives the number of bituminous operators, with and without coke manufacture at their mines, classified according to the acreage of land (coal and other) controlled:

NUMBER OF ACRES PER OPERATOR.	NUMBER OF OPERATORS—		
	Total.	Without coke manufacture at mines.	With coke manufacture at mines.
Total.....	13,456	13,275	181
Less than 100 acres.....	1,228	1,208	20
100 to 1,000 acres.....	1,430	1,386	44
1,000 to 10,000 acres.....	676	602	74
10,000 to 100,000 acres.....	111	77	34
100,000 acres and over.....	11	2	9

¹ Forty-seven operators failed to report acreage.

This table shows that holders of large areas of land are relatively much more numerous among operators making coke than among those without coke manufacture. On account of limited deposits many operators, particularly those affiliated with large coke consumers, have obtained extensive areas of coking coal for reserve supplies.

EXPENSES.

with deductions therefor from wages, but the wages tabulated were the gross earnings before these deductions were made, and hence the total expenses for these operators were slightly exaggerated. By correspondence most of such reports were corrected. Although the remaining reports could not be corrected, the limit of possible error caused by them was ascertained through the deductions from wages. Thus it appears that the limit of error from this cause in the above averages for the United States is only about half a cent per ton. In Alabama this error may amount to slightly over \$0.02 per ton; in Iowa, to \$0.05 per ton; in Michigan, to \$0.05 per ton; in North Dakota, to \$0.04 per ton; in Oklahoma, to \$0.08 per ton; and in Texas, to \$0.04 per ton. In all other states any such error, if existing at all, is negligibly small. Furthermore, it must be distinctly understood that these figures mentioned represent not a certain error, but only the extreme limit of a possible error, while doubtless the actual error is much within this limit.

Table 51

AVERAGE EXPENSE PER TON OF COAL PRODUCED.

STATE.	AVERAGE EXPENSE PER TON OF COAL PRODUCED.					
	Total.	Salaries.	Wages.	Supplies.	Royalties.	Miscellaneous expenses.
United States.....	\$1.00	\$0.05	\$0.75	\$0.12	\$0.03	\$0.05
Alabama.....	1.12	0.08	0.73	0.16	0.02	0.13
Arkansas.....	1.53	0.07	1.16	0.15	0.07	0.08
Colorado.....	1.24	0.06	0.92	0.16	0.04	0.05
Illinois.....	1.02	0.04	0.83	0.10	0.01	0.04
Indiana.....	1.01	0.04	0.83	0.08	0.02	0.04
Iowa.....	1.06	0.06	1.34	0.17	0.04	0.04
Kansas.....	1.42	0.04	1.18	0.09	0.04	0.07
Kentucky.....	0.96	0.07	0.67	0.11	0.03	0.07
Maryland.....	0.99	0.06	0.68	0.10	0.02	0.13
Michigan.....	1.08	0.07	1.28	0.18	0.03	0.12
Missouri.....	1.59	0.06	1.31	0.11	0.04	0.07
North Dakota.....	1.44	0.16	0.98	0.21	0.03	0.06
Ohio.....	0.99	0.05	0.76	0.10	0.03	0.05
Oklahoma.....	2.10	0.10	1.54	0.29	0.09	0.08
Oregon.....	2.85	0.14	1.83	0.75	0.01	0.13
Pennsylvania.....	0.86	0.04	0.63	0.12	0.03	0.04
Tennessee.....	1.12	0.09	0.80	0.11	0.07	0.05
Texas.....	1.54	0.10	1.17	0.18	0.02	0.08
Virginia.....	0.89	0.06	0.54	0.14	0.05	0.10
Washington.....	1.80	0.07	1.39	0.24	0.03	0.08
West Virginia.....	0.84	0.05	0.57	0.11	0.06	0.05
Wyoming.....	1.29	0.07	0.92	0.23	0.02	0.06
All other states ¹	1.36	0.08	1.03	0.20	0.01	0.04

¹ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

The above averages per ton vary widely in different states, but, owing to the differences in wage scales, the methods of mining, the scale of operations, and in other conditions of production, not only between different states but often within a state itself, the figures can be used only for very general comparisons. The average expense on account of royalties is not the average rate of royalty, for which see Table 55.

Expenses for selected mines, by states.—As explained in connection with Table 40, class A mines are

those reporting a total value of products greater than the total expenses reported. The following table gives data relating to expenses at such mines. Mines with coke manufacture are not included.

The averages in Table 52 for the United States as a whole, and for Alabama, Colorado, Kentucky, Pennsylvania, Tennessee, Virginia, Washington, West Virginia, and "All other states" are not strictly comparable with those in the preceding table, since in that table the figures for the United States as a whole and for the states named are based on all mines, including those with coke manufacture, while the results given here are based entirely on mines without coke manufacture. The consequent incomparability of the figures is shown by the averages for Pennsylvania, which are \$0.86 per ton for all mines, and \$0.89 per ton for the class A mines covered by Table 52. This difference is due to the inclusion in the former table and the exclusion from the latter of the Connellsville coke district, a region of cheap, large scale, coal mining. However, when the averages in the two tables for comparable states, such as Illinois, Indiana, and Ohio, are considered, it appears that the uniformly lower average expenses for the class A mines are due chiefly to lower average wage payments.

The remarks in connection with the preceding table, concerning the possible errors and the general limitations of the data, also apply to this table.

TOTAL TONS OF COAL PRODUCED, TOTAL EXPENSES, AND AVERAGE EXPENSES PER TON FOR MINES OF CLASS A, BY STATES, EXCLUDING MINES WITH COKE MANUFACTURE: 1909.

Table 52

STATE.	Total tons of coal produced.	EXPENSES.						AVERAGE EXPENSE PER TON OF COAL PRODUCED.					
		Total.	Salaries.	Wages.	Supplies.	Royalties.	Miscellaneous expenses.	Total.	Salaries.	Wages.	Supplies.	Royalties.	Miscellaneous expenses.
United States.....	201,553,624	\$200,611,179	\$9,865,250	\$153,437,847	\$22,066,921	\$6,463,877	\$8,777,284	\$1.00	\$0.05	\$0.76	\$0.11	\$0.03	\$0.04
Alabama.....	5,057,083	5,355,962	484,624	3,900,885	767,134	138,041	265,278	1.10	0.10	0.77	0.15	0.03	0.05
Arkansas.....	1,075,721	1,403,091	62,258	1,131,897	118,616	82,730	67,590	1.30	0.06	1.05	0.11	0.03	0.06
Colorado.....	4,832,791	6,148,956	353,198	4,518,027	781,837	215,704	280,640	1.27	0.07	0.93	0.16	0.04	0.06
Illinois.....	32,332,469	32,042,935	1,320,705	26,158,848	3,057,049	307,505	1,198,828	0.99	0.04	0.81	0.09	0.01	0.04
Indiana.....	8,634,563	8,106,407	354,807	6,092,393	645,697	119,601	293,909	0.93	0.04	0.77	0.07	0.01	0.03
Iowa.....	4,558,946	7,305,172	323,221	5,872,565	684,511	234,807	190,068	1.60	0.07	1.29	0.15	0.05	0.04
Kansas.....	4,300,216	5,842,557	165,554	4,961,999	348,474	133,262	233,298	1.33	0.04	1.13	0.08	0.03	0.05
Kentucky.....	5,893,522	5,018,374	347,600	3,710,117	504,399	194,937	261,261	0.85	0.06	0.63	0.08	0.03	0.04
Maryland.....	3,771,555	3,710,260	187,350	2,547,985	332,839	95,607	496,479	0.98	0.05	0.68	0.10	0.03	0.13
Michigan.....	1,144,916	1,740,196	60,505	1,398,244	176,738	26,586	78,123	1.52	0.05	1.22	0.16	0.02	0.07
Missouri.....	1,775,001	2,744,253	106,590	2,288,248	177,678	79,352	92,385	1.55	0.06	1.29	0.10	0.04	0.05
North Dakota.....	286,251	355,235	40,712	259,637	45,899	3,932	11,055	1.24	0.14	0.89	0.16	0.01	0.04
Ohio.....	18,342,526	16,792,771	768,633	13,253,872	1,466,841	646,060	592,965	0.91	0.04	0.72	0.08	0.04	0.03
Oklahoma.....	1,454,039	2,692,416	125,010	1,981,892	361,259	125,873	98,382	1.85	0.09	1.36	0.25	0.09	0.07
Oregon.....	30,512	66,948	4,920	53,814	4,520	170	3,524	2.19	0.16	1.76	0.15	0.01	0.12
Pennsylvania.....	71,260,885	63,311,634	2,920,036	47,238,566	7,758,012	2,534,035	2,861,285	0.89	0.04	0.66	0.11	0.04	0.04
Tennessee.....	3,123,127	3,052,464	256,432	2,104,475	251,712	299,835	140,010	0.98	0.08	0.67	0.08	0.10	0.04
Texas.....	1,456,156	2,077,025	126,551	1,678,371	258,485	24,399	89,219	1.43	0.09	1.08	0.18	0.02	0.06
Virginia.....	990,602	929,126	59,109	829,574	67,323	41,845	63,275	0.84	0.06	0.60	0.07	0.04	0.06
Washington.....	3,034,624	4,909,702	149,192	3,925,855	577,330	47,887	209,429	1.61	0.05	1.29	0.19	0.02	0.07
West Virginia.....	17,863,418	14,038,496	967,593	9,792,286	1,567,913	910,738	770,035	0.79	0.06	0.55	0.09	0.05	0.04
Wyoming.....	5,896,150	7,477,725	372,535	5,326,656	1,338,633	103,450	338,551	1.27	0.06	0.90	0.23	0.02	0.06
All other states ¹	4,219,200	3,389,144	278,745	4,144,641	724,563	97,501	143,694	1.28	0.07	0.98	0.17	0.02	0.03

¹ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.

Expenses and related data for mines classified according to method of mining, selected states.—The following table has been prepared to show broadly the differences in the cost of coal production resulting from different methods of mining. Mines with coke manufacture are excluded, because the expenses of the coke business can not be segregated here with sufficient precision to make comparisons with safety. Data are shown only for states

in which the number of enterprises of each class was large enough to furnish significant information. No totals for the United States are given, because conditions differ so widely in different parts of the country with respect to factors other than the method of mining that no conclusions could safely be derived from such totals. For the same reason in comparing the several methods of mining each state or group of states should be considered by itself.

states, \$0.12. The greater part of this advantage is, naturally, due to a considerably lower average expense per ton for wages.

Inasmuch as the total output of the mines using only the machine method may be considered comparatively small in some of the states shown, the average expenses per ton for the "mixed" mines should also be compared with those for mines using the pick method exclusively. This "mixed" group contains a few exclusively machine and a few exclusively pick mines (included by operators in one combined report), but is composed chiefly of mines operated partly by machine and partly by pick mining. As shown by the footnote, the major part of the great output of this group in each of the four states separately named is machine mined, and in each of them the average total expenses and the average wage payments per ton were lower than for pick mines with mechanical power. This difference in total expenses per ton in Illinois was \$0.20; in Ohio, \$0.22; in Pennsylvania, \$0.08; in West Virginia, \$0.17. In the Western states, where the difference was \$0.03 per ton, less than half the output of the "mixed" mines was machine mined.

The differences in average wage payments and in average total expenses per ton shown by this table are not to be taken as measuring precisely the general advantage of machine over pick mining. Numerous other factors also affect expenses. For example, in every instance except the Western states, the mines using the machine method exclusively, and also the

"mixed" group, show a larger average output per mine than the pick mines, which doubtless tends to reduce the expenses of production. Differences in the regularity of operation may also affect the expenses of production, while diversity of wage scales and variations, not only in the thickness and character of the veins worked, but also in numerous other details of mine operation, such as haulage, drainage, ventilation, and the preparation of coal, likewise affect costs. It is likely that the mines using machines for undercutting and shearing coal have also adopted better methods in these other details of operation, but probably a large part of the difference in average expenses per ton shown for the classes of mines in this table is due to the use or nonuse of mining machines.

Expenses and related data for mines classified according to kind of opening, selected states.—Table 54 gives, for selected states, comparative expenses, with related analytical data, for mines classified according to the kind of opening as defined in connection with Table 42. Open cuts are omitted because the number of such operations is small. Mines not reporting expenses separately, mines including the cost of coke manufacture in their expenses reported, and mines with two or more kinds of openings, are excluded because the data for such mines would have no significance. No United States totals are given because conditions other than the kind of opening differ so widely in different states as to render such totals valueless for comparative purposes.

