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MINERALS YEARBOOK

FUELS

Volume II

1952

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FOREWORD

The presentation of the MINERALS YEARBOOK 1952, in three volumes, initiates a change made necessary by an increase in YEARBOOK material that could no longer be published under a single cover without increasing the book to a thickness that caused binding problems and to a weight that inconvenienced the reader. The change is one of several made over the years to meet expansion in the mineral industry and new needs of the reading public.

From initiation of this series as "Reports Upon the Mineral Resources of the United States" published in 1867 by the Treasury Department, the series has appeared as "Mineral Resources West of the Rocky Mountains," as a part of the "Annual Report of the Geological Survey," as "Mineral Resources of the United States," and as the "MINERALS YEARBOOK," the first volume of which covered 1932 and carried the title "MINERALS YEARBOOK 1932–33."

In the current three-volume presentation, volume I is made up of chapters on mineral commodities, both metals and nonmetals, but exclusive of the mineral fuels. Included also are a chapter reviewing these mineral industries, a statistical summary and recapitulation, and chapters on mining technology, metallurgical technology, trends in technology and operations, and employment and injuries.

Volume II, which is devoted to the mineral fuels, consists of chapters on each mineral-fuel commodity, as well as chapters reviewing the industry as a whole, a statistical summary, and an employment and injury presentation.

Volume III is made up of chapters covering each of the 48 States, plus chapters on Alaska, the Territories and island possessions in the Pacific Ocean, and the Territories and island possessions in the Caribbean Sea, including the Canal Zone. Volume III also has a chapter recapitulating its statistics in summary form on a regional basis and another presenting employment and injury data regionally.

The MINERALS YEARBOOK will continue to present the year's development in the mineral industry with enough background data to give significance to the current record. The three-volume YEARBOOK permits fuller coverage in all phases of the reports, but major expansion has been undertaken in the regional presentation (volume III) and in the review of technologic developments and problems.

The Bureau of Mines wishes to acknowledge again the cooperation of industry and of many Government groups in the preparation of the YEARBOOK. Among the latter, some of the State geological surveys and mining bureaus are of great importance, particularly in their help in gathering and preparing the material that appears principally in volume III.

J. J. FORBES, *Director.*

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The chapters in this volume of the MINERALS YEARBOOK were prepared by the staff of the Fuels and Explosives Division of the Bureau of Mines. Those chapters dealing with coal and its products were prepared under the general supervision of Mr. T. W. Hunter, chief, Coal Branch; the chapters on petroleum and related commodities were prepared under the general supervision of R. A. Cattell, chief, Petroleum and Natural Gas Branch, and H. J. Barton, Petroleum and Natural Gas economics coordinator.

Because of the many sources of data presented, it is impossible to give credit to each source individually, but acknowledgment is here made of the ready and willing cooperation of producers and users of fuels who supplied data and of the business press, trade associations, scientific journals, international organizations, and State and Federal agencies. The United States Department of Commerce furnished data on foreign trade, and the United States Foreign Service provided information on foreign production and developments.

The mining and geology and related departments of the respective States and Alaska have been most cooperative and have made available supplementary and verifying information with respect to production and plant operations. For their assistance I am deeply grateful, and acknowledgment is made to the following State organizations which assisted with the canvasses of bituminous coal and lignite:

Alabama: Division of Safety and Inspection, Birmingham.
Alaska: Territorial Department of Mines, Juneau.
Arizona: State mine inspector, Phoenix.
Arkansas: State mine inspector, Fort Smith.
Colorado: Colorado Coal Mine Inspection Department, Denver..
Georgia: Department of Mines, Mining, and Geology, State Division of Conservation, Atlanta.
Illinois: State Department of Mines and Minerals, Springfield.
Indiana: Bureau of Mines and Mining, Terre Haute.
Iowa: State mine inspectors, Des Moines.
Kansas: State Mine Inspection Division, Pittsburg.
Kentucky: Kentucky Department of Mines and Minerals, Lexington.
Maryland: Maryland Bureau of Mines, Westernport.
Missouri: Division of Mine Inspection, Jefferson City,
New Mexico: State inspector of mines, Albuquerque.
North Carolina: State Department of Labor, Raleigh.
North Dakota: State coal-mine inspector, Bismarck.
Ohio: Division of Mines and Mining, Ohio Department of Industrial Relations, Columbus.
Oklahoma: Chief mine inspector, Oklahoma City.
Pennsylvania: Pennsylvania Department of Mines, Harrisburg.
Tennessee: Tennessee Division of Mines, Knoxville.
Utah: Safety Division, Industrial Commission of Utah, Salt Lake City.
Virginia: Division of Mines, Virginia Department of Labor and Industry, Big Stone Gap.
Washington: Chief coal-mine inspector, Department of Labor and Industries, Seattle.
West Virginia: West Virginia Department of Mines, Charleston.
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Appreciation is also expressed to the Commonwealth of Pennsylvania Department of Mines, Harrisburg, and Commonwealth of Massachusetts, Division on Necessaries of Life, Boston, for assistance

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Michigan: Department of Conservation, Lansing.
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Credit is also due the following State organizations which assisted with the petroleum and natural-gas canvasses:

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California: California Department of Natural Resources, San Francisco. Public Utilities Commission, State of California, San Francisco.
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Maryland: Department of Geology, Mines, and Water Resources, Baltimore.
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LOUIS C. MCCABE.

CONTENTS

PART I. GENERAL REVIEWS

Review of the Mineral-Fuel Industries in 1952

By Herbert E. Striner, E. P. Carman, and R. M. Gooding

GENERAL SUMMARY

PRELIMINARY data indicate that, although total new energy supply in the United States declined 1.7 percent (net) during 1952, the only decrease was in the output of coal (12 percent). As indicated in tables 1 and 2, the production and consumption of petroleum, natural gas, and waterpower increased. During the year the new supply of energy from crude petroleum increased 3.4 percent and from natural gas 7.5 percent. These changes become significant when compared with the fact that there was a general leveling of economic expansion because the rate of direct military expenditures was curtailed and the rate of private spending for defense-type plants and equipment was reduced. Although national security outlays were about 12 billion dollars higher in 1952 than in 1951, the quarterly rate of increase during the year was considerably smaller than that of the previous 1½ years.

TABLE 1.—[redacted]y of energy from mineral fuels and waterpower in the United States, 1951–52

[Trillions of British thermal units] [1] [2]

	1951	Percent of total	1952	Percent of total	Change from 1951 (percent)
Pennsylvania anthracite	1,084	2.8	1,031	2.7	−5.0
Bituminous coal and lignite	13,982	35.4	12,231	31.5	−12.5
Total coal	15,066	38.2	13,262	34.2	−12.0
Crude petroleum: [3]					
Domestic	13,037	33.0	13,294	34.3	+2.0
Imports [4]	1,800	4.6	2,041	5.2	+13.4
Total	14,837	37.6	15,335	39.5	+3.4
Natural gas (marketed production)	8,016	20.3	8,615	22.2	+7.5
Total petroleum and natural gas	22,853	57.9	23,950	61.7	+4.8
Total mineral fuels	37,919	96.1	37,202	95.9	−1.9
Waterpower	1,559	3.9	1,581	4.1	+1.4
Grand total	39,478	100.0	38,793	100.0	−1.7

[1] The unit heat values employed are: Anthracite, 12,700 B. t. u. per pound; bituminous coal and lignite, 13,100 B. t. u. per pound; petroleum, 5,800,000 B. t. u. per barrel; natural gas, 1,075 B. t. u. per cubic foot. Waterpower includes installations owned by manufacturing plants and mines, as well as Government and privately owned public utilities. The fuel equivalent of waterpower is calculated from the kilowatt-hours of power produced wherever available, as it is true of all public-utility plants since 1919. Otherwise, the fuel equivalent is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 percent for factories and mines and of 40 percent for public utilities.

[2] Includes gasoline, lubricants, and other products with which coal does not compete.

[3] Preliminary.

[4] Includes crude, residual, and distillate.

Intensification of competitive pressures on coal from petroleum and natural gas continued, reflecting the changing pattern of fuel consumption in the United States. Table 2 indicates that the produc-

tion of bituminous coal and anthracite dropped 12.5 and 5.0 percent, respectively, for the year, while the output of crude petroleum increased 2.0 percent and of natural gas (marketed production) 7.5 percent. Although in 1952, the production of bituminous coal declined more sharply in percent than anthracite, the decline in anthracite output was more serious, relatively, because the anthracite industry did not enjoy a period of increased production and high prices after World War II to the extent of the bituminous-coal industry.

TABLE 2.—Salient statistics of the fuel industries in the United States, 1951–52

	1952	1951	Change from 1951 (percent)
Production:			
Bituminous coal—million net tons	466.8	533.7	−12.5
Crude petroleum—million bbl.[1]	2,292.0	2,247.7	+2.0
Natural gas, marketed production—billion cubic ft.	8,013.5	7,457.4	+7.5
Anthracite—million net tons	40.6	42.7	−5.0
Value of production:			
Bituminous coal, f. o. b. mine or plant—million dollars	2,289.2	2,626.0	−12.8
Crude petroleum, value of production at wells—million dollars	5,790.3	5,690.4	+1.8
Natural gas, average value at well, per M cu. ft.—in cents	7.8	7.3	+6.8
Anthracite, f. o. b. mine or plant—million dollars	379.7	405.8	−6.4
Consumption (apparent):			
Bituminous coal—million net tons	418.8	468.9	−10.7
Crude petroleum, runs to stills—million bbl.	2,441.3	2,370.4	+3.0
Natural gas—billion cubic ft.	7,613.5	7,102.6	+7.2
Anthracite—million net tons	35.3	37.0	−4.6
Stocks:			
Bituminous coal, year end—million net tons	81.8	[redacted]	−0.5
Crude petroleum—total million bbl.	271.9	[redacted]	+6.3
Natural gas			
Anthracite, year end—million net tons[2]	4.7	3.7	+27.0
Imports:			
Bituminous coal—million net tons[3]	0.3	0.3	
Crude petroleum—million bbl.[4]	209.6	179.1	+17.0
Natural gas—billion cubic ft.[4]	7.8		
Anthracite—million net tons[3]	.029	.027	+7.4
Exports:			
Bituminous coal—million net tons[3]	47.6	56.7	−16
Crude petroleum—million bbl.[3]	26.7	28.6	−6.6
Natural gas—billion cubic ft.[4]	27.5	24.2	+13.6
Anthracite—million net tons[3]	4.6	6.0	−23.3
Employment:			
Bituminous coal, average number working daily	335,217	372,897	−10.1
Crude petroleum and natural gas (annual average in thousands)[5,6]	127.9	124.8	+2.5
Anthracite (average number employed)	65,923	68,995	−4.5

[1] Preliminary.
[2] Producers and estimated retail dealer stocks only.
[3] U. S. Department of Commerce.
[4] Bureau of Mines data.
[5] Bureau of Labor Statistics, U. S. Department of Labor.
[6] Except contract services.

TABLE 3.—Consumption of bituminous coal and lignite in the United States, 1951–52, by major consumer groups

[Thousands of net tons]

Year	Electric power utilities[1]	Class I railroads[2]	Coke plants	Steel and rolling mills	Cement mills	Other industrials	Retail deliveries	Bunker foreign trade[3]	Total
1951	101,898	54,005	113,448	7,973	8,525	105,634	76,531	890	468,904
1952	103,309	37,962	97,614	6,820	8,073	95,863	68,393	723	418,757

[1] Federal Power Commission.
[2] Association of American Railroads.
[3] Bureau of Census, U. S. Department of Commerce.

TABLE 4.—Consumption of residual fuel oil in the United States, 1951–52, by major consumer groups

[Millions of barrels]

Year	Gas and electric power plants	Railroads	Vessels (including tankers)	Smelters, mines, and manufacturing industries	Heating oils	Military uses	Oil-company fuels	Others	Total
1951	70.6	55.0	106.9	157.2	76.2	38.1	54.1	5.3	563.4
1952	70.5	40.0	110.4	158.3	79.2	37.2	54.4	5.8	555.8

TABLE 5.—Consumption of natural gas in the United States, 1951–52, by major consumer groups

Year	Residential		Commercial		Industrial (billions of cubic feet) [1]	Electric utility plants (billions of cubic feet)
	Thousands of consumers	Billions of cubic feet	Thousands of consumers	Billions of cubic feet		
1951	21,444	1,474.7	1,614	464.3	5,163.5	763.9
1952	22,569	1,622.0	1,855	515.7	5,475.8	910.1

[1] Including electric utility plants.

TABLE 6.—Consumption of distillate fuel oil in the United States, 1951–52, by major consumer groups

[Millions of barrels]

Year	Gas and electric power plants	Railroads	Vessels (including tankers)	Smelters, mines, and manufacturing industries	Heating oils	Military uses	Oil-company fuels	No. 1 fuel oil sold as range oil	Other uses	Total
1951	9.6	59.9	14.4	42.6	249.8	8.4	7.8	16.2	40.2	448.9
1952	8.4	68.0	17.2	42.8	263.4	9.6	8.0	15.9	45.9	479.2

CONSUMPTION

The apparent consumption of both bituminous coal and anthracite in the United States declined in 1952, although consumption of crude petroleum and natural gas increased. (See tables 2 and 3.) The consumption of residual fuel oil decreased in 1952, and consumption of distillate fuel oils increased. The competition of coal with residual fuel oil is largely in industrial markets; with distillate fuel oils, it is in space heating and locomotive-fuel markets; and with natural gas it is in both industrial and space-heating markets.

Although the consumption of bituminous coal in the United States dropped for all uses except electric power utilities, the most significant decrease was for Class I railroads, a continuation of a trend that began late in World War II. In 1945 Class I railroads consumed approximately 21 percent of the total United States bituminous-coal production. By the end of 1952 they consumed only approximately 8 percent of the total, reflecting the replacement of coal by diesel fuel.

At the beginning of 1940 the Class I railroads owned 41,117 steam locomotives and only 510 diesel-electric locomotives. By 1951 these

railroads owned 21,747 steam locomotives and 17,493 diesel-electric locomotives. Bituminous coal and residual fuel oil have been rapidly displaced by distillate (diesel) fuel oil. The coal tonnage lost in 1952 in the railroad market was approximately 16 million tons from 1951. A combination of the export and railroad market losses in 1952 accounted for approximately 36 percent of the total drop in United States bituminous-coal production.

Another factor that seriously affected bituminous-coal consumption during the year was the prolonged steel strike during the summer. It is estimated that coal requirements declined 15 to 20 million tons as a result of this strike.

Competition from distillate fuel oils and natural gas also has affected the consumption of coal adversely. Consumption of distillate fuel oils for heating purposes in 1952 increased 5 percent over 1951. Residential consumption of natural gas in 1952 was 10 percent over 1951 while the total marketed production of natural gas for all uses rose 7.5 percent in 1952.

For electric utility use, natural gas and bituminous coal made consumption gains, and residual fuel oil was slightly lower. For this purpose, coal consumption increased 1.4 percent over 1951, but natural-gas consumption was up 19.1 percent. Use of distillate fuel oil, which is of less importance to electric utilities, declined.

Table 1 indicates that petroleum and natural gas continued to replace coal as sources of power in 1952. In 1952, of the total energy supplied in the United States including gasoline and lubricants, measured in British thermal units, coal supplied 34.2 percent, crude petroleum 39.5 percent, natural gas 22.2 percent, and water power 4.1 percent. This represents a decline of 12.0 percent for coal in the pattern of total fuel supply over 1951 and gains of 3.4 percent for crude petroleum, 7.5 percent for natural gas, and 5.1 percent for waterpower. Since 1940 the total energy supplied by coal has dropped from 53.1 percent to 34.2 in 1952; crude petroleum has risen from 32.1 percent to 39.5 in 1952; and natural gas has risen from 11.3 percent to 22.2 in 1952. Waterpower supplied 3.5 percent in 1940 and 4.1 percent in 1952.

EMPLOYMENT AND WORKING TIME

The average number of employees in the bituminous-coal and anthracite industries declined 10.1 and 4.5 percent, respectively, in 1952. The average daily working force in the bituminous-coal industry in 1952 totaled 335,217 men compared with 372,897 in 1951. In the anthracite industry the decline was from 68,995 men in 1951 to 65,923 in 1952. Because of competitive pressures for continually advancing efficiency in coal production, it is significant that net tons mined per man-day in 1952 in the bituminous-coal industry was 7.47 compared to 7.04 in 1951, but because fewer days were worked in 1952 the net tons mined per man per year was 1,389 in 1952 compared with 1,429 in 1951.

In the anthracite industry the output per man-day increased from 2.97 tons in 1951 to 3.06 in 1952. The increase was largely in culm-bank operations and stripping.

In the crude-petroleum, and natural-gas industries employment increased 2.5 percent in 1952. The average labor force in 1952 was 127.9 thousand compared with 124.8 thousand in 1951.

TABLE 7.—Hours worked and gross earnings of production workers in the fuel industries, 1949–52

[Bureau of Labor Statistics, U. S. Department of Labor]

	1949	1950	1951	1952
Bituminous coal:				
Average weekly earnings	$63.28	$70.35	$77.79	$78.32
Average weekly hours	32.6	35.0	35.2	34.2
Average hourly earnings	$1.94	$2.01	$2.21	$2.29
Anthracite:				
Average weekly earnings	$56.78	$63.24	$66.66	$71.19
Average weekly hours	30.2	32.1	30.3	31.5
Average hourly earnings	$1.88	$1.97	$2.20	$2.26
Petroleum and natural gas (except contract services):				
Average weekly earnings	$71.48	$73.69	$79.76	$85.90
Average weekly hours	40.2	40.6	40.9	41.1
Average hourly earnings	$1.78	$1.82	$1.95	$2.09

Table 7 presents data on average hourly and weekly earnings and average number of hours worked weekly for the bituminous-coal, anthracite, and petroleum and natural-gas industries. Both hourly and weekly earnings in all these industries have increased steadily since 1949. However, only in the petroleum and natural-gas industries have the "average weekly hours worked" increased each year during this period. Average weekly hours worked in 1952 in the bituminous-coal-mining industry declined from 35.2 in 1951 to 34.2 in 1952. For the anthracite industry the average weekly hours worked for 1952 was 31.5, an increase over 1951 but a decline from the 1950 level of 32.1. More significant than the drop in weekly hours in the bituminous-coal industry is the drop in average number of days worked, which declined from 203 days in 1951 to 186 in 1952. In the anthracite industry the decline was from 208 days to 201.

As wages influence total production cost in the fuel industries, comparative wage increases granted by the respective segments of the fuel industries are significant. In 1952 hourly earnings in the bituminous-coal industry increased 3.6 percent, in the anthracite industry 2.7 percent, and in the petroleum and natural-gas industry 7.2 percent over 1951. Since 1949, average hourly earnings in the bituminous-coal industry increased 18.0 percent, in the anthracite industry 20.2 percent, and in the petroleum and natural-gas industry 17.4 percent.

FUEL PRICES

The average monthly wholesale price indexes for fuels indicate that the average price of natural gas increased for the second successive year, continuing a trend begun in 1946 but interrupted in 1949. The price index for petroleum declined from 110.5 in 1951 to 109.3 in 1952. The average index for all commodities declined from 114.8 in 1951 to 111.6 in 1952. (See table 8.) In table 9 comparative average prices are shown for several fuel products. Although average bituminous-coal market prices, for selected sizes, rose in 1952, the average value, f. o. b. mines, dropped 2 cents per ton. The 1952 prices of one of coal's chief competitors, residual fuel oil, declined. The average prices of distillate fuel oil and natural gas increased over 1951.

Since coal is a bulk commodity that must depend very largely on railroad transportation for movement to market, transportation charges represent a very high portion of the ultimate cost of coal to consumers, as compared with the relatively low cost per mile of pipe-

line transmission of oil and natural gas. The average railroad freight-rate charge per net ton on bituminous coal and lignite has been rising steadily for several years, having increased from $3.16 in 1951 to $3.35 in 1952.

TABLE 8.—Average monthly wholesale price indexes for fuels, 1948–52 (1947–49=100)

[Bureau of Labor Statistics, U. S. Department of Labor]

Fuel	1948	1949	1950	1951	1952
Gas	102.4	101.5	98.2	100.7	103.7
Petroleum and petroleum products	111.7	100.1	103.7	110.5	109.3
Coal	106.2	105.8	106.2	108.4	108.7
Average index for all commodities	104.4	99.2	103.1	114.8	111.6

TABLE 9.—Comparative fuel prices, 1951–52

Fuel	1951	1952	Change from 1951 (percent)
Bituminous coal:			
Average wholesale prices, dollars per net ton:[1]			
Prepared sizes	6.72	6.67	−0.7
Mine run	5.69	5.75	+1.1
Screenings	4.77	4.72	−1.1
Other average prices, dollars per net ton:			
Railroad fuel, f. o. b. mine [2]	4.54	4.59	+1.1
Average retail price [1]	15.96	16.27	+1.9
Cost of coal at merchant coke ovens	9.51	9.85	+3.6
Anthracite, average sales realization per net ton on Pennsylvania anthracite from breakers to points outside region, dollars:			
Chestnut	13.56	13.49	−0.5
Pea	10.38	10.16	−2.1
Buckwheat No. 1	7.49	7.94	+6.0
Petroleum and petroleum products:			
Crude petroleum, average price per barrel at well, dollars	2.53	2.53	----------
Gasoline, average dealers' net price (excluding taxes) of gasoline in 50 U. S. cities, cents per gallon [3]	15.33	15.27	−0.4
Residual fuel oil:			
No. 6 fuel oil, average of high and low prices in Philadelphia, dollars per barrel (refinery) [4]	2.50	2.49	−0.4
Bunker C, average price for all Gulf ports, dollars per barrel (refinery) [4]	1.83	1.76	−3.8
Distillate fuel oil:			
Gas oil, average of high and low prices at Philadelphia, cents per gallon (refinery) [4]	9.3	9.6	+3.2
No. 2 distillate, average for all Gulf ports, cents per gallon (refinery) [4]	7.9	8.1	+2.5
Natural gas:			
Average U. S. value, at well, cents per thousand cubic feet	7.3	7.8	+6.8
Average U. S. value, at points of consumption, cents per thousand cubic feet	29.8	33.2	+11.4
Average wholesale price index for all commodities [1]	114.8	111.6	−2.8

[1] Bureau of Labor Statistics, U. S. Department of Labor.
[2] Interstate Commerce Commission.
[3] The Texas Co.
[4] Platt's Oil Price Handbook.

INCOME, DIVIDEND, AND TAXES

The stability of the petroleum and natural-gas industries contrasted to that of the bituminous-coal and anthracite industries, is indicated in table 10. In spite of the leveling of general industrial activity and the sharp decline in coal production, the petroleum and natural-gas industries fared well in 1952. Although income for both incorporated and unincorporated coal enterprises, before and after taxes, dropped to levels well below both those of 1951 and 1950, that for petroleum

and natural-gas enterprises either equaled that in the peak year, 1951, or was only slightly below.

Corporate dividend payments paid by coal companies in 1952 were 3.3 percent less than in 1951. Petroleum and natural-gas corporate dividends were, however, about 1 percent higher in 1952. Undistributed corporate income presented an even more interesting comparison between coal and petroleum and natural-gas enterprises. In 1952 the undistributed corporate income of the bituminous-coal and anthracite companies was 45 percent less than in 1951, while for the petroleum and natural-gas enterprises it declined only 0.9 percent below 1951.

TABLE 10.—Income, dividend, and tax liability of incorporated and unincorporated enterprises in the fuel industries, 1949–52

[U. S. Department of Commerce]

	Millions of dollars			
	1949	1950	1951	1952
Income of unincorporated enterprises:				
Bituminous- and other soft-coal mining	46	63	60	50
Anthracite mining	4	5	5	4
Crude petroleum and natural gas	139	170	200	200
Corporate income before Federal and State income and excess-profits taxes:				
Bituminous- and other soft-coal mining	144	214	228	176
Anthracite mining	17	22	18	12
Crude petroleum and natural gas	631	821	926	921
Corporate income after Federal and State income and excess profits taxes:				
Bituminous- and other soft-coal mining	96	139	153	111
Anthracite mining	12	15	13	6
Crude petroleum and natural gas	482	602	655	653
Corporate dividend payments:				
Bituminous- and other soft-coal mining	51	53	60	58
Anthracite mining	8	5	4	3
Crude petroleum and natural gas	154	224	207	209
Undistributed corporate income:				
Bituminous- and other soft-coal mining	45	86	93	53
Anthracite mining	4	10	9	3
Crude petroleum and natural gas	328	378	448	444

INDUSTRY INCOME, WAGES AND SALARIES, AND NATIONAL INCOME

One of the more important indicators of national well-being and economic activity is the measurement of total national income. Of considerable interest to the fuel industries is the level of income for each of the segments thereof, and the relationship of income in those segments to the national income.

Table 11 indicates that the income for the fuel industries as a group decreased from 1.6 percent of the national income in 1951 to 1.5 percent in 1952. Similarly, wages and salaries that went to the fuel industries in 1952 was 1.5 percent of the United States total as compared with 1.6 percent in 1951.

Table 11 also shows that the bituminous-coal and anthracite industries in 1952 dropped well below their 1951 levels of income, wages, and salaries. This drop for coal more than offset the gain in petroleum and natural gas, so that the total for the fuels group in 1952 was lower than in 1951.

TABLE 11.—Industry income and wages and salaries in fuel industries, 1949–52

[U. S. Department of Commerce]

	Millions of dollars			
	1949	1950	1951	1952
Industry income:				
Bituminous- and other soft-coal mining	1,479	1,716	1,900	1,653
Anthracite	261	276	285	265
Crude petroleum and natural gas	1,820	1,988	2,352	2,529
Total	3,560	3,980	4,537	4,447
United States national income	216,259	240,632	278,373	291,629
Total as a percent of the U. S. national income	1.6	1.7	1.6	1.5
Wages and salaries:				
Bituminous- and other soft-coal mining	1,166	1,291	1,425	1,255
Anthracite	223	233	237	224
Crude petroleum and natural gas	929	967	1,128	1,287
Total	2,318	2,491	2,790	2,766
Total United States wages and salaries	133,356	145,573	169,839	183,643
Total as a percent of total United States wages and salaries	1.7	1.7	1.6	1.5

ENERGY FUELS IN INTERNATIONAL TRADE

The effects of World War II and hostilities in Korea are reflected in United States exports. In recent years the United States has become an important supplier of coal for the European market. Closing of the Abadan (Iran) refinery in June 1951, and acceleration of Korean activities resulted in a high level of fuel-oil exports.

In 1952 the increased level of gas-oil and distillate-fuel-oil exports continued. This high level of exports did not, however, continue in the case of bituminous coal. Exports of bituminous coal, though higher than normal, decreased rather sharply as a result of increased European coal production, increased output of hydroelectric power, and mild weather on the continent during 1952.

Crude oil and residual fuel imports and exports strikingly point up the shift in the United States import-export balance in these commodities. In recent years the United States has changed from a net exporter of crude petroleum to a net importer. During this same period the Middle East and Venezuela have grown considerably in importance as areas of supply, and the importance of Mexico and Colombia has diminished.

The importance of Venezuela has continued to increase as a source of gas oil and finished distillate fuel oil. In 1952 imports of these products from Venezuela totaled 408 thousand barrels.

The shift of the United States from a net exporter of crude petroleum to a net importer reflects the development of foreign sources of crude-oil and refinery capacity. This shift does not, of course, reflect inadequacy of United States potential supply or present reserves.

With growth of the natural-gas industry and expansion of natural-gas pipelines, this product has started to move in international trade. United States exports of natural gas, mainly to Canada, have begun to grow in importance. Natural-gas exports reached a peak in 1950 and after the decline of 1951 recovered in 1952 to a level close to that of 1950. Imports of natural gas from Canada rose from a negligible quantity in 1951 to 7.8 billion cubic feet in 1952 because in 1952

the ban on natural-gas exports from Canada was lifted to the extent of permitting shipments to certain copper smelters in Montana. The natural-gas imports from Canada made up the total of such imports into the United States, except for a very small quantity from Mexico.

TARIFFS AND TRADE AGREEMENTS

The United States and Venezuela signed a trade agreement at Caracas, Venezuela, effective October 11, 1952, which amended the Trade Agreement of 1939. Under this agreement the most important tariff concession made by the United States concerned various petroleum products. The agreement reduced the United States import excise tax to 5¼ cents per barrel on crude petroleum, topped crude petroleum and residual fuel-oil products testing less than 25° API (American Petroleum Institute gravity) and provided a rate of 10½ cents per barrel on United States imports of 25° API or more. No quotas were established. Before amendment the agreement provided a rate of 10½ cents per barrel on imports from all sources, based upon an annual quota not to exceed 5 percent of the amount of crude petroleum processed in refineries in the continental United States during the preceding calendar year, and 21 cents per barrel on imports in excess of this quantity. From 1943–50 a rate of 10½ cents applied to all imports of these products under the terms of the trade agreement with Mexico, which was terminated December 31, 1950.

WORLD REVIEW

Table 12 indicates that in 1952 large increases in coal production took place in France, West Germany, Poland, and the United Kingdom. Increasing European production had the effect of permitting these countries to supply a greater proportion of home requirements resulting in a decline in the United States exports, although exports to other European coal-shortage areas increased.

TABLE 12.—Fuels production in selected countries,[1] for 1951–52

[Thousands of metric tons]

Country	1951	1952	Country	1951	1952
Coal:			Crude petroleum:		
Australia	17,904	19,752	Canada	6,120	7,824
Belgium	29,664	30,384	Colombia	5,400	5,448
Brazil	1,968	1,944	Indonesia	7,440	8,520
Canada	14,820	14,052	Iran	16,848	1,344
Chile	2,208	2,172	Iraq	8,352	17,616
France	52,968	55,368	Kuwait	28,332	37,632
Saar	16,128	16,236	Mexico	11,064	11,052
West Germany	118,920	123,276	Saudi Arabia	37,476	40,704
India	34,860	36,804	United States	307,908	313,836
Italy	1,164	1,068	Venezuela	89,028	94,620
Japan	43,320	43,344			
Mexico	1,104	1,320	Natural gas (in million cubic meters):		
Netherlands	12,420	12,528	Canada	2,220	2,712
Poland	81,996	84,432	Italy	960	1,440
Southern Rhodesia	2,304	2,556	Mexico	2,376	2,640
Spain	11,328	12,000	United States	120,192	132,696
Turkey	4,728	4,848	Venezuela	19,152	20,976
Union of South Africa	26,112	27,252			
United Kingdom	226,440	230,088			
United States	522,840	458,100			
Yugoslavia	996	1,020			

[1] For more complete individual country listings see the individual commodity chapter.

SOURCE: United Nations monthly Bulletin of Statistics, February 1953.

The three largest coal-producing countries in Europe have been successful in increasing production. Both the United Kingdom and West Germany increased the number of men working underground, the United Kingdom by 14,972 and West Germany by 5,276. France, on the other hand, was relying on increased productivity rather than increased manpower, and output per man-shift in the French mines rose from 1.294 metric tons in the first half of 1951 to 1.351 metric tons for the first half of 1952. The lower output per man-shift in the United Kingdom, Belgium, and the Netherlands largely resulted from the large number of recruits who went into the coal mines during the period.

Table 13 indicates that the coal-consumption pattern for Europe differs little from that for the United States.

TABLE 13.—Percent of total coal consumed by selected industry groups in 1952 in the United States and in Europe

Industry:	*Europe*	*United States*
Railroads	8. 1	9. 0
Utilities	21. 1	24. 6
Coke plants	22. 1	23. 3
Iron and steel	2. 9	1. 6
Retail deliveries	18. 1	16. 3
Total	72. 3	74. 8

Source: Ministerial Coal Production Groups, O. E. E. C., Second Report, January 1953.

Crude-petroleum production increased markedly in most of the major oil-producing countries of the world, except Iran, where the unsettled political situation resulted in a production of only 8 percent of the 1951 quantity, which already was low because of the virtual shutdown of production after midyear. Other Middle Eastern countries, increased production sharply, with Iraq, Kuwait, and Saudi Arabia forging ahead rapidly. In the Western Hemisphere Venezuela increased production 6 percent, the United States 2 percent, and Canada 28 percent. Mexico and Colombia produced at about the 1951 level. In the Far East, Indonesia increased production 15 percent over 1951.

Natural-gas production in the major producing countries was higher, without exception, in 1952 than in 1951.

Table 14 presents a breakdown of demand for the crude runs to stills for selected countries. Domestic demand is a derived figure representing domestic production adjusted for increase or decrease in reported stocks plus imports less exports. These countries represent approximately 78 percent of the estimated world total of crude runs to stills.

The 1952 crude runs to stills for these countries were 7.0 percent above the 1951 level. Among the petroleum products in 1952, distillate demand increased the most—9.1 percent—followed by motor fuel, 6.7 percent; kerosine, 3.1 percent; and residual fuel oil, 2.8 percent. Lubricating-oil demand in 1952 was 5.6 percent below the 1951 level.

In 1952 the United States crude runs to stills were 3.0 percent higher than in 1951. Among the petroleum products in 1952, distillate demand increased the most—6.8 percent—followed by motor fuel, 5.9 percent; and kerosine, 1 percent. The 1952 demand for residual fuel oil was down 1.4 percent, and lubricating-oil demand was down 9.7 percent.

TABLE 14.—Estimated domestic demand [1] of selected petroleum products for selected countries, 1951–52

[In millions of barrels]

Country	Crude runs to stills		Demand									
			Motor fuel		Kerosine		Distillate fuel oil		Residual fuel oil		Lubricating oil	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
United States	2,370.4	2,441.3	1,090.4	1,154.3	123.7	124.6	449.1	479.8	563.8	555.9	42.3	38.2
Canada	127.2	138.7	57.8	65.7	9.9	10.1	26.3	32.2	37.0	38.6	2.8	2.7
Mexico	56.8	62.3	16.8	17.9	5.3	6.2	5.4	5.9	27.8	29.2	.6	.6
Argentina	[2] 46.3	[2] 46.9	13.7	13.5	5.7	6.2	6.6	6.9	34.1	34.5	1.1	1.2
Brazil	[2] 1.3	1.4	17.2	20.4	2.3	2.7	5.1	6.3	13.2	14.9	1.0	1.1
Venezuela	114.4	125.8	7.3	7.9	2.1	2.3	5.3	5.3	10.6	13.7	.3	.3
Belgium and Luxembourg	6.4	19.2	7.5	7.7	.4	.6	3.9	4.6	7.6	6.9	.7	.6
France	136.1	157.8	25.7	29.2	1.1	1.0	12.6	16.3	40.2	46.7	2.8	2.7
Germany, West	34.5	37.6	13.7	14.3	.4	.4	12.2	15.5	7.9	8.2	2.5	2.5
Italy and Trieste	54.5	72.8	7.2	8.8	1.9	1.9	7.4	8.8	25.6	28.3	1.1	.9
Netherlands	50.4	54.5	6.2	5.7	2.1	2.3	6.4	8.7	13.7	14.7	.5	.5
Spain	2.6	6.6	4.4	4.8	.2	.3	2.4	2.7	3.3	4.5	.5	.4
Sweden	7.5	8.2	7.7	7.6	2.3	2.1	10.1	12.9	12.9	12.3	.6	.5
United Kingdom	120.9	164.3	52.9	53.4	13.9	15.2	27.5	28.6	43.9	52.3	5.7	5.4
Iraq	3.9	[2] 5.0	.9	.8	.9	.9	.9	.5	2.0	2.8	.1	.1
Israel	5.4	6.1	1.6	1.4	.9	1.1	.9	.9	2.9	3.1	.1	.1
Saudi Arabia	58.1	62.2	.7	.9	.1	.1	1.5	2.7	8.1	9.0	----	----
Syria—Lebanon	----	----	1.2	1.6	.5	.6	.9	1.2	1.0	1.6	.1	.1
Turkey	.1	.1	2.1	2.7	1.3	1.6	1.1	1.5	.3	.4	.2	.3
Ceylon	----	----	1.0	1.1	.5	.5	1.2	1.2	3.8	3.7	.1	.1
India	[3] 3.9	[3] 4.0	8.1	8.1	8.6	8.7	5.7	5.0	6.6	5.8	1.3	1.3
Indochina	----	----	.8	1.1	.3	.3	.3	.4	.2	.3	.1	.1
Japan	19.8	30.8	5.2	9.9	.8	.7	2.4	2.5	13.4	19.8	1.8	2.4
Malaya	----	----	2.4	2.5	.6	.7	5.5	5.9	7.0	9.9	.2	.2
Pakistan	([3])	([3])	1.5	1.5	1.2	1.4	1.1	1.3	5.3	4.6	.2	.2
Thailand	----	----	1.0	1.3	.4	.5	.9	.9	----	----	.1	.1
Algeria	----	----	1.8	2.0	.5	.5	1.0	1.1	5.8	5.3	.2	.1
Egypt	16.8	17.4	2.6	2.5	4.8	5.3	[4] 5.1	[4] 4.3	[4] 18.9	[4] 17.8	[4] .4	.3
Morocco, French	.6	.7	2.1	2.3	.3	.3	1.1	1.0	1.7	1.7	.1	.1
Australia	6.7	7.1	19.0	21.8	3.6	3.6	8.5	9.8	10.3	8.0	1.2	1.5
New Zealand	----	----	5.1	5.3	.2	.2	1.4	1.4	2.2	2.6	.2	.3
Philippine Islands	----	----	4.1	4.2	1.2	1.2	2.4	2.6	2.4	2.4	.2	.3
Total	3,244.6	3,470.8	1,389.7	1,482.2	198.0	204.1	622.2	678.7	933.5	959.5	69.1	65.2

[1] Domestic demand is a derived figure representing domestic production, adjusted for increase or decrease in reported year-end stocks, plus imports, less exports.
[2] Partly estimated.
[3] This partly estimated figure is the total for India, Burma, and Pakistan.
[4] Includes transit trade in ships bunkers.

SOURCE: Petroleum and Natural Gas Branch, Bureau of Mines, World Petroleum Statistics 52, 1952; and World Petroleum Statistics 39, 1951.

FUEL TECHNOLOGY

Increased mechanization, research to improve the mining, preparation, and utilization of coal, enactment of the Federal Coal-Mine Safety Act, and an agreement increasing the basic wages of coal miners highlighted the coal picture in 1952. Despite increased competition from petroleum and natural gas, the outlook for coal was brightened by a number of encouraging developments. Of immediate interest were the increases in production per man day for both bituminous coal and anthracite, the beginning of a new chemicals-from-coal industry, and rising price trends for natural gas. Other encouraging factors were the increased use of coal by the expanding electric-utility industry, including rapid growth in power requirements for the atomic energy program, and the President's Materials Policy Commission report and other publications clearly indicating the significance of coal as the Nation's basic energy resource of the future.

COAL AND RELATED PRODUCTS

Significant developments during 1952 in the coal industry, and in coal research and technology are briefly described under the functional headings that follow. More detailed information regarding these developments may be found in the footnote references cited.

Exploration, Geology, and Reserves.—A significant contribution to the literature on coal reserves was published in 1952 as a book [1] analyzing existing fuel and energy resources of the world and giving past and present trends in the use of energy and the effects of such trends on energy supplies. New estimates of coal reserves in South Dakota [2] and Virginia [3] were published by the Federal Geological Survey; and that agency, together with State agencies, published detailed reports describing the geology and coal resources of 8 coal-bearing areas. The Bureau of Mines published 4 reports on minable reserves of coal in strategic areas, 3 on coking-coal deposits in this country,[4 5 6] and 1 on bituminous coal in Alaska.[7] The Bureau also published reports giving known recoverable reserves of coking coal in 2 West Virginia counties [8 9] and 1 each in Pennsylvania [10] and Kentucky.[11]

[1] Ayres, Eugene, and Scarlott, Charles A., Energy Sources—the Wealth of the World: McGraw-Hill Book Co., Inc., New York; 1952, 344 pp.

[2] Brown, Donald M., Lignite Resources of South Dakota: Geol. Survey Circ. 159, 1952, 18 pp.

[3] Brown, Andrew, Berryhill, Henry L., Jr., Taylor, Dorothy A., and Trumbull, James V. A., Coal Resources of Virginia: Geol. Survey Circ. 171, 1952, 57 pp.

[4] Toenges, Albert L., Turnbull, Louis A., Davis, J. D., Reynolds, D. A., Parks, B. C., Cooper, H. M., and Abernethy, R. F., Coal Deposit, Coal Creek District, Gunnison County, Colo.: Bureau of Mines Bull. 501, 1952, 83 pp.

[5] Toenges, Albert L., Williams, Lloyd, Turnbull, Louis A., Parks, B. C., O'Donnell, H. J., Abernethy, R. F., Ode, William H., and Waage, Karl M., Castleman Basin, Garrett County, Md.: Bureau of Mines Bull. 507, 1952, 122 pp. (with maps).

[6] Toenges, Albert L., Turnbull, Louis A., Shields, Joseph J., Haley, W. A., Parks, B. C., and Abernethy, R. F., Coal Deposits in the Deep River Field, Chatham, Lee, and Moore Counties, N. C.: Bureau of Mines Bull. 515, 1952, 41 pp.

[7] Jolley, Theodore R., Toenges, Albert L., and Turnbull, Louis A., Bituminous-Coal Deposits in the Vicinity of Eska, Matanuska Valley Coal Field, Alaska: Bureau of Mines Rept. of Investigations 4838, 1952, 87 pp.

[8] Dowd, James J.. Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A., Estimate of Known Recoverable Reserves of Coking Coal in Raleigh County, W. Va.: Bureau of Mines Rept. of Investigations 4893, 1952, 37 pp.

[9] Wallace, Joseph J., Dowd, James J., Tavenner, William H., Provost, John M., Abernethy, R. F., and Reynolds, D. A., Estimate of Known Recoverable Reserves of Coking Coal in McDowell County, W. Va.: Bureau of Mines Rept. of Investigations 4924, 1952, 26 pp.

[10] Dowd, James J., Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A., Estimate of Known Recoverable Reserves of Coking Coal in Jefferson County, Pa.: Bureau of Mines Rept. of Investigations 4840, 1952, 18 pp.

[11] Dowd, James J., Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A., Estimate of Known Recoverable Reserves of Coking Coal in Knott County, Ky.: Bureau of Mines Rept. of Investigations 4897, 1952, 20 pp.

Constitution, Petrography, Properties, and Analysis.—The Bureau of Mines cooperated with the Economic Commission for Europe and with the International Organization for Standardization in efforts to develop, respectively, an international coal-classification system and methods of sampling and analyzing coal for international use. Bureau investigations of coal reflectance,[12] while they did not confirm one British theory regarding the interpretation of reflectance studies, did show the value of such studies for classifying petrographic constituents of coal. The Coal Research Laboratory of Carnegie Institute of Technology, Pittsburgh, Pa., subjected bituminous coals to various mild reactions and, in identifying the products obtained, indicated the aromatic structure of coal and the abundance of polymers of 6- and 5-membered rings;[13 14 15] they also published data on the reactivity of coke,[16] showing quantitative relations between dry, ash-free volatile-matter content and reactivity indices.

Other research groups studying the fundamental structure and properties of coal included the Division of Fuel Technology, Pennsylvania State College, where ozone was used in studies of coal constitution,[17] the Alabama State Mine Experimental Station, where nitric acid was used in studying rates of oxidation of coal, and the Natural Resources Research Institute, University of Wyoming, where the fundamental composition of subbituminous coals was investigated by isolating chlorinated compounds. The Bureau of Mines published analytical data on foreign [18] and Ohio [19] coals. There was considerable interest in the possibilities of the recovery of rare elements from coal. The Eagle-Picher Co. analyzed hundreds of coal samples for germanium content, and the Federal Geological Survey conducted a survey of American coals to determine germanium content in the ash.

Mining and Mine Transportation.—Accelerated development and use of continuous mining machines, of conveying and transporting equipment for use with continuous miners, and of roof bolting were the outstanding developments in coal mining and mine transportation in 1952. The Bureau of Mines, in cooperation with Eastern Gas & Fuel Associates and Mining Progress, Inc., reported successful application of a German coal planer to modified longwall mining of a 34-inch bed of Pocahontas coal in West Virginia.[20] Recovery of coal from the first experimental panel was 83.3 percent, maximum production per shift was 800 tons, and average for the panel was 553 tons of clean coal per shift, while average production, including development work, was 12.3 tons per man-shift, an increase of 20 percent over average production per man-shift at this mine. Effective roof control was obtained with yielding steel props and wood cribs. Other

[12] McCartney, J. T., A Study of the Seyler Theory of Coal Reflectance: Econ. Geol., vol. 47, 1952, pp. 202–210; disc., pp. 211–215.
[13] Howard, H. C., Evidence for the Cyclic Structure of Bituminous Coals: Ind. Eng. Chem., vol. 44, May 1952, pp. 1083–1088.
[14] Savich, T. R., and Howard, H. C., Oxidation of Bituminous Coal to Organic Acids by Nitric Acid and Oxygen: Ind. Eng. Chem., vol. 44, June 1952, pp. 1409–1411.
[15] Roy, A. N., and Howard, H. C., Solvent Fractionation of Polycarboxylic Acids From Oxidation of Coal: Jour. Am. Chem. Soc., vol. 74, July 1952, pp. 3239–3242.
[16] Weisz, H. L., and Orning, A. A., Reactivity of Cokes: Fuel, vol. 31, No. 3, July 1952, pp. 288–301.
[17] Kinney, C. R., and Friedman, L. D., Ozonation Studies of Coal Constitution: Jour. Am. Chem. Soc., vol. 74, Jan. 5, 1952, pp. 57–61.
[18] Morgan, R. E., and Barkley, J. F., Analyses of Foreign Coal: Bureau of Mines Bull. 512, 1952, 35 pp.
[19] Fieldner, A. C., Taylor, Dorothy A., Toenges, Albert L., Crentz, William L., Fraser, Thomas, Young, W. H., Anderson, R. L., Snyder, N. H., Cooper, H. M., Abernethy, R. F., and Hartner, F. E., Analyses of Ohio Coals: Bureau of Mines Bull. 499, 1952, 93 pp.
[20] Haley, Wilbur A., Dowd, James J., and Turnbull, Louis A., Modified Longwall Mining With a German Coal Planer (Plow) in the Pocahontas No. 4 Coal Bed, Helen, W. Va.: Bureau of Mines Rept. of Investigations 4922, 1952, 13 pp.

operators were making arrangements to try the coal planer in thicker, less friable coal beds.

Another continuous-type machine for mining thin bituminous-coal beds was the Cardox-Hardsocg underground coal-recovery drill tested in 32-inch coal in eastern Kentucky.[21] Designed for use in thin coal under bad roof conditions, the unit tested had a 25-inch-diameter cutting head for drilling 100-foot holes from entries developed to leave 100- by 200-foot blocks for drilling. Other types of auger machines were experimentally tested underground in 1952, while use of augers operating at the outcrop or at the highwall limit of stripping operations increased, augers up to at least 4 feet in diameter being used. The Department of Mining and Metallurgical Engineering, University of Kentucky, announced completion of its design of a coal auger.

Late in the year, an electronically controlled auger-type continuous mining machine was announced [22] by Carbide & Carbon Chemicals Co. for mining coal by drilling holes about 3 feet high by 10 feet wide and 700 to 1,000 feet long into the bed from the outcrop. Electric sensing devices mounted on the outer 2 of the 4 rotating cutting heads transmit signals to the operator in the control cab at the outcrop, enabling him to control the direction of drilling. Designed for use in the West Virginia hill country, where relatively flat lying seams of bituminous coal outcrop on ridges, the machine is adapted to move itself along a bench cut in the hillsides, and the first experimental machine attained a maximum production in 1 shift of 567 tons, with recovery of about 65 percent from the bed.

During the year, production of bituminous coal from ripping-, boring-, and vibrating-type continuous mining machines previously developed and in commercial production continued to expand. The Bureau of Mines completed and published results of a study of pillar extraction with mechanized equipment [23] and began a study of operation in mines, using various types of continuous mining machines. With development of large-capacity mobile loaders that could operate in 30- to 36-inch beds, mechanical mining equipment similar to that previously used in thicker beds became available for mechanization of mining in thin beds. Equipment manufacturers, working in cooperation with the operators, devoted considerable effort to developing an improved flow of coal from the machine at the face to the tipple. As much of the coal from continuous miners was handled by mobile loaders and shuttle cars following the machines, many ideas for continuous gathering behind continuous-type machines materialized in 1952. An extendable belt conveyor was placed in coal mines, as were trains of conveyors comprising a receiving unit, a discharge unit, and up to 20 or more intermediate units. Where roof conditions permitted, there was limited expansion of the so-called piggy-back and chain-conveyor systems.

In the anthracite region of Pennsylvania, the Bureau of Mines conducted field investigations at mines in the region and did test and design work at the Anthracite Research Laboratory, Schuylkill

[21] Newell, J. P., and Storey, R. W., Experiments With an Underground Auger: Min. Eng., vol. 4, No. 7, July 1952, pp. 677–681.

[22] Mining Congress Journal, Carbide & Chemical Co., Develop New Mining Rig: Mining Cong. Jour., vol. 38, No. 11, November 1952, pp. 60–63.

[23] Haley, W. A., Shields, J. J., Toenges, A. L., and Turnbull, L. A., Mechanical Mining in Some Bituminous-Coal Mines. Progress Report 6, Extraction of Pillars With Mechanized Equipment: Bureau of Mines Inf. Circ. 7631, 1952, 64 pp.

Haven, Pa. Pneumatic packing of first-mined areas to permit recovery of pillars left in previous mining operations was studied. Initial work was begun on the design of a movable steel shield that would protect miners at the face by moving forward as the face advances. To provide design data on loads that might be encountered in use of such a shield, tests were made of loads borne by underground-roadway supports. Longhole retreat mining was tested in a steeply pitching anthracite bed and gave high rates of production, low consumption of explosives and timber, high percentage of recovery, an exceptionally clean product with an increased proportion of the larger sizes, and less arduous mining under safer conditions.[24] Initial tests of two other methods of mining in steeply pitching anthracite beds, mining by induced caving, and mechanical mining of coal left below rockholes were successfully concluded, and plans were made to continue test work in new sections. Other Bureau mining research projects in progress in the anthracite region included: Underground storage, transmission, and distribution of compressed air; use of yielding steel supports in combination with backfilling to eliminate wooden props, improve roof conditions, and increase recovery from thick flat beds; development of lightweight aggregate concrete roof supports; obtaining accessory equipment to permit testing of a vibrating-blade coal planer; design of a large-diameter coal drill or auger for developing entries and raises; and testing of a Bureau-designed scraper-shaker-loader for gangway development.