STATISTICS OF BITUMINOUS COAL MINES CLASSIFIED ACCORDING TO KIND OF OPENING: 1909.

[Exclusive of mines with coke manufacture.]

STATE AND CHARACTER OF MINE OPENING.	Number of mines.	EXPENSES.		COAL PRODUCED.					NUMBER OF WAGE EARNERS.		PRIMARY HORSEPOWER.	
		Total.	Average per ton.	Tons (2,000 pounds).		Per cent of total tonnage.		Value at mines.	Total.	Average per mine.	Total.	Average per mine.
				Total.	Average per mine.	Mined by machines.	Sold locally.					
ILLINOIS:												
Shaft mines	509	\$48,805,106	\$1.01	48,097,159	94,493	37.5	4.4	\$50,082,859	69,523	137	157,302	309
Slope mines	56	589,531	1.14	517,281	9,237	33.5		624,524	1,001	18	1,504	27
Drift mines	22	229,619	0.91	252,868	11,494	49.2		288,988	447	20	458	21
OHIO:												
Shaft mines	67	4,580,520	1.12	4,087,321	61,005	85.6	2.3	4,477,244	7,477	112	18,579	277
Slope mines	60	2,272,146	1.07	2,117,234	35,287	78.5	2.8	2,150,501	3,945	66	8,638	144
Drift mines	403	10,044,230	0.96	10,503,436	26,063	75.5	5.3	10,383,318	16,290	40	29,281	73
PENNSYLVANIA:												
Shaft mines	55	6,093,896	0.98	6,223,447	113,154	86.1	1.7	5,965,817	7,909	144	24,554	446
Slope mines	76	6,079,058	0.95	6,430,217	84,608	59.7	1.9	6,363,768	8,148	107	20,217	266
Drift mines	758	34,285,681	0.93	36,927,127	48,717	45.3	2.8	37,704,318	50,076	68	38,842	117
WEST VIRGINIA:												
Shaft mines	29	2,411,495	1.06	2,282,226	78,697	54.0	1.3	1,901,820	3,264	113	11,501	397
Slope mines	22	1,287,900	1.10	1,175,252	58,421	46.3	2.7	1,036,587	1,412	64	4,022	133
Drift mines	382	18,668,236	0.87	21,388,002	55,090	49.5	1.3	18,434,841	29,358	77	56,793	149
WESTERN STATES:¹												
Shaft mines	36	3,255,800	1.52	2,141,432	59,484	51.6	4.2	3,206,703	3,530	98	9,067	252
Slope mines	121	11,591,043	1.37	8,462,893	69,941	14.0	2.4	13,655,663	11,630	96	44,136	365
Drift mines	77	4,039,242	1.37	2,953,841	38,362	37.0	2.6	5,023,416	4,147	54	11,664	151

¹ Includes Colorado, Montana, New Mexico, Utah, and Wyoming.

This table shows that in all the states covered, shaft mines were comparatively large operations. In Illinois drifts and slopes were small workings largely dependent on local trade, while in the other states shown they were larger, and, although usually of smaller average output than shafts, were important commercial producers.

Since drainage and haulage expenses are usually lower in drifts than in shafts and slopes, drift mines would be expected to have lower average expenses per ton than shafts and slopes in the same field. Although somewhat obscured by other factors, Table 54 shows this to be the general result. The figures of these three groups of mines in Illinois are not

strictly comparable owing to the difference in the scale of production and in methods of mining, and to the fact that in the Illinois drifts a number of proprietors and partners performed services for which no compensation was included. However, in Ohio, Pennsylvania, West Virginia, and the Western states, where the returns for these different classes are fairly comparable, the average expenses per ton for drifts were from \$0.05 to \$0.19 lower than those for shafts. In connection with these figures the remarks following Table 53 as to the significance of such averages should be borne in mind and it should be clearly understood that other factors, such as the differences in rates of wages, methods of mining and the scale of production may render the kind of mine opening a distinctly minor factor in determining the expense of production. Accordingly these figures are to be taken, not as measuring precisely the advantage of one kind of opening over another in these states, but only as indicating such advantage in a general way.

Although not shown in this table, the open cuts or strippings in Iowa, Kansas, and Missouri (taken together) reported an average expense of \$1.17 per ton, as compared with \$1.55 per ton for slopes and for shafts in these states. Many of these open cuts, supplying chiefly local trade, were worked rather primitively, but others made use of the latest mechanical equipment for such operations.

In every instance the table shows a higher average horsepower per mine for shafts and slopes than for drifts. Although the smaller average output of the drifts doubtless accounts for a part of this difference, it is also in part due probably to the relatively greater power requirements of shafts and slopes for handling coal and draining the workings.

Royalty payments, by states: 1909.—Table 55 gives for different states the number of tons of coal produced by mines operated on lands held under lease

by operators, the total amount of royalties paid by these producers, and the average royalty per ton.

This table does not cover all mines operated on land held under lease by the operators. The reports for numerous mines of this kind were combined by the operators with the reports of other mines operated on land owned by the producers, and the mines covered by such combined reports could not be included in this table. However, the figures do cover a sufficient number of mines to show the general rates of royalty prevailing in different states.

Table 55

STATE.	MINES ON LEASED LAND.		
	Total tons of coal produced (2,000 pounds).	Royalties.	
		Amount.	Average per ton.
United States.....	82,912,956	\$6,882,568	\$0.08
Alabama.....	1,639,539	112,892	0.07
Arkansas.....	530,642	74,974	0.14
Colorado.....	1,660,106	192,528	0.12
Illinois.....	5,940,057	408,269	0.07
Indiana.....	2,506,029	162,724	0.06
Iowa.....	2,365,695	182,743	0.08
Kansas.....	1,868,893	173,652	0.09
Kentucky.....	3,056,051	247,677	0.08
Missouri.....	1,065,589	87,963	0.08
Ohio.....	4,022,418	272,013	0.07
Oklahoma.....	2,906,888	260,517	0.09
Pennsylvania:			
Without coke made at mines.....	10,222,867	1,650,285	0.09
With coke made at mines.....	2,177,650	333,388	0.15
Tennessee.....	3,043,900	337,985	0.11
Virginia.....	2,761,667	191,646	0.07
West Virginia:			
Without coke made at mines.....	15,538,143	1,222,914	0.08
With coke made at mines.....	10,573,269	759,180	0.07
Wyoming.....	688,717	68,379	0.10
All other states ¹	1,324,836	142,839	0.11

¹ Includes Maryland, Michigan, Montana, New Mexico, North Dakota, Oregon, Texas, Utah, and Washington.

The average rate of royalty shown for the United States in 1909 was \$0.08 per ton. Indiana shows the lowest average, \$0.06 per ton, while the highest were reported from Arkansas, \$0.14 per ton, and Pennsylvania, for mines at which coke was made, \$0.15 per ton. The superior quality of the Arkansas semianthracite and of some of the Pennsylvania coking coal explains these higher rates.

PERSONS ENGAGED IN THE INDUSTRY.

Classification according to general occupational status, by states: 1909.—The number of persons engaged in the bituminous coal industry in 1909, classified according to general occupational status, is shown, by states, in Table 56.

Wage earners constituted 96.1 per cent of all persons reported in the industry in the United States as a whole, and the proportion did not vary greatly from

state to state. Owing to the prevalence of incorporated companies, the number of individual proprietors and firm members was relatively small. These were generally small operators, and nearly one-half of the total number were reported as performing manual labor in mines. Many of these latter were the proprietors of small local "banks" with few or no wage earners.

Table 56

STATE.	Total.	Proprietors and firm members.	Salaries officers of corporations.	Superintendents and managers.	Clerks and other salaried employees.	Wage earners, number December 15, 1909, or nearest representative day.	Proprietors and firm members performing manual labor.
All mines: United States¹....	592,677	3,739	2,315	5,566	11,268	569,789	1,713
MINES WITHOUT COKE MANUFACTURE.							
United States¹....	453,473	3,048	2,005	4,188	8,218	435,414	1,700
Alabama.....	12,327	40	109	171	386	11,721	6
Arkansas.....	5,678	38	27	70	81	5,462	20
Colorado.....	10,942	165	65	151	193	10,368	10
Illinois.....	76,761	528	243	593	952	74,445	359
Indiana.....	23,109	202	99	157	294	22,357	110
Iowa.....	18,332	298	79	137	195	17,623	225
Kansas.....	13,374	283	40	78	182	12,791	152
Kentucky.....	18,800	118	170	229	417	17,935	39
Maryland.....	6,060	28	20	82	141	5,798	13
Michigan.....	3,782	104	17	33	56	3,572	70
Missouri.....	9,991	244	32	105	84	9,526	208
North Dakota.....	954	51	5	21	20	857	19
Ohio.....	46,046	421	201	371	648	44,405	203
Oklahoma.....	9,124	35	39	69	167	8,814	22
Oregon.....	371	9	1	4	6	251	9
Pennsylvania.....	110,972	724	336	911	1,927	110,074	179
Tennessee.....	8,031	20	60	102	270	8,470	9
Texas.....	4,416	8	22	40	103	4,234	4
Virginia.....	3,197	10	20	32	68	3,061	2
Washington.....	6,035	6	15	40	117	5,857	2
West Virginia.....	38,107	57	104	475	918	36,463	12
Wyoming.....	8,287	185	24	63	156	7,839	4
All other states ²	7,810	74	34	71	146	7,491	38
MINES WITH COKE MANUFACTURE.							
United States.....	139,204	91	310	1,378	3,050	134,375	4
Alabama.....	12,305	26	210	401	11,758	.....	.....
Colorado.....	5,224	8	28	95	5,093	.....	.....
Kentucky.....	1,763	3	17	23	1,720	.....	.....
Pennsylvania.....	70,630	84	139	802	1,271	68,334	4
Connellsville dist.....	48,391	78	90	655	827	46,735	2
Tennessee.....	2,798	9	35	70	2,684	.....	.....
Virginia.....	7,221	5	16	30	180	6,981	.....
Washington.....	313	1	7	7	298	.....	.....
West Virginia.....	34,370	2	93	217	855	33,293	.....
All other states ³	4,490	15	23	148	4,304	.....	.....

¹ Includes 138 salaried officers of corporations, 174 superintendents and managers and 601 clerks employed in general offices who could not be distributed among the individual states; the states to which their services related were Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Montana, Ohio, Oklahoma, Pennsylvania, Texas, Washington, West Virginia, and Wyoming.
² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.
³ Includes Georgia, Montana, New Mexico, and Utah.

Classification of wage earners according to occupation, by states: 1909.—The following table gives for mines with and without coke manufacture in different states, the average number of miners and miners' helpers per mine, the percentage of wage earners employed outside and inside, and the percentage in various occupations. The absolute numbers appear in Table 62. For mines with coke manufacture the percentages are based on all wage earners, including those in the coke branch of the business.

The table shows, of course, a much higher percentage of wage earners employed above ground for mines combining coal mining with coke manufacture than for mines without coke ovens. In the mines without coke manufacture considerable variation appears among different states in the proportions of wage earners employed outside and inside, the percentage employed inside ranging from 91.2 per cent in Kansas to 76.8 per cent in North Dakota. These variations are due chiefly to different methods of mine operation and coal preparation, which also explain the variations in the proportions for the different occupations.

The marked variations from state to state in the percentages for mines with coke manufacture are due chiefly to the fact that in some states most of the mines in this group coked a large part of their coal and hence required relatively more coke employees, while other mines of this group made but little coke and had few employees of this kind. In the Connellsville district, a region of great coke production, miners and miners' helpers constituted but 46 per cent of the total number of employees; while in Kentucky, where coke production was relatively insignificant, this class constituted 83.5 per cent of the total for mines with coke manufacture.