Results of extensive Bureau of Mines studies of the mine-water problem in the anthracite region were published, giving data on barrier pillars,[25] surface-water seepage,[26] and shafts for a proposed mine water drainage tunnel.[27]

Roof bolting has made spectacular advances since it was first systematically installed in coal mines in 1947, and these advances continued in 1952 with properly installed bolting providing increased efficiency and safety.[28 29] There was an increase of bolting in the face cycle, and at mines where difficult roof conditions made other types of support extremely costly or insecure. The University of West Virginia Engineering Experiment Station has investigated stresses in roof bolts and has also studied the use of wooden bolts. A centrifugal testing apparatus was constructed at the Bureau's College Park Station to test models of mine-roof formations to determine most efficient patterns for bolt installations and to develop the basic mathematical relationship of bolting.[30] Increased use of rotary drilling for roof bolting was noted,and although advances were made in methods of dust collection, the search for improvements continued.

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[24] Allan, Andrew, Jr., and Davies, Russell S., Anthracite Mechanical Mining Investigations. Progress Report 7. Longhole Retreat Mining of a Steeply Pitching Anthracite Bed: Bureau of Mines Rept. of Investigations 4925, 1952, 10 pp.

[25] Ash, S. H., Davies, B. S., Jenkins, H. E., and Romischer, W. M., Barrier Pillars in Lackawanna Basin, Northern Field, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 517, 1952, 114 pp.

[26] Ash, S. H., Eaton, W. L., and Whaite, R. H., Surface Water Seepage Into Anthracite Mines in the Lackawanna Basin, Northern Field, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 518, 1952, 37 pp.

[27] Ash, S. H., Doherty, R. Emmet, Miller, P. S., Romischer, W. M., and Smith, J. D., Core Drilling at Shaft Sites of Proposed Mine Water Drainage Tunnel, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 513, 1952, 43 pp.

[28] Kelly, L. W., Economic Benefits of Systematic Roof Bolting in Ziegler No. 3 Mine, Bell & Zollar Coal & Mining Co., Williamson County, Ill.: Bureau of Mines Inf. Circ. 7633, 1952, 9 pp.

[29] Kelly, L. W., Economies Through Roof Bolting in an Indiana Coal Mine: Bureau of Mines Inf. Circ. 7653, 1952, 10 pp.

[30] Panek, Louis A., Centrifugal Testing Apparatus for Mine-Structure Stress Analysis: Bureau of Mines Rept. of Investigations 4883, 1952, 22 pp.

In strip-coal mining, as the percentage of coal produced by stripping rose to 23.3 percent of total coal produced, improvements in equipment design through use of more power and of lightweight alloys to reduce weight and increase capacity enabled operators to handle deeper and harder overburden and to move material over greater distances. Additional installations were made of large walking draglines and of higher capacity shovels, and the necessity of drilling and shooting deeper and harder overburden was met by increased use of vertical drilling with pneumatic hole-cleaning. Aerial photography was used by the Atlas Powder Co. in helping operators improve blasting efficiency. Contour stripping continued at a high rate in bituminous coal, and many operators used coal augers to supplement their stripping production. In anthracite, there was a trend to more deep opencut mining with spoil haulage. Development and construction of larger and more powerful haulage equipment, including double-engine units, permitted increase of semitrailer capacity from about 80 to about 100 tons. Increased attention was given to reclamation of stripped land, and spoil leveling restored some land to agricultural and cattle-raising uses. Use of plastic and quick-coupling aluminum pipe and an interesting application of resin-bonded paper sheets for drainage flume sections aided in solving surface and strip-pit drainage problems and preventing stream pollution from acid mine water.

Outstanding accomplishments for 1952 in coal-mine safety were the lowest number of deaths in the history of the coal industry, and the lowest rates of occurrence. Although there were 2 major disasters (that is, those with loss of more than 5 lives), 1 in bituminous and 1 in anthracite mining, the total fatalities, 548 for the year, were 37 less than the previous low in 1949 and 237 less than 1951. The 449 fatalities in and around bituminous-coal mines gave death rates of 0.96 per million tons and 0.83 per million man-hours as compared to previous lows of 1.07 and 0.92, respectively, in 1950. In the anthracite region, there were 93 fatalities at underground mines and 6 at strip pits. Injury experience at anthracite mines hit a record low in 1952, but the actual number of nonfatal injuries at bituminous-coal and lignite mines increased from 1951.

The Bureau of Mines continued its research and test work to improve health and safety in coal mining with studies on the flammability of gases,[31] ignition of coal dust by explosives,[32] the blasting of coal,[33] [34] hazards of firing open shots,[35] design of explosion-proof mining equipment,[36] and the use of electricity and electrical equipment in mining.[37] [38] [39] As part of its coal-mine inspection work, the

[31] Coward, H. F., and Jones, G. W., Limits of Flammability of Gases and Vapors: Bureau of Mines Bull. 503, 1952, 155 pp.

[32] Hartmann, Irving, Nagy, John, McGibbeny, E. B., and Christofel, F. P., Ignition of Coal Dust by Permissible Explosives: Bureau of Mines Rept. of Investigations 4873, 1952, 18 pp.

[33] Hartmann, Irving, Nagy, John, and Howarth, H. C., Experiments in Multiple Short-Delay Blasting of Coal (in two parts), Part I: Bureau of Mines Rept. of Investigation 4868, 1952, 16 pp.

[34] Nagy, John, Hartmann, Irving, Christofel, F. P., and Seiler, E. C., Experiments on Multiple Short-Delay Blasting of Coal (in two parts), Part II: Bureau of Mines Rept. of Investigations 4875, 1952, 22 pp.

[35] Ankeny, M. J., Hazard of Firing Open, Unconfined Shots in Coal Mines: Bureau of Mines Inf. Circ. 7632, 1952, 4 pp.

[36] Gleim, E. J., and Marcy, J. F., A Study to Determine Factors Causing Pressure Piling in Testing explosion-Proof Enclosures: Bureau of Mines Rept. of Investigations 4904, 1952, 9 pp.

[37] Bureau of Mines, American Standard Safety Code for Installing and Using Electrical Equipment in and About Coal Mines (M2.1) (Revision of American Standard Safety Rules for Installing and Using Electrical Equipment in Coal Mines, M2-1926), American Standards Association, Sponsored by American Mining Congress and Bureau of Mines: Bureau of Mines Bull. 514, 1952, 28 pp.

[38] McCall, M. C., and Harrison, L. H., Some Characteristics of the Earth as a Conductor of Electric Current: Bureau of Mines Rept. of Investigations 4903, 1952, 9 pp.

[39] Holcomb, J. W., Modern Automatic Electrically Controlled Elevators for Transporting Men at Two Coal Mines in Western Pennsylvania: Bureau of Mines Inf. Circ. 7628, 1952, 5 pp.

Bureau analyzed thousands of samples of mine air and of coal and rock dusts and issued schedules for approval of equipment [40] and instructions and suggestions for improving mine operations and reducing hazards.[41] [42] [43] Passage of the Federal Coal-Mine Safety Act in July 1952 gave Bureau of Mines inspectors authority to close coal mines where conditions make disaster imminent.

Tests to remove methane from coal beds before mining were conducted in gassy beds in Pennsylvania and West Virginia in 1952 to reduce methane emission and increase safety of mining.

Coal Preparation, Transportation, and Briquetting.—Nearly half—49 percent—of the bituminous coal produced in 1952 was cleaned mechanically. On a percentage basis, this was an increase of 4 percent over 1951, although on a tonnage basis there was a decrease of nearly 13 million tons. This clearly shows that, as competition becomes more severe, prepared coal is better able to hold its markets.

Of the conventional wet methods of coal cleaning, actual tonnage increases were shown for launders and for jig and table combinations, reflecting the increased interest in fine-coal cleaning. In addition, percentage increases were shown for coal cleaned by jigs and by combination methods other than jigs and tables. The latter emphasizes the trend to more complicated and varied flowsheets to meet diverse market demands and obtain maximum recovery of coal; examples of this are the use of dual-density and three-product separating systems. Pneumatic systems increased in 1952, both on a tonnage and a percentage basis; as these are normally used to clean fine coal up to a maximum of ¼- to ¾-inch size, this further emphasizes the interest in the cleaning and recovery of fine coal. A recent innovation in dry cleaning is the vacuum jig for cleaning slack coal.

Several new types of heavy-medium processes—the Tromp, the countercurrent separator, and the Roller cleaner—were introduced. The wet cyclone has been investigated for use as a separator of coal from refuse and as a thickener to remove solids from effluent liquids to avoid stream pollution. The Bureau of Mines continued research on its kerosine-flotation process to increase cell capacity, and a field study of launder screens for cleaning and dewatering fine sizes of anthracite was completed.

Electrical heating of the screen cloth of vibrating screens has resulted in increased efficiency in screening fine coal. Thermal drying to remove surface moisture from small sizes received increasing attention with introduction of a new-type updraft drier and a downdraft-updraft type.

A new process for removing inherent moisture from high-moisture, low-rank coals was developed by the Bureau of Mines in cooperation with the Texas Power & Light Co. and is being applied by that company to the drying of lignite for a power plant at Rockdale, Tex. Lignite crushed to minus-¼-inch size is entrained in a stream of hot gases (products of combustion) and in this fluidized bed is dried in less than a minute from around 35 to 5 percent moisture or less. The

[40] Bureau of Mines, Procedure for Testing Dust Collectors for Permissibility for Use in Connection With Rock Drilling in Coal Mines: Code of Federal Regulations, Title 30, chap. 1, subchap. E, part 33, Federal Register, vol. 17, No. 25, Feb. 5, 1952, pp. 1118-1121. (Designated as Bureau of Mines Sched. 25.)

[41] Kingery, D. S., Recommendations for Improved Shuttle-Car-Haulage Safety: Bureau of Mines Inf. Circ. 7638, 1952, 10 pp.

[42] Kingery, D. S., and Baker, F. D., A Practical Method for Teaching Mine Workers and Officials Use of Gas-Detecting Equipment: Bureau of Mines Inf. Circ. 7639, 1952, 6 pp.

[43] Ankeny, M. J., Westfield, James, and Kingery, D. S., Ventilating Practices That Minimize Explosion Hazards in Bituminous-Coal Mines: Bureau of Mines Inf. Circ. 7648, 1952, 6 pp.

first commercial unit of this process was constructed and tested in 1952, and pilot-plant tests and design work were proceeding on a fluidized-bed carbonizer to follow the drying stage and yield char for the power-plant boilers, low-temperature tars and chemicals, and gas for process heating.

Pennsylvania State College investigated dewatering of fine coal, the nature of the coal-water bond, and factors influencing the strength of frozen coal. Various methods of combating the problem of frozen coal in rail cars have been used by industry—shakers, rams, freeze-proofing before loading with salt solutions or oil, and thawing with oil or gas torches or in steam sheds.[44]

One proposed solution to this difficulty, and to the high cost of transportation generally, is pipeline transmission of coal. The Pittsburgh Consolidation Coal Co. continued its studies of long-distance pipeline transmission of coal in water in its experimental line at Cadiz, Ohio. In tests of pneumatic transportation of coal over short distances, the Bureau of Mines found that about 20 pounds of pulverized coal could be transported for each cubic foot of air used from one piece of equipment to another in its pilot-scale synthetic-fuel-gasification laboratory at Morgantown, W. Va.

Production of fuel briquets declined 5 percent, and that of packaged fuel dropped 20 percent as oil and gas fuels encroached farther into the residential heating field. Major interest in these operations focused on drying of coal before processing and on binder properties and specifications.

UTILIZATION

Burning as Fuel.—Use of coal as fuel for electric power generation again increased in 1952 to a new high of over 103 million tons, although consumption by all other classes of consumers dropped. Railroad use of coal as fuel dropped sharply as the railroads continued their conversion to diesel operation. Electric power generation is now the most promising market for fuel use of coal, since further increases in the burning of coal for electric power production will follow as plants planned or under construction in 1952 come into operation to firm up and supplement hydro-generated power, to meet the huge power requirements of atomic energy programs, and to meet increasing industrial and domestic demands upon utility power-generating facilities. Fuel-generated electric power production has been doubling about every 10 years in a trend that shows no signs of abating. Possibilities of displacement of coal by atomic energy for electric power production, while being considered by cooperating groups of large utility companies and the Atomic Energy Commission, appears to be some years in the future; meanwhile, electric power requirements of atomic energy programs are requiring rapid expansion of coal-fired electric generating facilities.

During the year the trend continued toward high steam temperatures and pressures for thermal electric generating stations, and there was a significant increase in the use of the reheat cycle, cyclone furnaces, and controlled circulation in the water circuit. Improvement in fuel and steam turbine efficiency with the new large boilers and turbine units, resulting more from refinements in design than from revo-

[44] Mining Engineering, Four Solutions to Cold Weather Unloading: Vol. 4, No. 9, September 1952, pp. 870–873.

lutionary change, is shown in the decrease in average central station coal rate from 1.13 pounds per kilowatt-hour in 1951 to 1.09 in 1952 as new, more efficient units were put in operation. With heat requirements in the most recent, large, single, boiler-turbine generator units down to around 9,000 B. t. u. per kilowatt-hour, or about ¾ pound of coal per kilowatt-hour, the average central-station coal rate will continue to drop as new units are placed in service, although overall coal consumption will rise with increased generation of electric power. The design of new boilers and turbines was featured by an almost universal adoption of reheat, increase of steam temperatures up to 1,100° F. and steam pressures up to 2,300 pounds per square inch, and use of single boiler-turbine units with turbines of up to 250,000 kilowatt nameplate rating. Several boilers were placed in service, with the furnace operating at slight positive pressure. Still higher temperatures, pressures, and ratings were being considered for future installations, as well as application of the "once-through" principle. In the field of industrial heat and power generation, boiler sizes and steam pressures averaged much lower than in the utility-type plant, since the majority of boilers going into industrial plants and institutions have heating or process loads. By far the largest number of industrial boilers installed were in the lower pressure range—299 pounds per square inch or below. As compared to utility plants, where the largest number of new plants were in the range of 1,000 to 1,099 thousand pounds of steam per hour capacity, the size of the largest number of new industrial boilers was in the 29,000 or less pounds per hour category.

Pulverized-coal firing predominates for the larger utility-type plants, while spreader-stoker firing was selected for the largest number of new industrial boilers.

Research on the use of coal as fuel included fundamental studies by the Carnegie Institute of Technology, Coal Research Laboratory, on combustion reactions [45] and on the stability of small pulverized-coal flames. The Bureau of Mines investigated heat absorption and flow of gases in a large spreader-stoker boiler.[46] Bituminous Coal Research, Inc., continued experimental work on a small, automatic, coal-fired, steam generator and made studies looking to the design of spreader stokers that would meet municipal air-pollution ordinances. Equipment manufacturers, coal producers' associations, and State and university research groups have conducted research and tests to improve the design and operation of both industrial and domestic stokers and boilers, and several new units have been developed, including a residential stoker with several new features and crop driers.

Although the railroads continued to turn more and more to diesel locomotives, the Norfolk & Western announced it was having built a new-type, 4,500-horsepower, coal-fired, steam-turbine locomotive. The locomotive-size coal-fired gas-turbine unit being tested by the Locomotive Development Committee of Bituminous Coal Research, Inc., was run for about 33 days, but still was not perfected to the point of construction of a unit for operation on rails.

Interest in smoke abatement and reduction in air pollution continued high and was responsible for a number of research projects and coop-

[45] Reif, Arnold E., The Mechanism of the Carbon Dioxide-Carbon Reaction: Jour. Phys. Chem., vol. 56, June 1952, pp. 785–788.

[46] Myers, J. W., and Corey, R. C., Furnace-Heat Absorption in a Spreader-Stoker-Fired Steam Generator. 1. Furnace Heat Absorption Efficiency as Shown by Enthalpy of Gases Leaving the Furnace: Pres. at Ann. Meeting, Am. Soc. Mech. Eng., New York, N. Y., Nov. 30–Dec. 5, 1952.

erative studies, including Bureau of Mines studies of means of extinguishing and preventing fires in mine-refuse piles, and design of incinerators.

Carbonization.—As regards high-temperature carbonization, 1952 was a year of considerable expansion of capacity, with completion of 947 new ovens of 5.3 million tons annual coke capacity and with 1,075 ovens of 6 million tons annual capacity under construction at the end of the year. Part of this apparent gain was lost, however, through cessation of operation of 658 ovens, with an annual coke capacity of 2.9 million tons, either for rebuilding or permanent retirement, including 2 oven-coke plants retired because natural gas removed markets for coal gas and for coke for water-gas manufacture. Actual coke production during the year was lower than in 1951 from both slot-type and beehive ovens, primarily because of the steel strike.

Both fundamental and applied research on coal carbonization was conducted by the Bureau of Mines and by various State-, university-, and industry-sponsored organizations and groups. This work covered studies of the basic coking phenomena,[47] carbonizing properties of various coals and blends,[48 49 50 51] effect of particle size on carbonizing properties,[52] use of low-temperature coke as a substitute for low-volatile coal, and evaluation of both high- and low-temperature cokes, tars and chemical products, and gases.

The Bureau continued its cooperative work with Texas Power & Light Co. on development of the fluidized-bed drying and low-temperature carbonizing process to provide char for power boilers and tars and liquid products for various chemical uses from Texas lignite, as mentioned previously under Coal Preparation, Transportation, and Briquetting.

The University of Kentucky and the Southern Research Institute (Birmingham, Ala.) carried on low-temperature carbonization research. The plants of the Pittsburgh Coal Carbonizing Co. and the Dakota Briquets & Tar Products, Inc., were the only two commercial low-temperature carbonizing plants operating during the year in this country.

Chemical and Miscellaneous Uses.—Establishment of a coal-chemicals-manufacturing industry has been the goal of research by the Pittsburgh Consolidation Coal Co. and by Carbide and Carbon Chemicals Co., culminating in opening of the latter's semicommercial plant at Institute, W. Va., for producing coal chemicals by mild hydrogenation of coal. This plant was constructed to determine technical and economic factors involved in large-scale production and marketing of coal chemicals. Research to develop miscellaneous uses of coal included work on anthracite fines as a filtration medium

[47] Smith, Frank W., and Brown, Ralph L., How Does Coal Coke?: Am. Gas Assoc. Paper PC-52-15, 1952, 11 pp.

[48] Davis, J. D., Reynolds, D. A., Brewer, R. E., Wolfson, D. E., Naugle, B. W., and Birge, G. W., Carbonizing Properties: West Virginia Coals From the Pittsburgh Bed, Jamison No. 9 Mine, Marion County and Upper Freeport Bed, Bull Run No. 1 Mine, Preston County: Bureau of Mines Bull. 506, 1952, 31 pp.

[49] Davis, J. D., Reynolds, D. A., Brewer, R. E., Naugle, B. W., Wolfson, D. E., Gibson, F. H., and Birge, G. W., Carbonizing Properties: British Columbia, Matanuska Valley (Alaska), and Washington Coals and Blends of Six of Them With Lower Sunnyside (Utah) Coals: Bureau of Mines Bull. 510, 1952, 42 pp.

[50] Davis, J. D., Reynolds, D. A., Brewer, R. E., Wolfson, D. E., Naugle, B. W., Frederic, W. H., and Birge, G. W., Carbonizing Properties: Eastern Kentucky Coals From Elkhorn No. 1, Elkhorn No. 2, Leatherwood, and Harlan Beds: Bureau of Mines Bull. 511, 1952, 33 pp.

[51] Reed, F. H., Jackman, H. W., Rees, O. W., and Henline, P. W., Some Observations on the Blending of Coals for Metallurgical Coke: Illinois State Geol. Survey Circ. 178, 1952, 8 pp.

[52] Mandal, A. K., and Orning, A. A., A Test of a Reported Effect of Pulverization Upon the Carbonization Properties of Coal: Carnegie Inst. Technol. Coal Research Lab. Contrib. 175; also Fuel, vol. 31, January 1952, pp. 33-36.

and treatment of both eastern and western coals to produce low-ash coals and chars for electrometallurgical and electrochemical use.

Gasification.—Although natural gas continued to displace manufactured gas for utility distribution in this country, a substantial amount of research work was undertaken by various research groups with a number of objectives, including the making of synthesis gas by the Bureau of Mines as one step in synthetic liquid fuels production, development of efficient gas producers for industrial process heating, gasification of high-ash bone-coal colliery waste materials for colliery steam generation, and fundamental studies of the mechanisms and kinetics of complete gasification of coal.[53] [54]

A bibliography of coal gasification [55] listed about 400 references.

Feasible designs for gasifiers for converting pulverized coal entrained in a mixture of steam and oxygen have been developed and tested by the Bureau of Mines at Morgantown, W. Va., in pilot plants using 500 to 1,600 pounds of coal per hour. Additional operation of such gasifiers, particularly at elevated pressure (300 to 600 p. s. i.), is in progress to determine the effect of process variables. Laboratory research has been begun on processes for producing synthesis gas from coal, using air rather than oxygen.

The synthesis of high-B. t. u. gas by catalytic hydrogenation of carbon monoxide has been studied in a fluidized bed of both iron and nickel catalysts at the Bruceton, Pa., laboratories of the Bureau of Mines. By the use of multiple feed ports the initial thermal shock to the catalyst upon contact with the synthesis gas was largely eliminated, the temperature gradient through the reactor was reduced, and the extent of disintegration of the catalyst was greatly reduced. The life of nickel catalysts in the presence of various concentrations of sulfur compounds was determined in a laboratory fixed-bed reactor.

Early in the year, the Missouri School of Mines published the results of its cooperative tests with the Sinclair Coal Co. on underground electrocarbonization and gasification of coal at Hume, Mo.,[56] and during the year the Bureau of Mines, in cooperation with the Alabama Power Co. and the Sinclair Coal Co., used electrolinking quite successfully in opening up passages through a coal bed at the Gorgas, Ala., underground gasification project. The First International Conference on the Underground Gasification of Coal was held at Birmingham and Gorgas, Ala., in February 1952 and gave an opportunity for free exchange of information and experiences in underground gasification here and abroad by the American and foreign participants.

Synthetic Liquid Fuels.—In addition to the high-pressure gasification of coal and the synthesis of high-B. t. u. gas mentioned previously, Bureau of Mines research on the production of synthetic liquid fuels from coal continued during 1952 in equipment ranging from laboratory to demonstration-plant scale. Catalyst development work by the Bureau of Mines on the production of liquid fuels from synthesis gas has resulted in cheaper and more durable catalysts. One of these consists of mild-steel lathe turnings activated by alternate oxidation and

[53] Elliott, M. A., Perry, H., Jonakin, J., Corey, R. C., and Khullar, M. L., Gasification of Pulverized Coal With Oxygen and Steam in a Vortex Reactor: Ind. Eng. Chem., vol. 44, No. 5, May 1952, pp. 1074–1082.

[54] Edmister, W. C., Perry H., Corey, R. C., and Elliott, M. A., Thermodynamics of Gasification of Coal With Oxygen and Steam. Charts for Material and Enthalpy Balance Calculations: Trans. Am. Soc. Mech. Eng., vol. 74, No. 5, July 1952, pp. 621–636.

[55] Busche, Robert M., Batchelder, Howard R., and Armstrong, Willard P., A Selected Bibliography of Coal Gasification: Bureau of Mines Rept. of Investigations 4926, 1952, 28 pp.

[56] Forrester, J. D., and Sarapuu, Erich, The Process of Underground Electrocarbonization: Univ. of Missouri School of Mines and Metallurgy Bull. 78, 1952, 84 pp.

reduction. In the oil-circulation process (where the heat of reaction is removed by direct heat transfer to oil circulation through the reactor and a heat exchanger) the much lower pressure drop with the new catalyst is a marked advantage.

The scrubbing of carbon dioxide from recycle gas in the Fischer-Tropsch process is an expensive step. A study of the efficiency of hot carbonate solutions rather than the conventional cold amine solutions has indicated a considerable saving in steam.

Operations have been suspended for an indefinite period at the Carthage Hydrocol, Inc., synthetic fuels plant at Brownsville, Tex. This plant is designed to produce daily about 6,000 barrels of synthetic gasoline, 900 barrels of gas oil, 200 barrels of fuel oil, and 300,000 pounds of water-soluble oxygenated chemicals by the hydrogenation of carbon monoxide in a fluidized bed of iron catalyst. The synthesis gas is produced by partial combustion of natural gas with oxygen. Poor operability of this plant appears to be due chiefly to inadequate large-scale development work.

Laboratory research on catalysis of the primary reaction in hydrogenation of coal at the Bruceton, Pa., laboratories of the Bureau of Mines has led to a highly aromatic gasoline in one step. The results are attractive, but a long road of engineering and development work must be traveled before the feasibility of this procedure can be evaluated.

PETROLEUM AND NATURAL GAS

During 1952 the petroleum and natural-gas industry established an alltime record by drilling 45,840 wells, including 23,466 oil wells, 3,255 gas wells, 1,482 service wells, and 17,637 dry holes. The average depth per well increased from 3,871 feet (1951) to 4,085. There were 1,685 wells drilled to depths ranging from 10,000 to 15,000 feet and 10 wells to depths greater than 15,000 feet. One well now being drilled in California may establish a new world record, exceeding the existing depth record of 20,521 feet previously reached in a dry and abandoned well in Wyoming.

The number of exploratory wells included in the above total also set a new record of 12,425, with completions as follows: 1,776 oil producers, 380 gas producers, 179 condensate producers, and 10,090 dry holes. Thus, approximately 81 percent of the exploratory wells drilled were unsuccessful. The successful exploratory wells increased United States proved recoverable reserves to an alltime high: For crude oil—28.0 billion barrels and natural-gas liquids—5.0 billion barrels, for a total of 33 billion barrels of liquid hydrocarbons.

Production of crude oil and condensate in the United States was the highest ever attained, despite refinery and pipeline strikes in May of 1952 and short supply of tubular goods. Production averaged 6.26 million barrels per day for a total of 2.292 billion barrels for the year. To meet the growing demands for crude oil, petroleum products, and natural gas, the industry completed 11,500 miles of crude-oil and products pipelines and 18,600 miles of natural-gas pipelines, including distribution lines. By the end of 1952, 382,133 miles of pipeline was in operation.

Research benefits were realized in well logging, drilling mechanics, drilling muds, cementing, well completions, pumping methods, corrosion, and reservoir mechanics. Design of model flow tests for

evaluating recovery processes in any type of reservoir was emphasized. Results of research were reflected in many pieces of new equipment and in the oilfield specialty services that serve the industry. The cost of drilling and producing oil and gas wells at depths of 15,000 to 20,000 feet stimulated metallurgical and chemical research and resulted in better tubular goods. Research on corrosion, which costs the petroleum and natural-gas industries hundreds of millions of dollars annually, was expanded. The industry, the Bureau of Mines, and State agencies increased their research efforts on secondary recovery methods and their possible application to the 332,000 stripper wells in the country.

The Bureau of Mines completed its part of cooperative engineering studies in Scurry and adjacent counties of Texas, fulfilling an agreement with the Geological Survey and the Petroleum Administration for Defense for a determination of the availability of petroleum and natural gas in the area. Technical investigations were made for the Department of the Navy to assist the exploratory drilling operations in Naval Petroleum Reserve No. 4, Alaska.

Engineering studies relating to the Missouri, Arkansas, and Washita River Basin projects were completed or are in various stages of completion. Bureau engineering reports on oil fields in West Virginia, Pennsylvania, Texas, and Oklahoma were published. Research on drilling muds, oil-well spacing, electrical well logging, and experimental well shooting is being continued. Encouraging results were obtained from selective plugging of highly permeable sections in gas-injection wells by using chemical smoke. Cooperative projects concerned with the phase relations of gas-condensate fluids and the flow of natural gas in high-pressure, high-velocity pipelines are in final stages of completion.

Secondary recovery research continued to stimulate and improve methods of water flooding in the Appalachian and Mid-Continent areas. The Bureau published a comprehensive report on the secondary recovery of oil in California and is considering initiation of research on tertiary methods of recovery of crude oil.

PETROLEUM UTILIZATION

Petroleum utilization again set new records, with a total demand for all oils of 7,717,000 barrels daily, including exports of 436,000 barrels daily. This represented a gain of 3.4 percent over 1951, a moderate gain compared to the gains shown in the two preceding years. Crude runs to refineries likewise set new records, although a refinery strike in May substantially reduced output, and a record run of 7,100,000 barrels per day was achieved in August. Percentage yield of gasoline was 43.0, second only to the 43.9 figure for 1949 and equal to the figure for 1950. Refinery capacity increased to a new high of 7,639,000 barrels daily by the end of 1952, with over 500,000 barrels daily capacity under construction. Catalytic cracking facilities increased about 100,000 barrels per day during the year, with an additional 180,000 barrels under construction. Catalytic reforming facilities, a most important technologic development, reached 355,000 barrels per day capacity, with about 200,000 barrels more planned or under construction.

The trend toward higher octane number motor gasoline continued after a slight dip late in 1951 and early in 1952 caused by shortage of tetraethyllead. The Bureau of Mines survey for the winter of 1952–53 showed new record averages for octane numbers for both Regular- and Premium-grade fuels. Research into the utilization of heavy naphtha and kerosine for gas-turbine or jet-engine fuel is being furthered by a Bureau of Mines program related to the composition, characteristics, and storage stability of this type of petroleum product.

The first commercial catalytic reforming operation based on a platinum-containing catalyst was begun late in 1949, but 1952 marked the first year of big production from units utilizing this important new kind of catalyst. Catalytic reforming, admirably suited for small installations, has been a boon to small refiners because it allows the production of high-octane gasoline stocks which raise the octane number of the finished product. Five commercial processes are now available for license and use by the industry. The catalytic reformers likewise are being utilized to produce increasing amounts of benzene and other aromatics for defense needs and for the petrochemical industries. Benzene production from petroleum increased 60 percent in 1952 over 1951.[57]

The industry continued to supply significant portions of the demands for fertilizer, sulfur, and rubber. Recovery of sulfur from natural gas and refinery gas accounted for an increase of 85,000 long tons a year in sulfur production capacity, helping to alleviate the sulfur situation to such an extent that 1951 controls were removed. This increase likewise helped to increase fertilizer supplies based on sulfur. Ammonia from petroleum is not a new development in the industry, but its large-scale production from petroleum is new. In 1952 about half of the 2 million tons produced came from petroleum sources, and it is expected that by 1955, 75 percent of the 3.4 million tons will be supplied by petroleum. Improved processes for economical production of ammonia synthesis gases and processes for converting the ammonia to fertilizer materials are new developments. Most of the raw material for the synthetic rubber industry continued to come from petroleum refineries and from petrochemical plants. Production of the "cold" type of GR–S rubber increased to about 50 percent of the total capacity, meaning increased tire mileage.

New petrochemical plants continued to come into operation throughout the country, particularly on the Texas gulf coast, and these chemicals represented over 20 percent of the total 1952 demand for all chemicals. The petrochemical production amounted to 21.4 billion pounds, valued at $2.7 billion, and the principal fields of utilization were agriculture, plastics, synthetic fibers, rubber, drugs, and detergents. Several new classes of compounds became available in tank-car quantities during the year. Petrochemical production, from both crude oil and natural gas, represents only a little more than 3 percent by weight of the crude oil produced in the United States in 1952 but still is a most vital factor in the national economy. Technology and the availability of liquid and gaseous fuels in abundance have brought a rise in our standard of living that will continue in future years.

[57] Petroleum Processing, vol. 7, December 1952, pp. 1793–1800.

Kerosene and distillate fuel-oil production reached new highs during the year, reflecting some increase in the installation of oil-burning heating equipment and continued expansion of diesel-powered equipment, particularly for railroad operations and for waterborne vessels. This increased demand for distillates was reflected in refinery construction and modernization by the installation of additional capacity for high-vacuum distillation of crudes and residuals. A consequent drop in production of residual fuel oils occurred during the year. Lubricants production decreased slightly, principally as the result of a decrease in exports, the improved quality of lubricants, and an increase in the reclaiming of lubricants for reuse. Production of liquefied gases at refineries was 31 million barrels, a drop of 2 million barrels from 1951. This was 28 percent of the total production of liquefied gases (111 million barrels) produced at refineries and from natural gas. Asphalt production reached a record high, and wax production decreased slightly.

Research is a vital factor in the rapid improvement in fuels and lubricants and in the increased use of these materials. The technologic changes that characterize the petroleum industry are made possible by the large sums spent by the industry on research and development, augmented to some extent by funds spent through Government agencies. The value of the petroleum industry's investment in research in 1952 was between $130 and $150 million. The new catalytic reforming processes are among the many examples of the results of this work. More efficient tools, increased production, better transportation, improved products, and cheaper costs result from research. The Bureau of Mines continued fundamental research on petroleum that involved the public interest and conservation. There was close cooperation with industry in virtually all of this work, and a sizable portion was done with the financial assistance of the industry.

NATURAL-GAS UTILIZATION

Marketed production of natural gas in the United States increased 7 percent in 1952, a smaller gain than in the two preceding years. The record sales amounted to 8.013 trillion cubic feet as compared to 7.457 trillion cubic feet in 1951. The average price at the well increased 0.5 cent to 7.8 cents per 1,000 cubic feet. Residential and commercial consumption increased 10 and 11 percent, but use of gas for carbon black declined. For the first time since 1939, natural gas was imported into the United States. A smelter in Montana used Canadian gas in its operation.

The number of residential consumers of natural gas increased from 21,444,000 in 1951 to 22,569,000 in 1952. Commercial consumers numbered 1,854,931 in 1952 compared with 1,613,708 in 1951. Industrial use of natural gas increased to 5.476 trillion cubic feet, including use in the field, for carbon-black manufacture, in petroleum refineries, in portland-cement plants, by gas pipelines, and for other uses. 1952 saw the first installation of gas turbines to drive compressors on natural-gas pipelines, a significant contribution to development of gas turbines. Other installations undoubtedly will follow these first ones.

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NATURAL-GAS LIQUIDS

In conformity with a lower rate of increase in the use of natural gas, production of natural-gas liquids increased only 9 percent in 1952. Production of LP- (liquefied-petroleum) gases continued to grow rapidly and accounted for 46 percent of the total output of 225,513,000 barrels of natural-gas liquids in 1952. In 1951, production was 206,354,000 barrels. The 1952 production was valued at over one-half billion dollars, with the average value per unit changed only slightly from that in the preceding year. The average yield of liquids from natural gas treated was 1.46 gallons per 1,000 cubic feet, and Texas continued to be the major producer, supplying 54 percent of the total.

About half of the total production—114,400,000 barrels—was shipped to refineries for blending in motor gasolines. Domestic sales of LP-gases increased 12 percent in 1952 to a total of 2,266,178,000 gallons, and chemical sales amounted to 870,990,000 gallons, synthetic rubber claimed 370,997,000 gallons, 370,558,000 gallons was used as internal-combustion engine fuel, industrial use was 324,967,000 gallons, and 259,697,000 gallons was used in gas manufacturing. Some 99,296,000 gallons was exported. Propane continued to supply well over 50 percent of the total LP-gases.

1952 saw a remarkable increase in the amount of underground storage for LP-gases. By the end of the year some 3,000,000 barrels of storage capacity had been created or was under construction.[58] This type of large-capacity storage will help to eliminate some of the difficulties associated with seasonal variations in the demand for natural-gas liquids. The first large pipeline for transporting ethylene was placed in operation by the Gulf Oil Corp. for transferring liquid ethylene from Port Arthur, Tex., to Orange, Houston, and Texas City, Tex., for use by petrochemical plants.[59] A record number of tank cars (2,600) were delivered for LP-gas transportation, increasing to 17,000 the number of pressure tank cars available for use.

LIQUID FUELS FROM OIL SHALE

The very large deposits of rich oil shale in Colorado, Utah, and Wyoming provide a potential oil reserve of about 10 times our known reserves of petroleum.[60] Research and development by the Bureau of Mines at Rifle, Colo., and at Laramie, Wyo., and by the oil industry since 1945 have shown:

1. That in a commercial-size mine near Rifle, Colo., oil shale could be mined relatively inexpensively for about 50 cents per ton, including return on investment, depreciation, etc.[61]

2. That continuously operating retorts for the pyrolysis of oil shale to produce a crude shale oil were feasible.[62] A 150- to 250-ton-per-day retort was constructed at Rifle, Colo., by the Bureau of Mines. Another continuously operating retort was developed by the Union Oil Co.[63]

[58] Wheeler, Henry P., Jr., and Eckard, William E., Underground Storage of Natural Gas in Coal-Mining Areas: Bureau of Mines Inf. Circ. 7654, 1952, 11 pp.
[59] Resen, F. L., Oil and Gas Journal, vol. 50, Feb. 11, 1952, pp. 78–79.
[60] Belser, Carl, Green River Oil-Shale Reserves of Northwestern Colorado: Bureau of Mines Rept. of Investigations 4769, 1951, 13 pp.
[61] Bureau of Mines, Synthetic Liquid Fuels, Annual Report of the Secretary of the Interior for 1951, Part 2, Oil From Oil Shale: Bureau of Mines Rept. of Investigations 4866, 1952, 86 pp.
[62] *See* footnote 61.
[63] Berg, Clyde, Oil Shale as a Fuel Resource: Petrol. Eng., vol. 24, No. 1, January 1952, pp. A-37–A-43.

3. Several feasible methods for refining crude shale oil were studied by the Bureau of Mines at Laramie, Wyo.[64] Some preliminary work of this nature was done by industry.

4. The required selling price of "viscosity-broken" crude shale oil for use as a No. 5 or 6 fuel oil was estimated to be about $2 per barrel when transported by pipeline to Los Angeles, Calif., or Chicago, Ill. This selling price would provide only a small return (about 6 percent) on the investment after income taxes. On a similar basis, the required selling price of gasoline from oil shale was estimated to be about 15 cents per gallon.

ASPHALT AND RELATED BITUMENS

Production of petroleum asphalt reached a new record high of 12,784,000 short tons in 1952, a 6-percent increase over 1951, representing 88 percent of the total supply of all asphalts. Production of native asphalts and related bitumens increased to a total of 1,637,862 short tons. Small quantities of all types of asphalt were imported and exported, as in past years. Major use continues to be for roads, with next higher quantity going into roofing compounds and materials. New asphalt-processing plants are characterized by neatness and cleanliness, and locations are being picked with careful study of supply and markets. An important technical development was the acceleration in laying of "rubber roads," a program sponsored by the National Rubber Bureau. Roadway sections incorporating rubber in the top asphalt layers now are under test in 17 States and to date indicate marked advantages.

CARBON BLACK

Further reduction in the number of channel-black plants and production was noted in 1952, but new furnace plants and increased yields in other plants kept production within 4 percent of 1951. Total production amounted to 1,604,102,000 pounds, with a 32-percent decline in exports, reflecting production of new oil-furnace material in England. Contact production was 563,597,000 pounds, and furnace processes yielded 1,040,505,000 pounds. The most noteworthy technical advance in 1952 was the availability in quantity of a new superabrasion furnace black that—with improved synthetic rubber—allowed fabrication of automobile tires giving as much as 40-percent reduction in tire-tread wear.[65] Higher natural-gas prices and the superior characteristics of oil furnace blacks indicated further reductions for channel blacks in future years.

HELIUM

The Bureau operated its Amarillo and Exell, Tex., and Otis, Kans., helium plants in 1952 to produce 144,556,141 cubic feet of helium—a new record for production in 1 year. The distribution of this helium required handling and shipping 570 tank cars, 129,843 cylinders, and 34 automotive trailers.

[64] *See* footnote 61.
[65] Oil and Gas Journal, vol. 51, Nov. 24, 1952, pp. 72–73.

The inflation of Navy blimps continued to be the principal use for helium, but the rapid development of inert-gas shielded-arc welding has been responsible for the recent increasing trend in demand. Helium as a shielding medium in welding aluminum, magnesium, copper, titanium, stainless steel, and other metals has become an important industrial tool for maufacturing everyday peacetime goods as well as defense materials. Helium also is used in meteorological balloons, hospitals, low-temperature research, and for other purposes.

The Navajo Helium Plant, which has been in standby status since World War II, was placed in production again in February 1953, and all four of the Bureau's plants have been in operation since that time. All of the plants produce Grade A helium of 99.995 percent purity.

Statistical Summary of Mineral-Fuels Production

GENERAL SUMMARY

TABLES in this chapter provide a summary of mineral-fuels production in the continental United States, defined as the 48 States and the District of Columbia, by individual fuels, both in terms of quantity and value of production. Total value of all mineral production, including mineral fuels, is also shown to provide an integrated summary of the minerals industries during 1952. For a detailed summary of all minerals other than fuels, see volume I of the Minerals Yearbook.

Value of all mineral production, by States, is given in table 3.

The stage of measurement of production used in this chapter is, generally speaking, "mine output," a term referring to minerals in the form in which they are extracted from the ground. However, statistics for some commodities included, for practical reasons, are measured at some other stage of processing. For example, bituminous-coal production includes all marketable production, excluding washery and other refuse, while anthracite production is measured at the sizing and cleaning stage.

Crude petroleum is measured at the time it is removed from the producing property and natural-gas liquids are measured in the form in which they are shipped from the natural-gasoline or cycle plants. For precise descriptions of the stage of measurement, see the individual commodity chapters.

World production and the proportion of the total produced by the United States are given in table 4.

TABLE 1.—Value of mineral production in continental United States,[1] 1925–52[2]

[Millions of dollars]

Year	Fuels	All other[3]	Total	Year	Fuels	All other[3]	Total
1925	2,905	1,907	4,812	1939	2,420	1,388	3,808
1926	3,366	1,945	5,311	1940	2,659	1,539	4,198
1927	2,869	1,829	4,698	1941	3,224	1,883	5,107
1928	2,660	1,824	4,484	1942	3,563	2,060	5,623
1929	2,934	1,974	4,908	1943	4,023	1,908	5,931
1930	2,495	1,485	3,980	1944	4,568	1,742	6,310
1931	1,617	961	2,578	1945	4,563	1,668	6,231
1932	1,457	543	2,000	1946	5,084	1,978	7,062
1933	1,411	639	2,050	1947	7,181	2,429	9,610
1934	1,944	800	2,744	1948	9,495	2,778	12,273
1935	2,011	931	2,942	1949	7,912	2,668	10,580
1936	2,401	1,205	3,606	1950	8,681	3,174	11,855
1937	2,795	1,470	4,265	1951	9,770	3,754	13,524
1938	2,433	1,085	3,518	1952	9,605	3,767	13,372

[1] For data on Territories, possessions, and other areas administered by the United States, 1947–52, see vol. III.

[2] Value of asphalt and related bitumens, helium, peat, and carbon dioxide (estimated) included with "all other" for years 1925–51. For 1952 totals, see commodity chapters.

[3] Data for 1925–46 are not strictly comparable with those for 1947–52, since for the earlier years the value of heavy clay products has not been replaced by the value of raw clays used in such products.

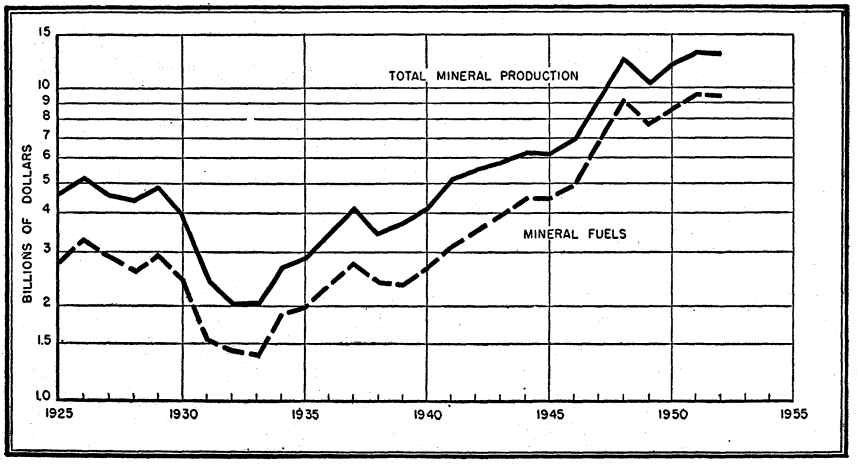

FIGURE 1.—Value of mineral production in continental United States, 1925–52.

TABLE 2.—Mineral-fuels production in continental United States, 1949–52, by individual fuels[1]

Mineral fuels	1949		1950		1951		1952	
	Quantity	Value (thousand dollars)	Quantity	Value (thousand dollars)	Quantity	Value (thousand dollars)	Quantity	Value (thousand dollars)
Coal:								
Bituminous[2]—thousand short tons	434,342	2,126,226	512,529	2,489,229	529,880	2,614,219	463,138	2,276,189
Lignite—do	3,092	7,336	3,370	8,112	3,291	8,044	3,017	7,212
Pennsylvania anthracite—do	42,702	358,008	44,077	392,398	42,670	405,818	40,583	379,714
Natural gas—million cubic feet	5,419,736	344,034	6,282,060	408,521	7,457,359	542,964	8,013,457	623,649
Natural-gas liquids:								
Natural gasoline and cycle products—thousands of 42-gallon barrels	99,217	303,136	109,679	321,832	118,377	369,718	121,482	371,468
LP-gases—do	57,869	99,054	72,282	97,773	86,377	138,443	102,033	161,692
Petroleum (crude)—do	1,841,940	4,674,770	1,973,574	4,963,380	2,247,711	5,690,410	[3] 2,289,836	[3] 5,785,230
Total mineral fuels		7,912,000		8,681,000		9,770,000		9,605,000
Total all other minerals		2,668,000		3,174,000		3,754,000		3,767,000
Grand total mineral production		10,580,000		11,855,000		13,524,000		13,372,000

[1] For year 1952 table does not include value of production for asphalt and related bitumens, carbon dioxide, helium, and peat. For data, see commodity chapters. Value of these commodities is included with "Total all other minerals" for years 1949–51.
[2] Includes small quantity of anthracite mined in States other than Pennsylvania. Excludes Alaska.
[3] Final figure. Supersedes preliminary figure given in commodity chapter.

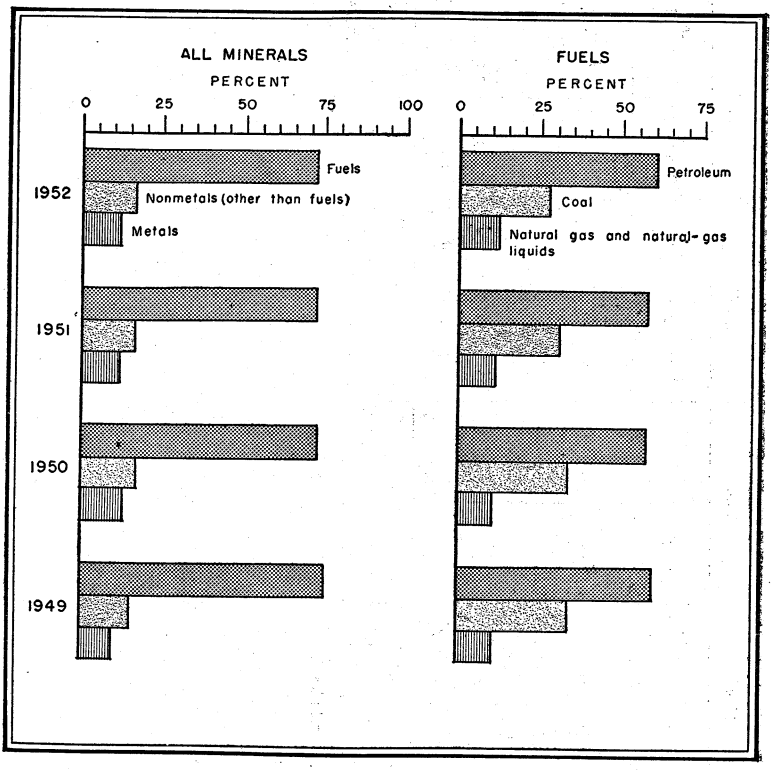

FIGURE 2.—Value of mineral production in continental United States, 1949–52, by mineral groups and by mineral fuels, in percent.

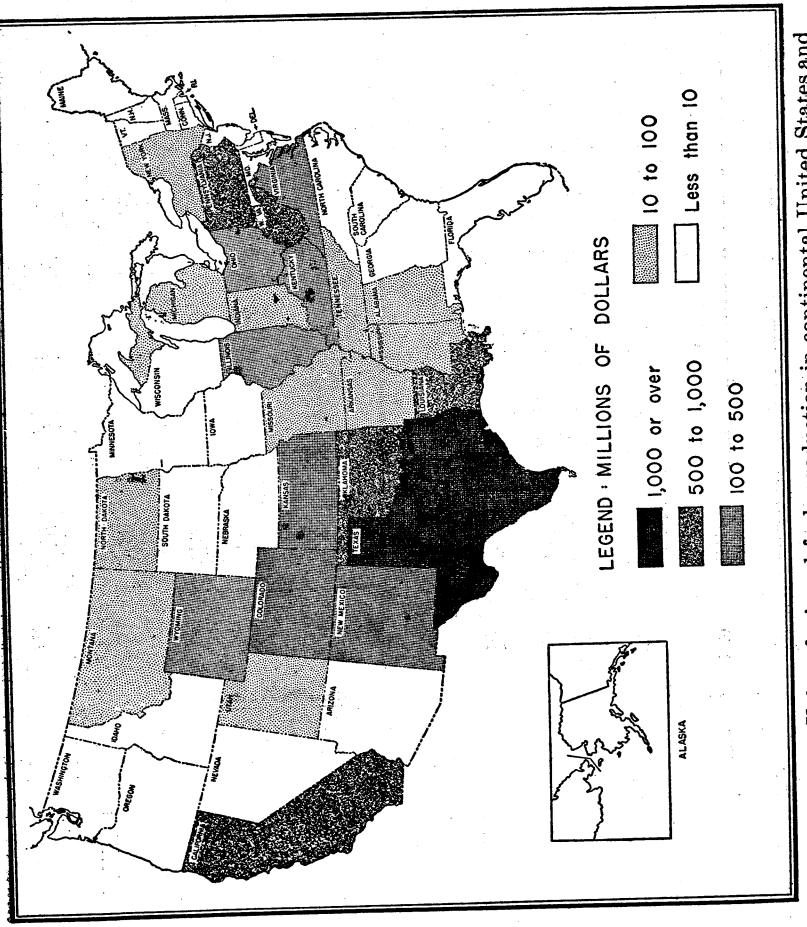

FIGURE 3.—Value of mineral-fuels production in continental United States and Alaska, 1952, by States.

TABLE 3.—Value of mineral production in continental United States, 1949–52, by States, in thousands of dollars, and principal minerals produced in 1952

State	1949	1950	1951[1]	1952			
				Value	Rank	Percent of U. S. total	Principal minerals in order of value
Alabama	143,905	158,975	164,280	158,382	21	1.18	Coal, iron ore, cement, stone.
Arizona	181,094	207,406	243,886	231,702	15	1.73	Copper, zinc, lead, silver.
Arkansas	109,523	118,642	118,694	116,335	24	.87	Petroleum, bauxite, coal, natural-gas liquids.
California	1,075,612	1,056,047	[2] 1,209,381	1,214,285	2	9.07	Petroleum, natural gas, natural-gas liquids, cement.
Colorado	139,873	154,898	179,435	187,589	17	1.40	Petroleum, molybdenum, coal, zinc.
Connecticut	4,887	5,675	[2] 6,247	7,125	45	.05	Stone, sand and gravel, lime, clays.
Delaware	335	522	[2] 584	677	48	.01	Sand and gravel, stone, clays.
District of Columbia	63	60	82	7	49	(3)	Clays.
Florida	55,018	67,717	78,548	80,335	27	.60	Phosphate rock, stone, cement, sand and gravel.
Georgia	35,508	44,157	[2] 47,555	52,398	34	.39	Clays, stone, cement, sand and gravel.
Idaho	64,292	79,077	[2] 82,795	77,060	28	.58	Zinc, lead, silver, sand and gravel.
Illinois	449,893	488,144	489,934	460,005	7	3.44	Coal, petroleum, stone, cement.
Indiana	141,025	166,632	174,388	161,925	20	1.21	Coal, petroleum, cement, stone.
Iowa	37,458	41,773	47,706	52,481	33	.39	Cement, stone, sand and gravel, coal.
Kansas	337,162	368,614	400,087	403,370	8	3.01	Petroleum, natural gas, cement, stone.
Kentucky	372,229	459,956	442,264	398,446	9	2.98	Coal, petroleum, natural gas, stone.
Louisiana	631,813	693,607	787,678	848,259	4	6.34	Petroleum, natural gas, natural-gas liquids, sulfur.
Maine	6,742	7,461	8,516	8,981	44	.07	Cement, sand and gravel, stone, slate.
Maryland	20,461	22,725	[2] 26,148	26,847	37	.20	Sand and gravel, stone, cement, coal.
Massachusetts	12,449	16,014	16,951	17,719	41	.13	Stone, sand and gravel, lime, clays.
Michigan	201,260	229,941	[2] 257,937	254,582	14	1.90	Iron ore, cement, petroleum, sand and gravel.
Minnesota	257,540	331,567	[2] 433,096	397,441	10	2.97	Iron ore, sand and gravel, stone, manganiferous ore.
Mississippi	103,711	102,945	103,030	101,675	25	.76	Petroleum, natural gas, natural-gas liquids, clays.
Missouri	111,293	113,191	[2] 135,249	140,977	22	1.05	Lead, cement, stone, coal.
Montana	98,070	103,389	126,166	121,400	23	.91	Copper, zinc, petroleum, manganese ore.
Nebraska	10,102	14,022	18,469	20,597	39	.15	Cement, petroleum, sand and gravel, stone.
Nevada	37,373	48,499	[2] 57,674	64,231	29	.48	Copper, tungsten, zinc, gold.
New Hampshire	1,389	1,711	1,295	1,941	46	.02	Sand and gravel, stone, feldspar, mica.
New Jersey	38,584	46,391	59,023	57,309	30	.43	Zinc, stone, sand and gravel, iron ore.
New Mexico	198,825	210,294	[2] 256,302	288,500	12	2.16	Petroleum, potassium salts, copper, zinc.
New York	138,493	156,529	[2] 188,790	180,741	18	1.35	Cement, iron ore, stone, sand and gravel.
North Carolina	19,755	26,338	29,647	34,726	35	.26	Stone, sand and gravel, tungsten, feldspar.
North Dakota	8,818	9,614	10,247	12,057	43	.09	Coal, petroleum, sand and gravel, natural gas.
Ohio	242,080	274,572	302,612	292,689	11	2.19	Coal, stone, cement, lime.
Oklahoma	484,264	527,095	607,486	621,351	6	4.64	Petroleum, natural-gas liquids, natural gas, zinc.

Oregon	21,845	21,542	28,402	26,674	38	.20	Stone, sand and gravel, cement, diatomite.
Pennsylvania	1,035,970	1,186,212	1,289,226	1,145,598	3	8.56	Coal, cement, petroleum, stone.
Rhode Island	929	1,425	1,278	1,250	47	.01	Stone, sand and gravel, graphite.
South Carolina	9,026	11,394	11,286	14,531	42	.11	Stone, clays, cement, sand and gravel.
South Dakota	26,746	32,716	[2] 29,652	30,455	36	.23	Gold, stone, cement, clays.
Tennessee	77,333	89,694	99,853	100,509	26	.75	Coal, cement, stone, zinc.
Texas	2,379,793	2,673,950	3,268,555	3,378,557	1	25.25	Petroleum, natural-gas liquids, natural gas, sulfur.
Utah	177,825	229,956	257,145	265,502	13	1.98	Copper, coal, lead, gold.
Vermont	17,384	18,563	[2] 18,516	17,891	40	.13	Stone, asbestos, slate, copper.
Virginia	116,408	137,806	161,252	164,679	19	1.23	Coal, stone, cement, sand and grafel.
Washington	40,863	49,055	[2] 54,554	56,129	31	.42	Cement, sand and gravel, zinc, coal.
West Virginia	718,119	829,624	941,723	825,675	5	6.17	Coal, natural gas, petroleum, natural-gas liquids.
Wisconsin	35,878	41,693	[2] 48,350	55,710	32	.42	Sand and gravel, stone, iron ore, zinc.
Wyoming	150,998	177,577	[2] 201,838	204,495	16	1.53	Petroleum, coal, clays, natural-gas liquids.
Total[4]	10,580,000	11,855,000	13,524,000	13,382,000	--------	100.00	Petroleum, coal, cement, natural gas.

[1] 1951 value figures may vary from those previously published because of differences in rounding procedure.
[2] Revised figure.
[3] Less than 0.005 percent.
[4] Table includes value of production for asphalt and related bitumens, carbon dioxide, helium and peat.

TABLE 4.—Comparison of world and United States (including Alaska) production of principal fuels, 1951–52

[Compiled by Berenice B. Mitchell and Pauline Roberts]

Fuel	1951			1952		
	World	United States		World	United States	
	Thousand metric tons		Percent of world	Thousand metric tons		Percent of world
Coal:						
Anthracite	144,700	38,709	27	146,400	36,816	25
Bituminous and lignite	1,778,300	484,130	27	1,785,600	423,509	24
Coke:						
Gashouse	[1] 33,000	115	[2]	[1] 34,000	41	[2]
Oven and beehive	204,000	71,967	35	207,000	61,919	30
Fuel briquets and packaged fuel	88,000	2,274	3	90,000	2,155	2
Natural gas, million cubic meters	[3] 240,000	211,170	88	[4]	226,917	[4]
Peat	53,000	176	[2]	54,000	191	[2]
Petroleum, crude thousand barrels	4,286,443	2,247,711	52	4,495,896	[5] 2,289,836	51

[1] Includes low- and medium-temperature and gashouse coke.
[2] Less than 0.5 percent.
[3] Consumption estimated by the United Nations.
[4] Data not available.
[5] Final figure; supersedes preliminary figure given in commodity chapter.

Employment and Injuries in the Fuel Industries

By Seth T. Reese

INTRODUCTION

THIS CHAPTER of the Minerals Yearbook is confined to employment and injury experience in the coal-mining, coking, and oil and gas industries of the United States. Each industry is treated separately, and no attempt has been made to combine data to show an overall picture for the fuels section of the mineral industries. Employment and injury experience for the mineral industries as a whole can be found in Volume III.

Lack of comparable and accurate statistics on injuries in the Nation's mineral industries and the importance of such statistics as a record of what had taken place, a basis for remedial legislation, and a measure of results of the Bureau's endeavor to reduce mining hazards led the Bureau in 1911 to undertake the collection of such data.

Coal Mines.—The only reliable records from which injury and related statistics for the coal-mining industry could be compiled were reports of the State coal-mine inspectors. Figures from these reports were supplemented by data furnished voluntarily by operators in States having no coal-mine-inspection system. When the compilation was begun, an attempt was made to classify fatalities by causes; but this was found to be impossible, because many State reports were incomplete. Before 1930 it was impossible to state the number of nonfatal injuries in the entire coal-mining industry; published figures related to fatalities that comprised only 2 percent of the total number of injuries actually incurred each year. However, through the cooperation of mining companies and State officials of the coal-producing States, the Bureau procured uniform reports for 1930 covering all lost-time injuries, fatal and nonfatal; thus it aided materially in bringing the accident problem more nearly within the control of individuals and organizations endeavoring to promote safety in the coal-mining industry.

The coal-mining industry was known to have one of the poorest injury records among the major industries of the country. A series of disastrous explosions in coal mines during 1940 stimulated the enactment of Public Law 49, 77th Congress, on May 7, 1941. One provision of this act required that all coal mines be inspected for

hazardous physical conditions and unsafe human practices to reduce or eliminate accidents that contributed to fatal and nonfatal injuries among mine employees. Other provisions required coal-producing companies to report all disabling injuries and related data to the Bureau. Coal mines were inspected under this Federal statute approximately 11 years, and the injury rate improved steadily. However, two disastrous explosions, one in 1947 and another in 1951, led to passage of the present Federal Coal Mine Safety Act, known as Public Law 552, 82d Congress. This act was designed primarily to prevent major disasters in coal mines by giving some enforcement powers to Federal coal-mine inspectors, but provisions of Public Law 49 requiring the reporting of injury data to the Bureau were retained. Such reports have made it possible to compile uniform and comparable figures showing the number and classification of fatal and nonfatal injuries and to relate the number of injuries to the number of employees and man-hours worked. Thus, the Bureau is able to supply industry and others interested with reliable and comparable injury rates for all coal mines or any group or class of coal mines as a basis for promoting safety programs and as a yardstick for measuring the effectiveness of accident-prevention work in the industry.

Coke Plants.—Accident statistics in the coking industry were first compiled in 1913 from data voluntarily supplied by officials and managers of coke plants at the request of the Bureau; there was no law then, and there is none at present, requiring coke companies to submit such reports. Difficulties similar to those in the coal-mining industry were experienced but were gradually eliminated. The data on coke operations in this chapter represent approximately full coverage of the industry.

Oil and Gas.—Accident data for the oil and gas industries were first collected and tabulated in 1942 from reports voluntarily submitted to the Bureau by operating companies. Through the cooperation of the American Petroleum Institute and the Society of Exploration Geophysicists the coverage has been expanded. Data in this chapter represent a reasonably comprehensive report of the injury and employment record of the industry. In the canvasses, fairly adequate coverage has been obtained of medium and small operating companies and of oil and gas contractors and excellent coverage obtained of the large companies. The departments of the industry covered by this survey are: Exploration, drilling, production, natural gasoline, pipeline oil, pipeline gas, marine transportation (ocean, coastwise and inland waters), refining, marketing, office, and unclassified.

COAL

Employment in the coal-mining industry decreased 5 percent in 1952 to an average of 421,500 men working daily. These men worked 197 days or 5 less than in 1951. The average shift worked at coal mines in 1952 was 7.75 hours, virtually identical to the 1951 shift of 7.80 hours. The total man-hours of worktime in 1952 declined 8 percent from 1951 because of fewer days of work and the decrease in the average number of men employed daily. In 1952 the average

coal-mine employee accumulated 1,524 hours of work—54 hours or 3 percent less than in 1951.

The injury record of bituminous-coal- lignite- and anthracite-mining operations was less favorable in 1952 than in 1951. Although the number of deaths due to mine accidents was the lowest recorded in the statistical history of the industry and the number of lost-time or nonfatal injuries the third lowest, the overall frequency rate of 58.48 fatal and nonfatal injuries per million man-hours of worktime was 12 percent greater than the corresponding rate of 52.12 in 1951. There were 548 fatalities during the year, 237 fewer than in 1951. The fatality rate of 0.85 per million man-hours was 25 percent better than the rate in the preceding year and a low-record rate for the industry. The nonfatal-injury experience was not as good as that in 1951. There were 37,020 disabling or lost-time injuries. These occurred at the rate of 57.63 injuries per million man-hours or 13 percent more frequently than in the previous year.

TABLE 1.—Employment and injury experience at coal mines in the United States, 1948–52

Industry and year	Average men working daily [1]	Average active mine-days [2]	Man-days worked	Man-hours worked	Number of injuries		Frequency rates per million man-hours	
					Fatal	Non-fatal	Fatal	Non-fatal
Bituminous-coal mines: [3]								
1948	429,378	220	94,574,820	747,685,733	862	42,078	1.15	56.28
1949	409,431	165	67,551,942	533,165,522	494	27,548	.93	51.67
1950	408,623	185	75,509,974	594,835,875	550	28,390	.92	47.73
1951	372,138	201	74,897,966	590,406,393	684	28,081	1.16	47.56
1952 [4]	355,500	195	69,245,000	542,000,000	449	31,015	.83	57.22
Anthracite mines:								
1948	77,955	263	20,508,227	150,544,988	137	11,394	.91	75.69
1949	75,875	196	14,885,115	109,310,226	91	7,857	.83	71.88
1950	74,616	211	15,721,460	116,553,682	93	8,874	.80	76.14
1951	69,767	207	14,467,428	106,841,000	101	7,472	.95	69.94
1952 [4]	66,000	207	13,630,000	100,380,000	99	6,005	.99	59.82
Total coal mines:								
1948	507,333	227	115,083,047	898,230,721	999	53,472	1.11	59.53
1949	485,306	170	82,437,057	642,475,748	585	35,405	.91	55.11
1950	483,239	189	91,231,434	711,389,557	643	37,264	.90	52.38
1951	441,905	202	89,365,394	697,247,393	785	35,553	1.13	50.99
1952 [4]	421,500	197	82,875,000	642,380,000	548	37,020	.85	57.63

[1] Average number of men at work each day mine was active. Because absenteeism and labor turnover are taken into consideration, this number is lower than number of men available for work, as measured by a count of names on payroll.
[2] Average in which operating time of each mine is weighted by average number of workers in mine.
[3] Includes lignite.
[4] Preliminary. Based on an average of 80-percent coverage.

In 1952 there were 2 major disasters in the coal-mining industry, in which a total of 11 men died. One of these disasters was a methane explosion (which caused the death of 6 men) in a Pennsylvania bituminous-coal mine; the other was caused by a break into an abandoned area filled with water (which caused the death of 5 men) in a Pennsylvania anthracite mine. During the previous year 5 major disasters took a total of 157 lives; 119 were lost in a gas explosion at an Illinois coal-mining operation. A major disaster is a single accident in which 5 or more men die instantly or later as a result of injuries sustained at the time of the accident.

Bituminous-Coal Mines.—The average number of men working daily at bituminous-coal mines decreased 16,638 to an average of 355,500 in 1952. The mines were active 195 days or 6 less than in 1951, and the total number of man-hours worked decreased 8 percent. The average worker had a 7.83-hour shift and accumulated 1,525 work-hours—62 hours under the previous year.

The fatality record in the bituminous-coal industry was better in 1952 than in any year since complete statistics of the industry were made available to the Bureau. In all, 449 men lost their lives in and around bituminous-coal mines or 235 less than in 1951 and 45 less than the previous low of 494 deaths in 1949. The frequency rate of 0.83 death per million man-hours was a new low-record death rate for this section of the coal-mining industry, bettering by 10 percent the previous record-low rate of 0.92, established in 1950.

Of the 449 fatalities resulting from accidents at bituminous-coal mines in 1952, 87 percent occurred underground, 8 percent on the surface, and 5 percent in strip pits. During the previous year underground accidents caused the death of 90 percent, surface accidents 5 percent, and stripping accidents 5 percent of the 684 fatalities for the industry.

Falls of roof and face caused 239 (61 percent) of the underground fatalities in 1952; in 1951 they caused the loss of 306 men (50 percent). The second principal agency responsible for fatal accidents underground in 1952 was haulage. In that year 101 men (26 percent) were killed in underground-haulage accidents; this number was 2 less than the number killed in similar accidents the previous year, but deaths from haulage accidents in 1951 represented only 17 percent of the underground death toll from all agencies. Thus, roof and face falls and haulage accidents continued to be the leading causes of underground fatalities at bituminous-coal mines. Although 69 fewer men were killed in such accidents than in 1951, they were responsible for 87 percent of all underground fatalities in 1952 and 66 percent in 1951.

There were nearly 3,000 more nonfatal or lost-time injuries at bituminous-coal mines in 1952 than in 1951, for a total of 31,015. They occurred at the rate of 57.22 per million man-hours, a 20-percent increase over the corresponding rate for 1951.

Anthracite Mines.—Employment at anthracite operations during 1952 decreased 5 percent compared with the average of 69,767 men that worked daily in 1951. Results of a monthly canvass by the Bureau of Mines showed a gradual decreased trend from a high of 69,300 in March to a low of 64,500 in November and December. This decreased working force averaged 207 active working days during the year, the same as in the preceding year. The decrease in the average number of men working daily was responsible for a decline of nearly 6.5 million man-hours of worktime. The average anthracite employee worked a 7.36-hour shift in 1952, slightly less than the 7.38-hour shift in 1951, and accumulated 1,521 hours of worktime or 10 hours less than in the previous year.

Injury experience at anthracite mines was more favorable in 1952 than in 1951; in fact, the injury-frequency rate (60.81 per million man-hours) was the lowest on record for the industry. The increased fatality rate (0.99 from 0.95 in 1951, or 4 percent) was more than

offset by the 14-percent decrease in the nonfatal rate to 59.82 injuries per million man-hours in 1952. The overall improved injury experience resulted directly from a 19-percent decrease in the total number killed and disabled—6,104 in 1952 and 7,573 in 1951. In all, 99 workers lost their lives in anthracite-mine accidents—2 less than in 1951. Of this number, 86 percent were killed in underground accidents, 8 percent on the surface, and 6 percent in strippings. During the previous year, the respective percentages were 88, 9, and 3. Falls of roof and face caused 45 (53 percent) of the number of underground fatalities in 1952, whereas in 1951, this agency was responsible for 57 percent of the 89 fatalities. Haulage accidents caused 17 (20 percent) of the total number of underground fatalities—the same number as in 1951. Thus, these 2 agencies were responsible for 73 percent of all underground fatalities in 1952 and 76 percent in 1951.

There were 1,467 fewer nonfatal or lost-time injuries at anthracite mines in 1952 than in 1951 and a new low-frequency rate of 59.82 per million man-hours of worktime, 14 percent lower than the 1951 rate.

TABLE 2.—Employment and injury experience at coke plants in the United States, 1948–52

Industry and year	Average men working daily [1]	Average active plant-days [2]	Man-days worked	Man-hours worked	Number of injuries		Frequency rates per million man-hours	
					Fatal	Non-fatal	Fatal	Non-fatal
Byproduct ovens:								
1948	21,877	364	7,964,283	63,788,327	17	676	0.27	10.60
1949	21,141	349	7,373,684	58,822,239	7	581	.12	9.88
1950	20,942	362	7,577,665	60,593,087	13	516	.21	8.52
1951	22,058	363	8,000,833	64,102,990	9	533	.14	8.31
1952	21,919	336	7,372,812	58,643,292	7	420	.12	7.16
Beehive ovens:								
1948	3,280	254	833,606	6,233,002	3	241	.48	38.67
1949	3,330	146	486,497	3,623,543		132		36.43
1950	3,405	210	714,470	5,267,918	1	264	.19	50.11
1951	3,657	228	833,496	6,087,503	1	235	.16	38.60
1952	3,322	170	566,307	4,159,945	1	126	.24	30.29
All ovens:								
1948	25,157	350	8,797,889	70,021,329	20	917	.29	13.10
1949	24,471	321	7,860,181	62,445,782	7	713	.11	11.42
1950	24,347	341	8,292,135	65,861,005	14	780	.21	11.84
1951	25,715	344	8,834,329	70,190,493	10	768	.14	10.94
1952	25,241	315	7,939,119	62,803,237	8	546	.13	8.69

NOTE: All data are final.

[1] Average number of men at work each day oven was active. Because absenteeism and labor turnover are taken into consideration, this number is lower than number of men available for work, as measured by a count of names on payroll.

[2] Average in which operating time of each mine is weighted by average number of workers in plant.

COKE

Employment in the coking industry of the United States decreased 2 percent in 1952 to an average of 25,241 men working daily. These men worked 315 days or 29 fewer than in 1951. The average shift worked at beehive and byproduct ovens in 1952 was 7.91 hours, slightly less than the 7.95-hour shift in 1951. The number of man-hours worked declined 11 percent from the 1951 total worktime, chiefly because of the strike in the iron and steel industries in June and July; virtually all coke-oven plants suspended operations during

this strike. For the year the average coke worker accumulated 2,488 hours of worktime—242 hours (9 percent) less than in 1951.

The overall injury experience at coke plants improved sharply in 1952, according to reports submitted to the Bureau of Mines from 30,137 active coke ovens. The combined frequency rate, fatal and nonfatal, was 8.82 injuries per million man-hours of exposure (20 percent lower than the corresponding rate in 1951).

Byproduct Plants.—In 1952, 686 more byproduct ovens were active than in 1951, and the average daily work force of 21,919 men was slightly lower. Byproduct plants operated 336 days (27 days less than in 1951), and the man-hours of worktime decreased 9 percent to 58,643,292. The average employee at byproduct plants worked a 7.95-hour shift compared with an 8.01-hour shift in 1951, thus accumulating 2,675 hours, or 231 hours less worktime.

At byproduct plants in 1952, 7 employees were killed and 420 injured, causing loss of time beyond the day on which the accidents occurred. This number of fatal and nonfatal injuries was 21 percent lower than in 1951; as a result, the rate of occurrence decreased 14 percent to 7.28 injuries per million man-hours.

Beehive Plants.—Reports from operators of 14,023 beehive ovens indicated an average daily working force of 3,322 men (335—9 percent—less than in 1951), and the number of active days decreased 25 percent to 170 days. The average employee at beehive ovens accumulated 1,252 hours in 1952—413 hours less than the previous year—although the length of the shift each worked was virtually the same in both years (7.35 in 1952 and 7.30 in 1951). Total worktime at beehive ovens decreased 32 percent to 4.2 million man-hours.

At beehive ovens there were 127 injuries, 1 a fatality. The combined fatal- and nonfatal-injury rate of 30.53 per million man-hours of worktime represented a sharp improvement over the corresponding rate of 38.77 in 1951.

OIL AND GAS

Employment in the oil and gas industry of the United States increased 9 percent in 1952 to an average of 586,138 men working daily. The men worked slightly less than 1¼ billion man-hours, the greatest volume in the statistical history of the industry and a 7-percent gain over 1951. The average employee accumulated 2,095 hours during 1952, 34 hours less than in the preceding year.

Although complete records covering injuries to employees were not available for the entire oil and gas industry, reports for nearly 3,500 large and small operations gave a favorable safety account in 1952. Compared with 1951, injuries were not as frequent, and the overall injury experience was better in only 1 year (1950) of the 11-year period for which relating statistics on the industry were collected. The combined frequency rate, fatal and nonfatal, of 12.72 injuries per million man-hours was 4 percent lower than the corresponding rate in 1951. Although the average daily number of men employed increased 9 percent in 1952 and the total worktime was 7 percent more, the increase in the number of injuries was only 2 percent.

A total of 15,615 employees in the industry suffered fatal or nonfatal injuries. Of this total, 150 were fatally injured or totally disabled. The remaining 15,465 nonfatal injuries included 507 permanent partial injuries and 14,958 injuries that caused disability beyond the day of injury.

The most hazardous occupation in the industry—drilling—showed the greatest improvement. The overall frequency rate, fatal and nonfatal, was 25 percent lower than the corresponding rate in 1951. The frequency of injuries per million man-hours decreased in all departments, except marine transportation (ocean and inland), and refining.

TABLE 3.—Employment and injury experience in the oil and gas industry of the United States, 1948–52

Year	Average men working daily	Man-hours worked	Number of injuries		Frequency rate per million man-hours	
			Fatal	Nonfatal	Fatal	Nonfatal
1948	501,253	1,072,727,708	156	15,356	0.15	14.31
1949	516,940	1,085,827,286	138	14,333	.13	13.20
1950	517,787	1,081,518,593	109	13,500	.10	12.48
1951	539,095	1,147,903,959	142	15,130	.12	13.18
1952 [1]	586,138	1,227,984,429	150	15,465	.12	12.59

[1] Fatal and permanent total injuries combined in 1952 only.

PART II. COMMODITY REVIEWS

A. Coal and Related Products

Coal—Bituminous and Lignite

By W. H. Young, R. L. Anderson, and E. M. Hall

GENERAL SUMMARY

THE BITUMINOUS-COAL and lignite industry showed mixed trends in 1952 compared with 1951; production, consumption, exports, and average value decreased, whereas productivity and the percentages cut by machine, mechanically loaded, mechanically cleaned, and mined by stripping all increased.

Production.—The output of soft coal in 1952—466.8 million tons [1]—was 13 percent less than the 533.7 million tons produced in 1951. The lower production in 1952 reflected the reduced market demand, both domestic and foreign. Exports were off 16 percent and domestic consumption 11 percent from the previous year.

There was considerable fluctuation in production during 1952. A substantial seasonal decline in the spring and early summer was followed by the miners' vacation and by strikes. According to the Bureau of Labor Statistics, 2.8 million man-days were lost because of strikes in 1952 compared with only 887,000 man-days in 1951.

Trend of Employment.—The average number of men working daily at bituminous-coal and lignite mines in 1952 decreased to 335,217 from 372,897 in 1951.

Index to Capacity.—As it is impossible for all mines to operate every working day in the year, a conservative figure of 280 days for calculating potential capacity was suggested some years ago by the coal committee of the American Institute of Mining and Metallurgical Engineers. (See Minerals Yearbook, 1935, pp. 631–632.) The average output per average number of days worked in 1952 was 2.5 million tons, which (if applied to 280 days) gives an annual potential output of 703 million tons, compared with the actual production of 466.8 million tons.

Mechanization.—Less coal was loaded mechanically at underground mines in the United States in 1952 than in 1951; however, the percentage mechanically loaded increased from 73 percent of the total underground output in 1951 to 76 percent in 1952. Sales of underground loading equipment, in terms of capacity, were 34 percent less in 1952 than in 1951.

[1] Throughout this chapter, "tons" refers to net tons of 2,000 pounds, except that the world table is in metric tons of about 2,205 pounds.

TABLE 1.—Salient statistics of the bituminous-coal and lignite industry in the United States,[1] 1951–52

[All tonnage figures represent net tons of marketable coal and exclude washery and other refuse]

	1951	1952	Change from 1951 (percent)
Production	533, 664, 732	466, 840, 782	−12. 5
Consumption in the United States	468, 904, 000	418, 757, 000	−10. 7
Stocks at end of year:			
Industrial consumers and retail yards	76, 636, 000	76, 745, 000	+. 1
Stocks on upper Lake docks	5, 542, 891	5, 135, 398	−7. 4
Imports and exports: [2]			
Imports	292, 378	262, 268	−10. 3
Exports	56, 721, 547	47, 643, 150	−16. 0
Price indicators (average per net ton):			
Average cost of railroad fuel purchased, f. o. b. mines [3]	$4. 54	$4. 59	+1. 1
Average cost of bituminous coal at merchant coke ovens	$9. 51	$9. 85	+3. 6
Average retail price [4]	$15. 96	$16. 27	+1. 9
Average railroad freight charge per net ton [3]	$3. 16	$3. 35	+6. 0
Average value f. o. b. mines	$4. 92	$4. 90	−. 4
Underground loading machinery sold:			
Mobile loading machines (number)	287	206	−28. 2
Scrapers (number)	4	8	+100. 0
Conveyors, including those equipped with duckbills (units)	297	155	−47. 8
"Mother" conveyors (units)	114	67	−41. 2
Surface stripping	117, 617, 676	108, 909, 756	−7. 4
Mechanically loaded underground	304, 255, 921	270, 499, 656	−11. 1
Mechanically cleaned	240, 009, 808	227, 264, 630	−5. 3
Number of mines	8, 009	7, 275	−9. 2
Average number of days worked	203	186	−8. 4
Average number of men working daily [5]	372, 897	335, 217	−10. 1
Production per man per day	7. 04	7. 47	+6. 1
Fuel-efficiency indicator: Pounds of coal per kw.-hr. at electric power plants [6]	1. 14	1. 10	−3. 5

[1] All data in this chapter, unless otherwise specified, includes Alaska. There was no recorded production in Hawaii and Puerto Rico.
[2] U. S. Department of Commerce. Figures for 1951 are revised.
[3] Interstate Commerce Commission.
[4] Bureau of Labor Statistics, U. S. Department of Labor. Figures for 1951 are revised.
[5] Equals man-days divided by number of active days.
[6] Federal Power Commission.

Mechanical Cleaning.—The total capacity of mechanical-cleaning equipment sold for use at bituminous-coal mines in 1952 was estimated at 8,700 tons of cleaned coal per hour, a 37-percent decrease from the previous year.

Consumption.—All classes of consumers except electric power utilities used less coal in 1952 than in 1951. The total consumption in 1952 was approximately 50.1 million tons less than in 1951. Table 47 shows trends in consumption for the major classes of consumers.

Trends of Fuel Efficiency.—During 1952 electric public-utility power plants attained increased fuel efficiency.

Competition With Oil and Gas.—Soft coal continued to meet serious competition with oil and gas.

Electric-power utilities consumed 1 percent more bituminous coal, 5 percent more fuel oil, and 19 percent more gas in 1952 than in 1951.

Class I railroads decreased their consumption of coal 30 percent in 1952 from 1951 and decreased their purchases of fuel oil and diesel fuel 5 percent during the same period.

The manufacture of domestic coal-burning equipment is reflected in statistics published by the Bureau of the Census. Factory sales of domestic stokers for burning bituminous coal decreased from 12,451 (revised figure) in 1951 to 8,572 in 1952. Shipments of domestic oil burners, boiler-burner units, and furnace-burner units increased from 661,251 (revised figure) in 1951 to 744,259 in 1952.

Stocks.—The reserve supply of bituminous coal and lignite in the hands of industrial consumers and retail coal dealers increased from 76.6 million tons at the beginning of 1952 to 76.7 million tons at the close of the year. The days' supply of stocks increased from 56 to 58. Stocks on the upper Lake docks decreased 407,493 tons from January 1 to December 31, 1952.

SOURCES OF DATA

Data for 1952 are final and are based upon detailed annual reports of production and mine operation furnished by the producers. As in previous years, all but a small percentage of the output was covered by the reports submitted. For the remaining output not directly reported—consisting chiefly of small mines—it has been possible to obtain reasonably accurate data from the records of the State mine departments, which have statutory authority to require such reports, or, in a few instances, from railroad carloadings. Production includes all marketable coal and excludes washery and other refuse.

In accordance with the practice followed by the Bureau of Mines in previous years, the statistics in this report relate to mines having an output of 1,000 tons a year or more and do not attempt to include many small mines producing less than 1,000 tons a year.

As in previous years, these data include all coal produced in Alaska and all that produced in the United States except Pennsylvania anthracite.

RESERVES [2]

TABLE 2.—Coal reserves of the United States, Jan. 1, 1950, by States

[In thousands of short tons]

State	Estimated original reserves					Reserves depleted to Jan. 1, 1950		Remaining reserves, Jan. 1, 1950	Recoverable reserves, Jan. 1, 1950, assuming 50-percent recovery
	Bituminous coal	Subbituminous coal	Lignite	Anthracite and semianthracite	Total	Produced [1]	Produced and lost in mining, assuming past losses equal production		
Alabama	67,570,000				67,570,000	821,590	1,643,180	65,926,820	32,963,410
Arkansas	1,396,000		90,000	230,000	1,716,000	91,894	183,788	1,532,212	766,106
Colorado	213,071,000	104,175,000		100,000	317,346,000	471,146	942,292	316,403,708	158,201,854
Georgia	933,000				933,000	11,533	23,066	909,934	454,967
Illinois	171,905,000				171,905,000	3,131,997	6,263,994	165,641,006	82,820,503
Indiana	53,051,000				53,051,000	984,137	1,968,274	51,082,726	25,541,363
Iowa	29,160,000				29,160,000	343,162	686,324	28,473,676	14,236,838
Kansas	[3] 17,574,000				[3] 17,574,000	[3] 9,800	[3] 19,600	17,554,400	8,777,200
Kentucky	123,327,000				123,327,000	1,951,803	3,903,606	119,423,394	59,711,697
Maryland	8,043,000				8,043,000	259,943	519,886	7,523,114	3,761,557
Michigan	296,900				296,900	[4] 46,240	[5] 77,000	219,900	109,950
Missouri	79,362,016				79,362,016	257,787	515,574	78,846,442	39,423,221
Montana	2,362,610	132,151,060	87,533,270		222,046,940	157,248	314,496	221,732,444	110,866,222
New Mexico	10,947,700	50,801,200		5,700	61,754,600	121,507	243,014	61,511,586	30,755,793
North Carolina	110,462				110,462	1,054	2,108	108,354	54,177
North Dakota			600,000,000		600,000,000	67,856	135,712	599,864,288	299,932,144
Ohio	86,497,000				86,497,000	1,694,259	3,388,518	83,108,482	41,554,241
Oklahoma	54,951,000				54,951,000	158,846	317,692	54,633,308	27,316,654
Pennsylvania	75,093,459			22,805,000	97,898,459	12,332,962	24,665,924	73,232,535	36,616,268
South Dakota			1,020,000		1,020,000	921	1,842	1,018,158	509,079
Tennessee	25,665,000				25,665,000	324,718	649,436	25,015,564	12,507,782
Texas	8,000,000		23,000,000		31,000,000	62,047	124,094	30,875,906	15,437,953
Utah	88,184,000	5,156,000			93,340,000	198,665	397,330	92,942,670	46,471,335
Virginia	21,149,000			500,000	21,649,000	548,479	1,096,958	20,552,042	10,276,021
Washington	11,413,000	52,442,000		23,000	63,878,000	142,904	285,808	63,592,192	31,796,096
West Virginia	116,618,447				116,618,447	4,979,385	9,958,770	106,659,677	53,329,838
Wyoming	13,234,950	[6] 108,318,900	([6])		121,553,850	362,375	724,750	120,829,100	60,414,550
Other States	[7] 820,000	[8] 15,500,000	[9] 49,963		16,369,963	8,789	17,578	16,352,385	8,176,193
Total	1,280,735,544	468,544,160	711,693,233	23,663,700	2,484,636,637	29,543,047	59,070,614	2,425,566,023	1,212,783,012

[1] Production, 1800 through 1885, from Eavenson, H. N., The First Century and a Quarter of American Coal Industry: 1942, 701 pp.; production, 1886 through 1949, from Geological Survey Mineral Resources of the United States and Bureau of Mines Minerals Yearbooks, unless otherwise indicated.
[2] Remaining reserves, Jan. 1, 1946.
[3] Production, Jan. 1, 1946 to Jan. 1, 1950.
[4] Michigan Geological Survey Division, as cited in Geol. Circ. 77, 1950, p. 56.
[5] Past losses assumed to be 40 percent of coal originally in the ground.
[6] Small reserves of lignite included under subbituminous coal.
[7] Includes Arizona, California, Idaho, and Oregon.
[8] Includes Arizona, California, and Oregon.
[9] Includes California and Louisiana.

[2] Averitt, Paul, and Berryhill, Louise R. Coal Resources of the United States: Geol. Survey Circ. 94, 1950, p. 5.

DOMESTIC PRODUCTION

The trend of average production of bituminous coal and lignite per working day in 1943-52 is illustrated in figures 1 and 5.

Production statistics for lignite are shown separately in table 54.

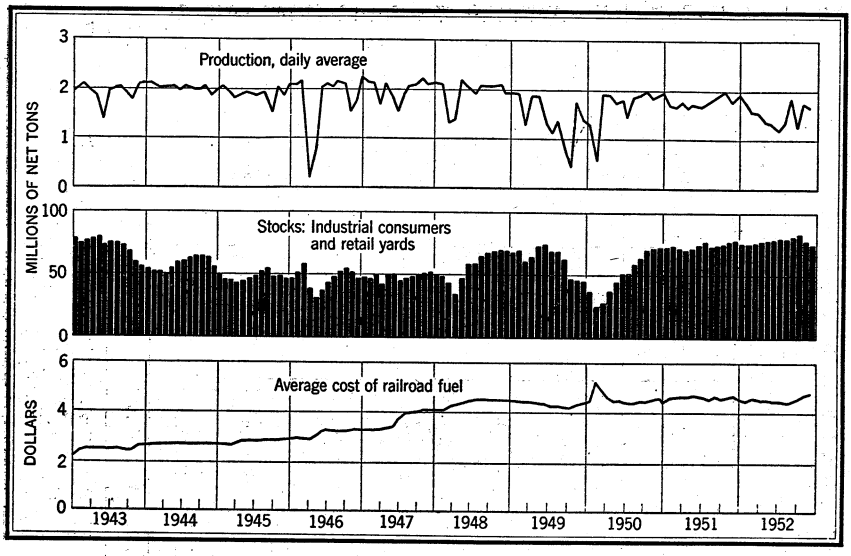

FIGURE 1.—Production, stocks, and prices of bituminous coal and lignite in the United States, 1943–52.

PRODUCTION BY YEARS

Production, realization, capacity, and net income of bituminous-coal and lignite mines in 1905–52 are shown graphically in figure 2.

PRODUCTION BY MONTHS AND WEEKS

Tables 4 to 7 summarize the statistics of monthly and weekly production of bituminous coal and lignite. The estimates given are based upon the latest information available and differ in some instances from the current figures published in the Weekly Coal Reports.

TABLE 3.—Growth of the bituminous-coal and lignite-mining industry in the United States,[1] 1890–1952

Year	Production (net tons)	Value of production [2]		Number of mines	Capacity at 280 days (millions of tons)	Foreign trade [3]	
		Total	Average per ton			Exports (net tons)	Imports (net tons)
1890	111,302,322	$110,420,801	$0.99	(4)	137	1,272,396	1,047,416
1891	117,901,238	117,188,400	.99	(4)	148	1,651,694	1,181,677
1892	126,856,567	125,124,381	.99	(4)	162	1,904,556	1,491,800
1893	128,385,231	122,751,618	.96	(4)	174	1,986,383	1,234,499
1894	118,820,405	107,653,501	.91	(4)	196	2,439,720	1,286,268
1895	135,118,193	115,779,771	.86	2,555	196	2,659,987	1,411,323
1896	137,640,276	114,891,515	.83	2,599	202	2,515,838	1,393,095
1897	147,617,519	119,595,224	.81	2,454	213	2,670,157	1,442,534
1898	166,593,623	132,608,713	.80	2,862	221	3,004,304	1,426,108
1899	193,323,187	167,952,104	.87	3,245	230	3,897,994	1,409,838
1900	212,316,112	220,930,313	1.04	(4)	255	6,060,688	1,911,925
1901	225,828,149	236,422,049	1.05	(4)	281	6,455,085	2,214,507
1902	260,216,844	290,858,483	1.12	(4)	316	6,048,777	2,174,393
1903	282,749,348	351,687,933	1.24	(4)	350	5,835,561	4,043,519
1904	278,659,689	305,397,001	1.10	4,650	386	7,206,879	2,179,882
1905	315,062,785	334,658,294	1.06	5,060	417	7,512,723	1,704,810
1906	342,874,867	381,162,115	1.11	4,430	451	8,014,263	2,039,169
1907	394,759,112	451,214,842	1.14	4,550	473	9,869,812	1,892,653
1908	332,573,944	374,135,268	1.12	4,730	482	11,071,152	2,219,243
1909	379,744,257	405,486,777	1.07	5,775	510	10,101,131	1,375,201
1910	417,111,142	469,281,719	1.12	5,818	538	11,663,052	1,819,766
1911	405,907,059	451,375,819	1.11	5,887	538	13,259,791	1,972,555
1912	450,104,982	517,983,445	1.15	5,747	566	16,475,029	1,456,333
1913	478,435,297	565,234,952	1.18	5,776	577	18,013,073	1,767,656
1914	422,703,970	493,309,244	1.17	5,592	608	17,589,562	1,520,962
1915	442,624,426	502,037,688	1.13	5,502	610	18,776,640	1,703,785
1916	502,519,682	665,116,077	1.32	5,726	613	21,254,627	1,713,837
1917	551,790,563	1,249,272,837	2.26	6,939	636	23,839,558	1,448,453
1918	579,385,820	1,491,809,940	2.58	8,319	650	22,350,730	1,457,073
1919	465,860,058	1,160,616,013	2.49	8,994	669	20,113,536	1,011,550
1920	568,666,683	2,129,933,000	3.75	8,921	725	38,517,084	1,244,990
1921	415,921,950	1,199,983,600	2.89	8,038	781	23,131,166	1,257,589
1922	422,268,099	1,274,820,000	3.02	9,299	832	12,413,085	5,059,999
1923	564,564,662	1,514,621,000	2.68	9,331	885	21,453,579	1,882,306
1924	483,686,538	1,062,626,000	2.20	7,586	792	17,100,347	417,226
1925	520,052,741	1,060,402,000	2.04	7,144	748	17,461,560	601,737
1926	573,366,985	1,183,412,000	2.06	7,177	747	35,271,937	485,666
1927	517,763,352	1,029,657,000	1.99	7,011	759	18,011,744	549,843
1928	500,744,970	933,774,000	1.86	6,450	691	16,164,485	546,526
1929	534,988,593	952,781,000	1.78	6,057	679	17,429,298	495,219
1930	467,526,299	795,483,000	1.70	5,891	700	15,877,407	240,886
1931	382,089,396	588,895,000	1.54	5,642	669	12,126,299	206,303
1932	309,709,872	406,677,000	1.31	5,427	594	8,814,047	186,909
1933	333,630,533	445,788,000	1.34	5,555	559	9,036,947	197,429
1934	359,368,022	628,383,000	1.75	6,258	565	10,868,552	179,661
1935	372,373,122	658,063,000	1.77	6,315	582	9,742,430	201,871
1936	439,087,903	770,955,000	1.76	6,875	618	10,654,959	271,798
1937	445,531,449	864,042,000	1.94	6,548	646	13,144,678	257,996
1938	348,544,764	678,653,000	1.95	5,777	602	10,490,269	241,305
1939	394,855,325	728,348,366	1.84	5,820	621	11,590,478	355,115
1940	460,771,500	879,327,227	1.91	6,324	639	16,465,928	371,571
1941	514,149,245	1,125,362,836	2.19	6,822	666	20,740,471	390,049
1942	582,692,937	1,373,990,608	2.36	6,972	663	22,943,305	498,103
1943	590,177,069	1,584,644,477	2.69	6,620	626	25,836,208	757,634
1944	619,576,240	1,810,900,542	2.92	6,928	624	26,032,348	633,689
1945	577,617,327	1,768,204,320	3.06	7,033	620	27,956,192	467,473
1946	533,922,068	1,835,539,476	3.44	7,333	699	41,197,378	434,680
1947	630,623,722	2,622,634,946	4.16	8,700	755	68,666,963	290,141
1948	599,518,229	2,993,267,021	4.99	9,079	774	45,930,133	291,337
1949	437,868,036	2,136,870,571	4.88	8,559	781	27,842,056	314,980
1950	516,311,053	2,500,373,779	4.84	9,429	790	25,468,403	346,706
1951	533,664,732	2,626,030,137	4.92	8,009	736	56,721,547	292,378
1952	466,840,782	2,289,180,401	4.90	7,275	703	47,643,150	262,268

[1] Includes Alaska.
[2] Figures for 1890 to 1936 and 1939 exclude selling expense. Figures for 1937–38 and 1940–52 include selling expense.
[3] Figures for 1890 to 1914, inclusive, represent fiscal year ended June 30.
[4] Data not available.

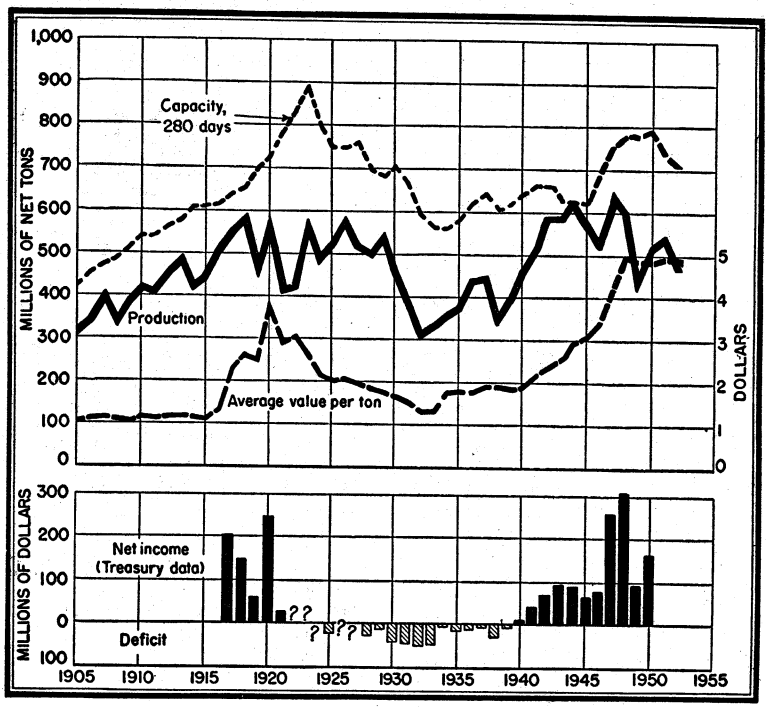

FIGURE 2.—Bituminous-coal and lignite production, realization, mine capacity, and net income or deficit in the United States, 1905–52.

TABLE 4.—Production of bituminous coal and lignite in the United States,[1] 1951–52, with estimates by months

Month	Production (thousands of net tons)		Maximum number of working days		Average production per working day (thousands of net tons)	
	1951	1952	1951	1952	1951	1952
January	51,531	50,116	26	26	1,982	1,928
February	39,990	43,902	24	25	1,666	1,756
March	44,713	41,120	27	26	1,656	1,582
April	41,888	39,253	24.2	25.3	1,731	1,552
May	43,281	36,592	26.4	26.4	1,639	1,386
June	43,448	31,581	25.5	23.8	1,704	1,327
July	34,007	25,916	20.2	21.8	1,684	1,189
August	47,072	34,313	27	26	1,743	1,320
September	42,853	47,076	24	25	1,786	1,883
October	51,675	32,871	27	27	1,914	1,217
November	49,207	41,195	24.8	23.3	1,984	1,768
December	44,000	42,906	25	26	1,760	1,650
Total	533,665	466,841	301.1	301.6	1,772	1,548

[1] Includes Alaska.

TABLE 5.—Production of bituminous coal and lignite in the United States and Alaska in 1952, by States, with estimates by months, in thousands of net tons

[Totals for year are based on final complete returns from all operators known to have produced 1,000 tons and over per year. In most cases monthly apportionment is based on current records of railroad carloadings and river shipments, supplemented by direct reports from local sources]

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
Alabama	1,296	1,093	1,116	1,077	921	402	315	791	1,357	769	1,047	1,199	11,383
Alaska	51	72	59	24	38	39	47	57	67	71	80	81	686
Arkansas	110	74	68	53	52	38	43	71	103	93	87	81	873
California (lignite)						1	1		1				3
Colorado	523	414	345	183	167	82	77	212	389	297	419	515	3,623
Illinois	5,433	4,438	3,932	3,291	3,078	3,135	2,414	3,035	4,675	3,422	4,231	4,706	45,790
Indiana	1,892	1,668	1,447	1,264	1,026	1,102	889	1,071	1,761	1,049	1,509	1,672	16,350
Iowa	182	153	118	97	79	78	88	76	107	133	107	163	1,381
Kansas	231	183	172	145	128	127	119	156	203	185	171	209	2,029
Kentucky:													
Eastern	4,948	4,152	3,580	3,741	3,492	3,242	2,576	3,365	4,781	2,983	4,095	3,977	44,932
Western	2,066	1,593	1,528	1,735	1,447	1,659	1,398	1,805	2,266	1,904	1,899	1,882	21,182
Total Kentucky	7,014	5,745	5,108	5,476	4,939	4,901	3,974	5,170	7,047	4,887	5,994	5,859	66,114
Maryland	78	56	53	59	50	45	53	48	36	16	27	67	588
Missouri	336	263	250	212	188	185	173	227	296	267	250	308	2,955
Montana:													
Bituminous	222	182	197	144	107	131	140	172	197	166	143	238	2,039
Lignite	3	3	3	2	2	2	2	3	3	2	3	3	31
Total Montana	225	185	200	146	109	133	142	175	200	168	146	241	2,070
New Mexico	102	87	86	66	67	29	11	47	78	49	63	75	760
North Dakota (lignite)	385	266	246	185	159	154	160	176	258	368	308	319	2,984
Ohio	3,184	2,837	2,977	3,418	3,162	3,110	2,337	2,866	3,581	2,585	3,248	2,904	36,209
Oklahoma	280	186	171	127	133	95	110	180	260	233	218	200	2,193
Pennsylvania	9,857	9,106	8,863	7,901	7,452	4,521	3,657	6,666	8,507	6,605	7,624	8,422	89,181
Tennessee	601	498	442	412	381	412	346	401	559	296	380	537	5,265
Utah	720	589	614	479	424	324	250	410	513	449	606	762	6,140
Virginia	2,105	2,023	1,721	1,805	1,728	1,672	1,586	1,604	2,192	1,443	1,802	1,898	21,579
Washington	92	78	73	75	60	63	54	52	72	76	73	76	844
West Virginia:													
Southern [1]	10,290	9,280	8,562	8,432	8,257	7,281	5,947	7,018	9,962	6,007	8,456	8,087	97,579
Northern [2]	4,454	4,097	3,930	3,895	3,639	3,281	2,764	3,361	4,260	2,925	3,694	3,834	44,134
Total West Virginia	14,744	13,377	12,492	12,327	11,896	10,562	8,711	10,379	14,222	8,932	12,150	11,921	141,713
Wyoming	669	506	563	428	353	369	357	441	589	475	651	687	6,088
Other States: Arizona, Georgia, North Carolina, and Oregon	6	5	4	3	2	2	2	2	3	3	4	4	40
Total	50,116	43,902	41,120	39,253	36,592	31,581	25,916	34,313	47,076	32,871	41,195	42,906	466,841

[1] Includes operations on the N. & W., C. & O., Virginian, T. & O. C., B. C. & G., and the B. & O. in Kanawha, Mason, and Clay Counties.
[2] Rest of State, including the Panhandle district and Grant, Mineral, and Tucker Counties.