Table 57

STATE.	PER CENT OF WAGE EARNERS EMPLOYED—		PER CENT OF WAGE EARNERS EMPLOYED AS—				Average number of miners and miners' helpers per mine.
	Out-side.	In-side.	Engineers, firemen, and mechanics.	Miners and miners' helpers.	Others 16 years and over.	Boys under 16 years.	
All mines: United States....	16.5	83.5	5.2	67.4	26.7	0.7	64
MINES WITHOUT COKE MANUFACTURE.							
United States.....	11.8	88.2	5.1	72.2	22.2	0.6	59
Alabama.....	14.0	85.4	6.3	69.6	23.0	1.2	49
Arkansas.....	12.8	87.2	7.2	69.6	23.0	0.2	55
Colorado.....	16.5	83.5	5.7	67.2	26.6	0.4	50
Illinois.....	9.7	90.3	5.0	71.9	23.1	0.1	85
Indiana.....	9.4	90.6	4.5	76.6	18.6	0.2	53
Iowa.....	10.1	89.9	4.3	74.2	20.8	0.7	42
Kansas.....	8.8	91.2	4.0	78.0	13.0	(1)	40
Kentucky.....	13.7	86.3	4.9	73.5	21.3	0.4	44
Maryland.....	16.8	83.2	4.3	66.1	26.7	2.8	55
Michigan.....	8.9	91.1	5.9	78.3	15.9	.....	100
Missouri.....	10.4	89.6	3.7	73.6	22.4	0.2	32
North Dakota.....	23.2	76.8	5.6	67.8	25.5	0.1	11
Ohio.....	9.2	90.8	4.4	74.7	20.5	0.4	52
Oklahoma.....	17.2	82.8	9.0	61.4	29.6	(1)	52
Oregon.....	15.0	84.1	11.2	78.1	10.8	.....	22
Pennsylvania.....	10.5	89.5	4.5	75.6	19.2	0.7	74
Tennessee.....	14.3	85.7	4.9	69.1	24.3	1.7	45
Texas.....	13.7	86.3	5.5	75.4	19.1	.....	68
Virginia.....	12.7	87.3	5.1	63.4	30.6	0.9	44
Washington.....	21.0	79.0	8.1	64.0	27.4	0.5	73
West Virginia.....	16.1	83.9	6.1	63.0	26.6	1.4	48
Wyoming.....	16.3	83.7	5.8	64.5	29.7	0.1	78
All other states ²	20.4	79.6	10.4	65.7	23.6	0.4	46
MINES WITH COKE MANUFACTURE.							
United States.....	31.9	68.1	5.7	51.9	41.4	0.9	108
Alabama.....	37.8	62.2	10.4	45.2	41.9	2.4	148
Colorado.....	33.1	66.9	7.3	52.5	40.0	0.2	178
Kentucky.....	15.6	84.4	7.3	83.5	9.2	.....	131
Pennsylvania.....	33.0	67.0	4.2	51.6	43.7	0.5	107
Connellsville dist.....	37.7	62.3	4.4	46.0	49.0	0.5	90
Tennessee.....	23.6	76.4	4.3	55.8	36.5	3.3	115
Virginia.....	39.9	60.1	8.8	43.4	46.4	1.4	74
Washington.....	35.9	64.1	9.7	28.9	61.4	.....	29
West Virginia.....	27.6	72.4	6.2	53.4	39.3	1.0	97
All other states ³	26.8	73.2	6.1	63.5	27.5	2.9	161

¹ Less than one-tenth of 1 per cent.
² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.
³ Includes Georgia, Montana, New Mexico, and Utah.

Maximum and minimum numbers of wage earners reported, by states: 1909.—The next table gives, for different states, the number of wage earners employed December 15, 1909, or the nearest representative day,¹ together with the number employed on the 15th day of the month of maximum employment, and the number employed on the 15th day of the month of minimum employment, with the per cent which the latter forms of the maximum number.

¹ See footnote to text accompanying Table 18, Part I.

Table 58

STATE.	Number of wage earners Dec. 15, 1909, or nearest representative day.	MAXIMUM MONTH.		MINIMUM MONTH.		Per cent of maximum.
		Month.	Number.	Month.	Number.	
All mines: United States.....	569,789	Dec...	560,089	May..	478,455	85.4
MINES WITHOUT COKE MANUFACTURE.						
United States.....	435,414	Dec...	424,407	May..	350,174	84.6
Alabama.....	11,721	Dec...	11,456	July...	9,684	86.3
Arkansas.....	5,462	Nov...	5,253	Apr...	2,674	50.9
Colorado.....	10,368	Dec...	10,303	July...	7,235	70.2
Illinois.....	74,445	Dec...	71,193	June...	58,799	82.6
Indiana.....	22,357	Dec...	21,316	June...	16,670	78.2
Iowa.....	17,623	Dec...	17,235	June...	13,381	77.6
Kansas.....	12,791	Dec...	12,586	May...	9,906	78.7
Kentucky.....	17,935	Dec...	17,435	May...	12,984	74.5
Maryland.....	5,798	Jan...	5,825	Aug...	5,257	90.2
Michigan.....	3,572	Jan...	3,703	May...	3,112	84.0
Missouri.....	9,526	Dec...	9,370	May...	5,616	59.9
North Dakota.....	857	Dec...	848	June...	321	37.9
Ohio.....	44,405	Nov...	43,770	May...	36,684	83.8
Oklahoma.....	8,814	Dec...	8,720	May...	6,377	73.1
Oregon.....	251	Feb...	270	July...	112	41.5
Pennsylvania.....	116,074	Dec...	113,913	Apr...	100,236	88.0
Tennessee.....	8,470	Jan...	8,559	July...	7,633	89.2
Texas.....	4,234	Oct...	4,174	Aug...	3,896	93.3
Virginia.....	3,061	July...	3,343	Feb...	2,472	73.9
Washington.....	5,857	Nov...	5,752	(Mar...)	5,376	93.5
West Virginia.....	36,463	Nov...	35,901	Apr...	31,802	88.7
Wyoming.....	7,839	Dec...	7,825	July...	6,563	83.9
All other states ¹	7,491	Dec...	7,404	May...	5,891	79.6
MINES WITH COKE MANUFACTURE.						
United States.....	134,375	Dec...	135,682	May..	119,281	87.9
Alabama.....	11,758	Dec...	13,171	June..	10,292	78.1
Colorado.....	5,093	Dec...	5,093	June..	4,313	84.7
Kentucky.....	1,720	Jan...	1,849	June..	1,595	86.3
Pennsylvania.....	68,334	Dec...	68,233	Apr...	58,584	85.9
Connellsville district.....	46,735	Dec...	46,656	Apr...	37,944	81.3
Tennessee.....	2,684	Nov...	2,717	July...	2,325	85.6
Virginia.....	6,981	Dec...	6,981	May...	5,653	81.0
Washington.....	298	May...	330	Mar...	282	85.5
West Virginia.....	33,203	Nov...	33,260	Apr...	30,995	93.2
All other states ²	4,304	Apr...	4,583	Oct...	3,996	87.2

¹ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.
² Includes Georgia, Montana, New Mexico, and Utah.

The above table shows that in the United States as a whole the maximum number of wage earners reported

in the industry on the 15th day of any month, namely, 560,089, was employed December 15, 1909, while the minimum number reported, namely, 478,455, was employed May 15, 1909. For mines without coke manufacture Washington showed the greatest regularity of employment, with the minimum number employed equaling 93.5 per cent of the maximum. Next in order in this respect was Texas (93.3 per cent), Maryland (90.2 per cent), Tennessee (89.2 per cent), and West Virginia (88.7 per cent). North Dakota shows the greatest irregularity, with the minimum number reported equaling only 37.9 per cent of the maximum. For mines with coke manufacture West Virginia showed the greatest regularity of employment, the number of wage earners in the minimum month equaling 93.2 per cent of that in the maximum month, while the greatest variation is shown for Alabama.

Hours of labor, by states.—The following table gives, by states, the number and percentage of mines operated specified numbers of hours per day or per shift, together with the percentage of the total number of wage earners (including those engaged in coke manufacture) employed by each class of mines. As explained in connection with Table 19, the latter percentages can not be taken as showing precisely the relative number of wage earners working the number of hours specified—for example, engineers, firemen, pumpmen, etc., sometimes work longer hours than the general standard for the mine, and at some mines with coke ovens the coke men work longer hours than the mine employees. However, these percentages may be taken as showing roughly the general distribution of wage earners according to hours of labor. Mines employing no wage earners are omitted from the table.

BITUMINOUS COAL MINES CLASSIFIED ACCORDING TO THE PREVAILING HOURS OF OPERATION PER DAY OR PER SHIFT, BY STATES: 1909.

Table 59

STATE.	Total number of mines.	NUMBER OF MINES OPERATED (PER DAY OR SHIFT)—						PER CENT OF TOTAL NUMBER OF MINES OPERATED—						PER CENT OF WAGE EARNERS EMPLOYED IN MINES OPERATED—					
		Less than 8 hours.	8 hours.	9 hours.	10 hours.	12 hours.	Hours not specified.	Less than 8 hours.	8 hours.	9 hours.	10 hours.	12 hours.	Hours not specified.	Less than 8 hours.	8 hours.	9 hours.	10 hours.	12 hours.	Hours not specified.
Total.....	5,978	65	3,747	810	1,270	9	77	1.1	62.7	13.5	21.2	0.2	1.3	0.4	58.5	13.8	25.4	0.9	1.1
Alabama.....	203	2	37	51	103	3	7	1.0	18.2	25.1	50.7	1.5	3.4	0.1	8.5	26.5	43.7	14.3	7.0
Arkansas.....	69		69						100.0						100.0				
Colorado.....	154		70	23	61				45.5	14.9	39.6				28.7	10.3	61.0		
Illinois.....	628	9	600	4	6		9	1.4	95.5	0.5	1.0		1.4	0.6	99.3	0.1	0.1		
Indiana.....	320	15	280	6	1				90.3	1.9	0.3		2.3	1.3	98.3	0.2	0.2		
Iowa.....	308	3	291	7	3		4	1.0	94.5	2.3	1.0		1.3	1.4	96.6	0.3	0.1		1.6
Kansas.....	199	1	167	21	2		8	0.5	83.9	10.6	1.0		4.0	1.4	96.7	1.7	0.1		(1)
Kentucky.....	310	3	93	85	127		2	1.0	30.0	27.4	41.0		0.6	1.0	32.8	24.4	41.8		
Maryland.....	70	1	5	11	53			1.4	7.1	15.7	75.7			0.1	0.3	12.7	86.9		
Michigan.....	28	1	26	1				3.6	92.9	3.6				0.3	98.5	1.3			
Missouri.....	217		192	18	2		5		88.5	8.3	0.9		2.3		97.8	1.8	0.2	0.1	
Montana.....	65	2	63					3.1	96.9					0.3	99.7				
New Mexico.....	27		3	10	14				11.1	37.0	51.9				1.0	25.8	73.2		
North Dakota.....	51	1	18	11	21			2.0	35.3	21.6	41.2			0.9	26.8	16.7	55.6		
Ohio.....	534	8	591	21	14			1.3	93.2	3.3	2.2			0.8	97.7	1.2	0.2		
Oklahoma.....	104	1	97		6			0.9	93.3		5.8			0.2	98.0		1.8		
Oregon.....	9		7	1	1				77.8	11.1	11.1				45.0	1.2	53.8		
Pennsylvania.....	1,502	14	904	310	268	2	4	0.9	60.2	20.6	17.8	0.1	0.3	0.1	52.4	23.6	23.2	0.8	(1)
Tennessee.....	140	2	17	80	34	4	3	1.4	12.1	57.1	24.3	2.9	2.1	1.4	10.1	47.7	32.6	1.6	6.8
Texas.....	47		27	2	16		2		57.4	4.3	34.0		4.3		69.5	1.5	27.5		1.6
Utah.....	22		19	1					86.4	4.5			9.1		99.8	0.2			
Virginia.....	85		3	11	68		3		3.5	12.9	80.0				0.6	5.7	89.6		4.0
Washington.....	54		51	1	1		1		94.4	1.9	1.9		1.9		98.8	0.9	0.3		
West Virginia.....	659	2	42	132	466		17	0.3	6.4	20.0	70.7			0.4	2.7	18.8	74.0		4.2
Wyoming.....	65		59	2	3				90.8	3.1	4.6				99.5	0.1	0.5		
All other states ²	8		7	1					87.5	12.5					16.5	83.5			

¹ Less than one-tenth of 1 per cent.

² Includes California, Georgia, and Idaho.

The table shows that nearly 60 per cent of all the wage earners were employed in mines operated on an 8-hour basis; nearly 14 per cent in mines operated on a 9-hour basis; and about 25 per cent in mines operated on a 10-hour basis. There was considerable variation in the prevailing hours of labor in different

states. In Illinois, Indiana, Iowa, Ohio, in some districts of Pennsylvania, and in various other fields, the time of operation was fixed at 8 hours by agreement between the operators and the mine workers. In most other states the most common working time was 9 or 10 hours per day.

POWER.

Mines operated with and without mechanical power, by states: 1909.—The following table classifies bituminous coal mines according to their operation with or without mechanical power, gives the number of mines and total output for each class and the average horsepower per mine for mines using mechanical power (including that used in coke manufacture, which is relatively unimportant). It should be remembered that the many small mines or banks producing less than 1,000 tons each—most of which use no mechanical power—were not canvassed at the census of 1909.

out the use of mechanical power in 1909; only 7 of these had coke manufacture. Mines without power are widely distributed among the states, but their relative importance is much greater in some states than in others. Such mines generally are small irregular producers depending largely on local trade. (See also Table 53.) For the United States these mines showed in 1909 an average output of less than 7,000 tons per mine as compared with about 80,000 tons for mines operated with mechanical power.

The variations in average horsepower per mine from state to state are due to differences in the kind of mine openings, the scale of production, the methods of operation, and the degree of development reached.

It will be observed that mines combining coal mining with coke manufacture show a much greater average horsepower per mine than mines without coke ovens. This is due, not so much to the need of power for the operation of the coke-yard machinery as to the fact that the mines of this group are generally much larger mines than those without coke manufacture. The average output of such mines was nearly 150,000 tons per mine, as compared with an average of less than 55,000 tons for mines without coke manufacture.

Comparative statistics of power, by states: 1909 and 1902.—The next table gives, by states, for 1909 and 1902, the total primary horsepower used in bituminous coal mines, the number and horsepower of steam engines, the number and horsepower of electric motors run by current generated by the operators themselves, together with the percentage of increase in the various items. The difference—comparatively small—between total primary power and power of steam engines is represented chiefly by the power of electric motors operated by purchased current. (See Table 62.)

In preparing this table no deduction was made on account of power used for coke manufacture at the mines, since one power plant ordinarily suffices for both mine and ovens, and since only a relatively small amount of the total power is used in coke manufacture.

The table shows a great increase in the use of mechanical power from 1902 to 1909. For the entire United States steam engines show an increase of 80.2 per cent in number and 145.5 per cent in total horsepower while the average horsepower per engine increased from 75 to 102 horsepower, or 36 per cent. Electric motors run by current generated by the mine operators increased 635 per cent in number and 400 per cent in total horsepower. This advance in the use of power was much more rapid than the increase in

Table 60

STATE.	NUMBER OF MINES.			Average horsepower per mine with power.	TONS (2,000 POUNDS) OF COAL PRODUCED BY MINES—		PER CENT OF COAL PRODUCED BY MINES—	
	Total.	With power.	Without power.		With power.	Without power.	With power.	Without power.
All mines:								
United States.....	6,013	4,584	1,429	308	366,962,460	9,903,050	97.4	2.6
MINES WITHOUT COKE MANUFACTURE.								
United States....	5,305	3,943	1,422	231	270,883,623	9,763,417	96.5	3.5
Alabama.....	107	128	30	147	6,042,774	473,148	92.7	7.3
Arkansas.....	69	60	0	175	2,330,613	37,006	98.4	1.6
Colorado.....	140	117	23	234	6,855,459	139,297	98.0	2.0
Illinois.....	631	564	67	205	50,241,053	329,459	99.3	0.7
Indiana.....	322	290	50	173	14,582,185	141,049	99.0	1.0
Iowa.....	311	219	92	87	7,391,029	334,050	95.7	4.3
Kansas.....	202	151	48	128	6,771,065	123,095	98.2	1.8
Kentucky.....	290	205	84	187	8,430,351	846,827	91.0	9.0
Maryland.....	70	49	21	201	3,808,065	193,207	95.2	4.8
Michigan.....	28	28	0	283	1,772,315	0	100.0	0
Missouri.....	220	142	78	84	3,360,805	235,880	93.4	6.6
North Dakota.....	53	10	34	107	280,191	84,345	76.0	23.1
Ohio.....	640	300	250	250	26,495,702	1,023,092	96.3	3.7
Oklahoma.....	104	92	12	280	3,067,034	55,215	98.2	1.8
Oregon.....	0	0	0	158	80,104	3,000	95.7	4.3
Pennsylvania.....	1,179	750	429	314	81,211,428	3,892,521	95.4	4.6
Tennessee.....	120	90	30	120	4,081,751	575,509	87.0	12.4
Texas.....	47	46	1	138	1,820,825	9,117	99.8	0.2
Virginia.....	44	31	13	108	1,985,579	104,555	93.0	7.0
Washington.....	51	48	3	330	3,480,800	9,352	99.7	0.3
West Virginia.....	470	413	57	102	26,209,829	957,102	96.5	3.5
Wyoming.....	65	53	12	530	6,241,800	52,730	99.2	0.8
All other states ¹	100	64	42	307	4,835,105	147,044	97.0	3.0
MINES WITH COKE MANUFACTURE.								
United States....	648	641	7	404	66,073,837	130,633	99.9	0.1
Alabama.....	36	36	0	681	7,160,630	0	100.0	0
Colorado.....	15	15	0	449	3,048,112	0	100.0	0
Kentucky.....	11	11	0	537	1,175,098	0	100.0	0
Pennsylvania.....	330	325	5	512	(2)	(2)	(2)	(2)
Connellsville district.....	238	235	3	473	(2)	(2)	(2)	(2)
Tennessee.....	13	13	0	340	1,315,673	0	100.0	0
Virginia.....	41	40	1	285	(2)	(2)	(2)	(2)
Washington.....	3	3	0	187	104,971	0	100.0	0
West Virginia.....	182	181	1	422	(2)	(2)	(2)	(2)
All other states ²	17	17	0	557	2,820,225	0	100.0	0

¹ Includes California, Georgia, Idaho, Montana, New Mexico, and Utah.
² Omitted in order to avoid disclosing operations of individual operators.
³ Includes Georgia, Montana, New Mexico, and Utah.

These figures show that 1,429 mines, or nearly one-fourth of the entire number reporting, operated with-

coal production, as shown by the fact that the total output of coal from 1902 to 1909 increased but 45 per cent, while the total primary horsepower increased nearly 150 per cent. The greatest percentages of increase in primary horsepower appeared in the following states: Kentucky, 267.1 per cent; West Virginia, 247.6 per cent; Texas, 228.1 per cent; Tennessee, 199.2 per cent; Pennsylvania, 196.1 per cent; and Alabama, 194.7 per cent. In the same period the coal output of these states increased as follows: Kentucky, 56.1 per cent; West Virginia, 109.6 per cent; Texas, 102.3

per cent; Tennessee, 44.9 per cent; Pennsylvania, 39.3 per cent; and Alabama, 32.1 per cent. The lowest percentages of increase in total horsepower were in Maryland, Missouri, Iowa, Wyoming, Arkansas, Washington, and Kansas; but even in these states the increase in total horsepower was far greater than the increase in the coal output for the same period. These figures of increase in the use of power reflect the general improvement in the scale of production and in various details of mine operation which has characterized this period.

STEAM ENGINES AND POWER AT BITUMINOUS COAL MINES, BY STATES: 1909 AND 1902.

STATE.	Cen- sus.	Total primary horse- power.	STEAM ENGINES.		ELECTRIC MOTORS RUN BY CURRENT GENERATED BY THE MINE OPERATORS.		STATE.	Cen- sus.	Total primary horse- power.	STEAM ENGINES.		ELECTRIC MOTORS RUN BY CURRENT GENERATED BY THE MINE OPERATORS.	
			Num- ber.	Horse- power.	Num- ber.	Horse- power.				Num- ber.	Horse- power.	Num- ber.	Horse- power.
United States.....	1909	1,227,401	11,738	1,199,430	9,717	329,298	North Dakota.....	1909	2,025	37	2,014	26	565
Per cent of increase.....	1902	493,148	6,513	488,478	1,322	65,927	Per cent of increase.....	1902	839	21	839	12	86
		148.9	80.2	145.5	635.0	399.5			141.4	76.2	140.0	116.7	557.0
Alabama.....	1909	54,084	503	53,334	366	11,584	Ohio.....	1909	97,422	1,003	95,545	1,211	35,501
Per cent of increase.....	1902	18,350	279	18,264	-----	-----	Per cent of increase.....	1902	45,790	597	45,517	131	5,527
		194.7	80.3	192.0	-----	-----			112.8	68.0	109.9	824.4	542.3
Arkansas.....	1909	10,508	140	10,508	20	1,746	Oklahoma.....	1909	26,316	277	25,881	31	1,700
Per cent of increase ¹	1902	6,437	153	6,432	15	940	Per cent of increase.....	1902	12,709	169	12,709	9	290
		63.2	-8.5	63.4	33.3	85.7			107.1	63.9	103.6	244.4	498.2
Colorado.....	1909	34,085	404	32,132	281	9,816	Oregon.....	1909	1,109	15	1,109	9	200
Per cent of increase.....	1902	16,449	258	16,192	83	3,276	Per cent of increase.....	1902	527	11	527	-----	-----
		107.2	56.6	98.4	238.6	199.6			110.4	36.4	110.4	-----	-----
Illinois.....	1909	166,174	1,987	165,441	298	12,165	Pennsylvania.....	1909	404,654	2,993	393,371	3,617	115,195
Per cent of increase.....	1902	78,586	1,212	78,493	102	4,322	Per cent of increase.....	1902	136,666	1,440	134,932	432	20,508
		111.5	63.9	110.8	192.2	181.5			196.1	107.8	191.5	737.3	461.7
Indiana.....	1909	45,910	577	45,739	187	7,476	Tennessee.....	1909	16,075	153	16,027	103	4,054
Per cent of increase.....	1902	22,045	393	22,026	29	2,247	Per cent of increase.....	1902	5,372	65	5,278	12	760
		108.3	46.8	107.7	544.8	232.7			199.2	135.4	203.7	758.3	433.4
Iowa.....	1909	19,118	354	18,746	32	1,375	Texas.....	1909	6,217	92	6,217	-----	-----
Per cent of increase.....	1902	11,815	298	11,673	14	296	Per cent of increase ¹	1902	1,895	53	1,895	1	40
		61.8	18.8	60.6	128.6	364.5			228.1	73.6	228.1	-100.0	-100.0
Kansas.....	1909	19,707	330	19,604	15	960	Virginia.....	1909	16,630	128	16,451	296	9,775
Per cent of increase.....	1902	11,812	220	11,795	9	270	Per cent of increase.....	1902	6,221	52	5,846	28	1,280
		66.8	50.0	66.2	66.7	255.6			167.3	146.2	181.4	957.1	663.7
Kentucky.....	1909	44,314	563	43,230	354	11,736	Washington.....	1909	16,812	133	16,300	169	5,834
Per cent of increase.....	1902	12,071	191	11,881	40	1,824	Per cent of increase.....	1902	10,146	85	9,116	77	2,133
		267.1	194.8	263.9	785.0	543.4			65.7	56.5	78.8	119.5	173.5
Maryland.....	1909	9,845	194	9,795	40	1,273	West Virginia.....	1909	155,576	1,114	149,815	2,232	81,598
Per cent of increase.....	1902	7,624	54	7,612	-----	-----	Per cent of increase.....	1902	44,757	433	44,495	217	16,894
		29.1	259.3	28.7	-----	-----			247.6	157.3	235.7	928.6	383.0
Michigan.....	1909	7,912	94	7,900	47	2,162	Wyoming.....	1909	28,071	172	27,356	79	2,461
Per cent of increase.....	1902	3,701	46	3,699	12	376	Per cent of increase.....	1902	17,283	132	17,283	24	1,079
		113.8	104.3	113.6	291.7	475.0			62.4	30.3	58.3	229.2	128.1
Missouri.....	1909	11,898	238	11,619	78	2,042	All other states ¹	1909	32,939	237	31,296	226	10,080
Per cent of increase.....	1902	8,220	190	8,184	7	300	Per cent of increase.....	1902	13,833	161	13,790	63	3,479
		44.7	25.3	42.0	1,014.3	580.7			138.1	47.2	126.9	232.4	189.7

¹ A minus sign (-) denotes decrease.² Includes California, Georgia, Idaho, Montana, New Mexico, and Utah in 1909; Alaska, California, Georgia, Idaho, Montana, New Mexico, North Carolina, and Utah in 1902.

PART IV.—GENERAL STATISTICS: 1909.

INTRODUCTION.