TABLE 6.—Production of bituminous coal and lignite in the United States and Alaska, in 1952, by districts, with estimates by months, in thousands of net tons

[Districts as defined in the Bituminous Coal Act of April 26, 1937 (50 Stats. 72, 91–94), and modifications thereto]

[Totals for year are based on final complete returns from all operators known to have produced 1,000 tons and over per year. In most cases monthly apportionment is based on current records of railroad carloadings and river shipments, supplemented by direct reports from local sources]

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
1. Eastern Pennsylvania	4,464	4,085	3,708	3,410	3,166	2,676	2,354	3,087	3,937	2,996	3,348	3,546	40,777
2. Western Pennsylvania	5,511	5,113	5,243	4,584	4,370	1,919	1,381	3,657	4,644	3,651	4,337	4,977	49,387
3. Northern West Virginia	4,070	3,744	3,592	3,560	3,323	2,998	2,525	3,071	3,893	2,672	3,375	3,504	40,327
4. Ohio	3,184	2,837	2,977	3,418	3,162	3,110	2,337	2,866	3,581	2,585	3,248	2,904	36,209
5. Michigan													
6. Panhandle	344	317	303	301	282	254	214	260	329	227	285	296	3,412
7. Southern Numbered 1	5,048	4,551	4,229	4,152	4,101	3,605	3,002	3,460	4,875	3,014	4,179	4,017	48,233
8. Southern Numbered 2	12,705	11,244	9,934	10,105	9,635	8,869	7,343	8,799	12,440	7,620	10,433	10,310	119,437
9. West Kentucky	2,066	1,593	1,528	1,735	1,447	1,659	1,398	1,805	2,266	1,904	1,899	1,882	21,182
10. Illinois	5,433	4,438	3,932	3,291	3,078	3,135	2,414	3,035	4,675	3,422	4,231	4,706	45,790
11. Indiana	1,892	1,668	1,447	1,264	1,026	1,102	889	1,071	1,761	1,049	1,509	1,672	16,350
12. Iowa	182	153	118	97	79	78	88	76	107	133	107	163	1,381
13. Southeastern	1,491	1,255	1,261	1,213	1,045	537	427	922	1,539	867	1,171	1,374	13,102
14. Arkansas-Oklahoma	226	152	139	106	108	77	89	146	211	190	178	164	1,786
15. Southwestern	731	554	522	431	393	368	356	488	651	588	548	634	6,264
16. Northern Colorado	151	114	95	39	25	16	12	28	79	66	125	161	911
17. Southern Colorado	459	374	323	200	199	91	74	224	376	273	347	418	3,358
18. New Mexico	16	14	14	10	10	5	3	7	13	7	11	12	122
19. Wyoming	669	506	563	428	353	369	357	441	589	475	651	687	6,088
20. Utah	720	589	614	479	424	324	250	410	513	449	606	762	6,140
21. North-South Dakota	385	266	246	185	159	154	160	176	258	368	308	319	2,984
22. Montana	225	185	200	146	109	133	142	175	200	168	146	241	2,070
23. Washington	144	150	132	99	98	102	101	109	139	147	153	157	1,531
Total	50,116	43,902	41,120	39,253	36,592	31,581	25,916	34,313	47,076	32,871	41,195	42,906	466,841

TABLE 7.—Production of bituminous coal and lignite in the United States,[1] 1951–52, with estimates by weeks

1951				1952			
Week ended—	Production (thousands of net tons)	Maximum number of working days	Average production per working day (thousands of net tons)	Week ended—	Production (thousands of net tons)	Maximum number of working days	Average production per working day (thousands of net tons)
Jan. 6	10,150	5	2,030	Jan. 5	[1] 7,446	[1] 4	[2] 1,848
Jan. 13	11,981	6	1,997	Jan. 12	11,890	6	1,982
Jan. 20	11,314	6	1,886	Jan. 19	11,451	6	1,909
Jan. 27	11,568	6	1,928	Jan. 26	11,333	6	1,889
Feb. 3	9,564	6	1,594	Feb. 2	10,487	6	1,748
Feb. 10	8,665	6	1,444	Feb. 9	10,599	6	1,767
Feb. 17	10,936	6	1,823	Feb. 16	10,623	6	1,771
Feb. 24	10,330	6	1,722	Feb. 23	10,251	6	1,709
Mar. 3	11,330	6	1,888	Mar. 1	10,344	6	1,724
Mar. 10	10,053	6	1,676	Mar. 8	9,911	6	1,652
Mar. 17	9,954	6	1,659	Mar. 15	9,776	6	1,629
Mar. 24	10,156	6	1,693	Mar. 22	9,560	6	1,593
Mar. 31	10,233	6	1,706	Mar. 29	9,868	6	1,645
Apr. 7	9,106	5.2	1,751	Apr. 5	8,172	5.3	1,542
Apr. 14	9,947	6	1,658	Apr. 12	8,094	6	1,349
Apr. 21	10,598	6	1,766	Apr. 19	9,219	6	1,537
Apr. 28	10,431	6	1,739	Apr. 26	9,782	6	1,630
May 5	9,671	6	1,612	May 3	8,583	6	1,431
May 12	9,587	6	1,598	May 10	7,993	6	1,332
May 19	9,620	6	1,603	May 17	8,348	6	1,391
May 26	9,722	6	1,620	May 24	8,902	6	1,484
June 2	8,645	5.4	1,601	May 31	8,351	5.4	1,546
June 9	9,749	6	1,625	June 7	7,616	6	1,269
June 16	10,208	6	1,701	June 14	7,288	6	1,215
June 23	10,876	6	1,813	June 21	7,935	6	1,323
June 30	10,457	5.5	1,901	June 28	8,430	5.5	1,533
July 7	1,476	1	1,476	July 5	1,128	1	1,128
July 14	8,337	5.2	1,603	July 12	5,200	5.1	1,020
July 21	10,128	6	1,688	July 19	6,644	6	1,107
July 28	10,125	6	1,688	July 26	6,733	6	1,122
Aug. 4	9,928	6	1,655	Aug. 2	8,336	6	1,389
Aug. 11	10,149	6	1,692	Aug. 9	9,465	6	1,578
Aug. 18	10,249	6	1,708	Aug. 16	9,822	6	1,637
Aug. 25	10,714	6	1,786	Aug. 23	11,006	6	1,834
Sept. 1	10,578	6	1,763	Aug. 30	2,207	6	368
Sept. 8	9,278	5	1,856	Sept. 6	9,238	5	1,848
Sept. 15	10,893	6	1,816	Sept. 13	11,895	6	1,983
Sept. 22	10,970	6	1,828	Sept. 20	11,617	6	1,936
Sept. 29	11,107	6	1,851	Sept. 27	10,081	6	1,680
Oct. 6	10,894	6	1,816	Oct. 4	9,143	6	1,524
Oct. 13	11,003	6	1,834	Oct. 11	9,153	6	1,526
Oct. 20	11,399	6	1,900	Oct. 18	8,415	6	1,403
Oct. 27	11,603	6	1,934	Oct. 25	2,185	6	364
Nov. 3	11,310	6	1,885	Nov. 1	9,294	6	1,549
Nov. 10	11,498	6	1,916	Nov. 8	9,991	5.5	1,817
Nov. 17	11,602	5.8	2,000	Nov. 15	10,541	5.8	1,817
Nov. 24	10,160	5	2,032	Nov. 22	10,518	6	1,753
Dec. 1	12,189	6	2,032	Nov. 29	9,071	5	1,814
Dec. 8	11,280	6	1,880	Dec. 6	10,150	6	1,692
Dec. 15	11,513	6	1,919	Dec. 13	10,125	6	1,688
Dec. 22	10,732	6	1,789	Dec. 20	10,336	6	1,723
Dec. 29	7,906	5	1,581	Dec. 27	6,600	5	1,320
Jan. 5	[1] 1,793	[1] 1	[2] 1,848	Jan. 3	[1] 5,695	[1] 3	[2] 1,545
Total	533,665	301.1	1,772	Total	466,841	301.6	1,548

[1] Figures represent output and number of working days in that part of the week included in the calendar year shown. Total production for the week ended Jan. 5, 1952, was 9,239,000 net tons, and for Jan. 3, 1953, 7,725,000 net tons.

[2] Average daily output for the entire week and not for working days in calendar year shown.

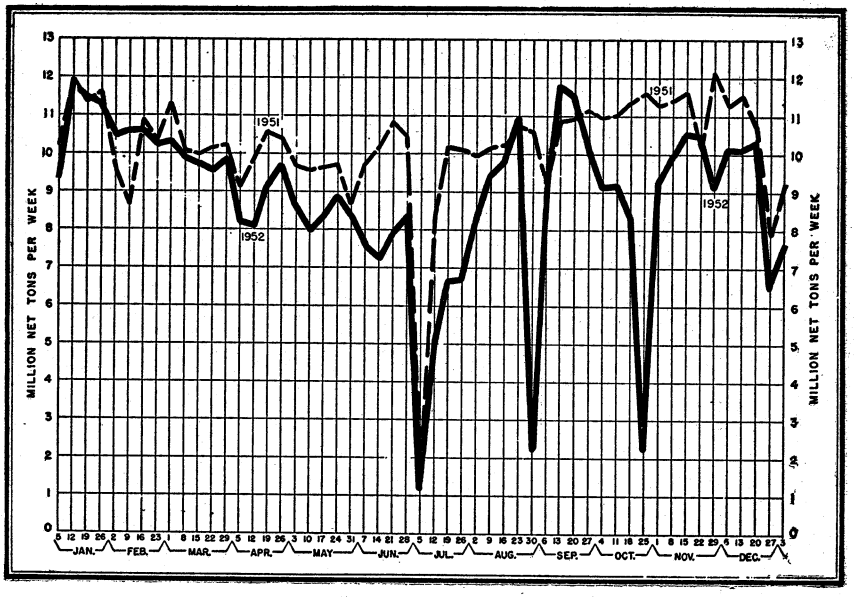

FIGURE 3.—Production of bituminous coal and lignite in the United States, 1951–52, by weeks.

SUMMARY BY STATES

TABLE 8.—Bituminous coal and lignite produced in the United States, by States, 1943–52, with production of maximum year and cumulative production from earliest record to end of 1952, in thousands of net tons

State	Maximum production		Production by years										Total production from earliest record to end of 1952
	Year	Quantity	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	
Alabama	1926	21,001	17,160	18,752	18,236	16,183	19,048	18,801	12,934	14,422	13,597	11,383	861,680
Arkansas	1907	2,670	1,718	1,972	1,854	1,631	1,871	1,662	962	1,169	1,107	873	94,525
Colorado	1917	12,483	8,324	8,168	7,621	5,914	6,358	5,631	4,636	4,259	4,103	3,623	483,106
Georgia	1903	416	14	24	43	114	7	20	(1)	(1)	(1)	(1)	(1)
Illinois	1918	89,291	72,631	76,792	73,011	63,469	67,860	65,342	47,208	56,291	54,200	45,790	3,287,564
Indiana	1918	30,679	25,065	27,962	25,183	21,697	25,449	23,849	16,550	19,957	19,451	16,350	1,041,046
Iowa	1917	8,966	2,771	2,141	2,046	1,788	1,684	1,670	1,725	1,891	1,630	1,381	342,635
Kansas	1918	7,562	3,437	3,369	3,228	2,493	2,745	2,538	2,031	2,125	1,961	2,029	272,166
Kentucky	1947	84,241	63,211	71,356	69,593	66,553	84,241	82,084	62,583	78,495	74,972	66,114	2,175,355
Maryland	1907	5,533	1,933	1,870	1,763	2,003	2,051	1,661	668	648	589	588	261,650
Michigan	1907	2,036	169	140	126	80	14	13	12	11	7		46,391
Missouri	1917	5,671	4,310	4,779	3,983	3,733	4,236	4,023	3,647	2,963	3,269	2,955	266,655
Montana (bituminous and lignite)	1944	4,844	4,833	4,844	4,467	3,723	3,178	2,898	2,766	2,520	2,345	2,070	164,198
New Mexico	1918	4,023	1,851	1,744	1,484	1,280	1,443	1,364	1,004	727	783	760	123,710
North Carolina	1922	79							(1)	(1)	(1)	(1)	(1)
North Dakota (lignite)	1950	3,261	2,500	2,366	2,522	2,555	2,760	2,961	2,967	3,261	3,224	2,984	77,109
Ohio	1920	45,878	32,255	33,877	32,737	32,314	37,548	38,708	30,961	37,761	37,949	36,209	1,809,601
Oklahoma	1920	4,849	2,838	3,209	2,909	2,647	3,421	3,462	3,022	2,679	2,223	2,193	165,870
Pennsylvania	1918	178,551	141,050	146,052	132,965	125,497	147,079	134,542	89,215	105,870	108,164	89,181	7,669,006
Tennessee	1942	8,158	7,179	7,266	6,271	5,618	6,258	6,483	4,172	5,070	5,401	5,265	340,048
Texas (bituminous and lignite)	1913	2,429	153	[2] 109	[2] 80	[2] 56	[2] 61	[2] 57	[2] 49	[2] 18			60,929
Utah	1947	7,429	6,666	7,119	6,679	5,994	7,429	6,813	6,160	6,670	6,136	6,140	216,812
Virginia	1952	21,579	20,280	19,514	17,235	15,527	20,171	17,999	14,584	17,667	21,400	21,579	614,769
Washington	1918	4,082	1,528	1,524	1,357	991	1,118	1,220	899	874	857	844	145,024
West Virginia	1947	176,157	158,804	164,704	152,035	144,020	176,157	168,862	122,610	144,116	163,310	141,713	5,410,882
Wyoming	1945	9,847	9,155	9,540	9,847	7,635	8,051	6,412	6,001	6,348	6,430	6,088	382,327
Other States [3]			342	383	342	407	386	443	502	499	557	729	67,764
Total	1947	630,624	590,177	619,576	577,617	533,922	630,624	599,518	437,868	516,311	533,665	466,841	26,380,822

[1] Included with "Other States."
[2] Lignite only.
[3] Includes Alaska.

TABLE 9.—Number of mines, production, value, men working daily, days active, man-days, and output per day at bituminous-coal and lignite mines in the United States, 1952, by States

[Exclusive of mines producing less than 1,000 tons]

State	Number of active mines	Disposition of coal produced (net tons)					Average value per ton [3]	Average number of men working daily				Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Trucked to railroad or waterway for further shipment	Shipped by truck	Used at mine [2]	Total quantity		Underground	Surface		Total			
									In strip pits	All others				
Alabama	287	8,742,491	745,523	973,160	922,253	11,383,427	$6.22	9,212	648	1,940	11,800	174	2,056,649	5.53
Alaska	7	559,100	70,196	52,069	4,853	686,218	8.42	211	64	99	374	253	94,487	7.26
Arizona	1			5,003		5,003	6.60	10		1	11	194	2,137	2.34
Arkansas	49	796,664	44,902	31,284	238	873,088	7.83	1,018	141	215	1,374	136	186,393	4.68
California (lignite)	1				2,998	2,998	10.24		2		2	125	250	11.99
Colorado	131	2,460,043	200,636	869,109	93,227	3,623,015	5.30	2,857	62	759	3,678	163	598,334	6.06
Georgia	8			32,100		32,100	5.00	36		8	44	209	9,177	3.50
Illinois	238	39,242,801	411,007	5,249,352	886,822	45,789,982	4.10	15,592	1,642	7,010	24,244	161	3,907,482	11.72
Indiana	93	14,152,515	85,722	1,690,098	421,867	16,350,202	3.97	3,876	1,551	1,815	7,242	180	1,305,844	12.52
Iowa	81	475,254	256,660	621,275	27,544	1,380,733	3.84	623	226	197	1,046	196	205,216	6.73
Kansas	33	1,750,547	22,820	243,811	11,423	2,028,601	3.90	128	349	233	710	208	147,938	13.71
Kentucky	1,865	51,494,117	5,953,262	8,199,349	467,613	66,114,341	4.80	42,405	1,708	8,570	52,683	171	9,020,692	7.33
Maryland	88	111,354	98,187	378,138	224	587,903	4.58	424	149	60	633	186	117,890	4.99
Missouri	68	2,425,775	3,417	519,695	5,563	2,954,450	4.08	476	431	332	1,239	188	232,947	12.68
Montana:														
Bituminous	12	1,981,705	3,840	45,668	7,595	2,038,808	2.80	371	55	179	605	183	110,446	18.46
Lignite	7			30,385	165	30,550	3.70	14	13	1	28	142	3,962	7.71
Total Montana	19	1,981,705	3,840	76,053	7,760	2,069,358	2.81	385	68	180	633	181	114,408	18.09
New Mexico	27	630,578	15,073	112,861	925	759,437	5.77	652	13	91	756	204	153,910	4.93
North Carolina	1			1,600		1,600	7.93	33		7	40	38	1,520	1.05
North Dakota (lignite)	49	2,401,809		365,924	216,019	2,983,752	2.37	85	300	243	628	202	126,666	23.56
Ohio	579	23,130,593	1,952,920	10,976,462	148,475	36,208,450	3.81	8,224	3,860	3,380	15,464	206	3,183,711	11.37
Oklahoma	47	1,962,730	91,567	136,177	2,935	2,193,409	5.78	1,015	377	275	1,667	191	318,467	6.89
Oregon	1			1,169	10	1,179	7.34	2			2	112	224	5.26
Pennsylvania	1,572	62,200,108	7,798,441	13,821,049	5,361,634	89,181,232	5.31	57,109	6,864	11,935	75,908	188	14,283,123	6.24
Tennessee	359	3,009,696	1,087,496	1,143,122	24,640	5,264,954	4.85	5,745	295	870	6,910	151	1,044,976	5.04
Utah	53	5,344,729	313,347	445,680	36,549	6,140,305	5.28	2,983		968	3,951	201	792,796	7.75
Virginia	315	16,782,026	2,669,909	1,840,383	287,050	21,579,368	5.32	14,205	487	2,760	17,452	199	3,480,301	6.20
Washington	25	649,392	38,951	136,989	18,865	844,197	7.09	653	67	168	888	221	196,509	4.30
West Virginia	1,244	126,461,980	9,234,647	2,121,102	3,895,330	141,713,059	5.23	82,672	3,446	16,878	102,996	197	20,327,424	6.97
Wyoming	34	5,786,328	5,965	187,514	108,614	6,088,421	4.34	1,996	190	656	2,842	209	592,923	10.27
Total	7,275	372,552,335	31,104,488	50,230,528	12,953,431	466,840,782	4.90	252,627	22,940	59,650	335,217	186	62,502,394	7.47

[1] Includes coal loaded at mine directly into railroad cars or river barges.

[2] Includes coal used by mine employees, taken by locomotive tenders at tipple, used at mine for power and heat, coal transported from mine to point of use by conveyor or tram, coal made into beehive coke at mine and all other uses at mine.

[3] Value received or charged for coal, f. o. b. mine, including selling cost. (Includes a value for coal not sold but used by producer, such as mine fuel and coal coked as estimated by producer at average prices that might have been received if such coal had been sold commercially.)

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TABLE 10.—Number of mines, production, value, men working daily, days active, man-days and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by districts

[Districts as defined in the Bituminous Coal Act of 1937 and modifications thereto; exclusive of mines producing less than 1,000 tons]

District	Number of active mines	Disposition of coal produced (net tons)					Average value per ton [3]	Average number of men working daily				Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Trucked to railroad or waterway for further shipment	Shipped by truck	Used at mine [2]	Total quantity		Underground	Surface		Total			
									In strip pits	All others				
1. Eastern Pennsylvania	1,060	27,588,887	6,051,454	5,604,689	1,531,757	40,776,787	$5.12	23,916	4,727	5,623	34,266	190	6,513,301	6.26
2. Western Pennsylvania	617	34,921,651	1,963,904	8,671,435	3,830,150	49,387,140	5.45	33,913	2,348	6,428	42,689	186	7,959,053	6.21
3. Northern West Virginia	475	33,616,342	5,140,313	703,164	867,185	40,327,004	4.56	18,518	1,658	4,329	24,505	182	4,457,215	9.05
4. Ohio	579	23,130,593	1,952,920	10,976,462	148,475	36,208,450	3.81	8,224	3,860	3,380	15,464	206	3,183,711	11.37
5. Michigan														
6. Panhandle	27	1,943,151	155,452	439,644	873,748	3,411,995	4.42	1,769	184	273	2,226	203	451,569	7.56
7. Southern Numbered 1	401	45,255,316	1,589,340	498,335	891,124	48,234,115	6.14	35,375	1,102	6,471	42,948	208	8,919,683	5.41
8. Southern Numbered 2	2,519	97,206,957	10,968,969	9,239,184	2,022,124	119,437,234	5.18	82,914	1,868	15,855	100,637	182	18,283,676	6.53
9. West Kentucky	164	18,866,797	691,630	1,607,080	16,187	21,181,694	3.55	4,587	966	1,893	7,446	187	1,394,717	15.19
10. Illinois	238	39,242,801	411,007	5,249,352	886,822	45,789,982	4.10	15,592	1,642	7,010	24,244	161	3,907,482	11.72
11. Indiana	93	14,152,515	85,722	1,690,098	421,867	16,350,202	3.97	3,876	1,551	1,815	7,242	180	1,305,844	12.52
12. Iowa	81	475,254	256,660	621,275	27,544	1,380,733	3.84	623	226	197	1,046	196	205,216	6.73
13. Southeastern	476	9,402,671	1,026,403	1,746,472	926,469	13,102,015	6.02	10,849	744	2,156	13,749	172	2,362,538	5.55
14. Arkansas-Oklahoma	75	1,585,783	105,160	92,822	1,805	1,785,570	7.13	1,416	337	320	2,073	154	320,162	5.56
15. Southwestern	122	5,349,933	57,546	838,145	18,354	6,263,978	4.27	1,221	961	735	2,917	194	565,583	11.08
16. Northern Colorado	22	479,469	16,139	379,512	35,692	910,812	4.30	599	27	125	751	151	113,377	8.03
17. Southern Colorado	117	2,597,589	184,497	517,709	58,178	3,357,973	5.67	2,725	35	692	3,452	175	605,027	5.55
18. New Mexico	21	13,563	15,073	89,752	3,280	121,668	5.77	195	15	34	244	148	36,227	3.36
19. Wyoming	34	5,786,328	5,965	187,514	108,614	6,088,421	4.34	1,996	190	656	2,842	209	592,923	10.27
20. Utah	53	5,344,729	313,347	445,680	36,549	6,140,305	5.28	2,983		968	3,951	201	792,796	7.75
21. North-South Dakota	49	2,401,809		365,924	216,019	2,983,752	2.37	85	300	243	628	202	126,666	23.56
22. Montana	19	1,981,705	3,840	76,053	7,760	2,069,358	2.81	385	68	180	633	181	114,408	18.09
23. Washington	33	1,208,492	109,147	190,227	23,728	1,531,594	7.69	866	131	267	1,264	230	291,220	5.26
Total	7,275	372,552,335	31,104,488	50,230,528	12,953,431	466,840,782	4.90	252,627	22,940	59,650	335,217	186	62,502,394	7.47

[1] Includes coal loaded at mine directly into railroad cars or river barges.

[2] Includes coal used by mine employees, taken by locomotive tender at tipple, used at mine for power and heat, coal transported from mine to point of use by conveyor or tram, coal made into beehive coke at mine, and all other uses at mine.

[3] Value received or charged for coal, f. o. b. mine including selling cost. (Includes a value for coal not sold but used by producer, such as mine fuel and coal coked as estimated by producer at average prices that might have been received if such coal has been sold commercially.)

NUMBER AND SIZE OF MINES

TABLE 11.—Number and production of bituminous-coal and lignite mines in the United States, 1952, by State and size of output

[Exclusive of mines producing less than 1,000 tons]

State	Class 1—500,000 tons and over				Class 2—200,000 to 500,000 tons				Class 3—100,000 to 200,000 tons			
	Mines		Production		Mines		Production		Mines		Production	
	Number	Percent	Net tons	Percent	Number	Percent	Net tons	Percent	Number	Percent	Net tons	Percent
Alabama	5	1.8	4,173,387	36.7	9	3.1	2,493,576	21.9	9	3.1	1,303,592	11.4
Alaska					2	28.6	467,306	68.1	1	14.3	104,168	15.2
Arizona												
Arkansas									2	4.1	292,162	33.5
California (lignite)												
Colorado					2	1.5	654,563	18.1	7	5.3	1,017,419	28.1
Illinois	40	16.8	32,972,528	72.0	20	8.4	7,390,581	16.1	17	7.1	2,589,614	5.6
Indiana	12	12.9	8,496,905	52.0	14	15.1	5,199,749	31.8	10	10.7	1,375,910	8.4
Iowa					1	1.2	297,648	21.6				
Georgia												
Kansas	1	3.0	574,204	28.3	3	9.1	1,040,328	51.3	1	3.0	135,790	6.7
Kentucky	29	1.5	21,543,834	32.5	61	3.3	18,447,184	27.9	63	3.4	8,871,003	13.4
Maryland												
Missouri	1	1.5	629,371	23.0	5	7.3	1,591,787	53.9	2	2.9	243,686	8.2
Montana (bituminous and lignite)	1	5.3	1,406,321	68.0	1	5.3	267,176	12.9	2	10.5	236,884	11.5
New Mexico	1	3.7	556,583	73.3								
North Carolina												
North Dakota (lignite)					6	12.3	2,125,493	71.3	3	6.1	493,332	16.5
Ohio	17	2.9	15,791,701	43.6	21	3.6	6,621,231	18.3	34	5.9	4,534,821	12.5
Oklahoma					3	6.4	741,695	33.8	6	12.8	874,843	39.9
Oregon												
Pennsylvania	38	2.4	34,570,216	38.8	58	3.7	18,083,382	20.3	96	6.1	13,315,940	14.9
Tennessee					4	1.1	1,046,154	19.9	10	2.8	1,359,011	25.8
Utah	4	7.5	2,358,308	38.4	6	11.3	1,997,001	32.5	7	13.2	1,011,774	16.5
Virginia	11	3.5	8,096,331	37.5	14	4.5	4,133,614	19.2	25	7.9	3,794,458	17.6
Washington					2	8.0	449,038	53.2				
West Virginia	67	5.4	54,711,406	38.6	148	11.9	47,345,845	33.4	124	10.0	17,871,929	12.6
Wyoming	4	11.8	3,286,269	54.0	6	17.7	1,913,121	31.4	6	17.6	727,997	11.9
Total	231	3.2	189,217,364	40.5	386	5.3	122,306,472	26.2	425	5.8	60,154,333	12.9

TABLE 11.—Number and production of bituminous-coal and lignite mines in the United States, 1952, by State and size of output—Con.

[Exclusive of mines producing less than 1,000 tons]

State	Class 4—50,000 to 100,000 tons				Class 5—10,000 to 50,000 tons				Class 6—Less than 10,000 tons				Total		
	Mines		Production		Mines		Production		Mines		Production		Mines	Production (net tons)	
	Number	Percent	Net tons	Percent	Number	Percent	Net tons	Percent	Number	Percent	Net tons	Percent		Total	Average per mine
Alabama	23	8.0	1,692,564	14.9	42	14.6	1,021,226	9.0	199	69.4	699,082	6.1	287	11,383,427	39,664
Alaska					4	57.1	114,744	16.7					7	686,218	98,031
Arizona									1	100.0	5,003	100.0	1	5,003	5,003
Arkansas	3	6.1	227,152	26.0	11	22.5	257,562	29.5	33	67.3	96,212	11.0	49	873,088	17,818
California (lignite)									1	100.0	2,998	100.0	1	2,998	2,998
Colorado	13	9.9	871,264	24.0	34	26.0	799,756	22.1	75	57.3	280,013	7.7	131	3,623,015	27,657
Illinois	15	6.3	1,085,843	2.4	59	24.8	1,356,856	3.0	87	36.6	394,560	.9	238	45,789,982	192,395
Indiana	8	8.6	565,997	3.4	24	25.8	602,659	3.7	25	26.9	108,982	.7	93	16,350,202	175,809
Iowa	6	7.4	344,249	24.9	28	34.6	528,770	38.3	46	56.8	210,066	15.2	81	1,380,733	17,046
Georgia									8	100.0	32,100	100.0	8	32,100	4,013
Kansas	1	3.0	88,931	4.4	8	24.3	110,283	5.4	19	57.6	79,065	3.9	33	2,028,601	61,473
Kentucky	75	4.0	5,176,884	7.8	358	19.2	7,485,704	11.4	1,279	68.6	4,595,732	7.0	1,865	66,114,341	35,450
Maryland	2	2.3	109,743	18.7	17	19.3	269,679	45.9	69	78.4	208,481	35.4	88	587,903	6,681
Missouri	1	1.5	53,203	1.8	8	11.8	212,327	7.2	51	75.0	173,986	5.9	68	2,954,450	43,448
Montana (bituminous and lignite)	1	5.3	77,425	3.7	1	5.3	17,260	.8	13	68.3	64,292	3.1	19	2,069,358	108,914
New Mexico					4	14.8	115,821	15.2	22	81.5	87,033	11.5	27	759,437	28,127
North Carolina									1	100.0	1,600	100.0	1	1,600	1,600
North Dakota (lignite)	1	2.0	56,008	1.9	10	20.4	194,747	6.5	29	59.2	114,172	3.8	49	2,983,752	60,893
Ohio	53	9.2	3,976,403	11.0	170	29.4	4,097,149	11.3	284	49.0	1,187,145	3.3	579	36,208,450	62,536
Oklahoma	7	14.9	403,117	18.4	4	8.5	82,571	3.8	27	57.4	91,183	4.1	47	2,193,409	46,668
Oregon									1	100.0	1,179	100.0	1	1,179	1,179
Pennsylvania	126	8.0	9,081,731	10.2	462	29.4	10,661,179	11.9	792	50.4	3,468,784	3.9	1,572	89,181,232	56,731
Tennessee	14	3.9	898,725	17.1	52	14.5	917,671	17.4	279	77.7	1,043,393	19.8	359	5,264,954	14,666
Utah	4	7.6	291,959	4.8	15	28.3	401,511	6.5	17	32.1	79,752	1.3	53	6,140,305	115,855
Virginia	27	8.6	1,794,328	8.3	104	33.0	3,129,374	14.5	134	42.5	631,263	2.9	315	21,579,368	68,506
Washington	2	8.0	120,196	14.2	10	40.0	234,498	27.8	11	44.0	40,465	4.8	25	844,197	33,768
West Virginia	149	12.0	10,691,752	7.6	392	31.5	9,412,646	6.6	364	29.2	1,679,481	1.2	1,244	141,713,059	113,917
Wyoming	1	2.9	52,869	.9	3	8.8	55,906	.9	14	41.2	52,259	.9	34	6,088,421	179,071
Total	532	7.3	37,654,433	8.1	1,820	25.0	42,079,899	9.0	3,881	53.4	15,428,281	3.3	7,275	466,840,782	64,171

EMPLOYMENT AND PRODUCTIVITY

TABLE 12.—Growth of the bituminous-coal- and lignite-mining industry in the United States, 1890–1952

Year	Men employed	Average number of days worked	Average days lost per man on strike	Net tons per man—		Percent of underground production—		Percent of total production—	
				Per day	Per year	Cut by machines[1]	Mechanically loaded	Mechanically cleaned[2]	Mined by stripping
1890	192,204	226	(3)	2.56	579	(3)	(3)	(3)	(3)
1891	205,803	223	(3)	2.57	573	5.3	(3)	(3)	(3)
1892	212,893	219	(3)	2.72	596	(3)	(3)	(3)	(3)
1893	230,365	204	(3)	2.73	557	(3)	(3)	(3)	(3)
1894	244,603	171	(3)	2.84	486	(3)	(3)	(3)	(3)
1895	239,962	194	(3)	2.90	563	(3)	(3)	(3)	(3)
1896	244,171	192	(3)	2.94	564	11.9	(3)	(3)	(3)
1897	247,817	196	(3)	3.04	596	15.3	(3)	(3)	(3)
1898	255,717	211	(3)	3.09	651	19.5	(3)	(3)	(3)
1899	271,027	234	46	3.05	713	22.7	(3)	(3)	(3)
1900	304,375	234	43	2.98	697	24.9	(3)	(3)	(3)
1901	340,235	225	35	2.94	664	25.6	(3)	(3)	(3)
1902	370,056	230	44	3.06	703	26.8	(3)	(3)	(3)
1903	415,777	225	28	3.02	680	27.6	(3)	(3)	(3)
1904	437,832	202	44	3,15	637	28.2	(3)	(3)	(3)
1905	460,629	211	23	3.24	684	32.8	(3)	(3)	(3)
1906	478,425	213	63	3.36	717	34.7	(3)	2.7	(3)
1907	513,258	234	14	3.29	769	35.1	(3)	2.9	(3)
1908	516,264	193	38	3.34	644	37.0	(3)	3.6	(3)
1909	543,152	209	29	3.34	699	37.5	(3)	3.8	(3)
1910	555,533	217	89	3.46	751	41.7	(3)	3.8	(3)
1911	549,775	211	27	3.50	738	43.9	(3)	(3)	(3)
1912	548,632	223	35	3.68	820	46.8	(3)	3.9	(3)
1913	571,882	232	36	3.61	837	50.7	(3)	4.6	(3)
1914	583,506	195	80	3.71	724	51.8	(3)	4.8	0.3
1915	557,456	203	61	3.91	794	55.3	(3)	4.7	.6
1916	561,102	230	26	3.90	896	56.9	(3)	4.6	.8
1917	603,143	243	17	3.77	915	56.1	(3)	4.6	1.0
1918	615,305	249	7	3.78	942	56.7	(3)	3.8	1.4
1919	621,998	195	37	3.84	749	60.0	(3)	3.6	1.2
1920	639,547	220	22	4.00	881	60.7	(3)	3.3	1.5
1921	663,754	149	23	4.20	627	66.4	(3)	3.4	1.2
1922	687,958	142	117	4.28	609	64.8	(3)	(3)	2.4
1923	704,793	179	20	4.47	801	68.3	0.3	3.8	2.1
1924	619,604	171	73	4.56	781	71.5	.7	(3)	2.8
1925	588,493	195	30	4.52	884	72.9	1.2	(3)	3.2
1926	593,647	215	24	4.50	966	73.8	1.9	(3)	3.0
1927	593,918	191	153	4.55	872	74.9	3.3	5.3	3.6
1928	522,150	203	83	4.73	959	76.9	4.5	5.7	4.0
1929	502,993	219	11	4.85	1,064	78.4	7.4	6.9	3.8
1930	493,202	187	43	5.06	948	81.0	10.5	8.3	4.3
1931	450,213	160	35	5.30	849	83.2	13.1	9.5	5.0
1932	406,380	146	120	5.22	762	84.1	12.3	9.8	6.3
1933	418,703	167	30	4.78	797	84.7	12.0	10.4	5.5
1934	458,011	178	15	4.40	785	84.1	12.2	11.1	5.8
1935	462,403	179	[4] 7	4.50	805	84.2	13.5	12.2	6.4
1936	477,204	199	21	4.62	920	84.8	16.3	13.9	6.4
1937	491,864	193	[4] 19	4.69	906	(3)	20.2	14.6	7.1
1938	441,333	162	13	4.89	790	87.5	26.7	18.2	8.7
1939	421,788	178	36	5.25	936	87.9	31.0	20.1	9.6
1940	439,075	202	8	5.19	1,049	88.4	35.4	22.2	9.2
1941	456,981	216	27	5.20	1,125	89.0	40.7	22.9	10.7
1942	461,991	246	7	5.12	1,261	89.7	45.2	24.4	11.5
1943	416,007	264	[4] 15	5.38	1,419	90.3	48.9	24.7	13.5
1944	393,347	278	[4] 5	5.67	1,575	90.5	52.9	25.6	16.3
1945	383,100	261	[4] 9	5.78	1,508	90.8	56.1	25.6	19.0
1946	[5] 396,434	214	[4] 23	6.30	1,347	90.8	58.4	26.0	21.1
1947	[5] 419,182	234	[4] 5	6.42	1,504	90.0	60.7	27.7	22.1
1948	[5] 441,631	217	[4] 16	6.26	1,358	90.7	64.3	30.2	23.3
1949	[5] 433,698	157	[4] 15	6.43	1,010	91.4	67.0	35.1	24.2
1950	[5] 415,582	183	[4] 56	6.77	1,239	92.6	69.4	38.5	23.9
1951	[5] 372,897	203	[4] 4	7.04	1,429	94.9	73.1	45.0	22.0
1952	[5] 335,217	186	[4] 6	7.47	1,389	95.1	75.6	48.7	23.3

[1] Percentages for 1890 to 1913, inclusive, are of total production, as a separation of strip and underground production is not available for those years.
[2] For 1906 to 1926, inclusive, these percentages are exclusive of coal cleaned at central washeries operated by consumers.
[3] Data not available.
[4] Bureau of Labor Statistics, U. S. Department of Labor.
[5] Average number of men working daily.

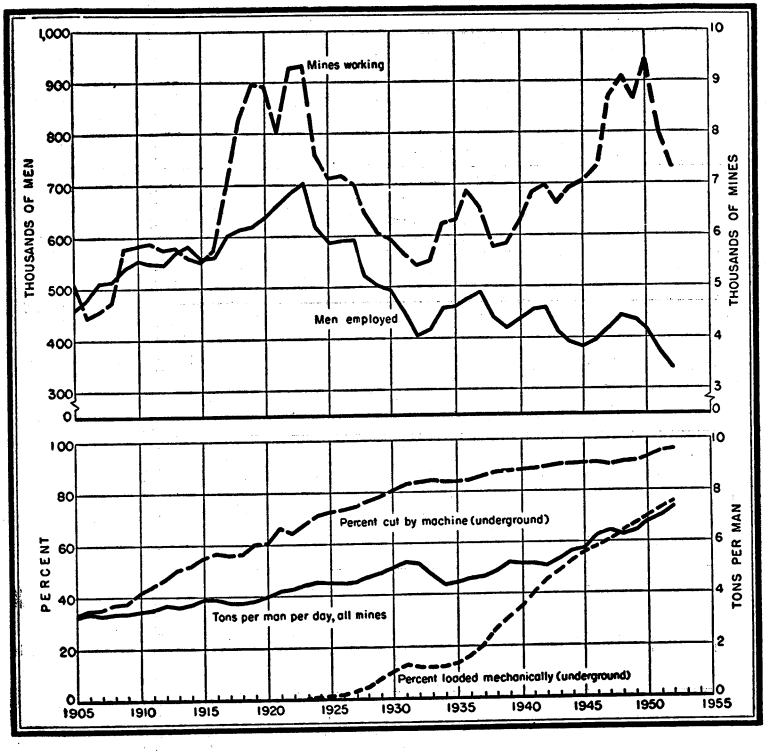

FIGURE 4.—Employment, mechanization, and output per man at bituminous coal and lignite mines in the United States, 1905–52.

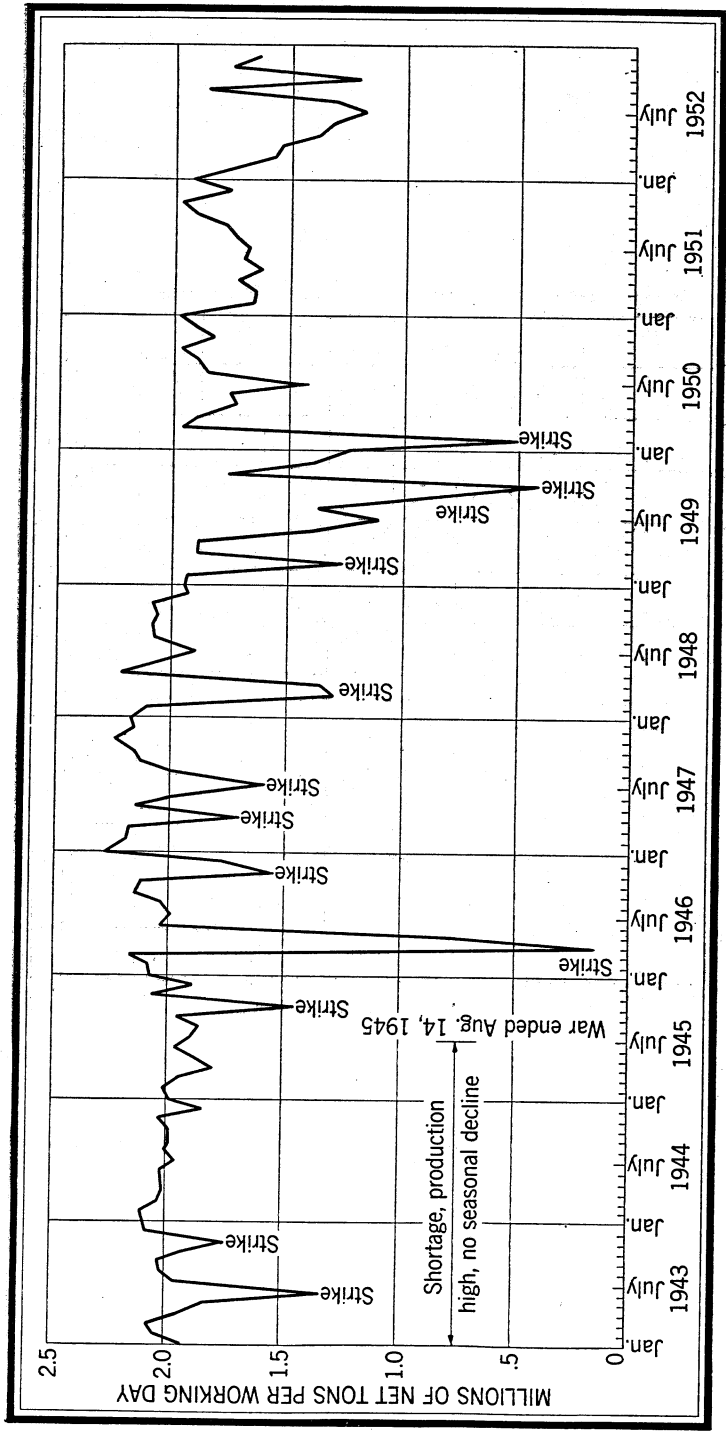

FIGURE 5.—Average production of bituminous coal and lignite in the United States per working day in each month, 1943–52.

TABLE 13.—Average output per man per day at bituminous-coal and lignite mines in the United States, 1952, by State and method of mining

State	Mined underground					Mined by stripping			Total production	
			Total							
	Hand loaded (net tons)	Mechanically loaded (net tons)	Net tons	Percent of grand total	Average tons per man per day	Net tons	Percent of grand total	Average tons per man per day	Net tons	Average tons per man per day
Alabama	1,298,064	8,431,328	9,729,392	85.5	5.11	1,654,035	14.5	10.83	11,383,427	5.53
Alaska	362,610	12,416	375,026	54.7	5.11	311,192	45.3	14.75	686,218	7.26
Arizona	5,003		5,003	100.0	2.34				5,003	2.34
Arkansas	81,900	476,156	558,056	63.9	3.52	315,032	36.1	11.37	873,088	4.68
California (lignite)						2,998	100.0	11.99	2,998	11.99
Colorado	977,064	2,260,287	3,237,351	89.4	5.57	385,664	10.6	23.04	3,623,015	6.06
Georgia	32,100		32,100	100.0	3.50				32,100	3.50
Illinois	1,470,322	27,614,643	29,084,965	63.5	9.41	16,705,017	36.5	20.48	45,789,982	11.72
Indiana	218,377	6,359,055	6,577,432	40.2	8.68	9,772,770	59.8	17.84	16,350,202	12.52
Iowa	414,802	30,698	445,500	32.3	3.47	935,233	67.7	12.17	1,380,733	6.73
Kansas	47,400		47,400	2.3	2.50	1,981,201	97.7	15.36	2,028,601	13.71
Kentucky	21,315,028	33,931,088	55,246,116	83.6	6.50	10,868,225	16.4	20.71	66,114,341	7.33
Maryland	263,323	108,461	371,784	63.2	3.97	216,119	36.8	8.95	587,903	4.99
Missouri	214,097		214,097	7.2	2.65	2,740,353	92.8	18.01	2,954,450	12.68
Montana:										
Bituminous	15,554	616,933	632,487	31.0	6.70	1,406,321	69.0	87.73	2,038,808	18.46
Lignite	16,224	7,175	23,399	76.6	8.58	7,151	23.4	5.79	30,550	7.71
Total Montana	31,778	624,108	655,886	31.7	6.75	1,413,472	68.3	81.86	2,069,358	18.09
New Mexico	113,800	636,996	750,796	98.9	4.92	8,641	1.1	6.86	759,437	4.93
North Carolina	1,600		1,600	100.0	1.05				1,600	1.05
North Dakota (lignite)	15,062	168,281	183,343	6.1	7.40	2,800,409	93.9	27.48	2,983,752	23.56
Ohio	2,038,072	12,021,864	14,059,936	38.8	7.23	22,148,514	61.2	17.88	36,208,450	11.37
Oklahoma	82,775	796,485	879,260	40.1	4.03	1,314,149	59.9	13.09	2,193,409	6.89
Oregon	1,179		1,179	100.0	5.26				1,179	5.26
Pennsylvania	19,132,474	49,750,901	68,883,375	77.2	5.43	20,297,857	22.8	12.77	89,181,232	6.24
Tennessee	3,027,062	1,692,350	4,719,412	89.6	4.75	545,542	10.4	10.81	5,264,954	5.04
Utah	52,397	6,087,908	6,140,305	100.0	7.75				6,140,305	7.75
Virginia	10,150,256	9,183,069	19,333,325	89.6	5.77	2,246,043	10.4	17.11	21,579,368	6.20
Washington	119,962	613,477	733,439	86.9	3.96	110,758	13.1	9.77	844,197	4.30
West Virginia	25,934,588	105,604,190	131,538,778	92.8	6.70	10,174,281	7.2	14.79	141,713,059	6.97
Wyoming	30,275	4,095,895	4,126,170	67.8	7.98	1,962,251	32.2	25.80	6,088,421	10.27
Total	87,431,370	270,499,656	357,931,026	76.7	6.39	108,909,756	23.3	16.77	466,840,782	7.47

METHOD OF MINING

TABLE 14.—Underground production of bituminous coal and lignite in the United States, 1952, by State and method of cutting

State	Cut by hand		Shot from solid		Cut by machines [1]				Total underground (net tons)
	Net tons	Percent of total underground	Net tons	Percent of total underground	Net tons	Percent of total underground	Number of coal-cutting machines in use	Average output per machine (net tons)	
Alabama	21,107	0.2	1,111,513	11.4	8,596,772	88.4	359	23,946	9,729,392
Alaska			375,026	100.0					375,026
Arizona					5,003	100.0	1	5,003	5,003
Arkansas	2,277	.4	34,240	6.1	521,539	93.5	72	7,244	558,056
Colorado	579,075	17.9	52,591	1.6	2,605,685	80.5	389	6,698	3,237,351
Georgia			32,100	100.0					32,100
Illinois			295,217	1.0	28,789,748	99.0	509	56,561	29,084,965
Indiana	21,895	.3	36,377	.6	6,519,160	99.1	170	38,348	6,577,432
Iowa			236,430	53.1	209,070	46.9	34	6,149	445,500
Kansas			2,856	6.0	44,544	94.0	11	4,049	47,400
Kentucky	315,128	.6	4,542,011	8.2	50,388,977	91.2	1,956	25,761	55,246,116
Maryland	122,493	32.9	35,983	9.7	213,308	57.4	26	8,204	371,784
Missouri	10,273	4.8	14,804	6.9	189,020	88.3	34	5,559	214,097
Montana:									
Bituminous					632,487	100.0	35	18,071	632,487
Lignite			23,399	100.0					23,399
Total Montana			23,399	3.6	632,487	96.4	35	18,071	655,886
New Mexico	1,787	0.2	51,103	6.8	697,906	93.0	43	16,230	750,796
North Carolina					1,600	100.0	2	800	1,600
North Dakota (lignite)			14,052	7.7	169,291	92.3	5	33,858	183,343
Ohio	9,399	.1	92,445	.6	13,958,092	99.3	559	24,970	14,059,936
Oklahoma			36,484	4.1	842,776	95.9	110	7,662	879,260
Oregon					1,179	100.0	1	1,179	1,179
Pennsylvania	2,546,316	3.7	716,974	1.0	65,620,085	95.3	2,865	22,904	68,883,375
Tennessee	56,464	1.2	1,177,039	24.9	3,485,909	73.9	194	17,960	4,719,412
Utah	1,390		45,932	.8	6,092,983	99.2	190	32,068	6,140,305
Virginia	65,608	.3	1,120,072	5.8	18,147,645	93.9	538	33,732	19,333,325
Washington	2,387	.3	199,870	27.3	531,182	72.4	38	13,978	733,439
West Virginia	745,325	.6	2,709,949	2.0	128,083,504	97.4	4,095	31,278	131,538,778
Wyoming	5,136	.1	6,157	.2	4,114,877	99.7	235	17,510	4,126,170
Total	4,506,060	1.3	12,962,624	3.6	340,462,342	95.1	12,471	27,300	357,931,026

[1] Includes augers and continuous mining machines.