The principal statistics obtained by the census of coal mines in 1909 are given for the different states in the following general summary. The table gives for the United States as a whole the data obtained not only for producing, but also for nonproducing mines, that is, those which were in course of development but which did not reach the producing stage during the year 1909. These data for nonproducing mines could not be published for the several states because of the disclosure of individual operations and are not included in any other table. This general summary does not include any statistics of mines operated by state penal institutions, nor of mines for which the operators failed to furnish full reports as to capital, expenses, employees, etc. The quantity and value of the coal produced by these mines—about 2,000,000 tons—are included in Tables 2, 4, 5, and 7, of Part I.

In the states of Alabama, Colorado, Kentucky, Montana, New Mexico, Pennsylvania, Tennessee, Utah, Virginia, Washington, and West Virginia coke is manufactured at many coal mines, and the returns received from numerous operators in these states covered coal mining and coke making combined. In view of this condition of the returns, and for the other reasons given on page 181 of this report, it was deemed advisable, in general, to present combined statistics of coal mining and coke manufacture where the two enterprises were conducted in combination. Accordingly, the totals given in this summary for the above states and for the United States include both coal mining and coke making at the mines. The statistics given in the upper portion of the table for Alabama, Colorado, Kentucky, Pennsylvania, Tennessee, Virginia, Washington, and West Virginia are subdivided in the lower portion under the headings (1) "Producing bituminous coal mines without coke manufacture," and (2) "Producing bituminous coal mines with coke manufacture." Under the first heading are given the statistics of mines in these states at which coke was not made, while under the second heading are given the combined statistics of coal mining and coke making for the mines at which coke manufacture was combined with mine operation. Such subdivision of the returns for Montana, New Mexico, and Utah could not be made on account of disclosing the business of individual concerns. It is recognized that for various reasons, such as comparison with the statistics of previous years, it is desirable to present certain data for coal mining in 1909 exclusive of coke manufacture. Accordingly, in Tables 2, 3, 4, 5, 6, 7, and 11, of Part I, and Tables 33, 34, 35, 36, 42, and

51, of Part III, the figures have been adjusted to give statistics of coal mining only, by deducting the estimated capital, expenses, wage earners, etc., attributable to the manufacture of coke at the mines.

The figures given for the anthracite industry include the statistics of river dredges and washeries, as well as of mines proper. The returns for river dredges are summarized in Table 21, and separate statistics for mines and for washeries are given in Table 28, Part II.

Stated briefly, then, the United States total for all mines, given in this general summary, is the total for all anthracite and bituminous enterprises, both producing and nonproducing, which rendered complete reports of their operations; the figures for anthracite coal cover river dredges and washeries, as well as mines proper, while those for bituminous include both coal mining and coke manufacture at the mines.

In the preliminary definitions and explanations, given on pages 181 and 182 of this report, the limitations of the census data are stated, the terms used are defined, and the methods of presenting the figures are explained in detail. These definitions and explanations relate to the scope of the census of coal mines, the period covered by the returns, the close connection of coal mining with coke manufacture at many mines, the treatment of subsidiary companies in determining the number of operators, the acreage of coal land controlled by coal mining concerns, the amount of capital invested, the expenses reported, the use of long and short tons in the statistics, the value of products, the number of persons engaged in the industry, and the figures for primary horsepower. Particular attention is directed to the remarks concerning the expenses reported. Those remarks consider mine development and depreciation, point out the limitations of the data obtained, give a full account of the method of dealing with administrative expenses of general offices when these were reported in toto by companies operating bituminous mines in more than one state, define the "gross" and "net" expenses shown for the anthracite industry, and give detailed explanations pertaining to the figures presented for wages, cost of supplies, and miscellaneous expenses. Attention is also directed to the remarks under "Value of products," referring not only to the amounts given for mines combining coal mining with coke manufacture, but also to the possible difference between the reported and the market value of products. All the definitions and explanations given on pages 181 and 182 must be taken into account in considering the statistics presented in this general summary.

MINES AND QUARRIES.

COAL MINES—GENERAL STATISTICS, BY STATES: 1909.

Table 62 (pp. 228-233).	STATE.	Number of mines.	LAND CONTROLLED (ACRES).						Capital.		
			All land.			Coal land.					
			Total.	Owned.	Held under lease.	Total.	Owned.	Held under lease.		Timber land.	Other land.
1	UNITED STATES—All mines...	6,497	18,272,962	6,006,938	2,277,713	16,932,730	4,782,470	2,161,235	437,956	1,902,276	\$1,318,550,554
2	ANTHRACITE										
3	All mines.....	6,429	14,655,647	316,868	160,468	12,744,311	183,144	102,701	71,851	118,926	246,950,806
4	Nonproducing mines.....	6	513	1	512	511	.....	511	.....	2	22,728
5	Producing mines.....	6,423	14,655,134	316,867	159,956	12,743,809	183,144	102,190	71,851	118,924	246,928,078
6	Pennsylvania.....	6,420	14,644,274	316,767	159,196	12,733,499	183,044	101,430	71,851	118,924	246,713,318
6	Colorado and New Mexico.....	3	860	100	760	860	100	760	.....	.....	214,700
7	BITUMINOUS										
8	All mines.....	6,068	7,807,315	5,690,070	2,117,245	6,657,860	4,599,326	2,058,534	366,105	783,350	\$1,071,599,748
9	Nonproducing mines.....	55	89,700	54,827	34,873	84,674	49,914	34,760	2,740	2,286	9,402,665
9	Producing mines:										
9	United States.....	6,013	7,717,615	5,635,243	2,082,372	6,573,186	4,549,412	2,023,774	363,365	781,064	\$1,062,197,083
10	Alabama.....	203	776,244	701,790	74,454	599,259	525,355	73,904	126,790	50,195	59,602,396
11	Arkansas.....	69	54,686	24,137	30,549	54,359	23,885	30,474	130	197	2,256,942
12	Colorado.....	155	113,636	84,915	28,721	92,942	65,101	27,841	400	20,294	30,534,933
13	Illinois.....	631	585,366	424,739	160,627	552,396	395,965	156,431	3,255	29,716	75,287,667
14	Indiana.....	322	158,576	117,619	37,957	140,244	103,910	36,334	3,436	11,896	35,937,961
15	Iowa.....	311	77,796	26,771	51,025	70,192	20,152	50,040	472	7,132	7,212,033
16	Kansas.....	202	83,869	56,205	27,664	80,459	53,340	27,119	.....	3,410	6,262,203
17	Kentucky.....	310	399,846	280,653	119,793	364,669	247,006	117,663	16,538	18,639	24,700,533
18	Maryland.....	70	92,814	88,129	4,685	68,220	63,596	4,624	8,345	16,249	22,871,136
19	Michigan.....	28	25,661	6,222	19,439	23,135	3,696	19,439	.....	2,522	6,865,156
20	Missouri.....	220	119,822	74,519	45,303	116,108	70,805	45,303	160	3,554	5,650,407
21	Montana.....	65	54,335	44,098	10,237	49,825	39,588	10,237	1,880	2,630	8,546,343
22	New Mexico.....	28	294,318	240,124	54,194	115,549	64,929	50,620	.....	178,769	23,558,127
23	North Dakota.....	53	14,695	12,300	2,395	10,356	7,971	2,385	.....	4,339	1,023,278
24	Ohio.....	640	432,204	283,439	148,765	406,336	260,423	145,913	5,767	20,101	64,131,141
25	Oklahoma.....	104	82,504	910	81,694	75,744	910	74,834	6,720	40	5,672,886
26	Oregon.....	9	6,630	4,960	1,670	3,122	1,452	1,670	2,910	598	642,410
27	Pennsylvania.....	1,509	1,965,568	1,604,753	360,815	1,073,537	1,321,981	351,556	38,573	253,458	417,598,630
28	Tennessee.....	142	661,507	548,247	113,260	458,924	353,954	104,970	128,540	74,043	20,329,066
29	Texas.....	47	130,063	108,132	21,931	125,774	104,513	21,261	80	4,209	5,894,898
30	Utah.....	22	27,541	27,341	200	17,341	17,221	120	4,600	5,600	5,856,501
31	Virginia.....	85	170,479	86,282	84,197	169,296	85,217	84,079	710	473	42,337,222
32	Washington.....	54	98,167	76,271	21,896	88,611	67,635	20,976	620	8,936	13,799,480
33	West Virginia.....	661	1,176,860	611,023	565,837	1,134,485	583,263	551,222	13,435	28,940	148,802,294
34	Wyoming.....	65	70,908	55,744	15,164	64,783	50,024	14,759	.....	6,125	7,609,229
35	All other states ¹	8	46,520	46,520	.....	17,520	17,520	.....	.....	29,000	1,014,823
	Producing bituminous mines without coke manufacture										
36	Alabama.....	167	241,651	169,597	72,054	231,765	160,261	71,504	1,790	8,096	19,632,647
37	Colorado.....	140	83,081	58,380	24,701	65,047	41,226	23,821	400	17,634	18,046,592
38	Kentucky.....	299	348,861	229,068	119,793	332,084	214,421	117,663	338	15,939	22,807,715
39	Pennsylvania.....	1,179	1,568,407	1,273,202	295,205	1,338,003	1,050,246	287,757	33,761	196,643	227,746,738
40	Tennessee.....	129	367,064	261,804	105,260	329,656	232,680	96,970	26,540	10,874	9,830,983
41	Virginia.....	44	36,263	12,418	23,845	35,190	11,353	23,837	600	473	21,846,844
42	Washington.....	51	92,269	74,931	17,338	83,313	66,295	17,018	620	8,336	13,040,936
43	West Virginia.....	479	596,979	236,585	360,394	565,457	215,401	350,056	11,353	20,169	77,677,068
	Producing bituminous mines with coke manufacture										
44	Alabama.....	36	534,593	532,193	2,400	367,494	365,094	2,400	125,000	42,099	39,969,749
45	Colorado.....	15	30,555	26,585	4,020	27,895	23,875	4,020	.....	2,660	12,488,341
46	Kentucky.....	11	50,985	50,985	.....	32,585	32,585	.....	15,700	2,700	1,892,818
47	Pennsylvania.....	330	397,161	331,551	65,610	335,534	271,735	63,799	4,812	56,815	189,851,892
48	Tennessee.....	13	294,443	286,443	8,000	129,274	121,274	8,000	102,000	63,169	10,498,083
49	Virginia.....	41	134,216	73,864	60,352	134,106	73,864	60,242	110	.....	20,490,378
50	Washington.....	3	5,898	1,340	4,558	5,298	1,340	3,958	.....	600	758,544
51	West Virginia.....	182	579,881	374,438	205,443	569,028	367,862	201,166	2,082	8,771	71,125,226

¹ Exclusive of duplications due to the fact that anthracite operators reported 11,689 acres, both in acres owned and in acres held under lease, of which 10,975 acres were coal land and 714 acres were other land. See page 181, "Coal land controlled."

² The United States total includes \$18,229,388 not distributed by states, due to the fact that several operators with bituminous mines in more than one state reported capital as a whole without segregating the investment for each state. The states affected are Arkansas, Illinois, Indiana, Iowa, Kansas, Missouri, Montana, Oklahoma, Pennsylvania, Washington, West Virginia, and Wyoming.

³ See Notes 5 and 7.

⁴ The statistics of salaries for the United States include \$87,857, salaries of officials, and \$625,499, salaries of clerks, etc., employed in general offices; these amounts are not included in the statistics of salaries for the individual states, but are included under sundries in the expenses of the several states. Similarly for the United States the statistics of taxes include \$172,937 and the statistics of contract work include \$57,174, reported by general offices, which have been included for the several states, not under the heads of taxes and contract work, respectively, but under sundries. The states affected by these items of salaries, taxes, and contract work are the following: Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Ohio, Oklahoma, Pennsylvania, Texas, Washington, and West Virginia. See page 182, "Administrative expenses of general offices."

COAL MINES—GENERAL STATISTICS, BY STATES: 1909.

EXPENSES OF OPERATION AND DEVELOPMENT.													
Aggregate.	Services.				Supplies.			Royalties.	Miscellaneous.				
	Total.	Salaries.		Wages.	Total.	Fuel and rent of power.	Other.		Total.	Taxes.	Contract work.	Rent of offices and sundries.	
		Salaried officers of corporations, superintendents, and managers.	Clerks and other subordinate salaried employees.										
1	\$531,351,592	\$413,363,645	\$15,086,587	\$11,360,445	\$386,916,613	\$74,934,946	\$10,707,873	\$64,227,073	\$20,067,727	\$27,877,543	\$7,178,898	\$4,126,847	\$16,571,798
2	134,695,699	97,084,561	2,324,374	2,269,090	92,491,097	26,759,485	3,195,789	23,563,696	7,981,639	7,762,283	2,685,633	1,702,865	3,373,785
3	724,145	183,598	7,151	3,009	173,438	61,519	2,563	58,956	900	17,484	3,756	1,351	12,377
4	134,451,554	96,900,963	2,317,223	2,266,081	92,317,659	26,697,966	3,193,226	23,504,740	7,950,739	7,744,799	2,681,877	1,701,514	3,361,408
5	134,245,600	96,742,395	2,311,003	2,261,486	92,169,906	26,662,088	3,189,279	23,472,809	7,969,785	7,736,176	2,677,853	1,701,514	3,356,909
6	7205,954	158,568	6,220	4,595	147,753	35,878	3,947	31,931	10,954	8,623	4,024	-----	4,599
7	396,655,893	316,278,084	12,762,213	9,091,355	294,425,516	48,175,461	7,512,084	40,663,377	12,086,088	20,115,260	4,493,265	2,423,982	13,198,013
8	748,807	281,701	37,795	14,878	229,028	166,814	2,137	164,677	3,600	290,752	11,449	214,310	70,993
9	395,907,026	315,997,383	12,724,418	9,076,477	294,196,488	48,008,647	7,509,947	40,498,700	12,082,488	19,818,508	4,481,816	2,209,672	13,127,020
10	16,868,435	12,270,925	687,371	580,841	11,022,713	2,348,650	585,984	1,762,666	224,829	2,024,031	139,448	751,384	1,133,199
11	3,630,526	2,924,194	109,071	56,996	2,758,127	362,217	89,961	272,231	103,896	190,224	40,250	26,511	143,403
12	14,279,495	11,096,066	413,970	298,390	10,883,766	2,167,107	303,960	1,863,187	430,136	556,126	133,126	49,139	443,801
13	51,097,504	44,074,914	1,324,355	759,313	41,991,246	4,944,371	1,005,253	3,939,118	744,860	1,933,359	171,582	51,480	1,710,297
14	14,906,831	12,877,655	381,944	222,197	12,273,544	1,198,974	214,621	984,353	240,494	589,708	53,290	10,674	495,804
15	12,816,076	10,851,841	280,146	188,023	10,383,672	1,330,436	125,214	1,205,222	322,673	311,126	38,454	38,266	234,876
16	9,778,297	8,393,193	154,201	132,232	8,106,670	609,521	100,975	508,546	266,545	509,038	18,394	49,793	440,851
17	10,171,949	7,943,284	523,880	266,042	7,153,362	1,198,120	173,453	1,024,667	325,239	705,306	67,946	86,600	530,700
18	3,941,359	2,935,410	111,261	110,855	2,713,294	408,227	35,719	372,508	95,767	501,965	79,720	1,053	420,586
19	2,985,802	2,392,412	87,445	37,695	2,267,272	325,517	30,266	295,251	61,555	206,318	14,439	2,203	189,676
20	5,715,727	4,905,202	148,745	60,485	4,695,972	397,068	75,688	321,380	160,182	253,275	6,911	23,903	222,461
21	4,584,674	3,695,048	117,661	97,493	3,479,894	665,804	125,967	539,837	96,151	127,671	33,718	415	93,538
22	3,275,025	2,704,421	97,588	147,436	2,459,397	358,489	29,850	328,339	6,712	205,403	27,071	7,521	170,811
23	523,410	417,290	32,762	27,317	362,223	75,187	12,835	62,352	10,647	20,256	4,265	1,325	14,696
24	27,153,497	22,289,075	911,606	455,430	20,922,039	2,681,281	388,466	2,292,815	892,398	1,290,743	234,021	52,854	1,003,868
25	6,535,441	5,105,722	187,087	115,243	4,803,392	912,614	166,630	745,984	269,651	247,454	36,589	22,266	188,599
26	288,246	184,559	6,050	5,664	152,845	62,590	43,067	19,528	4,338	10,659	2,642	2,000	6,017
27	128,161,063	99,861,056	3,517,425	2,647,494	93,696,137	17,317,225	2,302,679	15,014,546	3,996,568	6,986,214	2,344,575	787,163	3,884,476
28	6,859,204	5,400,104	329,796	232,105	4,838,203	713,984	100,792	613,192	404,429	340,687	48,704	6,036	255,947
29	2,812,079	2,308,146	115,072	62,031	2,126,043	334,807	41,603	293,204	36,247	137,819	12,340	21,214	104,265
30	3,217,579	2,524,073	118,347	77,426	2,328,300	608,920	110,661	493,259	2,169	57,417	55,183	2,500	29,734
31	5,286,920	3,587,503	202,349	180,385	3,204,769	789,082	230,282	558,800	251,524	658,511	117,232	114,453	426,826
32	6,533,164	5,286,890	132,530	113,910	5,040,450	802,697	195,163	667,534	103,330	280,247	85,484	10,162	184,601
33	45,469,759	34,000,488	1,596,534	1,408,251	30,995,703	5,845,054	707,151	5,138,903	2,870,850	2,752,467	485,161	62,279	2,205,027
34	8,146,526	6,219,817	230,615	180,954	5,808,248	1,435,465	307,831	1,127,634	104,908	386,336	55,969	10,644	319,723
35	318,438	249,739	8,700	6,830	234,209	59,225	5,836	53,389	-----	9,474	2,389	-----	7,085
36	7,806,117	5,966,251	415,349	264,560	5,286,342	1,140,858	255,130	885,728	210,008	489,000	58,959	93,439	336,602
37	9,394,037	7,364,973	342,409	190,757	6,831,807	1,234,149	197,334	1,036,815	332,219	462,696	65,889	9,139	487,608
38	9,140,144	7,144,573	479,019	242,562	6,422,992	954,049	136,842	847,207	325,239	686,283	57,083	86,660	542,540
39	79,351,941	62,311,534	1,972,404	1,683,853	58,655,277	10,057,493	1,517,684	8,539,809	3,209,038	3,773,876	1,301,289	393,320	2,079,267
40	5,185,588	4,055,674	260,401	183,805	3,611,468	500,909	69,897	431,012	399,649	229,356	35,285	6,036	188,035
41	1,628,098	1,194,785	82,481	41,876	1,070,428	125,973	30,664	95,309	99,364	307,974	55,787	114,453	37,734
42	6,205,090	4,017,095	115,160	107,823	4,794,112	824,851	190,205	634,646	90,993	274,151	81,339	10,162	419,650
43	24,327,393	18,194,203	1,009,940	700,682	16,483,581	3,200,654	379,157	2,821,497	1,575,439	1,357,067	213,655	58,123	1,085,289
44	9,062,318	6,304,674	272,022	296,281	5,736,371	1,207,792	330,854	876,938	14,821	1,535,031	80,489	657,945	796,597
45	4,885,453	3,731,093	71,561	107,573	3,551,959	933,013	106,646	826,372	97,917	123,430	67,237	-----	56,163
46	1,031,805	798,711	44,861	23,480	730,370	214,071	36,611	177,460	-----	19,623	10,863	-----	8,160
47	48,809,122	37,549,522	1,545,021	963,641	35,040,860	7,259,732	784,995	6,474,737	787,530	3,212,338	1,043,286	393,843	1,775,209
48	1,673,616	1,344,420	69,395	48,300	1,226,735	213,075	30,895	182,180	4,780	111,331	13,419	-----	97,912
49	3,658,824	2,392,718	119,868	138,509	2,134,341	663,100	199,618	463,491	152,490	450,537	61,445	-----	389,092
50	328,074	2,260,705	17,370	6,087	2,246,338	37,846	4,958	32,888	12,337	8,096	4,145	-----	3,851
51	21,142,396	15,806,285	586,594	707,569	14,512,122	2,645,300	327,994	2,317,306	1,285,411	1,395,400	271,566	4,156	1,119,738

* The totals for the United States include \$433,801, cost of coal purchased for coking at mines, of which \$128,176 are included in the statistics for Alabama, \$261,475 in those for Colorado, \$27,804 in those for Pennsylvania, and \$16,346 in those for Tennessee.

† The total number of producing anthracite mines given for Pennsylvania includes 63 river dredges and 52 washeries.

‡ Gross expenses for all anthracite mines were \$139,587,968, of which \$263,561 were for nonproducing mines and \$139,324,467 for producing mines; of this latter amount, \$139,110,444 relates to Pennsylvania and \$214,023 to Colorado and New Mexico. Deductions from the wages shown in the foregoing totals were made on account of explosives, oil, and blacksmithing, as follows: For all anthracite mines, \$4,892,269, of which \$19,356 were for nonproducing mines and \$4,872,913 were for producing mines; of this latter amount the deductions for Pennsylvania were \$4,864,844, and for Colorado and New Mexico \$8,069.

§ Includes California, Georgia, and Idaho.

MINES AND QUARRIES.

COAL MINES—GENERAL STATISTICS, BY STATES: 1909.

Table G2—Continued.		PRODUCTS.							
		Number of tons produced (2,000 pounds).							
		Coal.						Coke made at mines.	
STATE.	Total.	Loaded at mines for shipment, or used in other departments by producers.	Sold locally.	Used at mines for steam and heat.	Made into coke at mines.	Mined by machines.			
						Quantity.	Per cent.		
1	UNITED STATES—All mines.....	457,833,640	1 378,254,214	11,514,926	17,991,897	2 50,072,603			32,450,432
	ANTHRACITE								
2	All mines.....	80,968,130	70,246,074	2,105,772	8,616,284				
3	Nonproducing mines.....								
4	Producing mines.....	80,968,130	70,246,074	2,105,772	8,616,284				
5	Pennsylvania.....	80,881,106	70,161,446	2,105,772	8,613,858				
6	Colorado and New Mexico.....	87,024	84,628		2,396				
	BITUMINOUS								
7	All mines.....	376,865,510	1 308,008,140	9,409,154	9,375,613	2 50,072,603	144,775,410	38.4	32,450,432
8	Nonproducing mines.....								
9	Producing mines:								
	United States.....	376,865,510	1 308,008,140	9,409,154	9,375,613	2 50,072,603	144,775,410	38.4	32,450,432
10	Alabama.....	13,676,561	8,236,595	139,375	536,495	2 4,764,096	2,295,500	16.8	2,883,774
11	Arkansas.....	2,373,619	2,269,395	13,810	90,414		4,444	0.2	
12	Colorado.....	10,642,868	8,407,618	249,959	328,572	2 1,656,719	2,046,645	19.2	1,061,888
13	Illinois.....	50,570,503	46,602,733	2,508,463	1,459,307		18,140,591	35.9	
14	Indiana.....	14,723,231	13,484,475	808,871	434,885		7,450,091	50.6	
15	Iowa.....	7,725,679	6,834,088	679,579	212,012		8,414	0.1	
16	Kansas.....	6,895,660	6,575,258	174,067	146,335		54,976	0.8	
17	Kentucky.....	10,561,276	9,812,859	401,182	261,926	85,309	6,494,960	61.5	38,503
18	Maryland.....	4,001,272	3,915,794	36,493	48,985		117,568	2.9	
19	Michigan.....	1,772,315	1,611,182	91,057	70,076		628,211	35.4	
20	Missouri.....	3,596,091	3,237,360	293,160	66,171		798,878	22.2	
21	Montana.....	2,543,383	2 2,338,464	91,849	113,070	(*)	854,771	33.6	(*)
22	New Mexico.....	2,774,912	2 2,712,022	30,492	32,398	(*)	1,089,119	39.2	(*)
23	North Dakota.....	364,536	242,628	109,356	12,552		164,365	45.1	
24	Ohio.....	27,518,764	26,166,148	747,807	604,809		22,112,063	80.4	
25	Oklahoma.....	3,113,149	2,879,113	44,935	189,101		50,811	1.6	
26	Oregon.....	83,704	44,236	22,128	17,340		22,000	26.3	
27	Pennsylvania.....	137,304,760	98,472,107	2,097,098	2,959,862	2 33,775,693	57,574,954	41.9	22,499,706
28	Tennessee.....	5,972,930	5,399,092	79,568	98,978	2 395,292	1,024,398	17.2	213,759
29	Texas.....	1,824,742	1,770,504	6,330	47,908		17,230	0.9	
30	Utah.....	2,259,789	2 2,136,533	22,637	100,619	(*)			(*)
31	Virginia.....	4,949,341	2,802,693	50,232	183,433	1,912,983	1,439,811	29.1	1,264,213
32	Washington.....	3,601,213	3,331,087	56,828	143,590	69,708	48,690	1.4	42,980
33	West Virginia.....	51,495,666	43,817,088	582,420	927,729	6,168,429	20,945,819	40.7	3,809,028
34	Wyoming.....	6,294,596	5,941,776	68,324	284,496		1,391,101	22.1	
35	All other states ¹	224,350	211,666	8,134	4,550	2 1,244,374			9 636,651
	Producing bituminous mines without coke manufacture								
36	Alabama.....	6,515,922	6,142,266	116,763	256,893		1,151,808	17.7	
37	Colorado.....	6,994,756	6,536,517	235,697	222,542		2,046,645	29.3	
38	Kentucky.....	9,386,178	8,809,170	378,949	198,059		5,512,263	58.7	
39	Pennsylvania.....	85,103,949	81,604,471	1,690,930	1,808,548		46,873,329	55.1	
40	Tennessee.....	4,657,257	4,531,058	58,173	68,026		944,599	20.3	
41	Virginia.....	1,490,135	1,437,249	21,707	31,179		616,076	41.3	
42	Washington.....	3,496,242	3,300,078	56,236	139,928		48,690	1.4	
43	West Virginia.....	27,166,931	26,320,796	375,591	470,544		13,871,026	51.1	
	Producing bituminous mines with coke manufacture								
44	Alabama.....	7,160,639	2,094,329	22,612	279,602	2 4,764,096	1,143,642	16.0	2,883,774
45	Colorado.....	3,648,112	1,871,101	14,262	106,030	2 1,656,719			1,061,888
46	Kentucky.....	1,175,093	1,003,689	22,233	63,867	85,309	982,697	83.6	38,503
47	Pennsylvania.....	52,200,811	16,867,636	406,168	1,151,314	2 33,775,693	10,701,625	20.5	22,499,706
48	Tennessee.....	1,315,673	868,034	21,395	30,952	2 395,292	79,799	6.1	213,759
49	Virginia.....	3,459,206	1,365,444	28,525	152,254	1,912,983	823,735	23.8	1,264,213
50	Washington.....	104,971	31,009	592	3,662	69,708			42,980
51	West Virginia.....	24,328,735	17,496,292	206,829	457,185	6,168,429	7,074,793	29.1	3,809,028