TABLE 15.—Use of power drills for shot holes in underground bituminous-coal and lignite mines in the United States, 1940–52

[Production in thousands of net tons]

Year	Number of mines using power drills	Number of power drills		Production in working places where shot holes are power-drilled				Total production at mines using power drills
		Electric	Compressed air	Electric drills	Compressed air drills	Total	Percent of total underground	
1940	1,172	6,613	1,378	189,534	7,548	197,082	47.2	321,965
1941	1,266	7,697	1,502	230.841	6,372	237,213	51.7	359,578
1942	1,364	8,482	1,564	274,880	6,650	281,530	54.6	406,055
1943	1,376	8,930	1,630	293,599	6,206	299,805	58.7	415,514
1944	1,501	9,755	1,903	317,049	7,066	324,115	62.5	425.872
1945	1,504	10,267	1,855	298,867	3,919	302,786	64.7	384,234
1946	1,702	10,968	1,884	275,835	2,899	278,734	66.2	349,556
1947	2,522	12,940	1,449	349,113	2,753	351,866	71.6	415,414
1948	2,798	13,970	1,312	335,001	1,872	336,873	73.2	399,442
1949	2,923	14,087	1,411	249,941	1,388	251,329	75.7	284,287
1950	3,112	14,277	1,282	284,904	1,757	286,661	73.0	345,792
1951	3,027	14,231	1,345	322,345	2,300	324,645	78.0	379,165
1952	2,830	13,468	1,292	281,549	2,499	284,048	79.4	325,174

TABLE 16.—Use of power drills for shot holes in underground bituminous-coal and lignite mines, 1952, by States

State	Number of mines using power drills	Number of power drills		Production in working places where shot holes are power drilled (net tons)				Total production at mines using power drills (net tons)
		Electric	Compressed air	Electric drills	Compressed air drills	Total	Percent of total underground	
Alabama	85	518	37	8,007,238		8,007,238	82.3	8,850,919
Alaska	3	25	30	132,822	242,204	375,026	100.0	375,026
Arizona	1	3		5,003		5,003	100.0	5,003
Arkansas	19	36	21	103,800	88,517	192,317	34.5	425,163
Colorado	89	385	70	2,254,582	6,005	2,260,587	69.8	2,947,799
Illinois	142	890	7	27,311,626		27,311,626	93.9	27,583,560
Indiana	37	224		6,370,724		6,370,724	96.9	6,457,911
Iowa	17	34		130,298		130,298	29.2	155,122
Kentucky	893	2,467	122	44,127,237	884	44,128,121	79.9	50,160,489
Maryland	6	13		43,036		43,036	11.6	43,036
Missouri	8	11	1	128,134		128,134	59.8	136,766
Montana:								
Bituminous	11	35		632,487		632,487	100.0	632,487
Lignite	3	10		21,804		21,804	93.2	21,804
Total Montana	14	45		654,291		654,291	99.8	654,291
New Mexico	7	53		647,490		647,490	86.2	647,490
North Carolina	1	2		1,600		1,600	100.0	1,600
North Dakota (lignite)	7	13		176,431		176,431	96.2	176,431
Ohio	188	592	3	11,949,959		11,949,959	85.0	12,764,587
Oklahoma	10	90	4	785,304		785,304	89.3	834,306
Oregon	1		1		1,179	1,179	100.0	1,179
Pennsylvania	409	2,432	406	49,779,765	926,304	50,706,069	73.6	60,969,592
Tennessee	48	179	20	2,375,078	293,914	2,668,992	56.6	3,141,145
Utah	49	243		6,031,052		6,031,052	98.2	6,130,864
Virginia	203	603	40	13,052,750		13,052,750	67.5	17,331,390
Washington	13	72	125	167,758	528,807	696,565	95.0	704,082
West Virginia	559	4,177	403	103,298,744	411,472	103,710,216	78.8	120,554,928
Wyoming	21	361	2	4,014,186		4,014,186	97.3	4,121,685
Total	2,830	13,468	1,292	281,548,908	2,499,286	284,048,194	79.4	325,174,364

TABLE 17.—Number of underground bituminous-coal and lignite mines and number of haulage units in use, in the United States, in selected years [1]

Units	1924	1946	1948	1949	1950	1951	1952
Underground mines	7,352	5,888	7,108	6,798	7,559	6,225	5,632
Locomotives:							
Trolley	[2] 12,765	14,110	14,617	14,090	13,822	13,327	12,545
Battery	1,515	1,011	904	928	949	900	812
Other types	443	110	74	59	62	51	41
Total	14,723	15,231	15,595	15,077	14,833	14,278	13,398
Rope haulage units:							
Portable	([3])	4,084	3,886	3,904	4,225	3,875	3,584
Stationary	([3])	1,009	1,044	1,073	1,037	916	852
Total	649	5,093	4,930	4,977	5,262	4,791	4,436
Shuttle cars:							
Cable reel	([3])	([3])	([3])	2,144	2,782	3,191	3,382
Battery	([3])	([3])	([3])	623	512	567	462
Total	([3])	([3])	([3])	2,767	3,294	3,758	3,844
"Mother" conveyors	([3])	457	755	860	1,013	1,094	1,066
Animals	36,352	10,185	10,834	10,313	10,033	7,478	6,555

[1] Exclusive of lignite and Virginia semianthracite mines in 1946, 1948, and 1949.
[2] Includes combination trolley and battery locomotives.
[3] Data not available.

TABLE 18.—Number of haulage units in use in underground bituminous-coal and lignite mines in the United States, 1951–52, by States

State	Locomotives						Shuttle cars				Rope haulage units				"Mother" conveyor units		Animals	
	Trolley		Battery		Other types		Cable reel		Battery		Portable		Stationary					
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
Alabama	437	401	6	6			130	131	12	13	11	15	46	31	19	30	250	219
Alaska			12	10														
Arizona																	2	2
Arkansas	9	10	22	16	1	1					10	1	25	20	9	8	33	23
Colorado	120	126	69	76	2	1	25	30	26	22	77	65	67	79	6	8	289	270
Georgia																	2	6
Illinois	868	751	254	193	2	2	410	330	37	29	6	5	56	43	51	63	421	353
Indiana	282	227		4			65	62	66	51			13	14	8	2	55	59
Iowa	10	9			1						1		13	17			163	113
Kansas			2	2									2	2			15	11
Kentucky	1,899	1,763	62	50	2	8	521	536	50	52	138	106	83	98	188	163	2,149	1,838
Maryland	11	10	2	2			3				2		6	4			104	105
Michigan	2																	
Missouri	3	2	2	3	1								3	2			52	46
Montana:																		
Bituminous	61	57	1	1			3	4			2	2	5	6		2	7	5
Lignite									2	2			1	1			3	2
Total Montana	61	57	1	1			3	4	2	2	2	2	6	7		2	10	7
New Mexico	31	17	26	25									22	20			27	26
North Dakota (lignite)	8	8											1	1			23	24
Ohio	469	467	16	15	2	1	151	153	6	2	15	39	23	18	30	31	372	255
Oklahoma	11	13	7	8			2	4			6	5	4	8	6	5	20	17
Pennsylvania	3,374	3,252	192	174	23	13	536	642	151	103	2,995	2,819	298	258	183	182	1,736	1,429
Tennessee	216	186	3	6			47	29			15	11	12	11	15	8	184	358
Utah	198	154	25	20	1	1	117	101	14	13	31	12	38	36	18	20	30	41
Virginia	677	697	9	17			91	97	9	3	41	41	25	25	29	23	265	333
Washington	45	42	6	5			10	10			6	9	18	20			18	11
West Virginia	4,428	4,187	177	172	16	14	1,067	1,239	182	160	396	333	92	77	525	515	1,252	1,004
Wyoming	168	166	7	7			13	14	12	12	123	121	63	61	7	6	6	5
Total	13,327	12,545	900	812	51	41	3,191	3,382	567	462	3,875	3,584	916	852	1,094	1,066	7,478	6,555

TABLE 19.—Number and production of underground bituminous-coal and lignite mines using "mother" conveyors and number and length of units in use, in the United States, 1945–52 [1]

Year	Number of mines	Production (net tons)	Number of units in use	Average length (feet)	Total length (miles)
1945	117	40,189,857	359	1,438	97.6
1946	161	46,022,710	457	1,484	128.5
1947	199	70,690,920	594	1,470	165.3
1948	270	81,821,361	755	1,460	208.8
1949	314	69,947,713	860	1,514	246.7
1950	374	92,413,644	1,013	1,538	294.9
1951	372	99,643,003	1,094	1,568	325.0
1952	358	92,168,992	1,066	1,526	308.2

[1] Includes all belt conveyors 500 ft and over in length used for underground transportation of coal, except main slope conveyors. Excludes lignite and Virginia semianthracite mines in 1945–49, inclusive.

TABLE 20.—Number and production of underground bituminous-coal and lignite mines using "mother" conveyors and number and length of units in use in the United States, 1951–52, by States [1]

State	Number of mines		Production (net tons)		Number of units in use		Average length (feet)		Total length (miles)	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
Alabama	8	8	1,469,411	1,466,616	19	30	1,297	1,262	4.7	7.2
Arkansas	3	2	181,841	136,659	9	8	1,202	1,003	2.0	1.5
Colorado	4	4	140,910	207,237	6	8	1,208	1,288	1.4	2.0
Illinois	19	20	6,841,250	8,242,000	51	63	1,448	1,561	14.0	18.6
Indiana	5	1	1,427,499	106,194	8	2	981	1,275	1.5	.5
Kentucky	63	66	18,609,823	18,646,233	188	163	1,438	1,685	51.2	52.0
Montana (lignite)	------	2	----------	397,546	-------	2	--------	700	-------	.3
Ohio	10	10	3,494,060	3,153,379	30	31	1,832	1,750	10.4	10.3
Oklahoma	3	3	447,218	457,288	6	5	1,583	1,800	1.8	1.7
Pennsylvania	61	53	15,092,426	11,736,717	183	182	1,857	1,526	64.4	52.6
Tennessee	7	4	909,782	826,157	15	8	1,273	1,750	3.6	2.7
Utah	6	7	1,653,844	1,432,889	18	20	972	1,133	3.3	4.3
Virginia	13	12	3,464,870	3,029,262	29	23	1,830	2,029	10.1	8.8
West Virginia	165	162	43,231,047	39,642,325	525	515	1,548	1,471	153.9	143.4
Wyoming	5	4	2,679,022	2,688,490	7	6	2,029	2,033	2.7	2.3
Total	372	358	99,643,003	92,168,992	1,094	1,066	1,568	1,526	325.0	308.2

[1] Includes all mines using belt conveyors, other than main slope conveyors, 500 feet and over in length for underground transportation of coal.

TABLE 21.—Growth of strip mining at bituminous-coal and lignite mines in the United States, 1914–52

Year	Production (thousand net tons)			Percent of total mined by stripping	Average tons per man per day			Average value per ton, f. o. b. mine			Number of strip mines	Number of power shovels and draglines
	Underground mines	Strip mines	Total		Underground mines	Strip mines [1]	Total	Underground mines	Strip mines [1]	Total		
1914	421,423	1,281	422,704	0.3	3.71	5.06	3.71	(2)	(2)	$1.17	[3] 35	48
1915	439,792	2,832	442,624	.6	3.90	5.81	3.91	$1.13	$1.18	1.13	[3] 60	87
1916	498,587	3,933	502,520	.8	3.88	6.67	3.90	1.32	1.51	1.32	[3] 79	111
1917	546,001	5,790	551,791	1.0	3.75	6.52	3.77	2.26	2.34	2.26	[3] 126	182
1918	571,098	8,288	579,386	1.4	3.76	6.81	3.78	2.58	2.54	2.58	[3] 165	276
1919	460,225	5,635	465,860	1.2	3.82	6.21	3.84	2.49	2.33	2.49	[3] 168	287
1920	559,807	8,860	568,667	1.5	3.97	7.20	4.00	3.74	4.12	3.75	[3] 174	312
1921	410,865	5,057	415,922	1.2	4.18	8.28	4.20	2.89	2.87	2.89	[3] 155	279
1922	412,059	10,209	422,268	2.4	4.24	8.09	4.28	3.02	3.07	3.02	272	379
1923	552,625	11,940	564,565	2.1	4.43	9.32	4.47	2.69	2.31	2.68	263	442
1924	470,080	13,607	483,687	2.8	4.50	9.91	4.56	2.20	2.00	2.20	234	420
1925	503,182	16,871	520,053	3.2	4.45	11.18	4.52	2.05	1.84	2.04	227	389
1926	556,444	16,923	573,367	3.0	4.42	11.13	4.50	2.07	1.89	2.06	237	410
1927	499,385	18,378	517,763	3.6	4.47	11.06	4.55	1.99	1.90	1.99	255	455
1928	480,956	19,789	500,745	4.0	4.61	13.02	4.73	1.87	1.69	1.86	250	415
1929	514,721	20,268	534,989	3.8	4.73	14.08	4.85	1.79	1.57	1.78	200	411
1930	447,684	19,842	467,526	4.3	4.93	16.21	5.06	1.71	1.54	1.70	218	341
1931	363,157	18,932	382,089	5.0	5.12	17.68	5.30	1.54	1.51	1.54	235	314
1932	290,069	19,641	309,710	6.3	4.99	16.95	5.22	1.31	1.32	1.31	255	332
1933	315,360	18,270	333,630	5.5	4.60	13.59	4.78	1.34	1.33	1.34	289	389
1934	338,578	20,790	359,368	5.8	4.23	13.28	4.40	1.76	1.49	1.75	344	458
1935	348,726	23,647	372,373	6.4	4.32	12.01	4.50	1.79	1.47	1.77	368	507
1936	410,962	28,126	439,088	6.4	4.42	13.91	4.62	1.77	1.49	1.76	381	562
1937	413,780	31,751	445,531	7.1	(2)	(2)	4.69	(2)	(2)	1.94	449	(2)
1938	318,138	30,407	348,545	8.7	4.60	15.00	4.89	(2)	(2)	1.95	465	737
1939	357,133	37,722	394,855	9.6	4.92	14.68	5.25	1.88	1.49	1.84	537	914
1940	417,604	43,167	460,771	9.4	4.86	15.63	5.19	1.94	1.56	1.91	638	1,071
1941	459,078	55,071	514,149	10.7	4.83	15.59	5.20	2.23	1.79	2.19	769	1,321
1942	515,490	67,203	582,693	11.5	4.74	15.52	5.12	2.41	1.90	2.36	831	1,438
1943	510,492	79,685	590,177	13.5	4.89	15.15	5.38	2.75	2.28	2.69	1,004	1,839
1944	518,678	100,898	619,576	16.3	5.04	15.89	5.67	3.01	2.48	2.92	1,240	2,312
1945	467,630	109,987	577,617	19.0	5.04	15.46	5.78	3.16	2.65	3.06	1,370	2,439
1946	420,958	112,964	533,922	21.1	5.43	15.73	6.30	3.59	2.87	3.44	1,445	2,744

TABLE 21.—Growth of strip mining at bituminous-coal and lignite mines in the United States, 1914–52—Continued

Year	Production (thousand net tons)			Percent of total mined by stripping	Average tons per man per day			Average value per ton, f. o. b. mine			Number of strip mines	Number of power shovels and draglines
	Underground mines	Strip mines	Total		Underground mines	Strip mines [1]	Total	Underground mines	Strip mines [1]	Total		
1947	491, 229	139, 395	630, 624	22. 1	5. 49	15. 93	6. 42	4. 35	3. 47	4. 16	1, 750	3, 254
1948	460, 012	139, 506	599, 518	23. 3	5. 31	15. 28	6. 26	5. 26	4. 11	4. 99	1, 971	3, 712
1949	331, 823	106, 045	437, 868	24. 2	5. 42	15. 33	6. 43	5. 18	3. 94	4. 88	1, 761	3, 576
1950	392, 844	123, 467	516, 311	23. 9	5. 75	15. 66	6. 77	5. 15	3. 87	4. 84	1, 870	3, 877
1951	416, 047	117, 618	533, 665	22. 0	6. 08	16. 02	7. 04	5. 21	3. 88	4. 92	1, 784	3, 810
1952	357, 931	108, 910	466, 841	23. 3	6. 39	16. 77	7. 47	5. 24	3. 81	4. 90	1, 643	3, 527

[1] Includes power strip pits proper and excludes horse-stripping operations and mines combining stripping and underground in the same operation for 1914–42, inclusive. The years 1943–52, inclusive, include data on all strip mines.
[2] Data not available.
[3] Exclusive of horse-stripping operations.

TABLE 22.—Number and production of bituminous-coal and lignite strip mines, and units of stripping and loading equipment in use, in the United States, 1941–52

Year	Number of strip mines	Mined by stripping (net tons)	Number of power shovels and dragline excavators							Number of carry-all scrapers
			By capacity (in cubic yards) of dipper or bucket				By type		Total	
			Less than 3	3–5, inclusive	6–12, inclusive	More than 12	Power shovels	Dragline excavators		
1941	769	55,071,609	1,009	153	95	64	(1)	(1)	1,321	(1)
1942	834	67,202,663	1,114	159	97	68	(1)	(1)	1,438	(1)
1943	1,004	79,685,175	1,488	173	106	72	(1)	(1)	1,839	(1)
1944	1,240	100,898,376	1,900	225	113	74	(1)	(1)	2,312	(1)
1945	1,370	109,986,865	2,004	243	117	75	(1)	(1)	2,439	(1)
1946	1,445	112,963,717	2,256	302	112	74	2,406	338	2,744	263
1947	1,750	139,395,011	2,685	362	123	84	2,822	432	3,254	275
1948	1,971	139,505,920	3,048	446	130	88	3,177	535	3,712	362
1949	1,761	106,045,299	2,931	367	168	110	3,011	565	3,576	320
1950	1,870	123,466,564	3,182	416	170	109	3,247	630	3,877	286
1951	1,784	117,617,676	3,088	420	187	115	3,164	646	3,810	220
1952	1,643	108,909,756	2,800	425	183	119	2,892	635	3,527	218

[1] Data not available.

TABLE 23.—Number and production of bituminous-coal and lignite strip mines, and units of stripping and loading equipment in use in the United States, 1952, by States

State	Number of strip mines	Mined by stripping (net tons)	Number of power shovels and dragline excavators							Number of carry-all scrapers
			By capacity (in cubic yards) of dipper or bucket				By type		Total	
			Less than 3	3–5, inclusive	6–12, inclusive	More than 12	Power shovels	Dragline excavators		
Alabama	39	1,654,035	70	14	1	1	72	14	86	9
Alaska	4	311,192	6				4	2	6	
Arkansas	10	315,032	10	3	2	1	11	5	16	
California (lignite)	1	2,998	1					1	1	
Colorado	7	385,664	5	3	1		6	3	9	1
Illinois	60	16,705,017	53	38	34	40	102	63	165	2
Indiana	39	9,772,770	44	39	18	29	80	50	130	3
Iowa	34	935,233	62	13			37	38	75	2
Kansas	24	1,981,201	18	8	8	7	30	11	41	1
Kentucky:										
Eastern	69	2,023,120	101	3	2		105	1	106	2
Western	39	8,845,105	69	20	22	6	80	37	117	7
Total Kentucky	108	10,868,225	170	23	24	6	185	38	223	9
Maryland	24	216,119	28				26	2	28	
Missouri	36	2,740,353	24	9	4	8	34	11	45	2
Montana:										
Bituminous	1	1,406,321	1	1	2	4	4	4	8	1
Lignite	3	7,151	2				1	1	2	
Total Montana	4	1,413,472	3	1	2	4	5	5	10	1
New Mexico	2	8,641	2				2		2	
North Dakota (lignite)	39	2,800,409	33	9	9	2	45	8	53	23
Ohio	277	22,148,514	521	73	35	14	534	109	643	72
Oklahoma	19	1,314,149	20	5	7	2	23	11	34	
Pennsylvania	620	20,297,857	1,177	124	35	4	1,098	242	1,340	46
Tennessee	32	545,542	49	2			49	2	51	
Virginia	31	2,246,0 3	54	23	1		77	1	78	1
Washington	5	110,758	7				6	1	7	1
West Virginia	218	10,174,281	425	35	2	1	450	13	463	40
Wyoming	10	1,962,251	18	3			16	5	21	5
Total	1,643	108,909,756	2,800	425	183	119	2,892	635	3,527	218

TABLE 24.—Summary of operations at bituminous-coal and lignite strip mines using power drills in bank or overburden in the United States, 1946–52

Year	Number of mines	Production		Number of power drills
		Quantity (net tons)	Percent of total strip production	
1946	514	75,375,841	66.7	764
1947	598	95,915,346	68.8	875
1948	728	98,809,393	72.3	1,195
1949	756	78,146,655	73.7	1,256
1950	692	87,205,280	70.6	1,201
1951	650	85,331,204	72.5	1,125
1952	629	79,252,284	73.0	1,070

TABLE 25.—Summary of operations at bituminous-coal and lignite strip mines using power drills in bank or overburden in the United States, 1951–52, by States

State	Number of mines		Production				Number of power drills					
			Quantity (net tons)		Percent of total strip production		Horizontal		Vertical		Total	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
Alabama	22	21	1,291,707	1,015,560	68.2	61.4	29	27	11	11	40	38
Alaska	1		17,784		7.7				1		1	
Arkansas	4	4	352,254	272,625	86.3	86.5	6	7	3	3	9	10
Colorado	4	4	352,483	381,933	96.3	99.0	4	3	2	3	6	6
Illinois	33	31	15,466,661	13,417,741	84.5	80.3	44	46	24	23	68	69
Indiana	33	33	10,446,599	8,210,308	95.0	84.0	60	55	24	28	84	83
Iowa	22	20	886,129	734,211	77.0	78.5	21	19	20	17	41	36
Kansas	14	10	1,676,208	1,781,971	88.8	89.9	13	15	10	7	23	22
Kentucky:												
Eastern	5	14	183,823	1,228,827	7.0	60.7	5	12	1	12	6	24
Western	30	25	8,692,033	8,385,398	95.6	94.8	36	32	38	30	74	62
Total Kentucky	35	39	8,875,856	9,614,225	75.7	88.5	41	44	39	42	80	86
Maryland	1	1	21,903	52,259	13.2	24.2	1	1			1	1
Missouri	14	15	2,896,307	2,616,447	96.1	95.5	15	17	7	8	22	25
Montana:												
Bituminous	1	1	1,488,300	1,406,321	100.0	100.0	1	2	3		4	2
Lignite		1		1,432		20.0				1		1
Total Montana	1	2	1,488,300	1,407,753	100.0	99.6	1	2	3	1	4	3
North Dakota (lignite)	9	6	2,200,439	950,437	74.0	33.9	2	3	7	3	9	6
Ohio	109	119	16,282,009	17,563,346	75.3	79.3	130	126	51	58	181	184
Oklahoma	12	9	932,321	1,162,124	76.2	88.4	16	13	5	5	21	18
Pennsylvania	202	198	11,291,891	10,931,451	48.3	53.9	189	175	94	103	283	278
South Dakota (lignite)	1		26,972		95.1				1		1	
Tennessee	8	6	245,314	145,337	51.3	26.6	8	7			8	7
Virginia	12	11	853,864	866,125	62.2	38.6	16	13	5	4	21	17
Washington	3	2	62,121	43,185	84.0	39.0			4	2	4	2
West Virginia	104	92	8,347,557	6,687,919	64.1	65.7	132	105	76	62	208	167
Wyoming	6	6	1,316,525	1,397,327	71.7	71.2	9	7	1	5	10	12
Total	650	629	85,331,204	79,252,284	72.6	73.0	737	685	388	385	1,125	1,070

TABLE 26.—Summary of method of haulage from bituminous-coal and lignite strip mines to tipple or ramp, in the United States, 1948–52 [1]

Item	1948	1949	1950	1951	1952
MINES USING TRUCKS ONLY					
Number of mines	726	692	705	730	711
Percent of total strip production	40.7	37.6	35.6	35.4	42.5
Average distance from mine to tipple or ramp—miles	4.1	4.2	4.5	4.7	4.5
Number of trucks	6,121	5,576	5,308	5,127	4,767
Average capacity per truck—tons	7.7	8.0	8.0	8.3	9.0
MINES USING TRACTOR-TRAILERS ONLY					
Number of mines	59	61	72	74	78
Percent of total strip production	20.2	21.8	26.6	32.1	32.5
Average distance from mine to tipple or ramp—miles	2.8	2.7	2.7	3.2	2.9
Number of tractor-trailers	479	472	589	616	594
Average capacity per tractor-trailer—tons	26.6	30.2	28.3	28.3	28.7
MINES USING BOTH TRUCKS AND TRACTOR-TRAILERS					
Number of mines	47	65	45	35	36
Percent of total strip production	9.0	9.6	9.7	6.8	6.4
Average distance from mine to tipple or ramp—miles	3.9	4.0	4.0	3.6	5.8
Number of trucks	406	393	438	258	283
Average capacity per truck	10.0	10.9	8.6	8.8	9.0
Number of tractor-trailers	208	253	229	172	155
Average capacity per tractor-trailer—tons	19.0	18.2	20.3	19.2	20.5
RAIL AND RAIL AND TRUCK OR TRACTOR-TRAILERS					
Number of mines	11	9	5	3	3
Percent of total strip production	4.5	5.1	3.5	2.1	2.1
MINES NOT REPORTING METHOD OF HAULAGE					
Number of mines	1,128	934	1,043	942	815
Percent of total strip production	25.6	25.9	24.6	23.6	16.5
GRAND TOTAL—STRIP MINES					
Number of mines	1,971	1,761	1,870	1,784	1,643
Annual production	139,505,920	106,045,299	123,466,564	117,617,676	108,909,756

[1] Excludes lignite in 1948 and 1949.

TABLE 27.—Haulage by truck and tractor-trailer from bituminous-coal and lignite strip mines to tipple or ramp, in the United States, 1952, by States

State	Number of mines	Production (net tons)	Average distance from mine to tipple or ramp (miles)	Trucks		Tractor-trailers	
				Number	Average capacity per truck (tons)	Number	Average capacity per unit (tons)
HAULAGE BY TRUCK							
Alabama		907,759	4.2	127	7.0		
Alaska	4	311,192	3.2	18	9.8		
Arkansas	4	272,625	1.7	21	7.5		
Colorado	4	381,933	1.8	15	15.3		
Illinois	18	1,274,768	3.6	85	10.2		
Indiana	17	2,786,604	2.9	122	15.1		
Iowa	25	796,275	2.8	88	7.2		
Kansas	6	79,601	1.8	16	5.3		
Kentucky	27	2,883,152	2.4	160	9.4		
Missouri	6	244,979	4.9	15	13.1		
Montana (lignite)	2	5,714	.1	5	3.0		
North Dakota (lignite)	11	374,604	1.1	31	6.2		
Ohio	124	13,806,560	4.5	951	9.7		
Oklahoma	7	605,812	6.1	62	7.1		
Pennsylvania	314	13,679,876	5.4	2,137	8.4		
Tennessee	6	145,915	4.1	35	7.6		
Virginia	12	902,138	1.9	66	9.2		
Washington	4	107,681	.7	14	8.6		
West Virginia	95	6,570,759	5.4	787	9.4		
Wyoming	4	81,415	2.1	9	6.6		
Other States [1]	2	12,826	4.2	3	7.0		
Total and average	711	46,232,188	4.5	4,767	9.0		
HAULAGE BY TRACTOR-TRAILER							
Illinois	24	12,808,498	3.1			217	28.8
Indiana	14	6,680,889	3.9			119	31.2
Kansas	5	1,505,572	2.0			31	31.4
Kentucky	10	6,152,329	2.0			86	30.7
Missouri	6	1,813,057	2.2			35	34.1
North Dakota (lignite)	6	2,125,493	2.2			39	20.0
Ohio	6	2,583,709	2.8			36	26.6
Oklahoma	3	465,741	2.2			10	22.2
Pennsylvania	2	179,921	5.0			13	12.8
Wyoming	2	1,027,605	1.4			8	19.8
Total and average	78	35,342,814	2.9			594	28.7
HAULAGE BY COMBINATION TRUCK AND TRACTOR-TRAILER							
Alabama	2	180,148	1.8	6	8.5	7	17.1
Illinois	3	1,950,940	6.4	25	10.2	26	37.0
Missouri	2	607,892	2.2	7	15.0	12	29.2
Ohio	13	2,127,311	7.1	88	9.3	47	17.5
Pennsylvania	9	1,231,393	6.4	78	9.1	39	13.3
West Virginia	4	391,388	4.0	25	12.6	10	24.4
Wyoming	1	308,625	3.0	8	7.0	8	12.0
Other States [2]	2	216,938	5.0	46	5.1	6	11.7
Total and average	36	7,014,635	5.8	283	9.0	155	20.5

[1] California (lignite) and Maryland.
[2] Indiana and Oklahoma.

TABLE 28.—Summary of method of haulage from bituminous-coal and lignite strip mines to tipple or ramp, in the United States, 1952, by States, in net tons

State	Truck	Tractor-trailer	Combination truck and tractor-trailer	Rail and rail and truck or tractor-trailer	Not specified	Total
Alabama	907,759	----------	180,148	----------	566,128	1,654,035
Alaska	311,192	----------	----------	----------	----------	311,192
Arkansas	272,625	----------	----------	----------	42,407	315,032
California (lignite)	(1)	----------	----------	----------	----------	(1)
Colorado	381,933	----------	----------	----------	3,731	385.664
Illinois	1,274,768	12,808,498	1,950,940	----------	670,811	16,705,017
Indiana	2,786,604	6,680,889	(1)	----------	(1)	9,772,770
Iowa	796,275	----------	----------	----------	138,958	935,233
Kansas	79,601	1,505,572	----------	333,681	62,347	1,981,201
Kentucky	2,883,152	6,152,329	----------	556,702	1,276,042	10,868,225
Maryland	(1)	----------	----------	----------	(1)	(1)
Missouri	244,979	1,813,057	607,892	----------	74,425	2,740,353
Montana (bituminous and lignite)	5,714	----------	----------	1,406,361	1,397	1,413,472
New Mexico	----------	----------	----------	----------	(1)	(1)
North Dakota (lignite)	374,604	2,125,493	----------	----------	300,312	2,800,409
Ohio	13,806,560	2,583,709	2,127,311	----------	3,630,934	22,148,514
Oklahoma	605,812	465,741	(1)	----------	(1)	1,314,149
Pennsylvania	13,679,876	179,921	1,231,393	----------	5,206,667	20,297,857
Tennessee	145,915	----------	----------	----------	399,627	545,542
Virginia	902,138	----------	----------	----------	1,343,905	2,246,043
Washington	107,681	----------	----------	----------	3,077	110,758
West Virginia	6,570,759	----------	391,388	----------	3,212,134	10,174,281
Wyoming	81,415	1,027,605	308,625	----------	544,606	1,962,251
Other States	12,826	----------	216,938	----------	545,867	227,758
Total	46,232,188	35,342,814	7,014,635	2,296,744	18,023,375	108,909,756

[1] Included with "Other States."

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1952, by States and by counties [1]

State and county	Number of strip pits	Number of power shovels and dragline excavators				Mined by stripping (net tons)	Average number of men working daily			Average number of days worked	Number of man-days worked	Average tons per man per day
		Steam	Electric	Diesel	Gasoline		In strip pits	All others	Total			
Alabama:												
Blount	4	1	2	4	1	137,524	67	18	85	227	19,265	7.14
Cullman	1	1				17,014	12	5	17	189	3,215	5.29
Jefferson	5			9	2	231,161	93	39	132	203	26,832	8.62
Shelby	1			2		17,696	8	3	11	200	2,200	8.04
Tuscaloosa	13			26	1	435,943	159	28	187	189	35,417	12.31
Walker	15		2	35		814,697	309	64	373	176	65,795	12.38
Total Alabama	39	2	4	76	4	1,654,035	648	157	805	190	152,724	10.83
Alaska	4			6		311,192	64	43	107	197	21,103	14.75
Arkansas:												
Franklin	1	1		2		11,863	6	1	7	247	1,729	6.86
Johnson	5		1	6	1	267,410	114	28	142	145	20,649	12.95
Pope	1				1	1,146	3		3	90	270	4.24
Sebastian	3				4	34,613	18	3	21	241	5,055	6.85
Total Arkansas	10	1	1	8	6	315,032	141	32	173	160	27,703	11.37
California (lignite): Amador	1			1		2,998	2		2	125	250	11.99
Colorado:												
El Paso	1				1	4,925	2		2	202	404	12.19
Jackson	2				1	2,415	11		11	52	570	4.24
Routt	3		1	3	1	347,784	35	44	79	182	14,399	24.15
Weld	1		1	1		30,540	14	4	18	76	1,368	22.32
Total Colorado	7		2	4	3	385,664	62	48	110	152	16,741	23.04
Illinois:												
Bureau	1		5			712,631	44	91	135	239	32,265	22.09
Fulton	15		20	13	7	4,950,252	384	559	943	223	210,426	23.52
Grundy	2		2	1	2	246,052	38	56	94	199	18,737	13.13
Hancock	1			1	2	31,586	11	3	14	113	1,580	19.99
Jackson	5		6	1	2	640,135	89	83	172	184	31,589	20.26
Kankakee	1		6	1		652,568	80	153	233	198	46,146	14.14
Knox	3		11			1,657,452	149	225	374	221	82,608	20.06
La Salle	3		1		2	7,621	6	1	7	157	1,102	6.92
Livingston	1				1	2,416	4		4	129	516	4.68
Peoria	6			8	1	253,600	47	20	67	204	13,677	18.54
Perry	5		14	4	1	2,922,362	261	401	662	233	154,231	18.95
Randolph	1		2	1		456,376	30	31	61	268	16,377	27.87
St. Clair	3		6	8		1,560,662	141	147	288	236	67,950	22.97

Saline	2		2	5		358,698	110	175	285	135	38,428	9.33
Schuyler	1				2	8,493	4		4	240	958	8.87
Vermilion	5		3	2	4	861,735	84	52	136	251	34,069	25.29
Will	1		3		1	101,725	22	17	39	202	7,894	12.89
Williamson	4		6	8		1,280,653	138	72	210	272	57,196	22.39
Total Illinois	60		87	53	25	16,705,017	1,642	2,086	3,728	219	815,749	20.48
Indiana:												
Clay	11	1	7	20	11	1,101,056	268	118	386	218	84,158	13.08
Daviess	2		4	1		416,826	50	42	92	156	14,318	29.11
Fountain	1		2	1		58,237	24	5	29	237	6,873	8.47
Gibson	1		2		1	180,752	32	25	57	233	13,261	13.63
Greene	4		3	6		555,925	114	75	189	190	35,934	15.47
Knox	1		3	1		593,371	69	44	113	239	27,037	21.95
Owen	1		2			132,829	36	14	50	280	13,978	9.50
Pike	5		18	8		2,591,654	417	209	626	224	140,420	18.46
Spencer	1			1	1	39,500	13	5	18	177	3,190	12.38
Sullivan	4		8	2		1,104,957	182	96	278	189	52,500	21.05
Vermillion	1		2	1		164,287	27	15	42	253	10,611	15.48
Vigo	3		4	3	2	678,955	110	72	182	274	49,806	13.63
Warrick	4		10	5		2,154,421	209	259	468	204	95,688	22.52
Total Indiana	39	1	65	49	15	9,772,770	1,551	979	2,530	217	547,774	17.84
Iowa:												
Davis	2			5	1	83,616	15	6	21	287	6,021	13.89
Jasper	1			1	1	7,800	3	2	5	264	1,320	5.91
Mahaska	9			6	10	88,832	38	6	44	212	9,314	9.54
Marion	13		4	17	12	632,524	114	61	175	254	44,423	14.24
Monroe	1			1	1	4,500	5		5	60	300	15.00
Van Buren	3			5	2	36,589	20	12	32	166	5,308	6.89
Wapello	5			7	2	81,372	31	10	41	248	10,180	7.99
Total Iowa	34		4	42	29	935,233	226	97	323	238	76,866	12.17
Kansas:												
Bourbon	3	2			1	17,253	18		18	149	2,690	6.41
Cherokee	6		2	7	4	549,840	79	45	124	278	34,454	15.96
Coffey	1					3,325	5	2	7	120	840	3.96
Crawford	9	3	13	1	2	822,870	187	104	291	220	64,078	12.84
Linn	1		3			574,204	38	62	100	240	24,023	23.90
Osage	4	1		2		13,709	22		22	132	2,899	4.73
Total Kansas	24	6	18	10	7	1,981,201	349	213	562	230	128,984	15.36

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1952, by States and by counties [1]—Con.

State and county	Number of strip pits	Number of power shovels and dragline excavators				Mined by stripping (net tons)	Average number of men working daily			Average number of days worked	Number of man-days worked	Average tons per man per day
		Steam	Electric	Diesel	Gasoline		In strip pits	All others	Total			
Kentucky:												
Eastern:												
Bell	4			9		114,067	39	4	43	169	7,276	15.68
Boyd	1			5		235,902	50	22	72	260	18,720	12.60
Breathitt	1			3		399,951	37	71	108	208	22,495	17.78
Clay	1			2		16,754	8	2	10	179	1,790	9.36
Elliott	4			8		141,180	50	9	59	190	11,204	12.60
Greenup	1			4		58,000	20	5	25	160	4,000	14.50
Harlan	3			1	1	14,418	18	3	21	77	1,609	8.96
Knox	3			2		14,884	13	2	15	119	1,788	8.32
Laurel	2				1	10,123	9		9	155	1,395	7.26
Lawrence	2			2	2	46,840	14		14	221	3,100	15.11
Lee	1			2		18,100	6		6	230	1,380	13.12
Leslie	3				1	16,980	30	6	36	61	2,185	7.77
Letcher	4			7	1	180,401	59	19	78	175	13,654	13.21
Magoffin	1			2		167,067	56	8	64	198	12,672	13.18
McCreary	4			8		66,950	37	6	43	130	5,610	11.93
Morgan	9			8	5	89,216	46	5	51	172	8,795	10.14
Owsley	1				1	2,740	6		6	75	450	6.09
Pike	5			2	4	29,072	32	2	34	81	2,740	10.61
Pulaski	4			4	1	45,978	31	2	33	115	3,788	12.14
Rockcastle	7			3	5	59,288	48		48	127	6,105	9.71
Rowan	1					2,790	4		4	117	468	5.96
Whitley	6			12		290,425	127	39	166	184	30,599	9.49
Wolfe	1					1,994	2		2	270	540	3.69
Total Eastern Kentucky	69			84	22	2,023,120	742	205	947	171	162,363	12.46
Western:												
Butler	1			1		10,980	5		5	269	1,346	8.16
Daviess	3		1	4	2	483,064	65	8	73	279	20,394	23.69
Hancock	1			3		60,000	21	14	35	121	4,236	14.16
Hopkins	22		13	42	7	4,997,170	476	402	878	212	186,185	26.84
Muhlenberg	5		5	14	2	1,446,219	250	175	425	160	67,959	21.28
Ohio	6		8	9	1	1,573,148	125	190	315	233	73,414	21.43
Webster	1			5		274,524	24	16	40	221	8,840	31.05
Total Western Kentucky	39		27	78	12	8,845,105	966	805	1,771	205	362,374	24.41
Total Kentucky	108		27	162	34	10,868,225	1,708	1,010	2,718	193	524,737	20.71

Maryland:												
Allegany	11			4	2	55,960	58	3	61	139	8,487	6.59
Garrett	13			12	10	160,159	91	9	100	157	15,661	10.23
Total	24			16	12	216,119	149	12	161	150	24,148	8.95
Missouri:												
Barton	2	1	1			50,537	16	4	20	205	4,101	12.32
Bates	4		2		2	279,426	25	30	55	231	12,690	22.02
Boone	2			2		32,087	12	5	17	213	3,625	8.85
Callaway	2			3	1	143,665	35	13	48	279	13,405	10.72
Dade	1				1	8,712	6		6	275	1,650	5.28
Henry	11		8	4	1	740,035	134	74	208	194	40,301	18.36
Johnson	1					2,182	2		2	200	400	5.46
Macon	2		4	1		683,166	63	72	135	244	32,886	20.77
Ralls	2			1	1	4,073	11		11	126	1,382	2.95
Randolph	2		3			433,848	45	40	85	221	18,751	23.14
St. Clair	3		3		1	289,167	50	19	69	206	14,209	20.35
Vernon	4	2	1	1	1	73,455	32	6	38	230	8,746	8.40
Total Missouri	36	3	22	12	8	2,740,353	431	263	694	219	152,146	18.01
Montana:												
Bituminous coal: Rosebud	1		7	1		1,406,321	55	15	70	229	16,030	87.73
Lignite:												
Dawson	1					1,437	2		2	108	216	6.65
Sheridan	2			1	1	5,714	11		11	93	1,020	5.60
Total lignite	3			1	1	7,151	13		13	95	1,236	5.79
Total Montana	4		7	2	1	1,413,472	68	15	83	208	17,266	81.86
New Mexico:												
McKinley	1				1	7,171	8	2	10	110	1,100	6.52
Valencia	1				1	1,470	5		5	32	160	9.19
Total New Mexico	2				2	8,641	13	2	15	84	1,260	6.86
North Dakota (lignite):												
Adams	1			1		22,114	13		13	120	1,564	14.14
Bowman	1			1		148,836	12	5	17	222	3,776	39.42
Burke	2		3		2	440,907	26	41	67	209	14,017	31.46
Burleigh	1			1		20,086	4		4	200	800	25.11
Divide	1		2		1	292,640	18	22	40	195	7,800	37.52
Dunn	3				2	10,012	6		6	164	986	10.15
Grant	4			2		25,494	14		14	129	1,805	14.12
Hettinger	2				2	15,093	9	1	10	123	1,230	12.27
McLean	3		3		2	289,299	35	30	65	223	14,525	19.92
Mercer	6		5	5		893,850	68	63	131	215	28,183	31.72
Morton	6			4	2	34,687	25		25	106	2,646	13.11
Mountrail	1			1		1,565	2		2	42	84	18.63
Oliver	1			1		6,280	2		2	165	330	19.03

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1952, by States and by counties [1]—Con.

State and county	Number of strip pits	Number of power shovels and dragline excavators				Mined by stripping (net tons)	Average number of men working daily			Average number of days worked	Number of man-days worked	Average tons per man per day
		Steam	Electric	Diesel	Gasoline		In strip pits	All others	Total			
North Dakota (lignite)—Continued												
Stark	3			3		75,789	27	9	36	138	4,956	15.29
Ward	3		5	4		514,764	36	42	78	238	18,536	27.77
Williams	1				1	8,993	3	1	4	164	654	13.75
Total North Dakota	39		18	23	12	2,800,409	300	214	514	198	101,892	27.48
Ohio:												
Athens	3			7		141,844	44	13	57	183	10,425	13.61
Belmont	15			27	6	1,045,339	186	74	260	181	47,034	22.23
Carroll	8			17	5	332,710	100	25	125	256	32,034	10.39
Columbiana	42			72	9	1,176,838	334	60	394	235	92,711	12.69
Coshocton	11			29	9	857,990	167	66	233	243	56,562	15.17
Gallia	5			12		499,978	132	54	186	174	32,317	15.47
Guernsey	6			13	1	415,125	100	32	132	188	24,840	16.71
Harrison	20		18	35	6	5,936,074	558	568	1,126	229	258,230	22.99
Hocking	4			3	3	21,167	13	2	15	159	2,383	8.88
Holmes	1			1		2,292	4		4	65	260	8.82
Jackson	12		3	10	1	541,961	95	40	135	233	31,496	17.21
Jefferson	26		5	58	1	2,503,987	395	201	596	226	134,718	18.59
Lawrence	6			10		191,474	56	10	66	236	15,608	12.27
Mahoning	17		1	33	7	807,873	154	38	192	264	50,723	15.93
Meigs	5			7	4	355,447	95	15	110	220	24,158	14.71
Monroe	1				1	10,000	8		8	71	568	17.61
Morgan	3			6	1	83,500	34	5	39	136	5,300	15.75
Muskingum	14		3	11	13	1,047,709	156	53	209	189	39,458	26.55
Noble	6		3	17		1,887,153	203	118	321	223	71,454	26.41
Perry	15		4	23	7	1,553,321	322	163	485	184	89,384	17.38
Portage	2			4	1	191,410	27	14	41	319	13,073	14.64
Stark	17			29	16	845,116	210	46	256	233	59,532	14.20
Tuscarawas	26	1	2	46	19	1,249,470	314	104	418	247	103,309	12.09
Vinton	9			8	6	172,333	109	9	118	221	26,130	6.60
Washington	2			1	3	184,753	23	9	32	224	7,183	25.72
Wayne	1			4	1	93,650	21	11	32	298	9,536	9.82
Total Ohio	277	1	39	483	120	22,148,514	3,860	1,730	5,590	222	1,238,426	17.88
Oklahoma:												
Coal	1		1	2		55,409	16	7	23	177	4,078	13.59
Craig	3		1		1	14,932	40	4	44	52	2,294	6.51
Haskell	4	1		5		132,827	62	7	69	178	12,310	10.79
Latimer	1			2		22,546	10	2	12	103	1,240	18.18

Le Flore	3		1	4	1	192,714	80	25	105	156	16,382	11.76
McIntosh	2	1	1			212,194	31	11	42	307	12,894	16.46
Okmulgee	1			2		23,175	7	8	15	173	2,595	8.93
Rogers	2		2	2		370,709	70	49	119	250	29,798	12.44
Sequoyah	1			6		284,638	54	13	67	273	18,291	15.56
Wagoner	1				1	5,005	7		7	74	518	9.66
Total Oklahoma	19	2	6	23	3	1,314,149	377	126	503	200	100,400	13.09
Pennsylvania:												
Allegheny	53			63	23	995,926	397	93	490	164	80,299	12.40
Armstrong	33			67	11	1,685,384	455	147	602	192	115,582	14.58
Beaver	17			27	7	404,143	145	46	191	182	34,815	11.61
Bedford	3			4		50,311	38	3	41	105	4,321	11.64
Blair	4			10	2	133,777	43	7	50	248	12,405	10.78
Bradford	1			1	1	7,538	5		5	240	1,200	6.28
Butler	37			73	9	1,377,510	358	87	445	212	94,255	14.61
Cambria	24			41	9	541,410	205	38	243	165	40,181	13.47
Cameron	2			3		66,206	17	3	20	211	4,226	15.67
Centre	21			57	19	962,121	297	69	366	226	82,630	11.64
Clarion	26			82	8	1,902,901	495	201	696	232	161,458	11.79
Clearfield	95	1		201	18	3,918,693	1,331	333	1,664	202	336,491	11.65
Clinton	9			20	5	589,541	141	36	177	246	43,545	13.54
Elk	18			26	3	343,974	148	51	199	156	31,051	11.08
Fayette	35			33	12	543,512	289	40	329	112	36,753	14.79
Fulton and Huntingdon	3			17	1	255,584	126	10	136	116	15,796	16.18
Greene	1				1	6,719	6		6	120	720	9.33
Indiana	35		2	59	13	865,249	373	95	468	155	72,506	11.93
Jefferson	31		1	56	9	947,708	365	102	467	175	81,731	11.60
Lawrence	10		1	16	3	278,568	74	12	86	196	16,890	16.49
Lycoming	1			2		13,847	6		6	200	1,200	11.54
McKean	3			5	3	43,847	29	4	33	116	3,820	11.48
Mercer	7			12	1	383,156	99	24	123	202	24,876	15.40
Somerset	50			107	12	1,385,458	532	110	642	162	104,192	13.30
Tioga	1			3		11,710	11	4	15	35	526	22.26
Venango	11			31	4	509,692	108	26	134	245	32,848	15.52
Washington	35	1	6	56	4	1,486,930	412	117	529	202	106,703	13.94
Westmoreland	54			58	20	586,442	359	26	385	126	48,669	12.05
Total Pennsylvania	620	2	10	1,130	198	20,297,857	6,864	1,684	8,548	186	1,589,689	12.77
Tennessee:												
Anderson	2			2	1	25,400	14		14	166	2,320	10.95
Campbell	1			2	1	30,177	15	7	22	128	2,816	10.72
Claiborne	4			7	1	137,804	56	8	64	166	10,622	12.97
Cumberland	1			1		2,237	5		5	80	400	5.59
Fentress	1				1	5,487	4		4	127	508	10.80
Grundy	5			8	1	96,372	51	18	69	125	8,627	11.17
Hamilton	1			2		10,000	5		5	155	775	12.90
Marion	1			2	1	52,600	26	5	31	200	6,200	8.48
Morgan	6			7	1	78,164	43	2	45	153	6,901	11.33

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1952, by States and by counties [1]—Con.

State and county	Number of strip pits	Number of power shovels and dragline excavators				Mined by stripping (net tons)	Average number of men working daily			Average number of days worked	Number of man-days worked	Average tons per man per day
		Steam	Electric	Diesel	Gasoline		In strip pits	All others	Total			
Tennessee—Continued												
Overton	1			2		4,921	4	2	6	97	580	8.48
Scott	7			7	1	80,380	58	9	67	112	7,529	10.68
Sequatchie	1			1		10,000	4		4	200	800	12.50
White	1			2		12,000	10	2	12	200	2,400	5.00
Total Tennessee	32			43	8	545,542	295	53	348	145	50,478	10.81
Virginia:												
Buchanan	8		1	18		298,495	104	28	132	152	20,039	14.90
Dickenson	5		3	19		1,185,983	203	28	231	282	65,250	18.18
Russell	1				1	8,334	6		6	84	504	16.54
Tazewell	1			1		10,744	5	3	8	173	1,387	7.75
Wise	16		1	34		742,487	169	41	210	210	44,087	16.84
Total Virginia	31		5	72	1	2,246,043	487	100	587	224	131,267	17.11
Washington:												
King	2			2		43,185	25	6	31	157	4,865	8.88
Kittitas	2				3	64,496	30	5	35	176	6,174	10.45
Thurston	1			1	1	3,077	12	2	14	21	294	10.47
Total Washington	5			3	4	110,758	67	13	80	142	11,333	9.77
West Virginia:												
Barbour	14		2	28	2	1,131,719	318	156	474	158	74,772	15.14
Boone	2			4		116,576	70	15	85	107	9,131	12.77
Braxton	1				1	5,983	7		7	107	749	7.99
Brooke	6			13		477,903	146	29	175	207	36,263	13.18
Fayette	17			35	3	833,678	268	58	326	177	57,770	14.43
Gilmer	2			4		67,348	22	8	30	160	4,800	14.08
Grant	1			1		9,298	6		6	225	1,350	6.89
Greenbrier	8			16	2	223,668	159	34	193	111	21,441	10.43
Hancock	4			3	1	111,718	38	6	44	182	8,000	13.96
Harrison	38			78	11	2,138,904	520	212	732	165	120,569	17.74
Kanawha	7		1	16		359,438	146	28	174	156	27,081	13.27
Lewis	6			7	5	263,083	72	14	86	185	15,950	16.49
Marion	4			1		27,791	28	8	36	56	2,022	13.74
McDowell	14			39	3	691,666	249	41	290	159	46,072	15.01
Mercer	15			30	3	542,518	275	47	322	145	46,642	11.63
Mineral	3			3		25,106	23	1	24	92	2,210	11.36

Mingo	2			4	1	101,279	30	12	42	148	6,230	16.26
Monongalia	10			14	3	219,407	109	35	144	84	12,151	18.06
Nicholas	2			4		348,876	65	18	83	297	24,618	14.17
Pocahontas	1			3		66,784	29	5	34	223	7,582	8.81
Preston	13			20	3	410,908	191	37	228	143	32,663	12.58
Raleigh	10			21	6	494,979	170	26	196	166	32,549	15.21
Randolph	11			19	2	373,937	154	37	191	139	26,541	14.09
Taylor	5			9		194,572	83	24	107	120	12,870	15.12
Tucker	1			5		67,859	33	8	41	110	4,510	15.05
Upshur	10			13	4	300,560	80	18	98	170	16,700	18.00
Webster	1			1		51,116	9	3	12	195	2,340	21.84
Wyoming	10			18	1	517,607	146	38	184	188	34,537	14.99
Total West Virginia	218		3	409	51	10,174,281	3,446	918	4,364	158	688,113	14.79
Wyoming:												
Campbell	1		1			320,945	9	29	38	306	11,640	27.57
Carbon	2	1		5		430,973	55	31	86	257	22,086	19.51
Converse	1			1		6,897	3		3	277	831	8.30
Lincoln	1			3		706,660	53	20	73	287	20,951	33.73
Sheridan	3		2	1	2	330,274	36	25	61	189	11,548	28.60
Sweetwater	2			5		166,502	34	15	49	184	9,006	18.49
Total Wyoming	10	1	3	15	2	1,962,251	190	120	310	245	76,062	25.80
Total United States	1,643	19	321	2,642	545	108,909,756	22,940	9,915	32,855	198	6,495,111	16.77

[1] On returns from mines combining stripping and underground methods in same operation, tonnage has been separated and figures on employment prorated to include in this table only data pertaining to strip mining.