¹ Exclusive of 1,244,374 tons of coal made into coke at mines, which are included in this column in the statistics for Georgia, Montana, New Mexico, and Utah, to avoid disclosing individual operations.

² The total for the United States excludes 418,225 tons of coal purchased for coking at mines, of which 102,487 tons are excluded from the total for Alabama, 262,789 tons from the total for Colorado, 36,684 tons from the total for Pennsylvania, and 16,265 from the total for Tennessee.

³ Exclusive of \$2,328,122, value of coke made at mines, which is included in this column in the statistics for Georgia, Montana, New Mexico, and Utah, to avoid disclosing individual operations.

⁴ The total for the United States includes 1 water wheel of 4 horsepower in Kansas, 4 water wheels of 320 horsepower and 2 water motors of 14 horsepower in Washington, and 2 water wheels of 10 horsepower in West Virginia.

COAL MINES—GENERAL STATISTICS, BY STATES: 1909—Continued.

	PRODUCTS—continued.					POWER.										COKE OVENS AT MINES.	
	Value at mines.				Valuation of coal made into coke at mines (not charged to expense nor added to value of product).	Primary.						Secondary.		Number of mining machines.	Built.	Building.	
	Total.	Coal (exclusive of coal made into coke).	Coke made at mines.	Other products.		Total horsepower.	Steam engines.		Gas engines.		Electric motors operated by purchased current.		Electric motors run by current generated by the mine operators.				
							Number.	Horsepower.	Number.	Horsepower.	Number.	Horsepower.	Number.				Horsepower.
1	\$577,142,935	\$509,232,811	\$67,483,162	\$426,962	\$41,281,055	*1,908,708	19,373	1,878,555	374	3,101	872	26,704	10,872	375,626	13,585	86,379	1,403
2	149,180,471	149,180,471				678,698	7,801	676,516	25	772	32	1,410	1,152	46,088			
3	149,180,471	149,180,471				1,945	21	1,945									
4	148,957,894	148,957,894				676,753	7,580	674,571	25	772	32	1,410	1,152	46,088			
5	222,577	222,577				676,128	7,567	673,946	25	772	32	1,410	1,152	46,088			
6						625	13	625									
7	427,962,464	\$380,052,340	67,483,162	426,962	41,281,055	*1,230,010	11,772	1,202,039	349	2,329	840	25,294	9,720	329,538	13,585	86,379	1,403
8						2,609	34	2,609					3	249			
9	427,962,464	\$380,052,340	67,483,162	426,962	41,281,055	*1,227,401	11,738	1,199,430	349	2,329	840	25,294	9,717	329,298	13,585	86,379	1,403
10	18,459,433	10,777,476	7,670,711	11,246	5,396,802	54,084	503	53,334	10	87	15	663	366	11,554	300	8,607	
11	3,508,590	3,508,490		100	10,508	140	10,508						20	1,746	12		
12	15,782,197	12,483,536	3,296,500	2,071	1,620,732	34,085	404	32,132	2	7	52	1,946	281	9,816	259	2,261	
13	53,030,545	52,999,918		30,627	166,174	1,987	165,441	71	484	16	249	298	12,165	1,372	24		
14	15,018,123	14,984,616		33,507	45,910	577	45,739	19	91	4	80	187	7,476	672	10		
15	12,682,106	12,679,225		2,881		10,118	354	18,746	76	329	2	43	32	1,375	7		
16	9,835,614	9,835,567		47		419,707	330	19,604	12	56	4	43	15	960	16		
17	10,003,481	9,921,441	80,633	1,407	17,637	44,314	563	43,230	10	49	34	1,035	354	11,736	907	374	
18	4,483,137	4,445,041		38,096		9,845	194	9,795	2	35	3	15	40	1,273	39		
19	3,175,102	3,175,102				7,912	94	7,900	2	12			47	2,162	115		
20	5,881,034	5,879,972		1,062		11,898	238	11,619	30	144	6	135	78	2,042	103		
21	5,117,444	5,117,444	(e)		(e)	16,173	109	16,068	1	3	6	104	86	2,801	82		
22	3,984,660	3,974,250	(e)	10,410	(e)	9,387	53	7,866	2	21	44	1,500	72	4,063	8	960	
23	563,212	563,212				2,025	37	2,014	2	11			26	565	20		
24	27,353,663	27,274,403		79,260		97,422	1,003	95,545	26	159	91	1,718	1,211	35,501	1,537	4	
25	6,185,078	6,184,420		658		26,316	277	25,881			9	435	31	1,700	34		
26	225,026	225,026				1,109	15	1,109					9	200	27		
27	147,466,417	103,315,679	43,937,062	213,676	26,197,001	404,654	2,993	393,371	50	541	308	10,742	3,617	115,195	5,725	49,510	1,227
28	6,688,454	6,102,769	585,685		445,746	16,075	153	16,027	9	48			103	4,054	191	1,457	
29	3,136,004	3,134,720		1,284		6,217	92	6,217							11		
30	4,111,987	4,111,987			(e)	6,929	60	6,914			1	15	68	3,211	7	650	
31	4,988,328	2,776,965	2,211,353		1,559,220	16,630	128	16,451	2	9	9	170	296	9,775	112	5,130	50
32	9,226,793	8,086,180	240,604		153,518	416,812	133	16,300	1	7	6	171	169	5,834	18	185	
33	46,929,592	39,797,027	7,132,392	173	4,546,867	415,576	1,114	149,815	20	146	222	5,605	2,232	81,598	1,890	15,968	126
34	9,721,134	9,721,134				28,071	172	27,356	2	90	8	625	79	2,461	121		
35	405,310	7,404,853	2,328,122	457	1,343,532	450	15	450								201	
36	8,125,811	8,114,565		11,246		18,776	226	18,719	5	57			50	1,999	182		
37	10,208,042	10,208,042				27,350	348	25,477	2	7	50	1,866	185	5,721	258		
38	9,006,946	9,005,539		1,407		38,409	503	37,325	10	49	34	1,035	330	10,016	733		
39	85,773,883	85,749,052		24,831		233,250	1,688	232,459	45	501	159	5,290	2,001	77,810	4,471		
40	5,130,791	5,130,791				11,580	111	11,537	7	43			78	3,314	167		
41	1,379,924	1,379,924				5,214	43	5,035	2	9	9	170	46	1,145	57		
42	8,915,528	8,915,528				416,262	127	16,100	1	7	5	96	158	5,354	15		
43	23,330,421	23,330,248		173		479,233	671	76,610	16	124	110	2,494	1,022	32,535	1,387		
44	10,333,622	2,662,911	7,670,711		5,396,802	35,308	277	34,615	5	30	15	663	316	9,585	118	8,607	
45	5,574,155	2,275,494	3,296,500	2,071	1,620,732	6,735	56	6,655			2	80	96	4,095	1	2,261	
46	996,535	915,962	80,633		17,637	5,905	60	5,905					24	1,720	124	374	
47	61,692,534	17,566,627	43,937,062	188,845	26,197,001	166,404	1,305	160,912	5	40	149	5,452	1,018	37,385	1,254	49,510	1,227
48	1,557,663	971,978	585,685		445,746	4,495	42	4,490	2	5			25	740	24	1,457	
49	3,608,404	1,397,041	2,211,363		1,559,220	11,416	85	11,416					250	8,630	55	5,130	50
50	311,205	70,661	240,604		153,518	4,560	6	200					11	280		185	
51	23,599,171	16,466,779	7,132,392		4,546,867	76,338	543	73,205	4	22	112	3,111	1,210	49,673	503	15,966	126

* Includes coal made into coke at mines, to avoid disclosing individual operations.
 † See "All other states."
 ‡ Includes value of coke made at mines, to avoid disclosing individual operations.
 § Includes California, Georgia, and Idaho.
 ¶ Includes Montana, New Mexico, and Utah, to avoid disclosing individual operations.

MINES AND QUARRIES.

COAL MINES—GENERAL STATISTICS, BY STATES: 1909—Continued.

Table 62—Continued.		PERSONS ENGAGED IN INDUSTRY.														
		STATE.	Aggregate.	Proprietors and officials.				Clerks and other subordinate salaried employees.			Wage earners, December 15, or nearest representative day.					
				Total.	Proprietors and firm members.		Salaried officers of corporations.	Superintendents and managers.	Total.	Male.	Female.	Total.	Engineers, firemen, and mechanics.			Miners and miners' helpers (all inside).
					Total.	Performing manual labor.							Total.	Outside.	Inside.	
1	UNITED STATES—All mines...	771,773	12,991	3,936	1,790	2,505	6,550	14,483	13,373	1,110	744,299	42,191	34,230	7,961	467,685	
	ANTHRACITE.															
2	All mines	178,331	1,321	188	72	171	962	3,185	3,127	58	173,825	12,287	9,767	2,520	83,327	
3	Nonproducing mines	327	6				6				321	15	15		181	
4	Producing mines	178,004	1,315	188	72	171	956	3,185	3,127	58	173,504	12,272	9,752	2,520	83,156	
5	Pennsylvania	177,753	1,310	188	72	171	951	3,180	3,122	58	173,263	12,248	9,728	2,520	83,030	
6	Colorado and New Mexico	251	5				5	5	5		241	24	24		126	
	BITUMINOUS.															
7	All mines	593,442	11,670	3,748	1,718	2,334	5,588	11,298	10,246	1,052	570,474	29,904	24,463	5,441	384,348	
8	Nonproducing mines	765	50	9	5	19	22	30	30		685	78	74	4	325	
9	Producing mines:															
	United States	592,677	11,620	3,739	1,713	2,315	5,566	11,268	10,216	1,052	569,789	29,826	24,389	5,437	384,023	
10	Alabama	24,822	556	40	6	135	381	787	746	41	23,479	1,959	1,587	372	13,478	
11	Arkansas	5,678	135	38	20	27	70	81	76	5	5,462	392	350	42	3,800	
12	Colorado	16,166	417	165	10	73	179	288	256	32	15,461	966	770	196	9,647	
13	Illinois	76,761	1,364	528	359	243	593	952	847	105	74,445	3,699	2,974	725	53,503	
14	Indiana	23,109	458	202	110	99	157	294	246	48	22,357	1,017	933	84	17,129	
15	Iowa	18,332	514	298	225	79	137	195	158	37	17,623	752	600	152	13,073	
16	Kansas	13,374	401	283	152	40	78	182	155	27	12,791	512	387	125	9,972	
17	Kentucky	20,632	537	118	39	173	246	440	400	40	19,655	997	897	140	14,614	
18	Maryland	6,069	130	28	13	20	82	141	136	5	5,798	252	212	40	3,833	
19	Michigan	3,782	154	104	70	17	33	56	41	15	3,572	209	186	23	2,796	
20	Missouri	9,991	381	244	208	32	105	84	68	16	9,520	356	347	9	7,015	
21	Montana	4,793	93	41	28	14	38	88	80	8	4,612	463	341	122	3,096	
22	New Mexico	3,688	52	13	8	14	25	146	127	19	3,490	207	122	85	2,324	
23	North Dakota	954	77	51	19	5	21	20	18	2	857	48	42	6	581	
24	Ohio	46,046	993	421	203	201	371	648	551	97	44,405	1,946	1,690	256	33,155	
25	Oklahoma	9,124	143	35	22	39	69	167	160	7	8,814	790	668	124	5,414	
26	Oregon	271	14	9	1	4	4	6	6		251	28	13	15	196	
27	Pennsylvania	190,602	2,996	808	183	475	1,713	3,198	2,883	315	184,408	8,083	6,549	1,534	123,059	
28	Tennessee	11,729	235	20	9	78	137	340	325	15	11,154	534	377	157	7,348	
29	Texas	4,416	79	8		22	49	103	93	8	4,234	234	202	32	3,192	
30	Utah	3,263	50	5		18	27	53	48	5	3,160	330	255	75	1,941	
31	Virginia	10,418	128	15		42	71	248	237	11	10,042	772	623	149	4,970	
32	Washington	6,345	69	6	2	16	47	124	110	14	6,155	502	426	76	3,834	
33	West Virginia	72,477	1,038	59	12	287	692	1,773	1,700	73	69,666	4,285	3,435	850	40,710	
34	Wyoming	5,267	272	185	4	24	63	156	149	7	7,839	455	407	48	5,054	
35	All other states ¹	562	22	16	2	3	4	7	6	1	533	38	38		289	
	Producing bituminous mines without coke manufacture.															
36	Alabama	12,427	320	40	6	109	171	386	367	19	11,721	733	641	92	8,162	
37	Colorado	10,942	381	165	10	65	151	193	168	25	10,368	595	535	60	6,972	
38	Kentucky	18,869	517	118	39	170	229	417	380	37	17,935	872	746	126	13,177	
39	Pennsylvania	119,972	1,971	724	179	336	911	1,927	1,687	240	116,074	5,229	3,887	1,342	87,778	
40	Tennessee	8,931	191	20	9	69	102	270	258	12	8,470	418	304	114	5,850	
41	Virginia	3,197	68	10		26	32	68	61	7	3,061	155	131	24	1,941	
42	Washington	6,035	61	6	2	15	40	117	103	14	5,857	473	401	72	3,748	
43	West Virginia	35,107	726	57	12	194	475	918	882	36	36,463	2,213	1,801	412	22,966	
	Producing bituminous mines with coke manufacture.															
44	Alabama	12,395	236			26	210	401	379	22	11,758	1,226	946	280	5,316	
45	Colorado	5,224	36			8	28	93	88	7	5,093	371	235	136	2,675	
46	Kentucky	1,763	20			3	17	25	20	3	1,720	125	111	14	1,437	
47	Pennsylvania	70,630	1,025	84	4	139	802	1,271	1,196	75	69,334	2,834	2,662	192	35,281	
48	Tennessee	2,798	44			9	35	70	67	3	2,684	116	73	43	1,498	
49	Virginia	7,221	60	5		16	39	180	176	4	6,981	617	492	125	3,029	
50	Washington	313	8			1	7	7	7		298	29	25	4	86	
51	West Virginia	34,370	312	2		93	217	855	818	37	33,203	2,072	1,634	438	17,744	

¹ The United States totals include 592 male and 99 female clerks, 174 superintendents and managers, and 138 salaried officers of corporations employed in general offices who could not be distributed among the individual states; the states concerned are Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Montana, Ohio, Oklahoma, Pennsylvania, Texas, Washington, West Virginia, and Wyoming. See page 182, "Administrative expenses of general offices."

COAL MINES—GENERAL STATISTICS, BY STATES: 1909—Continued.

PERSONS ENGAGED IN INDUSTRY—continued.																		
Wage earners, December 15, or nearest representative day—Continued.						Wage earners employed 15th day of—												
Other wage earners 16 years of age and over.			Boys under 16 years of age.			January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Total.	Outside.	Inside.	Total.	Outside.	Inside.													
1	227,455	104,931	122,524	3,968	4,051	2,917	691,510	686,053	680,232	650,344	647,044	653,440	660,072	667,813	685,999	705,742	721,175	730,164
2	74,954	35,833	39,121	3,247	3,234	13	173,059	172,775	173,297	168,295	168,402	169,261	167,731	166,063	166,351	170,302	170,925	169,492
3	125	66	59				212	270	272	286	205	297	306	323	348	341	324	308
4	74,829	35,707	39,062	3,247	3,234	13	172,847	172,505	173,025	168,009	168,137	168,964	167,425	165,740	166,003	169,961	170,601	169,184
5	74,746	35,716	39,030	3,239	3,226	13	172,679	172,417	172,906	167,928	168,007	168,715	167,166	165,486	165,760	169,729	170,358	168,943
6	83	51	32	8	8		108	88	119	81	130	249	259	254	243	232	243	241
7	152,501	69,098	83,403	3,721	817	2,904	518,451	513,878	506,935	482,049	478,642	484,179	492,341	501,750	519,648	535,440	550,250	560,672
8	282	214	68				54	61	169	188	187	249	332	344	417	462	510	583
9	152,219	68,884	83,335	3,721	817	2,904	518,397	513,817	506,766	481,861	478,455	483,930	492,009	501,406	519,231	534,978	549,740	560,089
10	7,022	4,968	3,254	420	200	220	22,493	21,338	21,478	20,968	20,507	20,334	20,463	20,863	21,628	22,462	22,456	24,627
11	1,257	350	607	13	1	12	4,840	4,162	3,681	2,674	2,789	3,607	4,060	4,914	5,009	5,253	5,151	
12	4,701	2,607	2,184	57	23	34	14,043	13,582	13,327	12,530	11,850	11,703	11,707	12,344	13,370	14,246	14,650	15,396
13	17,100	4,262	12,804	77	4	73	69,376	68,760	67,569	61,203	60,852	58,799	59,637	59,571	64,177	68,032	70,074	71,183
14	4,158	1,169	2,989	53		53	19,309	19,117	18,813	17,304	17,515	16,970	18,144	18,635	20,033	20,626	21,267	21,318
15	3,074	1,178	2,406	124	5	110	16,552	16,518	16,033	14,379	13,787	13,881	13,709	14,410	15,336	16,132	16,861	17,235
16	2,303	735	1,567	5	1	4	12,354	12,362	11,971	10,255	9,906	11,032	10,970	11,158	11,073	12,078	12,445	12,586
17	3,080	1,869	2,120	64	15	49	16,992	16,884	16,165	15,189	14,062	14,699	15,191	15,051	16,743	17,874	18,568	19,127
18	1,549	739	810	164	21	143	5,825	5,753	5,716	5,570	5,528	5,533	5,383	5,257	5,409	5,445	5,505	5,772
19	507	132	435				3,703	3,644	3,611	3,305	3,112	3,213	3,254	3,320	3,382	3,386	3,414	3,496
20	2,136	644	1,462	19		19	8,680	8,392	7,910	5,795	5,616	6,231	6,511	7,057	7,955	8,680	8,917	9,370
21	1,053	597	456				4,095	3,905	3,940	3,823	3,950	3,842	3,741	3,828	4,088	4,261	4,498	4,544
22	911	611	270	48	18	30	3,530	3,676	3,576	3,662	3,516	3,461	3,589	3,543	3,623	3,417	3,444	3,455
23	227	157	70	1		1	730	724	624	411	348	321	384	391	434	694	753	843
24	0,110	2,383	0,727	104	10	184	40,463	40,465	39,375	36,910	36,684	37,235	37,680	36,281	40,418	40,784	43,770	43,126
25	2,007	850	1,757	3		3	7,545	7,274	6,670	6,451	6,377	6,621	7,206	7,543	7,794	8,378	8,544	8,720
26	27	27					258	270	245	199	171	121	112	141	178	229	212	235
27	52,128	27,001	24,107	1,138	291	847	162,715	163,261	163,765	158,520	159,902	164,889	167,634	169,672	171,748	175,066	178,367	182,146
28	3,036	1,434	1,602	230	38	198	10,971	10,726	10,640	10,372	10,216	10,005	9,958	10,205	10,204	10,636	11,117	11,119
29	808	378	430				4,032	4,007	4,011	4,075	3,904	3,910	4,015	3,896	3,988	4,174	4,093	4,118
30	891	523	338	28	17	11	2,912	2,800	2,653	2,621	2,473	2,463	2,581	2,638	2,667	2,599	2,670	2,712
31	4,173	2,527	1,646	127	25	102	9,014	8,789	8,620	8,734	8,727	9,078	9,075	9,168	9,632	9,206	9,596	9,967
32	1,788	880	908	31	31		5,722	5,705	5,658	5,674	5,802	5,703	5,702	5,708	5,988	6,044	6,062	6,020
33	23,814	11,485	12,349	837	114	723	63,080	63,461	62,932	63,308	62,983	63,906	64,080	65,276	66,965	67,704	69,161	68,986
34	2,325	808	1,457	5	3	2	7,726	7,620	7,265	6,956	6,764	6,699	6,563	6,593	6,893	7,200	7,504	7,825
35	120	120		77	77		519	502	500	509	505	504	510	521	523	531	539	539
36	2,090	900	1,700	130	76	60	11,136	10,862	10,943	10,046	9,913	10,042	9,884	10,120	10,557	10,975	11,053	11,456
37	2,755	1,164	1,591	46	14	32	9,166	8,682	8,318	7,943	7,509	7,890	7,285	7,732	8,786	9,416	9,731	10,303
38	3,822	1,702	2,120	64	15	40	15,143	15,038	14,446	13,445	12,984	13,014	13,521	13,667	15,046	16,132	16,826	17,435
39	22,255	8,226	14,029	812	114	698	101,876	102,021	102,504	100,236	101,290	103,976	105,806	106,475	107,653	109,464	111,855	113,913
40	2,055	887	1,108	147	24	123	8,559	8,257	8,064	7,909	7,794	7,647	7,633	7,821	7,905	8,024	8,400	8,445
41	936	252	684	20	0	23	2,595	2,472	2,603	2,954	3,074	3,248	3,343	3,315	3,071	3,176	3,204	2,986
42	1,605	798	807	31	6		5,434	5,494	5,376	5,376	5,472	5,461	5,453	5,400	5,705	5,731	5,752	5,722
43	10,770	3,097	0,770	608	63	445	32,463	32,383	31,862	32,313	31,888	32,846	33,005	33,853	34,966	35,110	35,901	35,750
44	4,932	3,378	1,554	284	124	160	11,357	10,976	11,435	10,922	10,594	10,292	10,579	10,743	11,069	11,487	11,403	13,171
45	2,030	1,443	593	11	9	2	4,877	4,900	5,009	4,593	4,350	4,313	4,472	4,584	4,830	4,919	5,063	5,063
46	158	158					1,849	1,846	1,719	1,744	1,678	1,595	1,670	1,697	1,742	1,742	1,692	1,692
47	20,873	10,735	10,138	326	177	149	60,839	61,236	61,261	58,584	58,600	60,913	61,828	63,107	64,095	65,602	66,512	68,283
48	981	547	434	80	14	75	2,412	2,469	2,582	2,463	2,422	2,358	2,325	2,384	2,359	2,612	2,717	2,674
49	3,237	2,275	962	98	19	79	6,419	6,817	6,957	5,780	5,653	5,830	5,732	5,853	5,961	6,030	6,392	6,981
50	183	82	101				288	301	282	298	330	302	309	302	283	313	310	298
51	19,958	7,488	5,570	320	51	278	31,517	31,078	31,070	30,995	31,095	31,060	31,075	31,423	31,999	32,594	33,260	33,236

* Includes California, Georgia, and Idaho.