MECHANICAL LOADING

Bituminous-coal and lignite mechanically loaded in underground mines amounted to 270.5 million tons in 1952, or 76 percent of the total underground output.

Mechanical loading equipment used in underground bituminous-coal and lignite mines is divided into two types, machines and conveyors. Machines are devices that virtually eliminate hand shoveling. They include mobile loaders, continuous mining machines, augers, scrapers, and conveyors equipped with duckbills or other self-loading heads. Conveyors are devices that greatly reduce the labor in hand shoveling and include hand-loaded face conveyors and pit-car loaders. (No pit-car loaders were used in 1952.)

Growth of mechanical loading at underground bituminous-coal and lignite mines and type of equipment in use, 1923–52, are shown in table 30. Summary data on continuous mining machines and augers are shown in the following tables for 1952, the first year these figures are available.

Extent of Mechanical Loading.—Table 31 shows the tons and percentage of bituminous-coal and lignite handled by each type of equipment in 1951 and 1952.

During 1952, in bituminous-coal and lignite mines, 4,083 mobile loaders handled 219 million tons of coal, an average of 53,633 tons per mobile loader per year; self-loading conveyors averaged 10,095, hand-loaded face conveyors 8,722, and scrapers 4,051.

Continuous mining machines and augers are comparatively new types of equipment. Many used in 1952 were installed during the year and did not operate the full year. However, in 1952 there were 152 continuous mining machines and 61 augers that operated all or part of the year. The auger tonnage has been included with underground production mechanically loaded.

Mechanical Loading, by States.—West Virginia has been the leading producer of mechanically loaded coal since 1939. During 1952 West Virginia produced 105.6 million tons of mechanically loaded coal, or 39 percent of the total bituminous coal and lignite that was mechanically loaded in the United States. Pennsylvania was second in the production of mechanically loaded coal, followed by Kentucky, Illinois, and Ohio. These 5 States produced 85 percent of the total output of underground, mechanically loaded bituminous coal in the United States in 1952.

Comparative changes in underground mechanical loading in 1951–52, by States, are shown in table 32. Detailed data, by States, on the number of mines, mechanical loading units and production of coal mechanically loaded compared with the total production at mines using mechanical loading devices are given in table 33.

Table 13 shows bituminous-coal and lignite tonnage mined by stripping compared with underground hand-loaded and machine-loaded tonnage, as well as productivity and percent mined at strip and underground mines, by States, for 1952.

TABLE 30.—Growth of Mechanical loading at underground bituminous-coal and lignite mines in the United States, 1923–52

[Production in thousands of net tons]

Year	Underground production mechanically loaded										Percent of underground production mechanically loaded	Number of mechanical loading units in actual use						
	Loaded by machines						Handled by conveyors			Total mechanically loaded		Mobile loading machines	Continuous mining machines	Augers	Scrapers	Conveyors equipped with duckbills or other self-loading heads	Pit-car loaders	Hand-loaded conveyors
	Mobile loading machines	Continuous mining machines	Augers	Scrapers	Conveyors equipped with duckbills or other self-loading heads	Total	Pit-car loaders	Hand-loaded conveyors	Total									
1923	(1)			(1)	(1)	(1)	(1)	(1)	(1)	[2] 1,880	[2] 0.3	(1)			(1)	(1)	(1)	(1)
1924	(1)			(1)	(1)	(1)	(1)	(1)	(1)	[2] 3,496	[2] .7	(1)			(1)	(1)	(1)	(1)
1925	(1)			(1)	(1)	(1)	(1)	(1)	(1)	[2] 6,243	[2] 1.2	(1)			(1)	(1)	(1)	(1)
1926	7,786			1,554	682	10,022	523	(1)	(1)	[2] 10,545	[2] 1.9	295			133	27	(1)	(1)
1927	(1)			(1)	(1)	(1)	(1)	(1)	(1)	16,500	3.3	(1)			(1)	(1)	(1)	(1)
1928	11,811			1,548	1,200	14,559	4,117	2,883	7,000	21,559	4.5	397			130	82	1,040	(1)
1929	16,432			1,550	1,309	19,291	14,979	3,592	18,571	37,862	7.4	488			126	99	2,521	(1)
1930	20,073			1,637	1,628	23,338	19,116	4,528	23,644	46,982	10.5	545			150	140	2,876	(1)
1931	19,407			1,471	1,811	22,689	19,172	5,701	24,873	47,562	13.1	583			146	165	3,428	(1)
1932	14,825			1,132	1,630	17,587	12,590	5,640	18,230	35,817	12.3	548			128	159	3,112	(1)
1933	17,865			991	1,656	20,512	11,413	5,896	17,309	37,821	12.0	523			93	132	2,453	525
1934	20,750			1,004	2,082	23,836	11,089	6,508	17,597	41,433	12.2	534			119	157	2,288	574
1935	24,675			1,118	2,595	28,388	11,098	7,691	18,789	47,177	13.5	657			78	179	2,098	670
1936	40,970			1,273	3,240	45,483	10,538	10,956	21,494	66,977	16.3	980			106	234	1,851	936
1937	(1)			(1)	(1)	(1)	(1)	(1)	(1)	83,500	20.2	(1)			(1)	(1)	(1)	(1)
1938	57,824			1,031	4,248	63,103	5,653	16,337	21,990	85,093	26.7	1,405			117	346	1,392	1,526
1939	76,442			1,007	6,759	84,208	5,038	21,466	26,504	110,712	31.0	1,573			131	559	873	1,834
1940	100,962			1,255	10,362	112,579	3,979	31,312	35,291	147,870	35.4	1,720			116	656	697	2,263
1941	126,478			1,290	14,918	142,686	3,447	40,534	43,981	186,667	40.7	1,985			109	788	607	2,807
1942	160,301			1,405	20,683	182,389	3,252	47,262	50,514	232,903	45.2	2,301			93	1,062	481	3,041
1943	179,008			1,349	22,917	203,274	2,669	43,862	46,531	249,805	48.9	2,525			83	1,226	321	3,191
1944	202,875			1,341	23,164	227,380	1,835	44,974	46,809	274,189	52.9	2,737			87	1,331	241	3,236

TABLE 30.—Growth of mechanical loading at underground bituminous-coal and lignite mines in the United States, 1923–52—Continued

[Production in thousands of net tons]

Year	Underground production mechanically loaded										Percent of underground production mechanically loaded	Number of mechanical loading units in actual use						
	Loaded by machines						Handled by conveyors			Total mechanically loaded		Mobile loading machines	Continuous mining machines	Augers	Scrapers	Conveyors equipped with duckbills or other self-loading heads	Pit-car loaders	Hand-loaded conveyors
	Mobile loading machines	Continuous mining machines	Augers	Scrapers	Conveyors equipped with duckbills or other self-loading heads	Total	Pit-car loaders	Hand-loaded conveyors	Total									
1945	198,668	--------	--------	1,252	21,506	221,426	986	40,100	41,086	262,512	56.1	2,950	--------	--------	87	1,383	142	3,385
1946	186,975	--------	--------	917	19,678	207,570	623	37,148	37,771	245,341	58.3	3,200	--------	--------	75	1,521	93	3,470
1947	229,836	--------	--------	854	21,921	252,611	353	45,193	45,546	298,157	60.7	3,569	--------	--------	67	1,531	71	3,979
1948	[3] 232,667	[4]	--------	743	19,634	253,044	184	42,578	42,762	295,806	64.3	[3] 3,980	[4]	--------	56	1,632	37	4,125
1949	[3] 177,239	[4]	--------	339	13,994	191,572	54	30,750	30,804	222,376	67.0	[3] 4,205	[4]	--------	46	1,483	17	4,312
1950	[3] 222,976	[4]	--------	318	13,985	237,279	39	35,407	35,446	272,725	69.4	[3] 4,318	[4]	--------	39	1,329	12	4,434
1951	[5] 252,663	[4]	[4]	126	13,884	266,673	[6]	37,583	37,583	304,256	73.1	[5] 4,410	[4]	[4]	22	1,242	[6]	3,904
1952	218,982	8,215	1,505	77	10,590	239,369	[6]	31,131	31,131	270,500	75.6	4,083	152	61	19	1,049	[6]	3,569

[1] Data not available.
[2] Exclusive of tonnage "Handled by conveyors."
[3] Includes continuous mining machines.
[4] Included with mobile loading machines.
[5] Includes continuous mining machines and augers.
[6] Canvass of pit-car loaders discontinued in 1951.

Sales of Mechanical Loading Equipment.—Shipments of mechanical loading equipment for underground use in coal mines in the United States, in terms of capacity, were 34 percent less in 1952 than in 1951. Table 34 shows the sales of mechanical loading equipment to bituminous-coal and lignite operators, by type of equipment and the number of manufacturers reporting for 1945–52.

Table 35 shows loading equipment, "mother" conveyors, and shuttle cars sold in 1951–52 for use in bituminous-coal and lignite mines, by States.

TABLE 31.—Bituminous coal and lignite mechanically loaded underground in the United States, 1951–52, by types of loading equipment

Type of equipment	1951		1952	
	Net tons	Percent of total	Net tons	Percent of total
Mobile loaders:				
Loading direct into mine cars	102,591,251	33.7	75,605,379	28.0
Loading onto conveyors	11,229,016	3.7	11,078,827	4.1
Loading into shuttle cars	138,842,852	45.6	132,297,476	48.9
Continuous mining machines	(1)		8,214,757	3.0
Augers	(1)		1,505,667	.6
Scrapers	126,148	(2)	76,969	(2)
Conveyors equipped with duckbills or other self-loading heads	13,883,389	4.6	10,590,076	3.9
Hand-loaded conveyors	37,583,265	12.4	31,130,505	11.5
Total mechanically loaded	304,255,921	100.0	270,499,656	100.0

[1] Included with mobile loaders.
[2] Less than 0.05 percent.

TABLE 32.—Comparative changes in underground mechanical loading of bituminous coal and lignite in the United States, 1951–52, by States and by principal types of loading devices

State	Net tons						Handled by each class (percent)				Underground output mechanically loaded (percent)	
	1951			1952			1951		1952			
	Loaded by machines [1]	Handled by conveyors	Total	Loaded by machines [1]	Handled by conveyors	Total	Loaded by machines [1]	Handled by conveyors	Loaded by machines [1]	Handled by conveyors	1951	1952
Alabama	8,227,286	1,798,408	10,025,694	6,980,521	1,450,807	8,431,328	82.1	17.9	82.8	17.2	85.7	86.7
Alaska	8,450		8,450	12,416		12,416	100.0		100.0		3.2	3.3
Arkansas	13,000	579,376	592,376		476,156	476,156	2.2	97.8		100.0	84.8	85.3
Colorado	2,198,350	348,948	2,547,298	2,071,648	188,639	2,260,287	86.3	13.7	91.7	8.3	68.2	69.8
Illinois	34,041,599	9,635	34,051,234	27,596,787	17,856	27,614,643	100.0	(2)	99.9	.1	94.8	94.9
Indiana	7,988,762	45,856	8,034,618	6,353,002	6,053	6,359,055	99.4	.6	99.9	.1	95.0	96.7
Iowa	43,341		43,341	30,698		30,698	100.0		100.0		9.0	6.9
Kentucky	30,854,223	4,961,628	35,815,851	29,716,988	4,214,100	33,931,088	86.1	13.9	87.6	12.4	56.6	61.4
Maryland	53,815	23,497	77,312	72,411	36,050	108,461	69.6	30.4	66.8	33.2	18.3	29.2
Montana:												
Bituminous	785,384		785,384	616,933		616,933	100.0		100.0		95.5	97.5
Lignite	8,150		8,150	7,175		7,175	100.0		100.0		28.3	30.7
Total Montana	793,534		793,534	624,108		624,108	100.0		100.0		93.3	95.2
New Mexico	620,246		620,246	634,496	2,500	636,996	100.0		99.6	.4	79.2	84.8
North Dakota (lignite)	224,651		224,651	168,281		168,281	100.0		100.0		89.5	91.8
Ohio	13,769,185	148,370	13,917,555	11,851,427	170,437	12,021,864	98.9	1.1	98.6	1.4	85.2	85.5
Oklahoma	49,200	776,717	825,917	93,154	703,331	796,485	6.0	94.0	11.7	88.3	82.6	90.6
Pennsylvania	51,247,197	7,012,523	58,259,720	44,266,169	5,484,732	49,750,901	88.0	12.0	89.0	11.0	68.7	72.2
Tennessee	1,278,613	691,728	1,970,341	1,211,469	480,881	1,692,350	64.9	35.1	71.6	28.4	40.0	35.9
Utah	5,941,516	62,277	6,003,793	6,026,945	60,963	6,087,908	99.0	1.0	99.0	1.0	97.8	99.1
Virginia	8,181,989	1,417,508	9,599,497	8,180,871	1,002,198	9,183,069	85.2	14.8	89.1	10.9	47.9	47.5
Washington	124,598	459,262	583,860	251,903	361,574	613,477	21.3	78.7	41.1	58.9	74.6	83.6
West Virginia	96,567,751	19,148,576	115,716,327	89,222,979	16,381,211	105,604,190	83.5	16.5	84.5	15.5	77.0	80.3
Wyoming	4,445,350	98,956	4,544,306	4,002,878	93,017	4,095,895	97.8	2.2	97.7	2.3	98.9	99.3
Total	266,672,656	37,583,265	304,255,921	239,369,151	31,130,505	270,499,656	87.6	12.4	88.5	11.5	73.1	75.6

[1] Includes mobile loaders, continuous mining machines, scrapers, conveyors equipped with duckbills or other self-loading heads, and augers.
[2] Less than 0.05 percent.

TABLE 33.—Mechanical loading underground in bituminous-coal and lignite mines in the United States, 1952, by States

State	Number of mines				Number of loading devices						Production mechanically loaded (net tons)			Total underground production at mines using mechanical loading devices (net tons)			
	Using loading machines only [1]	Using conveyors only	Using both loading machines and conveyors	Total	Mobile loading machines	Continuous mining machines	Augers	Scrapers	Conveyors equipped with duckbills or other self-loading heads	Hand-loaded conveyors (number of units)	Loaded by machines [1]	Handled by conveyors	Total	Mines using loading machines only [1]	Mines using conveyors only	Mines using both loading machines and conveyors	Total
Alabama	20	12	5	37	180	6		1	9	192	6,980,521	1,450,807	8,431,328	6,538,990	978,403	1,017,472	8,534,865
Alaska	2			2	1				2		12,416		12,416	346,372			346,372
Arkansas		15		15						68		476,156	476,156		476,156		476,156
Colorado	43	18	3	64	34	4		1	176	63	2,071,648	188,639	2,260,287	2,521,453	176,172	28,864	2,726,489
Illinois	83	2		85	367	18			12	10	27,596,787	17,856	27,614,643	27,897,297	76,090		27,973,387
Indiana	24	1		25	121					2	6,353,002	6,053	6,359,055	6,369,002	6,053		6,375,055
Iowa	3			3	1				3		30,698		30,698	41,753			41,753
Kentucky	132	36	20	188	483	10			100	437	29,716,988	4,214,100	33,931,088	29,289,005	4,183,713	4,652,729	38,125,447
Maryland	6	3		9			5		2	12	72,411	36,050	108,461	72,411	36,050		108,461
Montana:																	
Bituminous	8			8	24				11		616,933		616,933	616,933			616,933
Lignite	1			1	2						7,175		7,175	7,175			7,175
Total Montana	9			9	26				11		624,108		624,108	624,108			624,108
New Mexico	3	1		4	16			1	1	1	634,496	2,500	636,996	634,496	5,731		640,227
North Dakota (lignite)	2			2	4						168,281		168,281	168,281			168,281
Ohio	49	12	3	64	194	11	8		38	38	11,851,427	170,437	12,021,864	11,816,439	140,273	113,172	12,069,884
Oklahoma		6	1	7	5					145	93,154	703,331	796,485		680,331	116,154	796,485
Pennsylvania	135	94	29	258	938	71	5	8	86	729	44,266,169	5,484,732	49,750,901	44,601,654	4,856,884	6,323,108	55,781,646
Tennessee	8	6	5	19	28				17	59	1,211,469	480,881	1,692,350	985,058	352,987	926,429	2,264,474
Utah	33	6	2	41	124	2			57	19	6,026,945	60,963	6,087,908	5,478,534	49,735	565,744	6,094,013
Virginia	30	10	9	49	148		1		34	121	8,180,871	1,002,198	9,183,069	9,350,260	1,084,062	2,525,933	12,960,255
Washington	5	1	5	11		5		8	9	87	251,903	361,574	613,477	63,329	6,205	551,291	620,825
West Virginia	291	104	79	474	1,428	23	42		306	1,558	89,222,979	16,381,211	105,604,190	84,448,541	11,641,257	21,572,378	117,662,176
Wyoming	13	2		15	35	2			186	28	4,002,878	93,017	4,095,895	3,982,878	113,017		4,095,895
Total	891	329	161	1,381	4,083	152	61	19	1,049	3,569	239,369,151	31,130,505	270,499,656	235,229,861	24,863,119	38,393,274	298,486,254

[1] Includes mobile loaders, continuous mining machines, augers, scrapers, and conveyors equipped with duckbills or other self-loading heads.

TABLE 34.—Units of mechanical loading equipment sold to bituminous-coal and lignite mines for underground use in the United States, as reported by manufacturers, 1945–52

Type of equipment	1945	1946	1947	1948	1949	1950	1951	1952	Change from 1951 (percent)
Mobile loaders	349	490	485	[1] 723	[1] 286	[1] 289	[1] 287	[1] 206	−28.2
Scrapers	6	3	12	17	8	1	4	8	+100.0
Room conveyors [2]	738	838	846	1,025	394	316	297	155	−47.8
Total	1,093	1,331	1,343	1,765	688	606	588	369	−37.2
Number of manufacturers reporting	25	24	23	22	22	20	21	22	

[1] Includes continuous mining machines.
[2] Includes hand-loaded conveyers and those equipped with duckbills or other self-loading heads; excludes face conveyors.

TABLE 35.—Units of mechanical loading equipment, "mother" conveyors, and shuttle cars sold for use in underground bituminous-coal and lignite mines in the United States, as reported by manufacturers, 1951–52, by States

State	Mechanical loading equipment								"Mother" conveyors [4]		Shuttle cars	
	Mobile loaders [1]		Scrapers		Room conveyors [2]		Face conveyors [3]					
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
Alabama	5	7			1						26	35
Colorado	7		2	6	17	8	2	3	6		6	5
Illinois	27	13			3	5			19	14	70	14
Indiana	1	1				1					4	
Kentucky	38	19			47	23	24	13	18	17	46	42
New Mexico	1					7				2		
North Dakota		1										
Ohio	13	5							2	1	20	4
Oklahoma	1	1		1	2			4	3			2
Pennsylvania	58	58			73	18	19	10	24	6	131	127
Tennessee	3	1			3	2			1		6	2
Utah	6	6		1	2				2	1	8	7
Virginia	5	7	1		3		6	2	3		8	24
Washington	2	3				1						
West Virginia	119	82	1		146	90	60	44	36	26	197	166
Wyoming	1	2									2	
Total	287	206	4	8	297	155	111	76	114	67	524	428

[1] Includes continuous mining machines.
[2] Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads.
[3] Includes "bridge" conveyors and all other conveyors from 10 to 100 feet long.
[4] Includes all haulage conveyors with capacity over 500 feet, except main slope conveyors.

MECHANICAL CLEANING

Bituminous coal mechanically cleaned in 1952 totaled 227.3 million tons, or 49 percent of the entire output.

Mechanical cleaning by wet methods includes jigs, concentrating tables, classifiers, launders, dense-medium processes, flotation, and any combinations of these six methods.

Pneumatic methods of coal cleaning include air tables, air flow, air sand, and any combination of these three methods.

The growth of mechanical cleaning, 1927–52, is shown in table 36 and the method of mining at mines served by cleaning plants, 1933–52, is shown in table 37.

Sales of Mechanical Cleaning Equipment.—Reports from 19 manufacturers of bituminous-coal-cleaning equipment show that the total capacity of equipment sold in 1952 was 8,700 net tons of clean coal per hour compared with 13,900 tons in 1951, a 37-percent decrease. Sales in 1952, by type of equipment, in terms of capacity, show that jigs ranked first, followed by dense-medium and pneumatic methods. The capacity of all types of equipment sold in 1952 for cleaning bituminous coal by wet methods was equivalent to 6 percent of the bituminous coal cleaned by wet methods during the year, whereas the capacity of pneumatic equipment sold in 1952 was 10 percent of the tonnage pneumatically cleaned in 1952. Approximately 65 percent of the total capacity of cleaning equipment sold in 1952 was for additions to present installations, and the remainder was new plants.

Tables 38, 39, 42, and 43 include mechanical-cleaning data on all coal mined in the United States except Pennsylvania anthracite. Tables 40 and 41 are on the same basis but do not include consumer-operated plants. The percentage of total production mechanically cleaned in 1906–52 is shown in table 12.

Consumer-operated plants include those owned by steel companies that receive coal (usually affiliated companies), clean it, and then consume it directly at the plant.

Types of Cleaning Equipment.—The tonnage of bituminous coal cleaned by wet-washing methods was 208.6 million in 1952—a 6-percent decrease from 1951. The quantity cleaned by pneumatic methods was 18.6 million tons—a small increase over 1951.

Table 39 compares the number of cleaning plants and the tons of cleaned coal, by types of equipment, for 1951 and 1952. During 1952, 604 wet-washing and 96 pneumatic cleaning plants were in operation. Seventy-five tipples used both wet and dry methods at the same plant; deducting these duplications gives a net total of 625 plants that cleaned coal in 1952, a decrease of 6 plants from 1951.

Mines served by cleaning plants (exclusive of those that shipped to washeries operated by steel companies) produced 276.1 million tons (59 percent of the total bituminous output) in 1952. In this same group of mines, 221.2 million tons was cleaned mechanically; therefore, 80 percent of the coal produced at mines with cleaning plants in 1952 was cleaned at the mine. The remaining output from these mines (20 percent) presumably represents the larger sizes commonly picked by hand. (See tables 41 and 43.)

Relation Between Raw Coal, Clean Coal, and Refuse.—For every 100 tons of raw coal cleaned at the mines during 1952, 83 tons of clean merchantable coal, on an average, was obtained and 17 tons of refuse discarded. Table 43 shows the total production of mines with cleaning plants and results of cleaning operations, by States.

Methods of Mining at Mines Served by Cleaning Plants.—Underground mechanical loading appears to be closely related to mechanical cleaning. Underground coal loaded mechanically in 1952 totaled 270.5 million tons, of which 201.1 million tons (74 percent) passed through tipples equipped with mechanical cleaning devices. Production of coal from strip mines in 1952 was 108.9 million tons, of which 48.2 million tons (44 percent) came from strip mines having mechanical cleaning tipples. Hand-loaded under-ground coal production in 1952 totaled 87.4 million tons, of which 31 percent passed through tipples equipped with cleaning plants. (See tables 13 and 41.)

TABLE 36.—Growth of mechanical cleaning of bituminous coal in the United States, 1927–52, by types of equipment [1]

[Includes coal cleaned at plants operated by consumers at central washeries in Colorado and Pennsylvania]

Year	Wet methods								Pneumatic methods	Total
	Jigs	Concentrating tables	Classifiers	Launders	Dense-medium	Jigs and tables	Other combinations [2]	Total		
	THOUSANDS OF NET TONS OF CLEAN COAL									
1927	18,741	3,200	(3)	[3] 1,000	(3)	300	800	24,041	3,651	27,692
1928	17,927	3,412	(3)	[3] 2,446	(3)	1,056	156	24,997	3,786	28,783
1929	18,915	3,532	(3)	[3] 7,103	(3)	1,214	191	30,955	5,844	36,799
1930	17,724	2,272	(3)	[3] 9,818	(3)	1,029	62	30,905	7,895	38,800
1931	13,957	1,551	(3)	[3] 11,213	(3)	926	11	27,658	8,514	36,172
1932	9,963	821	(3)	[3] 12,140	(3)	806	9	23,739	6,539	30,278
1933	11,895	1,119	(3)	[3] 13,272	(3)	693	5	26,984	7,574	34,558
1934	14,012	1,116	(3)	[3] 15,168	(3)	1,227	6	31,529	8,298	39,827
1935	15,735	1,118	(3)	[3] 18,454	(3)	1,549	----------	36,856	8,505	45,361
1936	23,417	1,843	(3)	[3] 22,631	(3)	2,613	----------	50,504	10,591	61,095
1937	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	65,000
1938	27,615	984	4,521	10,681	4,450	2,791	2,145	53,187	10,268	63,455
1939	37,056	1,402	5,917	12,809	4,683	3,256	2,611	67,734	11,695	79,429
1940	47,064	2,330	7,762	16,269	6,692	2,765	4,408	87,290	14,980	102,270
1941	53,287	2,510	8,177	16,954	9,344	4,364	5,742	100,378	17,162	117,540
1942	66,876	3,138	10,529	18,658	12,495	4,366	5,938	122,000	20,187	142,187
1943	66,092	2,929	11,854	17,424	13,388	4,322	8,366	124,375	21,201	145,576
1944	74,175	2,753	14,780	19,686	13,869	4,649	8,751	138,663	20,064	158,727
1945	68,609	2,594	14,203	18,980	12,875	4,754	8,455	130,470	17,416	147,886
1946	64,702	1,447	13,883	16,021	14,173	3,776	8,057	122,059	16,611	138,670
1947	85,931	2,980	14,648	17,902	17,702	4,303	12,617	156,083	18,353	174,436
1948	87,506	4,360	18,304	16,788	20,638	5,252	11,816	164,664	16,216	180,880
1949	72,423	4,040	14,865	11,238	17,821	3,288	17,033	140,708	12,944	153,652
1950	94,161	4,693	18,059	11,630	28,948	6,153	19,526	183,170	15,528	198,699
1951	101,746	5,811	23,174	10,362	33,840	7,613	38,884	221,430	18,580	240,010
1952	97,336	3,723	19,296	11,738	31,321	8,280	36,925	208,619	18,646	227,265
	PERCENT CLEANED BY EACH TYPE									
1927	67.6	11.6	(3)	[3] 3.6	(3)	1.1	2.9	86.8	13.2	100.0
1928	62.3	11.8	(3)	[3] 8.5	(3)	3.7	.5	86.8	13.2	100.0
1929	51.4	9.6	(3)	[3] 19.3	(3)	3.3	.5	84.1	15.9	100.0
1930	45.6	5.9	(3)	[3] 25.3	(3)	2.7	.2	79.7	20.3	100.0
1931	38.6	4.3	(3)	[3] 31.0	(3)	2.6	(5)	76.5	23.5	100.0
1932	32.8	2.7	(3)	[3] 40.2	(3)	2.7	(5)	78.4	21.6	100.0
1933	34.4	3.2	(3)	[3] 38.5	(3)	2.0	(5)	78.1	21.9	100.0
1934	35.2	2.8	(3)	[3] 38.1	(3)	3.1	(5)	79.2	20.8	100.0
1935	34.7	2.5	(3)	[3] 40.7	(3)	3.4	----------	81.3	18.7	100.0
1936	38.3	3.0	(3)	[3] 37.1	(3)	4.3	----------	82.7	17.3	100.0
1937	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	----------
1938	43.5	1.6	7.1	16.8	7.0	4.4	3.4	83.8	16.2	100.0
1939	46.6	1.8	7.5	16.1	5.9	4.1	3.3	85.3	14.7	100.0
1940	46.0	2.3	7.6	15.9	6.5	2.7	4.3	85.3	14.7	100.0
1941	45.3	2.2	7.0	14.4	7.9	3.7	4.9	85.4	14.6	100.0
1942	47.0	2.2	7.4	13.1	8.8	3.1	4.2	85.8	14.2	100.0
1943	45.4	2.0	8.1	12.0	9.2	3.0	5.7	85.4	14.6	100.0
1944	46.7	1.8	9.3	12.4	8.8	2.9	5.5	87.4	12.6	100.0
1945	46.4	1.8	9.6	12.8	8.7	3.2	5.7	88.2	11.8	100.0
1946	46.7	1.0	10.0	11.6	10.2	2.7	5.8	88.0	12.0	100.0
1947	49.3	1.7	8.4	10.3	10.1	2.5	7.2	89.5	10.5	100.0
1948	48.4	2.4	10.1	9.3	11.4	2.9	6.5	91.0	9.0	100.0
1949	47.1	2.6	9.7	7.3	11.6	2.2	11.1	91.6	8.4	100.0
1950	47.4	2.4	9.1	5.8	14.6	3.1	9.8	92.2	7.8	100.0
1951	42.4	2.4	9.7	4.3	14.1	3.2	16.2	92.3	7.7	100.0
1952	42.8	1.6	8.5	5.2	13.8	3.6	16.3	91.8	8.2	100.0

[1] There are no mechanical cleaning plants at lignite mines.
[2] Includes all other wet methods.
[3] Launders include classifiers and dense mediums for 1927–36, inclusive.
[4] Data not available.
[5] Less than 0.05 percent.

TABLE 37.—Method of mining at bituminous-coal and lignite mines in the United States served by cleaning plants, 1933–52 [1]

Year	Strip mines			Underground mines						Total all mines		
				Mechanical loading			Hand loading					
	Production, thousand tons	Production from mines with cleaning plants		Production mechanically loaded, thousand tons	Production from mines with cleaning plants		Production hand loaded, thousand tons	Production from mines with cleaning plants		Grand total production, thousand tons	Production from mines with cleaning plants	
		Thousand tons	Percent of total		Thousand tons	Percent of total		Thousand tons	Percent of total		Thousand tons	Percent of total
1933	18,270	3,940	21.6	37,821	9,253	24.5	277,539	51,603	18.6	333,630	64,796	19.4
1934	20,790	7,128	34.3	41,433	10,129	24.4	297,145	59,052	19.9	359,368	76,309	21.2
1935	23,647	9,314	39.4	47,177	15,066	31.9	301,549	62,786	20.8	372,373	87,166	23.4
1936	28,126	10,953	38.9	66,977	23,462	35.0	343,985	80,987	23.5	439,088	115,402	26.3
1937	31,751	[2]	[2]	83,500	[2]	[2]	330,280	[2]	[2]	445,531	[2]	[2]
1938	30,407	15,214	50.0	85,093	37,195	43.7	233,045	55,829	24.0	348,545	108,238	31.1
1939	37,722	17,960	47.6	110,712	53,496	48.3	246,421	61,858	25.1	394,855	133,314	33.8
1940	43,167	20,030	46.4	147,870	66,148	44.7	269,734	75,558	28.0	460,771	161,736	35.1
1941	55,071	24,773	45.0	186,667	93,374	50.0	272,411	67,321	24.7	514,149	185,468	36.1
1942	67,203	28,597	42.6	232,903	118,917	51.1	282,587	70,560	25.0	582,693	218,074	37.4
1943	79,685	30,326	38.1	249,805	125,314	50.2	260,687	67,258	25.8	590,177	222,898	37.8
1944	100,898	32,444	32.2	274,189	137,927	50.3	244,489	62,565	25.6	619,576	232,936	37.6
1945	109,987	35,910	32.6	262,512	129,733	49.4	205,118	48,615	23.7	577,617	214,258	37.1
1946	112,964	33,222	29.4	245,341	125,521	51.2	175,617	41,531	23.6	533,922	200,274	37.5
1947	139,395	42,017	30.1	298,157	158,507	53.2	193,072	43,988	22.8	630,624	244,512	38.8
1948	139,506	44,305	31.8	295,806	171,346	57.9	164,206	36,061	22.0	599,518	251,712	42.0
1949	106,045	38,972	36.8	222,376	142,797	64.2	109,447	24,553	22.4	437,868	206,322	47.1
1950	123,466	47,701	38.6	272,725	188,732	69.2	120,120	30,256	25.2	516,311	266,689	51.7
1951	117,618	50,675	43.1	304,256	217,257	71.4	111,791	34,333	30.7	533,665	302,265	56.6
1952	108,910	48,193	44.3	270,500	201,113	74.3	87,431	26,827	30.7	466,841	276,133	59.1

[1] Does not include any estimate for mines that may ship to consumer-operated plants.
[2] Data not available.

TABLE 38.—Bituminous coal mechanically cleaned by wet and pneumatic methods, in the United States, 1949–52, by method of cleaning, in net tons of clean coal

Method of cleaning	1949	1950	1951	1952	
				Quantity	Change from 1951 (percent)
Wet methods:					
At mines	132,658,984	174,776,675	213,806,870	202,597,163	—5.2
At consumer-operated plants	8,049,004	8,393,528	7,623,530	6,021,819	—21.0
Total wet methods	140,707,988	183,170,203	221,430,400	208,618,982	—5.8
Pneumatic methods	12,943,915	15,528,315	18,579,408	18,645,648	+.4
Grand total	153,651,903	198,698,518	240,009,808	227,264,630	—5.3

TABLE 39.—Bituminous coal cleaned in the United States, 1951–52, by type of equipment

[Includes consumer-operated plants]

Type of equipment	Plants in operation		Net tons of clean coal		Cleaned by each type (percent of total)	
	1951	1952	1951	1952	1951	1952
Wet methods:						
Jigs	308	300	101,746,501	97,336,578	42.4	42.8
Concentrating tables	19	17	5,810,626	3,723,076	2.4	1.6
Classifiers	84	80	23,174,005	19,295,679	9.7	8.5
Launders	13	11	10,362,595	11,737,760	4.3	5.2
Dense-media	120	124	33,840,174	31,320,926	14.1	13.8
Jigs and concentrating tables	21	23	7,612,636	8,280,239	3.2	3.6
Other combinations and methods	43	49	38,883,863	36,924,724	16.2	16.3
Total wet methods	608	604	221,430,400	208,618,982	92.3	91.8
Pneumatic methods	94	96	18,579,408	18,645,648	7.7	8.2
Grand total	[1] 631	[1] 625	240,009,808	227,264,630	100.0	100.0

[1] Total does not add. Number of plants using both wet and pneumatic method was 71 in 1951 and 75 in 1952.

TABLE 40.—Total production from bituminous-coal mines served by cleaning plants in the United States, 1951–52, by type of equipment, in net tons

[Excludes consumer-operated plants]

Type of equipment	1951	1952	Change from 1951 (percent)
Wet methods:			
Jigs	134,597,871	123,977,777	−7.9
Concentrating tables	3,826,081	3,276,024	−14.4
Classifiers	39,166,788	32,590,301	−16.8
Launders	8,063,056	9,289,757	+15.2
Dense-medium	55,483,670	51,590,475	−7.0
Jigs and concentrating tables	9,463,836	7,305,783	−22.8
Other combinations and methods	46,039,830	43,498,925	−5.5
Total wet methods	296,641,132	271,529,042	−8.5
Pneumatic methods	46,159,758	43,702,734	−5.3
Grand total	342,800,890	315,231,776	−8.0
Less duplications [1]	40,535,788	39,098,611	−3.5
Net total	302,265,102	276,133,165	−8.6
United States total production [2]	533,664,732	466,840,782	−12.5
Percent produced at mines having cleaning plants	56.6	59.1	

[1] Mine using both wet and pneumatic methods.
[2] Includes all coal except Pennsylvania anthracite. There are no mechanical cleaning plants at lignite mines.

TABLE 41.—Total production from bituminous-coal mines served by cleaning plants in the United States, 1949–52, by method of mining

[Excludes consumer-operated plants]

Method of mining	1949		1950		1951		1952	
	Thousand tons	Percent	Thousand tons	Percent	Thousand tons	Percent	Thousand tons	Percent
Mined from strip pits	38,972	18.9	47,701	17.9	50,675	16.8	48,193	17.5
Mechanically loaded underground	142,797	69.2	188,732	70.8	217,257	71.9	201,113	72.8
Hand-loaded underground	24,553	11.9	30,256	11.3	34,333	11.3	26,827	9.7
Total	206,322	100.0	266,689	100.0	302,265	100.0	276,133	100.0

TABLE 42.—Bituminous coal mechanically cleaned by wet and pneumatic methods in the United States, 1951–52, by States

[Includes consumer-operated plants]

State	Plants in operation		Net tons of clean coal		Output mechanically cleaned (percent)	
	1951	1952	1951	1952	1951	1952
Alabama	48	43	11,069,682	9,801,444	81.4	86.1
Alaska	2	2	195,241	265,529	39.5	38.7
Arkansas	2		17,916		1.6	
Colorado	7	5	1,649,012	1,485,290	40.2	41.0
Illinois	67	69	39,606,748	36,402,615	73.1	79.5
Indiana	27	27	14,060,674	12,935,513	72.3	79.1
Kansas	5	3	1,189,092	1,174,053	60.6	57.9
Kentucky	75	76	26,923,389	27,710,824	35.9	41.9
Missouri	10	10	2,865,138	2,578,768	87.6	87.3
Montana	2	2	126,115	104,150	5.4	5.0
New Mexico	1	1	59,635	143,681	7.6	18.9
Ohio	29	27	13,939,962	14,771,814	36.7	40.8
Oklahoma	6	5	692,692	628,083	31.2	28.6
Pennsylvania [1]	88	89	46,325,054	40,740,414	42.8	45.7
Tennessee	9	6	607,392	406,720	11.2	7.7
Utah	6	6	2,039,335	2,497,890	33.2	40.7
Virginia	29	33	7,356,766	7,786,248	34.4	36.1
Washington	17	16	809,619	821,788	94.5	97.3
West Virginia [2]	201	205	70,476,346	67,009,806	43.2	47.3
Total	[3] 631	[4] 625	240,009,808	227,264,630	45.0	48.7

[1] Includes some coal mined in Pennsylvania and cleaned in Ohio and a small tonnage mined in other States and cleaned at a consumer-operated plant in Pennsylvania.
[2] Includes some coal mined in West Virginia and cleaned in Pennsylvania.
[3] Represents 71 plants using both wet and pneumatic methods of cleaning and 560 plants using only 1 cleaning method.
[4] Represents 75 plants using both wet and pneumatic methods of cleaning and 550 plants using only 1 cleaning method.

TABLE 43.—Operations at bituminous-coal-cleaning plants in the United States, 1952, by States, in net tons

State	Total raw coal moved to cleaning plants	Coal obtained in cleaning process	Refuse resulting in cleaning process	Ratio of refuse to raw coal (percent) [1]	Total production from mines served by cleaning plants
Alabama	14,449,934	9,801,444	4,648,490	32.2	9,998,109
Alaska	311,009	265,529	45,480	14.6	266,546
Colorado	300,976	273,926	27,050	9.0	311,755
Illinois	42,819,097	36,402,615	6,416,482	15.0	39,424,699
Indiana	14,938,993	12,935,513	2,003,480	13.4	14,073,626
Kansas	1,488,254	1,174,053	314,201	21.1	1,207,321
Kentucky	32,403,628	27,710,824	4,692,804	14.5	32,324,553
Missouri	3,320,613	2,578,768	741,845	22.3	2,668,753
Montana	114,512	104,150	10,362	9.0	123,774
New Mexico	156,267	143,681	12,586	8.1	556,583
Ohio	18,226,475	14,771,814	3,454,661	19.0	17,017,303
Oklahoma	756,049	628,083	127,966	16.9	690,258
Pennsylvania [2]	45,477,901	35,929,959	9,547,942	21.0	42,302,404
Tennessee	471,341	406,720	64,621	13.7	1,021,628
Utah	2,858,970	2,497,890	361,080	12.6	3,270,426
Virginia	8,584,707	7,786,248	798,459	9.3	12,589,002
Washington	1,102,298	821,788	280,510	25.4	824,530
West Virginia [3]	79,718,160	67,009,806	12,708,354	15.9	97,461,895
Total at mines only [4]	267,499,184	221,242,811	46,256,373	17.3	276,133,165
Consumer plants [5]	6,746,933	6,021,819	725,114	10.7	
Grand total	274,246,117	227,264,630	46,981,487	17.1	

[1] In Alabama (for example) for every 100 tons of raw coal cleaned in 1952, an average of 32.2 tons of refuse was discarded and 67.8 tons of clean marketable coal was obtained.
[2] Includes some coal that was mined in Pennsylvania and cleaned in Ohio.
[3] Includes some coal that was mined in West Virginia and cleaned in Pennsylvania.
[4] Includes all mechanical cleaning other than washeries operated by consumer steel companies.
[5] Includes central washeries in Colorado and Pennsylvania operated by consumer steel companies.

BY STATES AND COUNTIES

Detailed production and employment statistics are given in table 44 for each coal-producing county in the United States from which three or more operators submitted reports for 1952. Statistics on counties with less than three reporting producers have been combined with data for other counties in the same State to avoid disclosing individual figures, unless the operators have granted permission to publish them separately. Production of mines on the border between two States has been credited to the State from which the coal was extracted rather than to that in which the tipple was situated. If the coal is mined from lands in both States, the tonnage has been apportioned accordingly.

The data in the present report, as in those published for many years by the Bureau of Mines, relate only to mines with an annual output of 1,000 tons or more. That fact should be borne in mind when the statistics in this report are compared with similar data compiled by State mine departments. Differences arise largely from variations in coverage by State reports, some of which include data for all mines regardless of size, and others only data for mines employing more than a specified minimum number, ranging from 2 to 10 men.

Because of a change in method of reporting, beginning with 1946, statistics of average production per man per day are not precisely comparable with those for other years. The figures since 1946 are based on the average number of men working daily, whereas the figures for previous years were based on the average number of men on the rolls per pay period.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
ALABAMA												
Bibb	150,272	33,744	3,724	187,740	$6.93	225	-------	49	274	161	44,086	4.26
Blount	89,703	93,306	33	183,042	6.54	79	67	22	168	204	34,319	5.33
Cullman	9,449	26,801	-------	36,250	6.07	27	12	9	48	190	9,140	3.97
Jackson	-------	1,419	-------	1,419	5.51	3	-------	-------	3	200	600	2.37
Jefferson	6,907,910	152,412	34,142	7,094,464	6.43	6,630	93	1,319	8,042	176	1,416,742	5.01
Marion	114,408	187,583	1,742	303,733	8.55	452	-------	120	572	172	98,604	3.08
St. Clair	9,200	12,508	-------	21,708	5.92	28	-------	2	30	209	6,275	3.46
Shelby	10,950	98,370	105	109,425	6.52	136	8	19	163	193	31,451	3.48
Tuscaloosa	486,972	52,624	1,269	540,865	4.73	66	159	62	287	193	55,498	9.75
Walker	1,709,150	310,545	881,238	2,900,933	5.65	1,560	309	338	2,207	163	358,904	8.08
Winston	-------	3,848	-------	3,848	5.88	6	-------	-------	6	172	1,030	3.74
Total Alabama	9,488,014	973,160	922,253	11,383,427	6.22	9,212	648	1,940	11,800	174	2,056,649	5.53
ALASKA												
Total Alaska	629,296	52,069	4,853	686,218	$8.42	211	64	99	374	253	94,487	7.26
ARIZONA												
Navajo	-------	5,003	-------	5,003	$6.60	10	-------	1	11	194	2,137	2.34

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
ARKANSAS												
Franklin	13,676	4,717	----------	18,393	$5.95	21	6	4	31	165	5,129	3.59
Johnson	321,947	8,293	30	330,270	7.30	143	114	70	327	115	37,605	8.78
Logan	104,952	3,003	208	108,163	10.20	325	----------	54	379	81	30,686	3.53
Pope	12,100	1,146	----------	13,246	8.86	62	3	16	81	55	4,482	2.96
Sebastian	388,891	14,125	----------	403,016	7.68	467	18	71	556	195	108,491	3.71
Total Arkansas	841,566	31,284	238	873,088	7.83	1,018	141	215	1,374	136	186,393	4.68
CALIFORNIA (LIGNITE)												
Amador	----------	----------	2,998	2,998	$10.24	----------	2	----------	2	125	250	11.99
COLORADO												
Boulder	19,645	59,852	492	79,989	$5.67	99	----------	19	118	145	17,144	4.67
Delta	39,585	23,039	1,314	63,936	5.44	41	----------	15	56	187	10,474	6.10
El Paso	8,361	42,372	21,303	72,036	4.52	58	2	14	74	228	16,892	4.26
Fremont	52,131	149,133	377	201,641	4.48	148	----------	59	207	163	33,740	5.98
Garfield	2,535	39,877	----------	42,412	5.39	24	----------	6	30	228	6,830	6.21
Gunnison	248,565	63,967	26,966	339,498	5.58	255	----------	110	365	140	50,952	6.66
Huerfano	203,906	39,946	2,297	246,149	6.61	273	----------	72	345	173	59,689	4.12
Jackson	----------	2,415	----------	2,415	5.54	----------	11	----------	11	52	570	4.24
Jefferson	----------	1,538	55	1,593	5.08	3	----------	1	4	73	292	5.46
La Plata	15,424	22,428	1	37,853	4.06	34	----------	2	36	197	7,105	5.33
Las Animas	808,891	31,982	16,716	857,589	6.53	1,102	----------	197	1,299	171	221,763	3.87
Mesa	62,839	31,652	547	95,038	4.94	52	----------	12	64	202	12,916	7.36
Moffat	73,807	16,725	----------	90,532	5.26	38	----------	17	55	164	9,002	10.06
Montrose	----------	3,083	----------	3,083	5.34	3	----------	----------	3	238	714	4.32

Pitkin		7,328		7,328	4.80	7		2	9	163	1,467	5.00
Rio Blanco	20,000	20,153	21	40,174	5.56	22		6	28	181	5,066	7.93
Routt	637,390	40,284	9,296	686,970	4.84	259	35	136	430	152	65,239	10.53
Weld	467,602	273,335	13,842	754,779	4.13	439	14	91	544	144	78,479	9.62
Total Colorado	2,660,679	869,109	93,227	3,623,015	5.30	2,857	62	759	3,678	163	598,334	6.06
GEORGIA												
Dade		4,500		4,500	$5.00	3		2	5	260	1,300	3.46
Walker		27,600		27,600	5.00	33		6	39	202	7,877	3.50
Total Georgia		32,100		32,100	5.00	36		8	44	209	9,177	3.50
ILLINOIS												
Bureau	576,133		136,498	712,631	$4.25		44	91	135	239	32,265	22.09
Christian	4,926,642	55,781	87,647	5,070,070	3.49	2,375		633	3,008	127	382,811	13.24
Clinton	106,849	141,618	12,123	260,590	4.39	226		67	293	193	56,660	4.60
Douglas	157,797	20,582	1,150	179,529	4.43	45		15	60	232	13,920	12.90
Edgar		4,800	234	5,034	6.23	24		4	28	55	1,540	3.27
Franklin	4,939,668	155,066	184,363	5,279,097	4.75	3,665		1,533	5,198	142	739,103	7.14
Fulton	4,845,195	236,376	11,736	5,093,307	3.75	147	384	588	1,119	210	234,666	21.70
Gallatin	105,909	32,751	3,303	141,963	3.73	77		21	98	225	22,016	6.45
Grundy	190,354	66,487	228	257,069	5.31	15	38	59	112	193	21,582	11.91
Hancock		31,473	113	31,586	5.89		11	3	14	113	1,580	19.99
Henry	58,948	31,016	1,011	90,975	4.52	62		20	82	158	12,949	7.03
Jackson	1,130,394	91,913	11,463	1,233,770	3.89	241	89	159	489	186	91,182	13.53
Jefferson	1,249,631	926	2,969	1,253,526	4.57	277		112	389	219	85,191	14.71
Kankakee	567,729	84,839		652,568	4.89		80	153	233	198	46,146	14.14
Knox	1,498,755	125,446	94,694	1,718,895	3.99	61	149	243	453	215	97,209	17.68
La Salle		12,625	2,601	15,226	5.98	12	6	4	22	128	2,813	5.41
Livingston		2,416		2,416	7.12		4		4	129	516	4.68
Logan		34,308		34,308	5.76	30		10	40	169	6,770	5.07
Macoupin	1,576,434	56,662	81,777	1,714,873	4.00	1,285		275	1,560	142	221,304	7.75
Madison	490,793	701,871	35,728	1,228,392	4.09	728		205	933	179	166,934	7.36
Marion	50,340	17,923	2,387	70,650	3.80	34		15	49	195	9,555	7.39
Menard		14,773	822	15,595	6.20	36		9	45	162	7,297	2.14
Montgomery	1,045,471	50,968	22,439	1,118,878	3.79	488		165	653	155	101,344	11.04
Peoria		367,799	1,832	369,631	4.54	165	47	43	255	138	35,288	10.47
Perry	4,345,317	131,579	54,641	4,531,537	3.74	675	261	628	1,564	190	297,400	15.24
Randolph	809,205	99,433	2,911	911,549	3.70	242	30	144	416	141	58,619	15.55
St. Clair	1,711,071	1,649,926	40,271	3,401,268	3.80	736	141	324	1,201	185	221,989	15.32
Saline	2,688,570	33,256	23,791	2,745,617	4.51	1,207	110	539	1,856	147	272,312	10.08
Sangamon	5,644	280,530	1,532	287,706	5.07	360		47	407	122	49,700	5.79
Schuyler		25,270		25,270	5.06	31	4	9	44	150	6,588	3.84
Tazewell		34,700	410	35,110	6.09	60		10	70	130	9,074	3.87
Vermilion	703,113	252,232	3,765	959,110	4.19	96	84	72	252	198	49,940	19.21

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
ILLINOIS—Continued												
Warren	----------	2,500	40	2,540	5.83	4	----------	2	6	152	912	2.79
Washington	7,058	13,795	1,551	22,404	4.46	68	----------	13	81	91	7,382	3.03
Will	33,012	68,713	----------	101,725	5.71	----------	22	17	39	202	7,894	12.89
Williamson	5,833,776	318,999	62,792	6,215,567	4.39	2,120	138	778	3,036	176	535,031	11.62
Total Illinois	39,653,808	5,249,352	886,822	45,789,982	4.10	15,592	1,642	7,010	24,244	161	3,907,482	11.72
INDIANA												
Clay	897,332	200,372	3,352	1,101,056	$4.08	----------	268	118	386	218	84,158	13.08
Daviess	391,258	50,856	2,211	444,325	4.26	13	50	44	107	168	17,995	24.69
Dubois	----------	27,371	----------	27,371	3.62	20	----------	3	23	126	2,905	9.42
Fountain	----------	58,237	----------	58,237	5.82	----------	24	5	29	237	6,873	8.47
Gibson	710,108	114,127	20,721	844,956	4.14	393	32	90	515	159	82,076	10.29
Greene	535,053	41,481	1,820	578,354	4.13	23	114	78	215	182	39,215	14.75
Knox	1,844,311	475,542	3,434	2,323,287	3.79	672	69	164	905	204	184,983	12.56
Martin	----------	1,468	----------	1,468	4.48	5	----------	----------	5	100	500	2.94
Owen	129,918	2,204	707	132,829	4.86	----------	36	14	50	280	13,978	9.50
Parke	----------	11,804	----------	11,804	5.50	14	----------	5	19	102	1,938	6.09
Pike	2,562,944	33,249	13,057	2,609,250	3.69	42	417	215	674	213	143,695	18.16
Spencer	39,500	4,241	----------	43,741	4.67	2	13	6	21	185	3,895	11.23
Sullivan	1,865,726	123,139	5,818	1,994,683	4.03	727	182	236	1,145	131	150,360	13.27
Vermillion	145,505	51,233	1,787	198,525	4.12	53	27	26	106	164	17,414	11.40
Vigo	2,595,505	277,107	365,279	3,237,891	4.21	1,518	110	396	2,024	188	380,561	8.51
Warrick	2,521,077	217,667	3,681	2,742,425	3.80	394	209	415	1,018	172	175,298	15.64
Total Indiana	14,238,237	1,690,098	421,867	16,350,202	3.97	3,876	1,551	1,815	7,242	180	1,305,844	12.52

IOWA

Appanoose	33,353	86,936	10,460	130,749	$5.26	266	--------	33	299	171	51,276	2.55
Boone	----------	6,196	9,233	15,429	6.11	29	--------	8	37	122	4,532	3.40
Davis	42,853	52,254	410	95,517	3.44	15	15	10	40	208	8,335	11.46
Jasper	----------	7,800	----------	7,800	4.65	--------	3	2	5	264	1,320	5.91
Lucas	6,559	10,994	353	17,906	5.50	33	--------	9	42	115	4,824	3.71
Mahaska	60,151	40,565	32	100,748	3.30	13	38	10	61	207	12,654	7.96
Marion	448,813	265,589	3,920	718,322	3.53	87	114	72	273	243	66,235	10.85
Monroe	89,699	53,308	3,086	146,093	4.20	133	5	24	162	193	31,327	4.66
Page	----------	2,412	----------	2,412	8.04	14	--------	1	15	80	1,200	2.01
Van Buren	3,531	42,911	----------	46,442	4.02	12	20	14	46	167	7,702	6.03
Wapello	46,955	45,009	50	92,014	3.62	12	31	12	55	247	13,560	6.79
Warren	----------	7,301	----------	7,301	4.66	9	--------	2	11	205	2,251	3.24
Total Iowa	731,914	621,275	27,544	1,380,733	3.84	623	226	197	1,046	196	205,216	6.73

KANSAS

Bourbon	----------	17,253	----------	17,253	$3.99	--------	18	--------	18	149	2,690	6.41
Cherokee	473,853	74,840	1,147	549,840	3.96	--------	79	45	124	278	34,454	15.96
Coffey	----------	3,325	----------	3,325	6.00	--------	5	2	7	120	840	3.96
Crawford	728,775	128,749	3,955	861,479	3.84	100	187	120	407	191	77,920	11.06
Linn	567,883	----------	6,321	574,204	3.80	--------	38	62	100	240	24,023	23.90
Osage	2,856	19,644	----------	22,500	6.34	28	22	4	54	148	8,011	2.81
Total Kansas	1,773,367	243,811	11,423	2,028,601	3.90	128	349	233	710	208	147,938	13.71

KENTUCKY

Eastern Kentucky:												
Bell	1,423,952	271,975	15,942	1,711,869	$5.49	2,117	39	291	2,447	140	343,633	4.98
Boyd	168,778	88,231	75,000	332,009	4.14	162	50	45	257	162	41,696	7.96
Breathitt	859,620	75,309	3,040	937,969	5.46	616	37	151	804	185	148,847	6.30
Carter	31,207	162,992	90	194,289	5.04	210	--------	30	240	145	34,778	5.59
Clay	583,066	257,711	----------	840,777	4.91	1,029	8	167	1,204	166	199,816	4.21
Clinton	----------	54,012	----------	54,012	4.18	64	--------	8	72	146	10,508	5.14
Elliott	----------	170,155	----------	170,155	4.72	62	50	16	128	147	18,844	9.03
Floyd	4,851,297	712,435	5,195	5,568,927	5.74	4,292	--------	944	5,236	177	927,885	6.00
Greenup	46,000	54,664	----------	100,664	3.79	59	20	9	88	158	13,876	7.25
Harlan	9,160,690	323,805	107,955	9,592,450	5.97	8,944	18	1,546	10,508	176	1,852,577	5.18
Jackson	----------	242,230	200	242,430	5.02	338	--------	55	393	139	54,630	4.44
Johnson	264,534	196,083	104	460,721	4.72	594	--------	84	678	146	99,294	4.64
Knott	606,978	230,940	1,769	839,687	4.47	607	--------	89	696	124	86,012	9.76
Knox	88,742	134,025	245	223,012	5.21	432	13	27	472	89	41,852	5.33
Laurel	52,669	104,894	----------	157,563	4.95	162	9	36	207	186	38,447	4.10
Lawrence	----------	84,804	----------	84,804	4.53	62	14	--------	76	170	12,909	6.57

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
KENTUCKY—Continued												
Eastern Kentucky—Continued												
Lee	171,757	80,293		252,050	5.34	257	6	46	309	183	56,531	4.46
Leslie	1,602,173	750,037	1,152	2,353,362	4.84	1,532	30	232	1,794	164	294,356	7.99
Letcher	4,081,623	588,166	28,707	4,698,496	5.77	3,110	59	540	3,709	179	662,118	7.10
Magoffin	174,944	6,310	442	181,696	3.93	22	56	10	88	176	15,468	11.75
Martin	83,780	8,685		92,465	4.96	76		24	100	127	12,705	7.28
McCreary	291,842	188,458		480,300	5.03	492	37	82	611	134	81,692	5.88
Morgan		169,366		169,366	4.88	119	46	9	174	153	26,595	6.37
Owsley		16,290		16,290	5.55	24	6	2	32	134	4,275	3.81
Perry	5,108,534	151,462	42,666	5,302,662	5.25	4,065		881	4,946	164	809,849	6.55
Pike	7,812,270	863,396	167,778	8,843,444	4.99	7,349	32	1,222	8,603	179	1,541,530	5.74
Pulaski	2,003	277,739		279,742	4.64	352	31	23	406	128	52,148	5.36
Rockcastle	4,750	163,583		168,333	4.58	159	48	13	220	139	30,470	5.52
Rowan		21,991		21,991	5.33	40	4	5	49	82	4,018	5.47
Wayne		40,436		40,436	3.79	81		1	82	117	9,582	4.22
Whitley	417,743	93,298	1,141	512,182	4.85	379	127	88	594	163	97,054	5.28
Wolfe		8,494		8,494	5.39	11	2	1	14	141	1,980	4.29
Total Eastern Kentucky	37,888,952	6,592,269	451,426	44,932,647	5.39	37,818	742	6,677	45,237	169	7,625,975	5.89
Western Kentucky:												
Butler		99,483		99,483	3.83	100	5	13	118	130	15,396	6.46
Daviess	390,741	225,353		616,094	2.62	144	65	28	237	168	39,902	15.44
Hancock	18,205	41,795		60,000	3.49		21	14	35	121	4,236	14.16
Henderson	23,200	243,880		267,080	3.54	201		34	235	184	43,322	6.16
Hopkins	12,518,134	602,722	1,764	13,122,620	3.64	2,538	476	1,038	4,052	201	814,581	16.11
McLean		12,447		12,447	4.05	19		2	21	109	2,285	5.45
Muhlenberg	4,177,068	266,053	12,623	4,455,744	3.29	1,209	250	485	1,944	163	316,380	14.08
Ohio	1,571,704	57,544	555	1,629,803	3.62	84	125	200	409	210	85,754	19.01
Union	572,336	57,803	1,245	631,384	3.62	249		56	305	207	63,021	10.02
Webster	287,039			287,039	4.22	43	24	23	90	109	9,840	29.17
Total Western Kentucky	19,558,427	1,607,080	16,187	21,181,694	3.55	4,587	966	1,893	7,446	187	1,394,717	15.19
Total Kentucky	57,447,379	8,199,349	467,613	66,114,341	4.80	42,405	1,708	8,570	52,683	171	9,020,692	7.33

MARYLAND

Allegany	66,692	165,400	84	232,176	$4.80	226	58	25	309	183	56,496	4.11
Garrett	142,849	212,738	140	355,727	4.45	198	91	35	324	189	61,394	5.79
Total Maryland	209,541	378,138	224	587,903	4.58	424	149	60	633	186	117,890	4.99

MISSOURI

Adair		72,110	1,300	73,410	$5.08	102		24	126	163	20,544	3.57
Barton	48,172	2,315	50	50,537	4.30		16	4	20	205	4,101	12.32
Bates	267,484	8,964	2,978	279,426	3.80		25	30	55	231	12,690	22.02
Boone		32,012	75	32,087	4.05		12	5	17	213	3,625	8.85
Callaway		143,665		143,665	4.68		35	13	48	279	13,405	10.72
Clay		15,798	587	16,385	8.57	84		6	90	95	8,531	1.92
Dade		8,712		8,712	3.75		6		6	275	1,650	5.28
Daviess		1,514		1,514	8.06	9		1	10	60	600	2.52
Harrison		4,490		4,490	6.98	12		2	14	85	1,190	3.77
Henry	674,561	65,054	420	740,035	3.83		134	74	208	194	40,301	18.36
Johnson		2,182		2,182	6.00		2		2	200	400	5.46
Lafayette		20,923	153	21,076	6.86	59		8	67	161	10,761	1.96
Linn		3,411		3,411	5.78	14		2	16	143	2,288	1.49
Macon	655,027	35,071		690,098	3.91	32	63	78	173	219	37,825	18.24
Putnam		10,709		10,709	5.42	34		2	36	172	6,180	1.73
Ralls		4,073		4,073	5.36		11		11	126	1,382	2.95
Randolph	438,247	68,979		507,226	4.24	109	45	56	210	199	41,889	12.11
Ray		2,792		2,792	8.01	21		2	23	114	2,630	1.06
St. Clair	286,928	2,239		289,167	3.91		50	19	69	206	14,209	20.35
Vernon	58,773	14,682		73,455	3.82		32	6	38	230	8,746	8.40
Total Missouri	2,429,192	519,695	5,563	2,954,450	4.08	476	431	332	1,239	188	232,947	12.68

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
MONTANA												
Bituminous coal:												
Blaine		8,372	100	8,472	$6.39	7		1	8	300	2,400	3.53
Carbon	112,853	9,555	1,366	123,774	4.99	70		23	93	199	18,479	6.70
Cascade		3,242		3,242	6.31	4		1	5	206	1,030	3.15
Musselshell	468,666	24,499	3,834	496,999	4.45	290		139	429	169	72,507	6.85
Rosebud	1,404,026		2,295	1,406,321	1.99		55	15	70	229	16,030	87.73
Total bituminous coal	1,985,545	45,668	7,595	2,038,808	2.80	371	55	179	605	183	110,446	18.46
Lignite:												
Custer		7,768		7,768	3.99	5			5	134	670	11.59
Dawson		1,437		1,437	3.50		2		2	108	216	6.65
Richland		8,755	15	8,770	4.00	5			5	226	1,130	7.76
Sheridan		12,425	150	12,575	3.33	4	11	1	16	122	1,946	6.46
Total lignite		30,385	165	30,550	3.70	14	13	1	28	142	3,962	7.71
Total Montana	1,985,545	76,053	7,760	2,069,358	2.81	385	68	180	633	181	114,408	18.09
NEW MEXICO												
Bernalillo		1,493	20	1,513	$4.58	4		1	5	116	580	2.61
Colfax	617,015	28,112	643	645,770	5.80	467		58	525	229	120,070	5.38
McKinley	13,563	47,075	262	60,900	6.02	100	8	19	127	115	14,563	4.18
Rio Arriba	15,073	2,089		17,162	4.43	26		5	31	186	5,775	2.97
Sandoval		2,634		2,634	4.76	6			6	228	1,368	1.93
San Juan		3,943		3,943	4.97	6			6	199	1,194	3.30
Santa Fe		24,345		24,345	5.75	38		6	44	200	8,800	2.77
Socorro		1,700		1,700	5.74	5		2	7	200	1,400	1.21
Valencia		1,470		1,470	4.50		5		5	32	160	9.19
Total New Mexico	645,651	112,861	925	759,437	5.77	652	13	91	756	204	153,910	4.93

NORTH CAROLINA

Chatham	----------	1,600	----------	1,600	$7.93	33	--------	7	40	38	1,520	1.05

NORTH DAKOTA (LIGNITE)

Adams	15,959	6,105	50	22,114	$3.31	--------	13	--------	13	120	1,564	14.14
Bowman	143,280	5,556	----------	148,836	1.64	--------	12	5	17	222	3,776	39.42
Burke	340,253	33,248	67,406	440,907	2.33	--------	26	41	67	209	14,017	31.46
Burleigh	----------	20,086	----------	20,086	3.35	--------	4	--------	4	200	800	25.11
Divide	266,570	25,592	478	292,640	2.37	--------	18	22	40	195	7,800	37.52
Dunn	----------	9,912	100	10,012	2.75	--------	6	--------	6	164	986	10.15
Golden Valley	----------	1,590	----------	1,590	2.73	2	----------	--------	2	152	304	5.23
Grant	----------	26,504	----------	26,504	3.13	3	14	--------	17	127	2,165	12.24
Hettinger	80	15,013	----------	15,093	2.87	--------	9	1	10	123	1,230	12.27
McKenzie	----------	1,190	----------	1,190	4.00	2	----------	--------	2	100	200	5.95
McLean	235,413	53,628	258	289,299	2.49	--------	35	30	65	223	14,525	19.92
Mercer	940,412	22,249	91,616	1,054,277	2.33	60	68	88	216	222	47,988	21.97
Morton	----------	37,166	----------	37,166	2.55	2	25	--------	27	113	3,046	12.20
Mountrail	----------	1,565	----------	1,565	3.65	--------	2	--------	2	42	84	18.63
Oliver	----------	6,280	----------	6,280	2.50	--------	2	--------	2	165	330	19.03
Stark	----------	19,781	56,008	75,789	2.61	--------	27	9	36	138	4,956	15.29
Ward	459,842	62,673	103	522,618	2.39	6	36	44	86	235	20,224	25.84
Williams	----------	17,786	----------	17,786	3.36	10	3	3	16	167	2,671	6.66
Total North Dakota	2,401,809	365,924	216,019	2,983,752	2.37	85	300	243	628	202	126,666	23.56

OHIO

Athens	518,300	292,872	500	811,672	$4.38	701	44	169	914	135	123,368	6.58
Belmont	6,851,751	633,269	16,646	7,501,666	4.04	3,132	186	774	4,092	210	860,960	8.71
Carroll	142,093	325,346	1,333	468,772	3.82	138	100	44	282	215	60,673	7.73
Columbiana	114,107	1,128,866	51	1,243,024	3.36	72	334	69	475	231	109,507	11.35
Coshocton	508,161	509,901	64	1,018,126	3.57	137	167	82	386	224	86,465	11.78
Gallia	608,396	119,558	----------	727,954	3.15	239	132	88	459	173	79,282	9.18
Guernsey	418,659	54,156	13,760	486,575	3.34	91	100	49	240	194	46,453	10.47
Harrison	6,730,055	290,518	15,359	7,035,932	4.10	505	558	672	1,735	224	389,295	18.07
Hocking	32,475	75,024	----------	107,499	3.70	100	13	12	125	149	18,622	5.77
Holmes	----------	3,305	----------	3,305	3.31	1	4	--------	5	98	492	6.72
Jackson	418,280	157,165	8,298	583,743	3.87	51	95	47	193	220	42,479	13.74
Jefferson	3,583,747	1,366,543	10,816	4,961,106	3.95	1,269	395	484	2,148	210	451,158	11.00
Lawrence	----------	242,622	163	242,785	3.95	68	56	18	142	199	28,321	8.57
Mahoning	26,740	775,649	5,484	807,873	3.88	--------	154	38	192	264	50,723	15.93
Meigs	489,803	36,441	----------	526,244	3.25	143	95	41	279	222	62,068	8.48
Monroe	----------	10,000	----------	10,000	3.47	--------	8	--------	8	71	568	17.61
Morgan	63,981	37,262	----------	101,243	3.05	21	34	8	63	138	8,690	11.65

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
OHIO—Continued												
Muskingum	698,324	695,181	3,308	1,396,813	2.64	221	156	95	472	187	88,333	15.81
Noble	1,624,846	264,512	188	1,889,546	2.91	5	203	118	326	220	71,704	26.35
Perry	2,049,123	383,431	1,162	2,433,716	4.27	695	322	303	1,320	179	236,704	10.28
Portage		190,931	479	191,410	4.16		27	14	41	319	13,073	14.64
Stark		896,976	4,966	901,942	2.64	49	210	53	312	223	69,509	12.98
Tuscarawas	89,166	2,105,786	65,784	2,260,736	3.86	538	314	167	1,019	228	232,723	9.71
Vinton	71,334	147,016	15	218,365	4.22	48	109	15	172	208	35,822	6.10
Washington	44,172	140,577	4	184,753	3.42		23	9	32	224	7,183	25.72
Wayne		93,555	95	93,650	4.25		21	11	32	298	9,536	9.82
Total Ohio	25,083,513	10,976,462	148,475	36,208,450	3.81	8,224	3,860	3,380	15,464	206	3,183,711	11.37
OKLAHOMA												
Coal	48,201	9,953	30	58,184	$5.04	12	16	9	37	177	6,563	8.87
Craig	6,770	8,073	89	14,932	4.54		40	4	44	52	2,294	6.51
Haskell	257,185	48,619	1,508	307,312	6.07	176	62	41	279	210	58,618	5.24
Latimer	22,546			22,546	2.62		10	2	12	103	1,240	18.18
Le Flore	308,019	12,454	59	320,532	7.60	222	80	51	353	161	56,860	5.64
McIntosh	208,778	3,416		212,194	3.52		31	11	42	307	12,894	16.46
Okmulgee	384,917	9,177		394,094	5.75	353	7	61	421	165	69,395	5.68
Pittsburg	194,528	5,598		200,126	7.51	244		32	276	219	60,486	3.31
Rogers	337,780	31,680	1,249	370,709	4.90		70	49	119	250	29,798	12.44
Sequoyah	284,173	465		284,638	5.60		54	13	67	273	18,291	15.56
Tulsa		3,137		3,137	7.46	8		2	10	151	1,510	2.08
Wagoner	1,400	3,605		5,005	3.35		7		7	74	518	9.66
Total Oklahoma	2,054,297	136,177	2,935	2,193,409	5.78	1,015	377	275	1,667	191	318,467	6.89

OREGON

Coos	----------	1,169	10	1,179	$7.34	2	--------	--------	2	112	224	5.26

PENNSYLVANIA (BITUMINOUS COAL)

Allegheny	6,598,644	2,011,600	1,004,616	9,614,860	$5.30	6,331	397	1,224	7,952	190	1,510,496	6.37
Armstrong	2,980,855	373,953	6,366	3,361,174	4.35	1,243	455	352	2,050	187	383,517	8.76
Beaver	1,040	454,344	----------	455,384	4.29	47	145	53	245	194	47,591	9.57
Bedford	186,278	58,123	2,657	247,058	5.99	327	38	53	418	151	63,050	3.92
Blair	73,296	135,939	165	209,400	4.32	103	43	18	164	198	32,465	6.45
Bradford	----------	9,739	----------	9,739	5.12	4	5	--------	9	217	1,952	4.99
Butler	1,033,571	857,802	5,890	1,897,263	4.02	423	358	146	927	211	195,596	9.70
Cambria	10,870,066	566,068	903,126	12,339,260	6.09	10,361	205	2,107	12,673	198	2,509,507	4.92
Cameron	39,420	26,786	----------	66,206	3.87	--------	17	3	20	211	4,226	15.67
Centre	541,298	554,189	743	1,096,230	3.95	236	297	101	634	214	135,726	8.08
Clarion	1,465,337	781,486	11,671	2,258,494	3.66	324	495	246	1,065	217	231,087	9.77
Clearfield	5,363,642	660,127	1,950	6,025,719	4.53	2,114	1,331	660	4,105	190	778,806	7.74
Clinton	262,966	367,971	35	630,972	3.26	38	141	47	226	244	55,068	11.46
Elk	381,047	236,477	11	617,535	4.26	268	148	101	517	166	85,842	7.19
Fayette	4,750,096	1,051,989	1,779,179	7,581,264	5.77	6,585	289	1,067	7,941	182	1,446,553	5.24
Greene	9,454,128	108,795	35,272	9,598,195	5.69	7,137	6	1,437	8,580	190	1,628,054	5.90
Indiana	5,318,791	386,534	583,310	6,288,635	5.24	3,742	373	887	5,002	183	915,467	6.87
Jefferson	1,505,194	218,977	2,342	1,726,513	4.20	812	365	220	1,397	178	248,891	6.94
Lawrence	56,536	231,125	41	287,702	3.61	10	74	12	96	202	19,424	14.81
Lycoming	----------	31,921	40	31,961	4.47	13	6	4	23	255	5,871	5.44
McKean	----------	43,847	----------	43,847	3.39	--------	29	4	33	116	3,820	11.48
Mercer	238,930	289,219	1,393	529,542	4.14	144	99	40	283	214	60,470	8.76
Somerset	4,598,951	683,987	19,034	5,301,972	5.22	3,780	532	738	5,050	181	914,888	5.80
Tioga	15,480	56,100	355	71,935	5.37	85	11	17	113	130	14,653	4.91
Venango	57,949	451,340	1,750	511,039	3.50	4	108	26	138	242	33,352	15.32
Washington	11,579,225	1,188,561	601,440	13,369,226	5.76	9,633	412	1,748	11,793	185	2,178,084	6.14
Westmoreland	2,255,588	1,933,633	399,484	4,588,705	5.33	3,145	359	584	4,088	176	719,245	6.38
Other counties: Fulton and Huntingdon	370,221	50,417	764	421,402	6.21	200	126	40	366	162	59,422	7.09
Total Pennsylvania	69,998,549	13,821,049	5,361,634	89,181,232	5.31	57,109	6,864	11,935	75,908	188	14,283,123	6.24

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
TENNESSEE												
Anderson	481,255	35,079	1,987	518,321	$4.93	473	14	91	578	154	89,283	5.81
Bledsoe		46,130		46,130	2.80	72		11	83	181	15,008	3.07
Campbell	866,300	51,488	5,437	923,225	5.83	1,632	15	232	1,879	124	233,354	3.96
Claiborne	683,942	75,220	6,038	765,200	5.12	800	56	128	984	149	147,065	5.20
Cumberland		31,173		31,173	3.65	40	5	2	47	184	8,671	3.60
Davidson		4,115		4,115	5.14	10			10	100	1,000	4.12
Fentress	144,265	29,528		173,793	4.65	231	4	22	257	145	37,303	4.66
Grundy	324,119	47,501	4,055	375,675	4.33	195	51	47	293	164	48,122	7.81
Hamilton		209,051		209,051	3.56	271	5	38	314	161	50,671	4.13
Marion	615,803	253,220	161	869,184	5.53	857	26	89	972	151	146,780	5.92
Morgan	245,964	75,001	6,235	327,200	5.25	417	43	100	560	233	130,514	2.51
Overton	40,821	19,427		60,248	3.57	107	4	12	123	123	15,100	3.99
Putnam	397,508	36,964	727	435,199	3.50	205		34	239	172	41,037	10.61
Roane		13,020		13,020	5.34	16		2	18	200	3,600	3.62
Scott	296,077	30,895		326,972	4.04	213	58	39	310	133	41,337	7.91
Sequatchie	1,138	140,068		141,206	3.24	151	4	15	170	152	25,768	5.48
Van Buren		9,350		9,350	2.82	12		1	13	156	2,027	4.61
Warren		6,955		6,955	4.97	12		2	14	101	1,416	4.91
White		28,937		28,937	2.89	31	10	5	46	150	6,920	4.18
Total Tennessee	4,097,192	1,143,122	24,640	5,264,954	4.85	5,745	295	870	6,910	151	1,044,976	5.04
UTAH												
Carbon	4,243,178	183,589	25,490	4,452,257	$5.34	2,177		703	2,880	200	576,409	7.72
Emery	1,380,875	160,606	10,765	1,552,246	5.15	735		243	978	197	192,235	8.07
Garfield		1,547		1,547	5.67	2			2	208	416	3.72
Grand	5,716	225	50	5,991	4.83	4		2	6	197	1,182	5.07
Iron		22,069		22,069	4.75	19		4	23	275	6,314	3.50
Kane		2,774		2,774	6.06	4		1	5	180	900	3.08
Sevier	28,307	48,982	244	77,533	5.21	30		10	40	274	10,953	7.08
Summit		24,888		24,888	3.42	10		4	14	258	3,607	6.90
Uintah		1,000		1,000	6.35	2		1	3	260	780	1.28
Total Utah	5,658,076	445,680	36,549	6,140,305	5.28	2,983		968	3,951	201	792,796	7.75

VIRGINIA

Buchanan	6,176,668	165,703	22,484	6,364,855	$5.37	4,014	104	825	4,943	196	966,658	6.58
Dickenson	4,257,865	850,306	608	5,108,779	4.94	2,339	203	499	3,041	214	652,113	7.83
Lee	660,973	77,969	6,415	745,357	6.14	815	-------	146	961	181	173,685	4.29
Montgomery	84,762	18,523	-------	103,285	5.25	109	-------	27	136	204	27,685	3.73
Russell	739,381	152,686	-------	892,067	5.30	702	6	88	796	184	146,324	6.10
Scott	-------	32,000	-------	32,000	5.38	35	-------	6	41	200	8,200	3.90
Tazewell	2,978,172	194,510	17,551	3,190,233	6.11	2,575	5	580	3,160	211	667,371	4.78
Wise	4,554,114	348,686	239,992	5,142,792	5.04	3,616	169	589	4,374	192	838,265	6.14
Total Virginia	19,451,935	1,840,383	287,050	21,579,368	5.32	14,205	487	2,760	17,452	199	3,480,301	6.20

WASHINGTON

King	101,220	86,347	1,949	189,516	$7.33	128	25	41	194	203	39,358	4.82
Kittitas	563,109	10,748	14,304	588,161	7.12	450	30	91	571	246	140,264	4.19
Lewis	-------	33,968	-------	33,968	6.32	29	-------	5	34	179	6,079	5.59
Pierce	1,103	2,307	-------	3,410	6.68	3	-------	2	5	148	741	4.60
Thurston	4,866	690	-------	5,556	4.21	17	12	7	36	21	747	7.44
Whatcom	18,045	2,929	2,612	23,586	6.38	26	-------	22	48	194	9,320	2.53
Total Washington	688,343	136,989	18,865	844,197	7.09	653	67	168	888	221	196,509	4.30

WEST VIRGINIA

Barbour	3,063,919	17,377	687	3,081,983	$4.17	1,085	318	405	1,808	167	301,151	10.23
Boone	5,871,839	35,566	14,289	5,921,694	5.03	3,044	70	880	3,994	197	785,062	7.54
Braxton	76,723	1,055	147	77,925	4.21	66	7	10	83	159	13,177	5.91
Brooke	440,421	197,776	869,040	1,507,237	4.35	624	146	117	887	204	180,695	8.34
Clay	750,460	13,590	20,000	784,050	5.37	534	-------	171	705	203	143,167	5.48
Fayette	9,854,571	162,248	630,717	10,647,536	5.78	7,908	268	1,319	9,495	210	1,994,440	5.34
Gilmer	141,748	2,114	1,267	145,129	3.26	99	22	20	141	109	15,373	9.44
Grant	5,975	53,545	-------	59,520	5.21	73	6	11	90	204	18,335	3.25
Greenbrier	1,782,690	79,533	5,405	1,867,628	5.67	1,385	159	195	1,739	183	318,634	5.86
Hancock	13,265	117,426	-------	130,691	3.88	12	38	8	58	185	10,702	12.21
Harrison	8,641,673	89,417	1,555	8,732,645	4.10	2,846	520	782	4,148	171	707,545	12.34
Kanawha	8,956,895	278,869	82,644	9,318,408	4.96	4,947	146	917	6,010	202	1,214,414	7.67
Lewis	284,360	10,949	-------	295,309	3.50	8	72	16	96	184	17,656	16.73
Logan	18,790,684	10,045	96,888	18,897,617	4.94	10,447	-------	2,183	12,630	191	2,412,266	7.83
Marion	9,298,280	120,846	654,160	10,073,286	4.89	4,187	28	1,073	5,288	204	1,080,734	9.32
Marshall	416,267	31,507	43	447,817	4.61	321	-------	41	362	183	66,296	6.75
Mason	114,249	24,337	552,496	691,082	5.57	429	-------	50	479	215	103,032	6.71
McDowell	17,857,917	110,074	538,687	18,506,678	6.18	13,229	249	2,622	16,100	203	3,271,853	5.66
Mercer	2,237,250	30,133	18,621	2,286,004	6.31	1,516	275	385	2,176	191	415,285	5.50
Mineral	64,900	22,917	14	87,831	5.14	63	23	12	98	175	17,118	5.13
Mingo	6,351,103	5,742	19,778	6,376,623	5.01	3,382	30	799	4,211	203	856,649	7.44
Monongalia	9,378,639	170,776	8,640	9,558,055	4.46	4,548	109	842	5,499	181	994,261	9.61
Nicholas	3,810,139	37,576	41,858	3,889,573	5.11	2,417	65	354	2,836	215	608,879	6.39
Ohio	1,228,650	92,935	4,665	1,326,250	4.48	812	-------	107	919	211	193,876	6.84
Pocahontas	231,698	-------	-------	231,698	6.63	73	29	17	119	269	32,062	7.23
Preston	1,668,986	167,925	146,810	1,983,721	4.28	1,644	191	353	2,188	162	354,296	5.60
Putnam	-------	46,426	-------	46,426	4.83	37	-------	6	43	190	8,167	5.68

For footnotes, see end of table.

TABLE 44.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1952, by States and by counties—Continued

[Exclusive of mines producing less than 1,000 tons]

County	Production (net tons)				Average value per ton [3]	Average number of men working daily				Average number of days mines worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total		Underground	Surface		Total			
							In strip pits	All others				
WEST VIRGINIA—Continued												
Raleigh	11,069,795	49,121	97,316	11,216,232	5.80	8,544	170	1,497	10,211	204	2,082,231	5.39
Randolph	1,391,744	44,570	9,338	1,445,652	5.37	922	154	222	1,298	177	229,126	6.31
Summers	12,053			12,053	5.23	15		2	17	135	2,298	5.24
Taylor	370,819	11,190		382,009	3.67	136	83	42	261	124	32,380	11.80
Tucker	246,931	475	35	247,441	5.41	160	33	33	226	159	35,888	6.89
Upshur	928,035	36,298	21	964,354	3.96	442	80	89	611	174	106,499	9.06
Wayne	195,485	4,864		200,349	4.38	138		22	160	195	31,255	6.41
Webster	1,417,287	3,679	7,201	1,428,167	5.83	1,119	9	252	1,380	185	255,021	5.60
Wyoming	8,731,177	40,201	73,008	8,844,386	6.11	5,460	146	1,024	6,630	214	1,417,601	6.24
Total West Virginia	135,696,627	2,121,102	3,895,330	141,713,059	5.23	82,672	3,446	16,878	102,996	197	20,327,424	6.97
WYOMING												
Campbell	276,632	23,903	20,410	320,945	$1.38		9	29	38	306	11,640	27.57
Carbon	935,355	80,483	7,090	1,022,928	5.23	245	55	111	411	225	92,486	11.06
Converse		8,684	23	8,707	3.62	2	3		5	246	1,231	7.07
Fremont		4,043		4,043	5.60	5		2	7	196	1,372	2.95
Hot Springs	5,965	11,119	20	17,104	7.43	18		7	25	132	3,307	5.17
Johnson		1,659		1,659	5.39	2			2	252	504	3.29
Lincoln	812,254	6,336	1,087	819,677	2.63	77	53	49	179	219	39,208	20.91
Sheridan	565,466	43,888	1,720	611,074	4.42	77	36	67	180	153	27,629	22.12
Sublette		1,016		1,016	4.90	3			3	115	345	2.94
Sweetwater	3,196,621	6,383	78,264	3,281,268	4.76	1,567	34	391	1,992	208	415,201	7.90
Total Wyoming	5,792,293	187,514	108,614	6,088,421	4.34	1,996	190	656	2,842	209	592,923	10.27
UNITED STATES												
Total United States	403,656,823	50,230,528	12,953,431	466,840,782	$4.90	252,627	22,940	59,650	335,217	186	62,502,394	7.47

[1] Includes coal loaded at mine directly into railroad cars or river barges, hauled by truck to railroad siding, and hauled by truck to waterway.

[2] Includes coal used by mine employees, taken by locomotive tenders at tipple, used at mine for power and heat, coal transported to point of use by conveyor or tram, coal made into beehive coke at mine, and all other uses.

[3] Value received or charged for coal f. o. b. mine, including selling cost. (Includes a value for coal not sold but used by producer, such as mine fuel and coal coked as estimated by producer at average prices that might have been received if such coal had been sold commercially.)

[4] In certain counties the average tons per man per day is large due to strip mining or mechanical loading underground.

TRANSPORTATION

TABLE 45.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1952, as reported by mine operators [1]

Route	State	Net tons	
		By State	Total for route
RAILROAD			
Alabama Central	Alabama	61,950	61,950
Alaska	Alaska	629,296	629,296
Algers, Winslow & Western	Indiana	1,727,223	1,727,223
Artemus-Jellico	Kentucky	53,292	53,292
Atchison, Topeka & Santa Fe	Colorado	181,282	1,210,498
	Illinois	394,727	
	Kansas	3,911	
	New Mexico	630,578	
Baltimore & Ohio	Illinois	194,266	36,230,271
	Indiana	318,796	
	Maryland	33,937	
	Ohio	4,075,536	
	Pennsylvania	7,289,874	
	West Virginia	24,317,862	
Bessemer & Lake Erie	Pennsylvania	2,561,774	2,561,774
Brimstone	Tennessee	61,250	61,250
Buffalo Creek & Gauley	West Virginia	667,063	667,063
Cambria & Indiana	Pennsylvania	2,708,507	2,708,507
Campbell's Creek	West Virginia	458,686	458,686
Carbon County	Utah	1,373,554	1,373,554
Central of Georgia	Alabama	6,975	6,975
Chesapeake & Ohio	Kentucky	10,913,726	58,234,512
	Ohio	327,210	
	Virginia	1,003,925	
	West Virginia	45,989,651	
Cheswick & Harmar	Pennsylvania	602,850	602,850
Chicago, Burlington & Quincy	Colorado	16,906	8,661,948
	Illinois	6,965,216	
	Iowa	176,736	
	Missouri	655,027	
	Wyoming	848,063	
Chicago & Eastern Illinois	Illinois	795,079	1,615,357
	Indiana	820,278	
Chicago & Illinois Midland	Illinois	3,229,766	3,229,766
Chicago, Indianapolis & Louisville	Indiana	410,734	410,734
Chicago, Milwaukee, St. Paul & Pacific	Indiana	3,089,503	3,717,488
	Montana (bituminous)	468,666	
	North Dakota (lignite)	159,319	
Chicago & North Western	Illinois	1,749,549	1,749,549
Chicago, Rock Island & Pacific	Arkansas	40,059	976,483
	Illinois	576,133	
	Iowa	143,731	
	Missouri	188,364	
	Oklahoma	28,196	
Clinchfield	Kentucky	70,096	5,256,761
	Virginia	5,186,665	
Colorado & Southeastern	Colorado	25,149	25,149
Colorado & Southern	Colorado	140,744	140,744
Colorado & Wyoming	Colorado	545,138	545,138
Conemaugh & Black Lick	Pennsylvania	415,794	415,794
Cumberland & Pennsylvania	Maryland	40,303	40,303
Dardanelle & Russellville Ry. Co.	Arkansas	12,100	12,100
Denver & Rio Grande Western	Colorado	1,283,858	4,227,061
	New Mexico	15,073	
	Utah	2,928,130	
Detroit, Toledo & Ironton	Ohio	1,367	1,367
East Broad Top R. R. & Coal Co.	Pennsylvania	392,545	392,545
Emory River R. R.	Tennessee	124,593	124,593
Erie	Ohio	109,426	594,762
	Pennsylvania	485,336	
Fort Smith & Van Buren	Oklahoma	299,989	299,989
Galesburg & Great Eastern	Illinois	397,962	397,962

For footnotes, see end of table.

TABLE 45.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1952, as reported by mine operators [1]—Con.

Route	State	Net tons	
		By State	Total for route
RAILROAD—continued			
Great Northern	North Dakota (lignite)	606,823	624,868
	Washington	18,045	
Gulf, Mobile & Ohio	Alabama	161,073	1,245,174
	Illinois	1,084,101	
Huntingdon & Broad Top Mountain R.R. & Coal Co	Pennsylvania	163,954	163,954
Illinois Central	Alabama	114,408	26,286,417
	Illinois	11,851,543	
	Indiana	116,287	
	Kentucky	14,204,179	
Illinois Terminal	Illinois	301,954	301,954
Interstate	Kentucky	223,023	1,835,270
	Virginia	1,612,247	
Johnstown & Stony Creek	Pennsylvania	199,119	199,119
Joplin-Pittsburg	Kansas	88,849	88,849
Kanawha Central	West Virginia	142,643	142,643
Kansas City Southern	Kansas	567,883	1,151,385
	Missouri	267,484	
	Oklahoma	316,018	
Kelley's Creek & Northwestern	West Virginia	1,348,355	1,348,355
Kentucky & Tennessee	Kentucky	269,359	269,359
Lake Erie, Franklin & Clarion	Pennsylvania	478,028	478,028
Litchfield & Madison	Illinois	384,777	384,777
Louisville & Nashville	Alabama	2,147,523	28,311,071
	Illinois	10,643	
	Kentucky	25,186,448	
	Tennessee	699,798	
	Virginia	266,659	
Mary Lee	Alabama	513,003	513,003
Midland Valley	Arkansas	184,792	271,050
	Oklahoma	86,258	
Minneapolis & St. Louis	Illinois	990,124	990,964
	Iowa	840	
Minneapolis, St. Paul & Sault Ste. Marie	North Dakota (lignite)	695,255	695,255
Missouri-Kansas-Texas	Kansas	455,186	1,251,457
	Missouri	397,215	
	Oklahoma	399,056	
Missouri Pacific	Arkansas	440,575	4,634,112
	Illinois	3,808,730	
	Kansas	326,034	
	Missouri	58,773	
Monongahela	Pennsylvania	1,481,788	11,738,563
	West Virginia	10,256,775	
Montana, Wyoming & Southern	Montana (bituminous)	112,853	112,853
Montour	Pennsylvania	2,944,685	2,944,685
Nashville, Chattanooga & St. Louis	Tennessee	939,922	939,922
New York Central (includes coal shipped over Kanawha & Michigan, Kelley's Creek, Toledo & Ohio Central, and Zanesville & Western)	Illinois	5,313,511	19,035,805
	Indiana	3,010,695	
	Ohio	4,722,906	
	Pennsylvania	4,366,194	
	West Virginia	1,622,499	
New York, Chicago & St. Louis	Ohio	7,658,321	7,658,321
Nicholas, Fayette & Greenbrier	West Virginia	857,507	857,507
Norfolk & Western	Kentucky	5,126,779	41,288,500
	Virginia	10,035,825	
	West Virginia	26,125,896	
Northeast Oklahoma	Kansas	1,833	1,833
Northern Pacific	Montana (bituminous)	1,404,026	2,936,142
	North Dakota (lignite)	940,412	
	Washington	591,704	

For footnotes, see end of table.

TABLE 45.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1952, as reported by mine operators [1]—Con.

Route	State	Net tons	
		By State	Total for route
RAILROAD—continued			
Oklahoma City-Ada-Atoka	Oklahoma	48,201	48,201
Pacific Coast	Washington	73,728	73,728
Pennsylvania (includes Pittsburgh, Cincinnati, Chicago & St. Louis)	Illinois	18,800	33,543,064
	Indiana	4,104,716	
	Ohio	6,113,939	
	Pennsylvania	22,958,237	
	West Virginia	347,372	
Pittsburgh & Lake Erie	Pennsylvania	1,081,626	1,081,626
Pittsburg & Shawmut	Pennsylvania	1,732,178	1,732,178
Pittsburgh, Chartiers & Youghiogheny	Pennsylvania	20,671	20,671
Pittsburgh & West Virginia	Ohio	387,996	770,819
	Pennsylvania	286,024	
	West Virginia	96,799	
Preston	West Virginia	48,661	48,661
St. Louis & O'Fallon	Illinois	237,405	237,405
St. Louis-San Francisco	Alabama	1,016,013	2,821,636
	Arkansas	164,040	
	Kansas	329,671	
	Missouri	435,333	
	Oklahoma	876,579	
Southern	Alabama	813,762	4,504,745
	Indiana	640,005	
	Kentucky	525,617	
	Tennessee	1,263,509	
	Virginia	1,261,852	
Southern Iowa	Iowa	27,956	27,956
Tennessee	Tennessee	510,388	510,388
Tennessee Central	Tennessee	496,594	496,594
Tennessee Coal, Iron & Railroad Co.	Alabama	2,849,169	2,849,169
Thomas & Sayreton	Alabama	232,774	232,774
Toledo, Peoria & Western	Illinois	99,700	99,700
Union	Pennsylvania	34,943	34,943
Union Pacific	Colorado	467,602	5,416,698
	Washington	4,866	
	Wyoming	4,944,230	
Unity	Pennsylvania	300,772	300,772
Utah	Utah	1,356,392	1,356,392
Virginian	Virginia	84,762	13,774,937
	West Virginia	13,690,175	
Wabash	Illinois	44,808	854,455
	Iowa	382,651	
	Missouri	426,996	
West Virginia Northern	West Virginia	627,441	627,441
Western Allegheny	Pennsylvania	207,430	207,430
Western Maryland	Maryland	135,301	4,929,912
	Pennsylvania	557,375	
	West Virginia	4,237,236	
Winifrede	West Virginia	235,877	235,877
Woodward Iron Co.	Alabama	927,069	927,069
Youngstown & Southern	Ohio	21,211	21,211
Total railroad shipments		375,910,941	375,910,941

For footnotes, see end of table.

TABLE 45.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, as reported by mine operators[1]—Continued

Route	State	Net tons	
		By State	Total for route
WATERWAY			
Allegheny River	Pennsylvania	1,208,632	1,208,632
Black Warrior River	Alabama	187,672	187,672
Illinois River	Illinois	988,839	988,839
Inland Water Way	Alabama	456,623	456,623
Kanawha River	West Virginia	2,739,205	2,739,205
Monongahela River	Pennsylvania	17,488,133	18,934,779
	West Virginia	1,446,646	
Ohio River	Illinois	216,175	3,196,914
	Kentucky	874,860	
	Ohio	1,665,601	
	West Virginia	440,278	
Tennessee River	Tennessee	1,138	1,138
Youghiogheny River	Pennsylvania	32,080	32,080
Total waterway shipments		27,745,882	27,745,882
Total loaded at mines for shipment by railroads and waterways.		403,656,823	403,656,823
Shipped by truck from mine to final destination		50,230,528	50,230,528
Used at mine[2]		12,953,431	12,953,431
Total production, 1952		466,840,782	466,840,782

[1] Includes coal loaded at mine directly into railroad cars or river barges, hauled by truck to railroad siding and hauled by truck to waterway. In general, figures show the quantity of bituminous coal and lignite originated for each railroad and waterway as reported by mine operators. It must be noted that in 1 year an operator may report coal loaded on the subsidiary railroad and in another year the same operator may report coal loaded on the parent railroad system.

[2] Includes coal used by mine employees, taken by locomotive tenders at tipple, used at mine for power and heat, coal transported from mine to point of use by conveyor or tram, coal made into beehive coke at mine, and all other uses at mine.

TABLE 46.—Truck shipments from bituminous-coal and lignite mines in the United States, 1940–52

Year	Trucked to final destination		Trucked to railroad siding or waterway		
	Thousands of net tons	Percent of total production	Thousands of net tons	Percent of total production	Average distance trucked (miles)
1940	35,540	7.7	6,127	1.3	3.6
1941	40,056	7.8	12,486	2.4	3.7
1942	45,154	7.7	18,843	3.2	3.9
1943	42,433	7.2	32,092	5.4	3.8
1944	40,123	6.5	51,871	8.4	3.8
1945	41,477	7.2	48,536	8.4	3.8
1946	42,731	8.0	44,070	8.2	4.0
1947	55,859	8.9	48,778	7.7	4.6
1948	58,260	9.7	60,933	10.2	5.3
1949	47,787	10.9	41,489	9.5	5.4
1950	58,286	11.3	42,931	8.3	5.9
1951	58,132	10.9	35,044	6.6	5.7
1952	50,231	10.8	31,105	6.7	7.5

CONSUMPTION

TABLE 47.—Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States, 1933–52, in thousands of net tons

Year and month	Electric-power utilities [1]	Bunker foreign trade [2]	Railroads [3] (class I)	Coke plants		Steel and rolling mills	Cement mills [4]	Other industrials [5]	Retail deliveries [6]	Total of classes shown [7]
				Beehive	Ovens					
1933	27,088	1,316	72,548	1,408	38,681	10,009	2,832	83,321	80,482	317,685
1934	29,707	1,321	76,037	1,635	44,343	10,898	3,500	89,448	86,925	343,814
1935	30,936	1,576	77,109	1,469	49,046	11,747	3,516	96,937	83,990	356,326
1936	38,104	1,622	86,391	2,698	63,244	13,471	4,771	113,792	84,200	408,293
1937	41,045	1,832	88,080	4,927	69,575	12,853	5,247	127,142	80,076	430,777
1938	36,440	1,352	73,921	1,360	45,266	8,412	4,483	96,527	68,520	336,281
1939	42,304	1,477	79,072	2,298	61,216	9,808	5,274	103,079	71,570	376,098
1940	49,126	1,426	85,130	4,803	76,583	10,040	5,633	110,469	87,700	430,910
1941	59,888	1,643	97,384	10,529	82,609	10,902	6,832	124,868	97,460	492,115
1942	63,472	1,585	115,410	12,876	87,974	10,434	7,570	135,979	104,750	540,050
1943	74,036	1,647	130,283	12,441	90,019	11,238	5,851	145,518	122,764	593,797
1944	76,656	1,559	132,049	10,858	94,438	10,734	3,789	134,610	124,906	589,599
1945	71,603	1,785	125,120	8,135	87,214	10,084	4,215	129,606	121,805	559,567
1946	68,743	1,381	110,166	7,167	76,121	8,603	7,009	120,610	100,586	500,386
1947	86,009	1,689	109,296	10,475	94,325	10,048	7,938	126,948	99,163	545,891
1948	95,620	1,057	94,838	10,322	96,984	10,046	8,554	112,741	89,747	519,909
1949	80,610	874	68,123	5,354	85,882	7,451	7,988	98,957	90,299	445,538
1950	88,262	717	60,969	9,088	94,757	7,698	7,943	98,164	86,604	454,202
1951:										
January	9,276	27	5,717	1,132	8,627	848	745	10,590	10,699	47,661
February	8,281	37	4,901	941	7,658	765	658	9,584	9,521	42,346
March	8,721	41	5,398	984	8,578	767	702	10,014	7,623	42,828
April	7,577	90	4,798	873	8,407	671	685	8,857	5,043	37,001
May	7,658	110	4,367	948	8,703	609	695	8,269	3,306	34,665
June	7,736	98	3,985	969	8,458	568	685	7,737	3,719	33,955
July	7,769	75	3,814	827	8,699	534	699	7,270	3,612	33,299
August	8,635	96	4,064	964	8,736	579	701	7,820	5,135	36,730
September	8,288	86	3,902	862	8,449	544	688	7,464	5,564	35,847
October	9,244	104	4,252	985	8,686	625	728	8,741	6,758	40,123
November	9,408	91	4,344	965	8,362	705	781	9,515	7,408	41,579
December	9,305	35	4,463	968	8,667	758	758	9,773	8,143	42,870
Total	101,898	890	54,005	11,418	102,030	7,973	8,525	105,634	76,531	468,904
1952:										
January	9,537	19	4,301	980	8,796	775	740	9,783	9,389	44,320
February	8,427	19	3,877	904	8,207	743	673	8,932	7,830	39,612
March	8,498	16	3,698	879	8,845	677	665	8,914	7,070	39,262
April	7,749	76	3,321	648	7,661	582	608	7,818	4,214	32,677
May	7,719	92	3,075	627	7,895	562	637	7,208	3,017	30,832
June	7,367	83	2,569	182	3,344	208	582	6,444	2,978	23,757
July	7,605	78	2,342	99	3,302	229	603	6,102	3,219	23,579
August	8,262	76	2,722	344	8,295	532	681	6,602	5,212	32,726
September	8,506	75	2,852	562	8,265	538	679	6,919	6,176	34,572
October	9,602	77	3,128	471	8,677	623	699	8,746	6,936	38,959
November	9,623	75	3,031	540	8,481	653	725	8,895	5,056	37,079
December	10,414	37	3,046	676	8,934	698	781	9,500	7,296	41,382
Total	103,309	723	37,962	6,912	90,702	6,820	8,073	95,863	68,393	418,757

[1] Federal Power Commission. Represents latest available revised figures for bituminous coal and lignite consumed by public-utility power plants in power generation, including a small quantity of coke amounting to approximately 100,000 tons annually.

[2] Bureau of Census, U. S. Department of Commerce.

[3] Association of American Railroads. Represents consumption of bituminous coal and lignite by Class I railways for all uses, including locomotive, powerhouse, shop, and station fuel. The Interstate Commerce Commission reports that in 1951 consumption for all uses by Class I line-haul railways, plus purchases for Class II and Class III railways, plus purchases by all switching terminal companies combined was 56,196,152 tons of bituminous coal and lignite. Similar data from the Interstate Commerce Commission are not yet available for 1952.

[4] Includes a small amount of anthracite.

[5] Estimates based upon reports collected from a selected list of representative manufacturing plants.

[6] Estimates based upon reports collected from a selected list of representative retailers. Include some coal shipped by truck from mine to final destination.

[7] The total of classes shown approximates total consumption. It is not possible to calculate consumption closely from production, imports, exports, and changes in stocks because certain significant items of stocks are not included in year-end stocks. These items are: Stocks on Lake and tidewater docks, stocks at other intermediate storage piles between mine and consumer, and coal in transit.

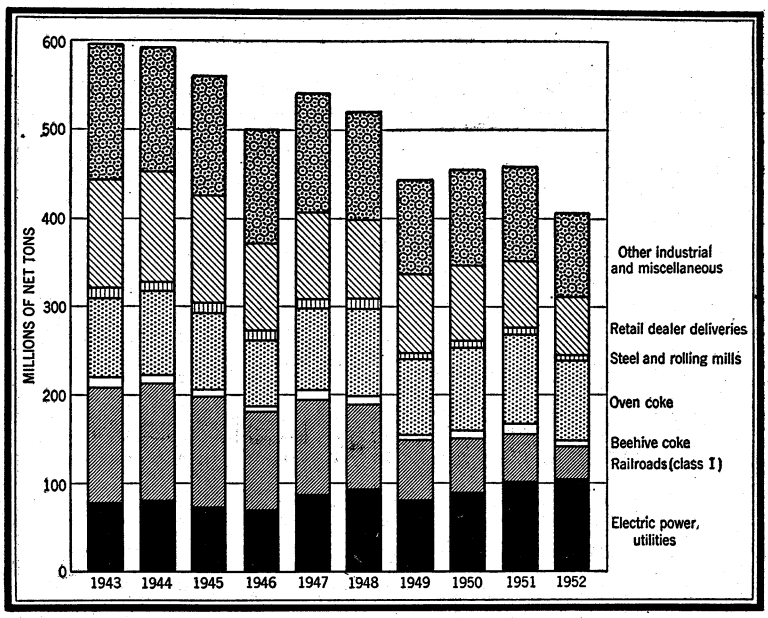

FIGURE 6.—Consumption of bituminous coal and lignite, by consumer class with retail dealer deliveries in the United States, 1943–52.

TABLE 48.—Fuel economy in consumption of coal at electric-utility powerplants in the United States, 1919–52

Year	Pounds of coal per kilowatt-hour	Economy gain over 1919 (percent)	Year	Pounds of coal per kilowatt-hour	Economy gain over 1919 (percent)	Year	Pounds of coal per kilowatt-hour	Economy gain over 1919 (percent)
1919	3.20		1931	1.52	52.5	1943	1.30	59.4
1920	3.00	6.2	1932	1.49	53.4	1944	1.29	59.7
1921	2.70	15.6	1933	1.46	54.4	1945	1.30	59.4
1922	2.50	21.9	1934	1.45	54.7	1946	1.29	59.7
1923	2.40	25.0	1935	1.44	55.0	1947	1.31	59.1
1924	2.20	31.3	1936	1.44	55.0	1948	1.30	59.4
1925	2.00	37.5	1937	1.44	55.0	1949	1.24	61.2
1926	1.90	40.6	1938	1.40	56.2	1950	1.19	62.8
1927	1.82	43.1	1939	1.38	56.9	1951	1.14	64.4
1928	1.73	45.9	1940	1.34	58.1	1952	1.10	65.6
1929	1.66	48.1	1941	1.34	58.1			
1930	1.60	50.0	1942	1.30	59.4			

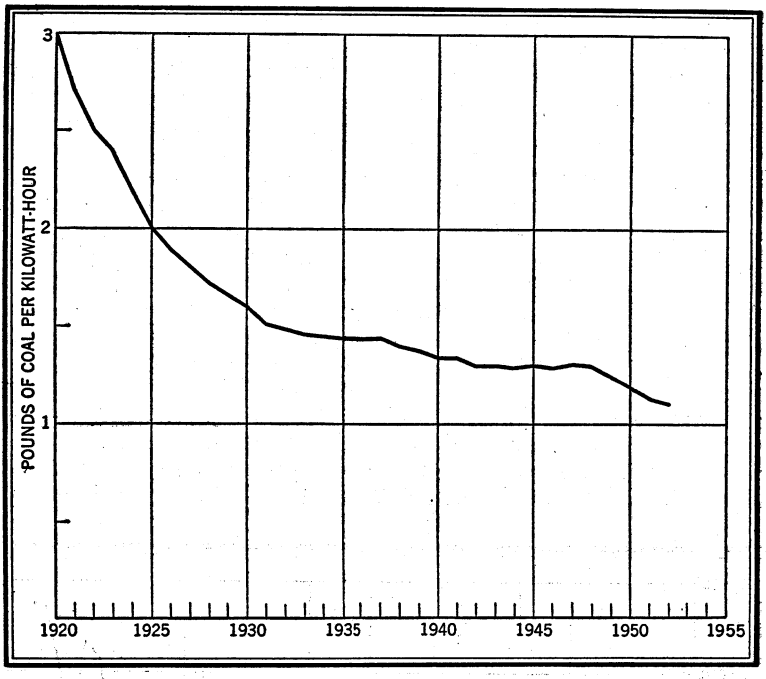

FIGURE 7.—Trend in fuel economy at electric-utility powerplants in the United States, 1920–52.

RELATIVE RATE OF GROWTH OF COAL, PETROLEUM, NATURAL GAS, AND WATERPOWER, 1889–1952

The total supply of available energy in the form of coal, oil, natural gas, and waterpower in 1952 was 38,783 trillion B. t. u.—a 1.8-percent decrease from 1951.

The figures are expressed in British thermal units because some common denominator is necessary for such unlike quantities as tons of coal, barrels of oil, and cubic feet of gas. Table 49 summarizes the equivalent of each of the fuels in trillions of British thermal units. Waterpower is represented by the equivalent fuel required to perform the same work. The table covers 1889 and 1899 to 1952.

In converting waterpower to its equivalent of fuel required to perform the same work, the *prevailing* or average performance of all fuel-burning central electric stations for each year in question has been used. This average has declined from about 7.05 pounds of coal per kilowatt-hour in 1899 to 1.10 in 1952, which shows the influence of improving fuel efficiency. The *prevailing* fuel equivalent closely approximates the quantity of fuel that would have been needed in any year to generate the same power in a steam-electric station. It should be noted, however, that the ultimate use of the waterpower generated often displaces fuel burned much less efficiently than in central stations and that no other important branch of fuel consumption has made advances in fuel efficiency approaching that of the central stations. As these tables attempt to determine the total

energy from all fuels and from waterpower, the ideal factor for converting waterpower into fuel equivalent would be the average efficiency of all forms of fuel consumption in each year. No basis for determining such an all-embracing average exists at present, but enough is known to make certain that it would show much less reduction in fuel efficiency from 1899 to 1952 than do the central stations.

The figures for oil represent production of crude petroleum and imports; the figures for natural gas represent marketed production. Most of this production does not come into direct competition with coal. Much of the supply of both oil and gas is used in regions of the country, such as California and portions of the Southwest, where coal is available only at unusually high cost because of heavy transportation charges. Nearly half of the natural gas is used in the field for drilling or operating oil and gas wells and pipelines or for the manufacture of carbon black. Over half of the oil is used in the form of gasoline, kerosine, and lubricants, for which purposes coal cannot well compete, except at very much higher levels of oil prices. Even these refined products, however, involve a certain measure of indirect competition with coal, for the energy market of the country is becoming

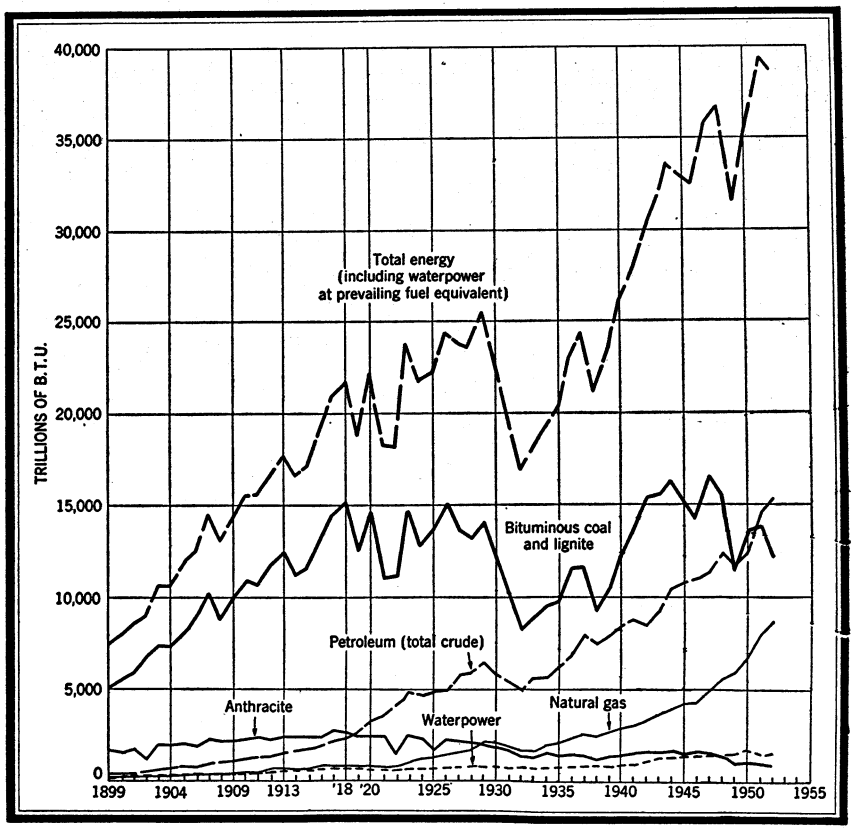

FIGURE 8.—Annual supply of energy from mineral fuels and waterpower in the United States, 1899–1952

more fluid and competitive, and a demand that cannot be met by one source of supply tends to fall back on the others.

The subject of interfuel competition is exceedingly complex, and an elaborate analysis and the accumulation of data not now available would be required to determine even approximately how much of any one fuel actually has been displaced either by other fuels or by waterpower. The present tables do not permit determination of such displacement; their purpose is rather to measure the long-time trends in the total demand for energy.

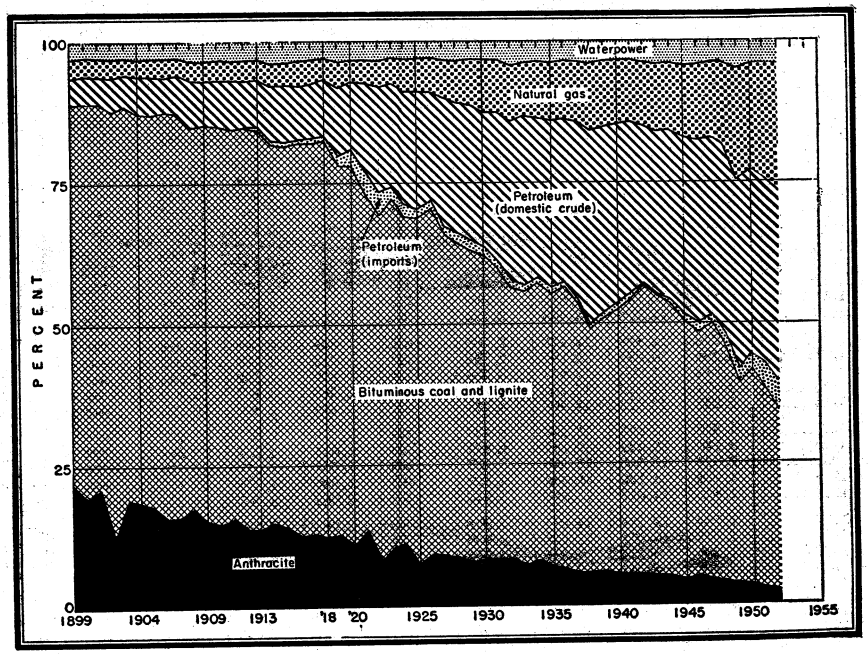

FIGURE 9.—Percentage of total British thermal units equivalent contributed by the several sources of energy in the United States, counting waterpower at the prevailing fuel equivalent of central stations in each year, 1899-1952.

TABLE 49.—Annual supply of energy from mineral fuels and waterpower in the United States, 1889 and 1899–1952, in trillions of British thermal units [1]

Year	Pennsylvania anthracite	Bituminous coal and lignite	Total coal	Petroleum (crude)		Natural gas (marketed production)	Total petroleum and natural gas	Total mineral fuels	Waterpower [2]	Grand total
				Domestic production	Imports					
1889	1,157	2,507	3,664	204	---	268	472	4,136	[3]	[3]
1899	1,535	5,065	6,600	331	---	240	571	7,171	238	7,409
1900	1,457	5,563	7,020	369	---	254	623	7,643	250	7,893
1901	1,714	5,917	7,631	402	---	283	685	8,316	264	8,580
1902	1,051	6,818	7,869	515	---	301	816	8,685	289	8,974
1903	1,895	7,408	9,303	583	---	319	902	10,205	321	10,526
1904	1,858	7,301	9,159	679	---	333	1,012	10,171	354	10,525
1905	1,973	8,255	10,228	781	---	377	1,158	11,386	386	11,772
1906	1,811	8,983	10,794	734	---	418	1,152	11,946	414	12,360
1907	2,174	10,343	12,517	963	---	437	1,400	13,917	441	14,358
1908	2,115	8,713	10,828	1,035	---	432	1,467	12,295	476	12,771
1909	2,059	9,949	12,008	1,062	---	517	1,579	13,587	513	14,100
1910	2,146	10,928	13,074	1,215	3	547	1,765	14,839	539	15,378
1911	2,298	10,635	12,933	1,279	8	551	1,838	14,771	565	15,336
1912	2,143	11,793	13,936	1,293	40	604	1,937	15,873	585	16,458
1913	2,325	12,535	14,860	1,441	98	626	2,165	17,025	609	17,634
1914	2,307	11,075	13,382	1,541	98	636	2,275	15,657	636	16,293
1915	2,260	11,597	13,857	1,630	105	676	2,411	16,268	659	16,927
1916	2,224	13,166	15,390	1,744	121	810	2,675	18,065	681	18,746
1917	2,530	14,457	16,987	1,945	175	855	2,975	19,962	700	20,662
1918	2,510	15,180	17,690	2,064	219	775	3,058	20,748	701	21,449
1919	2,238	12,206	14,444	2,195	306	802	3,303	17,747	718	18,465
1920	2,276	14,899	17,175	2,569	616	858	4,043	21,218	738	21,956
1921	2,298	10,897	13,195	2,739	727	712	4,178	17,373	620	17,993
1922	1,389	11,063	12,452	3,234	738	820	4,792	17,244	643	17,887
1923	2,371	14,792	17,163	4,248	476	1,083	5,807	22,970	685	23,655
1924	2,233	12,672	14,905	4,141	451	1,228	5,820	20,725	648	21,373
1925	1,570	13,625	15,195	4,430	359	1,278	6,067	21,262	668	21,930
1926	2,145	15,022	17,167	4,471	350	1,411	6,232	23,399	728	24,127
1927	2,034	13,565	15,599	5,227	339	1,553	7,119	22,718	776	23,494
1928	1,914	13,120	15,034	5,229	463	1,686	7,378	22,412	854	23,266
1929	1,875	14,017	15,892	5,842	458	2,062	8,362	24,254	816	25,070
1930	1,762	12,249	14,011	5,208	360	2,089	7,657	21,668	752	22,420
1931	1,515	10,011	11,526	4,936	274	1,813	7,023	18,549	668	19,217
1932	1,266	8,114	9,380	4,554	259	1,673	6,486	15,866	713	16,579
1933	1,258	8,741	9,999	5,253	185	1,672	7,110	17,109	711	17,820
1934	1,452	9,415	10,867	5,267	206	1,904	7,377	18,244	698	18,942
1935	1,325	9,756	11,081	5,780	187	2,060	8,027	19,108	806	19,914
1936	1,386	11,504	12,890	6,378	187	2,330	8,895	21,785	812	22,597
1937	1,317	11,673	12,990	7,419	159	2,588	10,166	23,156	871	24,027
1938	1,171	9,132	10,303	7,043	153	2,468	9,664	19,967	866	20,833
1939	1,308	10,345	11,653	7,337	192	2,663	10,192	21,845	838	22,683
1940	1,308	12,072	13,380	7,849	247	2,860	10,956	24,336	880	25,216
1941	1,432	13,471	14,903	8,133	294	3,024	11,451	26,354	934	27,288
1942	1,532	15,267	16,799	8,043	71	3,282	11,396	28,195	1,136	29,331
1943	1,540	15,463	17,003	8,733	80	3,671	12,484	29,487	1,304	30,791
1944	1,618	16,233	17,851	9,732	260	3,989	13,981	31,832	1,344	33,176
1945	1,395	15,134	16,529	9,939	429	4,213	14,581	31,110	1,442	32,552
1946	1,537	13,989	15,526	10,057	517	4,333	14,907	30,433	1,406	31,839
1947	1,453	16,522	17,975	10,771	576	4,926	16,273	34,248	1,426	35,674
1948	1,451	15,707	17,158	11,717	[4] 1,099	5,534	18,350	35,508	1,481	36,989
1949	1,085	11,472	12,557	10,683	[4] 1,376	5,827	17,886	30,443	1,539	31,982
1950	1,120	13,527	14,647	11,449	[4] 1,803	6,753	20,005	34,652	1,573	36,225
1951	1,084	13,982	15,066	13,037	[4] 1,800	8,016	22,853	37,919	1,559	39,478
1952 [5]	1,031	12,231	13,262	13,294	[4] 2,041	8,605	23,940	37,202	1,581	38,783

[1] The unit heat values employed are: Anthracite, 12,700 B. t. u. per pound; bituminous coal and lignite, 13,100 B. t. u. per pound; petroleum, 5,800,000 B. t. u. per barrel; residual oil, 6,300,000 B. t. u. per barrel; natural gas, 1,075 B. t. u. per cubic foot. Waterpower includes installations owned by manufacturing plants and mines, as well as Government and privately owned public utilities. The fuel equivalent of waterpower is calculated from the kilowatt-hours of power produced wherever availble, as it is true of all public-utility plants since 1919. Otherwise, the fuel equivalent is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 percent for factories and mines and of 40 percent for public utilities.

[2] Fuel equivalent calculated by assuming the average central-station practice for each of the years for which data are available.

[3] Data not available.

[4] Includes crude, residual, and distillate.

[5] Preliminary.

TABLE 50.—Index numbers for relative rate of growth of coal, oil, and water-power in the United States, 1889 and 1899–1952

[1918=100]

Year	Pennsylvania anthracite	Bituminous coal and lignite	Total coal	Petroleum (crude)		Natural gas (marketed production)	Total petroleum and natural gas	Total mineral fuels	Water-power	Grand total
				Domestic production	Imports					
1889	46	17	21	10	----------	35	15	20	(1)	(1)
1899	61	33	37	16	----------	31	19	35	34	35
1900	58	37	40	18	----------	33	20	37	36	37
1901	68	39	43	19	----------	37	22	40	38	40
1902	42	45	44	25	----------	39	27	42	41	42
1903	75	49	53	28	----------	41	29	49	46	49
1904	74	48	52	33	----------	43	33	49	50	49
1905	79	54	58	38	----------	49	38	55	55	55
1906	72	59	61	36	----------	54	38	58	59	58
1907	87	68	71	47	----------	56	46	67	63	67
1908	84	57	61	50	----------	56	48	59	68	60
1909	82	66	68	51	----------	67	52	65	73	66
1910	85	72	74	59	1	71	58	72	77	72
1911	92	70	73	62	4	71	60	71	81	71
1912	85	78	79	63	18	78	63	77	83	77
1913	93	83	84	70	45	81	71	82	87	82
1914	92	73	76	75	45	82	74	75	91	76
1915	90	76	78	79	48	87	79	78	94	79
1916	89	87	87	84	55	105	87	87	97	87
1917	101	95	96	94	80	110	97	96	100	96
1918	100	100	100	100	100	100	100	100	100	100
1919	89	80	82	106	140	103	108	86	102	86
1920	91	98	97	124	281	111	132	102	105	102
1921	92	72	75	133	332	92	137	84	88	84
1922	55	73	70	157	337	106	157	83	92	83
1923	94	97	97	206	217	140	190	111	98	110
1924	89	83	84	201	206	158	190	100	92	100
1925	63	90	86	215	164	165	198	102	95	102
1926	85	99	97	217	160	182	204	113	104	112
1927	81	89	88	253	155	201	233	109	111	110
1928	76	86	85	253	211	218	241	108	122	108
1929	75	92	90	283	209	266	273	117	116	117
1930	70	81	79	252	164	270	250	104	107	105
1931	60	66	65	239	125	234	230	89	95	90
1932	50	53	53	221	118	216	212	77	102	77
1933	50	57	57	255	84	216	233	82	101	83
1934	58	62	61	255	94	246	241	88	100	88
1935	53	64	63	280	85	266	262	92	115	93
1936	55	76	73	309	85	301	291	105	116	105
1937	52	77	73	359	73	334	332	112	124	112
1938	47	60	58	341	70	318	316	96	124	97
1939	52	68	66	355	88	344	333	105	120	106
1940	52	80	76	380	113	369	358	117	126	118
1941	57	89	84	394	134	390	374	127	133	127
1942	61	101	95	390	32	423	373	136	162	137
1943	61	102	96	423	37	474	408	142	186	144
1944	64	107	101	472	119	515	457	153	192	155
1945	56	100	93	482	196	544	477	150	206	152
1946	61	92	88	487	236	559	487	147	201	148
1947	58	109	102	522	263	636	532	165	203	166
1948	58	103	97	568	[2] 502	714	600	171	211	172
1949	43	76	71	518	[2] 628	752	585	147	220	149
1950	45	89	83	555	[2] 823	871	654	167	224	169
1951	43	92	85	632	[2] 822	1,034	747	183	222	184
1952 [3]	41	81	75	644	[2] 932	1,110	783	179	226	181

[1] Data not available.
[2] Includes crude, residual, and distillate.
[3] Preliminary figures.

TABLE 51.—Percentage of total British thermal unit equivalent contributed by the several mineral fuels and waterpower in the United States, 1899–1952 [1]

Year	Pennsylvania anthracite	Bituminous coal and lignite	Total coal	Petroleum (crude)		Natural gas (marketed production)	Total petroleum and natural gas	Total mineral fuels	Waterpower	Grand total
				Domestic production	Imports					
1899	20.7	68.4	89.1	4.5	----------	3.2	7.7	96.8	3.2	100.0
1900	18.4	70.5	88.9	4.7	----------	3.2	7.9	96.8	3.2	100.0
1901	20.0	68.9	88.9	4.7	----------	3.3	8.0	96.9	3.1	100.0
1902	11.7	76.0	87.7	5.7	----------	3.4	9.1	96.8	3.2	100.0
1903	18.0	70.4	88.4	5.6	----------	3.0	8.6	97.0	3.0	100.0
1904	17.6	69.4	87.0	6.4	----------	3.2	9.6	96.6	3.4	100.0
1905	16.8	70.1	86.9	6.6	----------	3.2	9.8	96.7	3.3	100.0
1906	14.7	72.7	87.4	5.9	----------	3.4	9.3	96.7	3.3	100.0
1907	15.2	72.0	87.2	6.7	----------	3.0	9.7	96.9	3.1	100.0
1908	16.6	68.2	84.8	8.1	----------	3.4	11.5	96.3	3.7	100.0
1909	14.6	70.6	85.2	7.5	----------	3.7	11.2	96.4	3.6	100.0
1910	13.9	71.1	85.0	7.9	----------	3.6	11.5	96.5	3.5	100.0
1911	15.0	69.3	84.3	8.3	0.1	3.6	12.0	96.3	3.7	100.0
1912	13.0	71.7	84.7	7.8	.2	3.7	11.7	96.4	3.6	100.0
1913	13.2	71.0	84.2	8.2	.6	3.5	12.3	96.5	3.5	100.0
1914	14.1	68.0	82.1	9.5	.6	3.9	14.0	96.1	3.9	100.0
1915	13.4	68.5	81.9	9.6	.6	4.0	14.2	96.1	3.9	100.0
1916	11.9	70.2	82.1	9.3	.7	4.3	14.3	96.4	3.6	100.0
1917	12.2	70.0	82.2	9.4	.9	4.1	14.4	96.6	3.4	100.0
1918	11.7	70.8	82.5	9.6	1.0	3.6	14.2	96.7	3.3	100.0
1919	12.1	66.1	78.2	11.9	1.7	4.3	17.9	96.1	3.9	100.0
1920	10.4	67.8	78.2	11.7	2.8	3.9	18.4	96.6	3.4	100.0
1921	12.8	60.6	73.4	15.2	4.0	4.0	23.2	96.6	3.4	100.0
1922	7.8	61.8	69.6	18.1	4.1	4.6	26.8	96.4	3.6	100.0
1923	10.0	62.6	72.6	17.9	2.0	4.6	24.5	97.1	2.9	100.0
1924	10.5	59.3	69.8	19.4	2.1	5.7	27.2	97.0	3.0	100.0
1925	7.2	62.1	69.3	20.2	1.7	5.8	27.7	97.0	3.0	100.0
1926	8.9	62.3	71.2	18.5	1.5	5.8	25.8	97.0	3.0	100.0
1927	8.7	57.7	66.4	22.3	1.4	6.6	30.3	96.7	3.3	100.0
1928	8.2	56.4	64.6	22.5	2.0	7.2	31.7	96.3	3.7	100.0
1929	7.5	55.9	63.4	23.3	1.8	8.2	33.3	96.7	3.3	100.0
1930	7.9	54.6	62.5	23.2	1.6	9.3	34.1	96.6	3.4	100.0
1931	7.9	52.1	60.0	25.7	1.4	9.4	36.5	96.5	3.5	100.0
1932	7.6	49.0	56.6	27.5	1.5	10.1	39.1	95.7	4.3	100.0
1933	7.1	49.0	56.1	29.5	1.0	9.4	39.9	96.0	4.0	100.0
1934	7.7	49.7	57.4	27.8	1.1	10.0	38.9	96.3	3.7	100.0
1935	6.7	49.0	55.7	29.0	.9	10.4	40.3	96.0	4.0	100.0
1936	6.1	50.9	57.0	28.2	.9	10.3	39.4	96.4	3.6	100.0
1937	5.5	48.6	54.1	30.9	.6	10.8	42.3	96.4	3.6	100.0
1938	5.6	43.8	49.4	33.8	.7	11.9	46.4	95.8	4.2	100.0
1939	5.8	45.6	51.4	32.3	.9	11.7	44.9	96.3	3.7	100.0
1940	5.2	47.9	53.1	31.1	1.0	11.3	43.4	96.5	3.5	100.0
1941	5.2	49.4	54.6	29.8	1.1	11.1	42.0	96.6	3.4	100.0
1942	5.2	52.1	57.3	27.4	.2	11.2	38.8	96.1	3.9	100.0
1943	5.0	50.2	55.2	28.4	.3	11.9	40.6	95.8	4.2	100.0
1944	4.9	48.9	53.8	29.3	.8	12.0	42.1	95.9	4.1	100.0
1945	4.3	46.5	50.8	30.5	1.3	13.0	44.8	95.6	4.4	100.0
1946	4.8	44.0	48.8	31.6	1.6	13.6	46.8	95.6	4.4	100.0
1947	4.1	46.3	50.4	30.2	1.6	13.8	45.6	96.0	4.0	100.0
1948	3.9	42.5	46.4	31.7	[2] 3.0	14.9	49.6	96.0	4.0	100.0
1949	3.4	35.9	39.3	33.4	[2] 4.3	18.2	55.9	95.2	4.8	100.0
1950	3.1	37.4	40.5	31.6	[2] 5.0	18.6	55.2	95.7	4.3	100.0
1951	2.8	35.4	38.2	33.0	[2] 4.6	20.3	57.9	96.1	3.9	100.0
1952 [3]	2.7	31.5	34.2	34.3	[2] 5.2	22.2	61.7	95.9	4.1	100.0

[1] Percentages based upon figures in table 49.
[2] Includes crude, residual, and distillate.
[3] Preliminary figures.

STOCKS

Stocks of bituminous coal and lignite in the hands of industrial consumers and in retail yards in 1943–52 are shown graphically in figure 1. Stocks at upper Lake docks in 1951–52 are listed in table 1.

TABLE 52.—Stocks of bituminous coal and lignite in hands of commercial consumers and in retail dealers' yards in the United States, 1951–52

Date	Total stocks (net tons)	Days' supply at current rate of consumption on date of stock taking							
		Coke ovens	Steel plants	Other industrials	Electric utilities	Retail yards	Railroads	Cement mills	Total
1951									
Jan. 1	72,516,000	61	39	58	93	8	28	53	50
Feb. 1	74,006,000	61	39	59	90	6	29	59	48
Mar. 1	70,662,000	60	38	56	87	6	29	58	47
Apr. 1	71,425,000	60	44	60	94	7	28	55	52
May 1	72,081,000	59	51	66	109	9	30	54	59
June 1	74,807,000	58	63	75	121	16	32	56	67
July 1	76,992,000	58	63	79	121	14	38	58	68
Aug. 1	74,100,000	50	68	84	127	16	36	58	69
Sept. 1	75,414,000	51	62	79	116	12	33	59	64
Oct. 1	76,245,000	51	63	81	120	10	33	59	64
Nov. 1	78,019,000	53	57	72	115	9	30	60	60
Dec. 1	77,858,000	54	49	63	109	8	29	58	56
Dec. 31	76,636,000	55	48	62	112	7	29	58	56
1952									
Jan. 1	76,636,000	55	48	62	112	7	29	58	56
Feb. 1	75,423,000	52	49	62	106	5	30	57	53
Mar. 1	76,474,000	56	50	64	112	6	32	58	56
Apr. 1	77,293,000	59	61	68	119	5	36	59	61
May 1	78,141,000	65	70	76	130	9	38	61	72
June 1	79,496,000	67	74	85	139	15	41	61	80
July 1	80,744,000	65	70	94	146	16	47	73	84
Aug. 1	79,359,000	64	66	99	146	16	47	75	85
Sept. 1	81,238,000	60	67	96	138	10	39	74	77
Oct. 1	83,298,000	57	69	94	133	9	37	77	72
Nov. 1	77,951,000	52	58	70	118	7	30	72	62
Dec. 1	75,978,000	48	50	63	113	10	29	66	62
Dec. 31	76,745,000	50	48	62	107	7	31	61	58

PRICES

The average values per ton of bituminous coal and lignite sold in 1890–1952 are listed in table 3, and those sold in 1905–52 are plotted in figure 2. The average values, classified according to method of mining, in 1914–52 are shown in table 21. The unit prices of railroad fuel and coking coal and the average retail price in 1951–52 are quoted in table 1. Figure 1 includes a graph of prices of railroad fuel in 1943–52. Lignite values are shown separately in table 54.

TABLE 53.—Average value per ton, f. o. b. mines, of bituminous coal and lignite produced in the United States, 1951–52, by States [1]

State	1951			1952		
	Strip mines	Underground mines	Total all mines	Strip mines	Underground mines	Total all mines
Alabama	$5.37	$6.18	$6.06	$5.44	$6.35	$6.22
Alaska	6.61	8.51	7.62	7.09	9.52	8.42
Arizona		6.00	6.00		6.60	6.60
Arkansas	6.84	8.44	7.85	6.90	8.36	7.83
California (lignite)	10.25		10.25	10.24		10.24
Colorado	4.36	5.24	5.16	4.46	5.40	5.30
Illinois	3.92	4.15	4.07	3.86	4.24	4.10
Indiana	3.93	4.19	4.04	3.86	4.15	3.97
Iowa	3.43	4.51	3.75	3.50	4.53	3.84
Kansas	3.90	4.94	3.94	3.87	4.91	3.90
Kentucky	3.89	5.08	4.89	3.58	5.04	4.80
Maryland	4.19	4.93	4.73	4.16	4.83	4.58
Michigan		10.19	10.19			
Missouri	4.00	5.33	4.10	3.96	5.57	4.08
Montana:						
Bituminous	1.65	4.36	2.61	1.99	4.59	2.80
Lignite	3.00	3.63	3.51	3.40	3.79	3.70
Total Montana	1.65	4.34	2.63	2.80	4.56	2.81
New Mexico		5.75	5.75	4.50	5.79	5.77
North Dakota (lignite)	2.42	2.39	2.41	2.36	2.45	2.37
Ohio	3.51	4.33	3.87	3.47	4.35	3.81
Oklahoma	5.15	7.57	6.24	5.00	6.96	5.78
Oregon					7.34	7.34
Pennsylvania	4.02	5.64	5.29	3.96	5.70	5.31
South Dakota (lignite)	3.49		3.49			
Tennessee	4.55	5.03	4.99	4.00	4.95	4.85
Utah		5.32	5.32		5.28	5.28
Virginia	4.73	5.47	5.42	4.70	5.40	5.32
Washington	7.19	7.02	7.04	6.91	7.12	7.09
West Virginia	4.23	5.32	5.23	4.27	5.31	5.23
Wyoming	3.15	4.61	4.19	2.99	4.99	4.34
Other States: Georgia and North Carolina		6.71	6.71		5.14	5.14
Total	3.88	5.21	4.92	3.81	5.24	4.90

[1] Average gross realization, selling cost not deducted.

LIGNITE [3]

TABLE 54.—Summary of number of mines, production, value, men working daily, days operated, man-days of labor, output per man per day, and detailed operations at underground and strip lignite mines in the United States, 1952, by States [1]

	California	Montana [2]	North Dakota	Total
OPERATIONS AT UNDERGROUND AND STRIP MINES				
Number of mines	1	7	49	57
Production (net tons):				
Shipped by rail [3]			2,401,809	2,401,809
Shipped by truck or wagon		30,385	365,924	396,309
Used at mines [4]	2,998	165	216,019	219,182
Total	2,998	30,550	2,983,752	3,017,300
Average value per ton	$10.24	$3.70	$2.37	$2.39
Average number of men working daily:				
Underground		14	85	99
Surface: In strip pits	2	13	300	315
All others		1	243	244
Total	2	28	628	658
Average number of days worked	125	142	202	199
Number of man-days worked	250	3,962	126,666	130,878
Average tons per man per day	11.99	7.71	23.56	23.05
OPERATIONS AT UNDERGROUND MINES				
Number of mines		4	10	14
Shot off the solid, net tons		23,399	14,052	37,451
Cut by machines, do.			169,291	169,291
Total, do.		23,399	183,343	206,742
Number of cutting machines			5	5
Average output per machine, net tons			33,858	33,858
Percent of total underground production cut by machines			92.3	81.9
Average value per ton		$3.79	$2.45	$2.60
Average number of men working daily:				
Underground		14	85	99
All other		1	29	30
Total		15	114	129
Average number of days worked		182	217	213
Number of man-days worked		2,726	24,774	27,500
Average tons per man per day		8.58	7.40	7.52
OPERATIONS AT STRIP MINES				
Number of strip pits	1	3	39	43
Production at strip pits, net tons	2,998	7,151	2,800,409	2,810,558
Average value per ton	$10.24	$3.40	$2.36	$2.37
Number of shovels and dragline excavators	1	2	53	56
Average number of men working daily:				
In strip pits	2	13	300	315
All other			214	214
Total	2	13	514	529
Average number of days worked	125	95	198	195
Number of man-days worked	250	1,236	101,892	103,378
Average tons per man per day	11.99	5.79	27.48	27.19

[1] Exclusive of small mines producing less than 1,000 tons.
[2] Includes output from Custer, Dawson, Richland, and Sheridan Counties.
[3] Includes coal loaded at mine directly into railroad cars and hauled by truck to railroad siding.
[4] Includes coal used by mine employees, taken by locomotive tenders at tipple, used at mine for power and heat, coal made into briquets and other uses.

[3] Detailed data, by counties, shown in table 44.

FOREIGN TRADE[4]

TABLE 55.—Bituminous coal[1] imported for consumption in the United States, 1950–52, by countries and by customs districts, in net tons

[U. S. Department of Commerce]

Country	1950	1951	1952
North America:			
Canada	344,838	[2] 291,774	262,264
Mexico	165		
South America: Brazil	53	441	
Europe:			
France	1,650		4
Germany		18	
Greece		145	
Total	346,706	[2] 292,378	262,268

Customs district	1950	1951	1952
Alaska	4,634	2,506	777
Buffalo			772
Chicago	1,687	52	
Dakota	1,655	1,185	541
Duluth and Superior	39	221	147
Hawaii		310	
Laredo	165		
Los Angeles	53	441	
Maine and New Hampshire	140,482	[2] 127,816	128,909
Maryland		18	
Michigan	3,354	74	
Minnesota			50
Montana and Idaho	164,973	157,500	129,876
New York		612	4
Philadelphia	3,145		15
St. Lawrence			50
Vermont	4,255	49	
Washington	15,264	1,594	1,127
Wisconsin	7,000		
Total	346,706	[2] 292,378	262,268

[1] Includes slack, culm, and lignite.
[2] Revised figure.

TABLE 56.—Exports of bituminous coal, by country groups, 1948–52, in thousands of net tons

[U. S. Department of Commerce]

Year	Canada (including Newfoundland) and Mexico	West Indies and Central America[1]	"Overseas" (all other countries)							Grand total
			Miquelon, Bermuda, and Greenland	South America	Europe	Asia	Africa	Oceania	Total "Overseas"	
1948	26,000	214	4	1,867	16,093	765	961	26	19,716	45,930
1949	16,100	140	6	819	8,682	1,395	612	88	11,602	27,842
1950	23,010	108	1	1,303	794	147	105		2,350	25,468
1951	22,823	125	13	3,016	27,926	[2] 1,889	[2] 919	11	[2] 33,774	[2] 56,722
1952	20,984	77	7	2,280	20,672	3,053	541	29	26,582	47,643

[1] Includes Bahamas and Panama.
[2] Revised figure.

[4] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 57.—Bituminous coal exported from the United States, 1948–52, by countries, in net tons [1]

[U. S. Department of Commerce]

Country	1948	1949	1950	1951	1952
North America:					
Bermuda	3,508	731		612	2,460
Canada	25,842,797	15,982,038	23,009,089	22,823,044	20,956,569
Newfoundland and Labrador	154,932	115,797			
Central America:					
British Honduras	4	45	50	20	20
Canal Zone	22,207	9,051	10,632		
Costa Rica	3,177	42	41	100	55
El Salvador	86	176	110	75	187
Guatemala	230	140	337	190	130
Honduras	293	276	372	248	287
Nicaragua			6	16	6
Panama	45	20	50	30	40
Greenland				11,461	4,627
Mexico	1,593	1,617	767	907	27,496
Miquelon and St. Pierre	500	4,697	508	444	
West Indies:					
British:					
Barbados	1,225				
Jamaica	48,890	32,465	3,360	30,274	12,584
Leeward and Windward				11,060	
Trinidad and Tobago	57,675	33,502	11,184	11,974	18,774
Other British	5		20		5
Cuba	76,471	55,907	73,021	64,808	38,339
Dominican Republic	625	106	99	177	75
French	1,910	9,330	8,940	5,467	6,526
Haiti	15	15	15	15	15
Netherlands Antilles	2,004	137	80	176	50
Total North America	26,218,192	16,246,092	23,118,681	22,961,098	21,068,245
South America:					
Argentina	826,750	30,625	97,343	1,632,480	1,073,938
Bolivia	511	15,288	11,101	2,810	3,763
Brazil	959,323	681,838	1,055,305	1,026,952	875,507
Chile	27,634	29,472	97,101	219,496	230,943
Surinam	3,875	2,510	3,008	2,590	3,615
Uruguay	48,705	58,628	39,168	128,370	92,286
Other South America	276	321	47	3,505	60
Total South America	1,867,074	818,682	1,303,073	3,016,203	2,280,112
Europe:					
Austria	58,447			929,356	720,804
Belgium-Luxembourg	630,604		50,352	1,495,110	711,519
Denmark	52,098			1,075,809	953,273
Finland	6,273		48,107	191,218	204,693
France	8,459,268	3,639,516	10,944	4,305,301	3,169,758
Germany	70,777		31,333	6,047,167	[2] 7,182,086
Gibraltar			21,743	170,587	46,025
Greece	62,830				

For footnotes, see end of table.

TABLE 57.—Bituminous coal exported from the United States, 1948–52, by countries, in net tons [1]—Continued

[U. S. Department of Commerce]

Country	1948	1949	1950	1951	1952
Europe—Continued					
Iceland				4,865	
Ireland	8		10,827	681,679	220,228
Italy	4,696,415	3,912,139	114,578	5,085,519	3,158,088
Netherlands	770,761	310,961	33,629	3,368,526	2,077,716
Norway			5,643	991,523	173,480
Portugal	257,230	184,275	26,378	139,286	27,265
Spain	20,117			14,800	209,164
Sweden	587,322	437,012	140,882	942,039	798,476
Switzerland	420,621	186,655	195,975	1,062,053	647,952
United Kingdom			103,579	1,302,260	216,366
Yugoslavia					106,301
Other Europe		11,226		118,395	49,027
Total Europe	16,092,771	8,681,784	793,970	27,925,493	20,672,221
Asia:					
China	40,078	40,002			
Indonesia				13,803	8,255
Japan	688,776	1,355,102	147,218	[3] 1,564,472	2,785,313
Pakistan	32,376			310,945	255,740
Other Asia	3,934	10	25	20	3,076
Total Asia	765,164	1,395,114	147,243	[3] 1,889,240	3,052,384
Africa:					
Algeria	556,686	265,576	68,211	401,592	192,942
Belgian Congo				32,242	105,245
Canary Islands	2,082		6,193	66,452	16,271
Egypt	27,596		3,557	106,212	21,870
French Cameroon	17,206	22,740			
French Equatorial Africa	10,827	46,517			
French Morocco	169,551	127,753		76,574	18,369
French West Africa	132,668	84,595		80,217	33,525
Gold Coast				10,362	74,859
Madagascar	10,918	55,273			
Madeira Islands				8,886	4,046
Spanish Africa, n. e. s.	22,481				
Tunisia		9,291	27,470	107,823	49,383
Other Africa	10,725	6	5	27,956	24,551
Total Africa	960,740	611,751	105,436	918,316	541,061
Oceania	26,192	88,633		11,197	29,127
Grand total	45,930,133	27,842,056	25,468,403	[3] 56,721,547	47,643,150

[1] Amounts stated do not include fuel or bunker coal loaded on vessels engaged in foreign trade, which aggregated 1,057,118 tons in 1948, 874,029 tons in 1949, 717,488 tons in 1950, 908,269 tons in 1951, and 723,372 tons in 1952.

[2] West Germany.

[3] Revised figure.

TABLE 58.—Bituminous coal exported from the United States, 1948–52, by customs districts, in net tons

[U. S. Department of Commerce]

Customs district	1948	1949	1950	1951	1952
North Atlantic:					
Maine and New Hampshire	5,586	6,276	4,208	3,629	6,456
Massachusetts		68	30		
New York	23,788	7,196	1,294	4,169	59
Philadelphia	453,540	32,150	22,217	356,978	390,073
Rhode Island					723
South Atlantic:					
Georgia		560	49		176
Maryland	3,471,674	1,336,249	337,153	3,861,883	2,981,228
South Carolina	768,520	54,450		646,454	[illegible] 344,351
Virginia	13,827,771	10,061,387	2,104,393	28,742,863	22,563,456
Gulf coast:					
Florida	330,455	3,501	4,618	562	588
Mobile	617,042	26,388	66,874	193,143	126,975
New Orleans	7,968	1,569	1,545	1,462	3,382
Sabine				10	377
Mexican border:					
Arizona	273	265	399	308	164
El Paso	1,138	1,317	211	488	27,266
Pacific coast:					
Los Angeles	100			10,065	20,496
Oregon	10,982		325	[1] 15,552	58,228
San Diego	125	10	157	77	53
San Francisco	69	115	62	830	5
Washington	134,461	37,929	6,112	118,800	224,670
Northern border:					
Buffalo	1,103,124	744,288	979,624	1,036,728	853,663
Chicago	1,633,134	711,818	442,569	925,479	1,192,503
Dakota	36,373	50,210	36,728	36,559	43,283
Duluth and Superior	340,995	204,062	207,212	350,332	354,055
Michigan	3,127,640	2,245,509	3,662,662	3,572,549	3,033,863
Montana and Idaho	723	1,284	614	1,637	2,793
Ohio	13,314,027	8,763,909	12,456,669	11,551,859	11,057,815
Rochester	3,465,712	1,798,570	3,068,678	3,160,056	2,394,845
St. Lawrence	2,815,519	1,473,762	2,062,946	2,126,249	1,959,833
Vermont	5,041	1,575	1,044	1,388	1,762
Wisconsin				200	
Miscellaneous:					
Alaska	283	10		5	9
Hawaii				40	
Minnesota		74			
Pittsburgh				1,193	
Puerto Rico			10		
Total	[2] 45,930,133	[2] 27,842,056	25,468,403	[1] 56,721,547	47,643,150

[1] Revised figure.
[2] Includes 434,070 tons in 1948, and 277,555 tons in 1949, representing shipments on vessels operated by the United States Army or Navy.

TABLE 59.—Shipments of bituminous coal to possessions and other areas administered by the United States, 1950–52 [1]

[U. S. Department of Commerce]

Territory	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
Guam					2	$400
Puerto Rico	6,007	$58,142	[2] 8,577	[2] $93,767	11,459	153,138
Virgin Islands	19,473	174,883	[2] 4,224	[2] 40,538	10,515	101,272

[1] Effective August 1951 shipments of bituminous coal to possessions and other areas administered by the United States not separately classified; data for 1951 and 1952 cover "coal and related fuels."
[2] Revised figures.

WORLD PRODUCTION

World production of anthracite and bituminous coal amounted to 1,549 million metric tons in 1952 and that of lignite amounted to 383 million tons—a total of 1,932 million tons. Total coal output in 1952, including lignite, was 9 million metric tons over that of 1951. Of the total world coal output, 71 percent was produced in 4 countries—the United States, Russia, Germany, and the United Kingdom. The United States supplied 460 million metric tons (bituminous, anthracite, and lignite), or 24 percent of the world output, in 1952.

Most coal-producing countries in Europe enjoyed increased production during 1952; however, consumption requirements of the principal coal-producing countries on the European Continent exceeded available supplies.

Although world production of anthracite, bituminous coal, and lignite increased in 1952, the European output was not adequate to meet requirements, and imports from the United States made up a large part of the deficit.

TABLE 60.—World production of bituminous coal, anthracite, and lignite, 1948–52, by countries, in thousands of metric tons [1]

[Compiled by Pauline Roberts and Berenice R. Mitchell]

Country	1948	1949	1950	1951	1952
North America:					
Canada:					
Bituminous	15,296	15,648	15,364	14,845	14,057
Lignite	1,442	1,697	1,999	2,017	1,890
Greenland: Bituminous	7	9	7	8	7
Mexico: Bituminous	1,057	1,075	912	1,119	1,317
United States:					
Anthracite (Pennsylvania)	51,836	38,738	39,986	38,709	36,816
Bituminous	541,072	394,420	465,330	481,144	420,771
Lignite	2,799	2,805	3,057	2,986	2,737
South America:					
Argentina: Bituminous	17	18	26	37	109
Brazil: Bituminous (including lignite)	2,025	2,129	1,959	1,963	1,961
Chile: Bituminous	2,271	2,141	2,181	2,211	2,417
Colombia: Bituminous [2]	900	1,015	1,200	1,350	1,300
Peru: Bituminous and anthracite	189	170	196	186	225
Venezuela: Bituminous	21	24	25	28	25
Europe:					
Albania: Lignite [2]	16	16	16	16	16
Austria:					
Bituminous	181	183	183	196	190
Lignite	3,338	3,816	4,308	4,989	5,179
Belgium: Bituminous and anthracite	26,691	27,854	27,304	29,651	30,384
Bulgaria:					
Anthracite [2]	27	27	30	35	35
Bituminous	[3] 300	4,695	5,682	6,134	[3] 6,200
Lignite	3,544				
Czechoslovakia:					
Bituminous	17,746	17,003	18,456	18,300	20,100
Lignite	23,589	26,526	27,506	31,000	[3] 32,500
Denmark: Lignite	2,347	1,600	770	1,582	1,236
France:					
Bituminous and anthracite	43,291	51,199	50,843	52,968	55,365
Lignite	1,838	1,845	1,686	2,004	1,990
Germany:					
Bituminous and anthracite:					
East Germany	2,848	3,019	2,807	3,417	3,525
West Germany	88,416	104,808	110,756	118,920	123,278
Lignite:					
East Germany	110,900	124,000	137,300	158,700	172,900
West Germany	64,860	72,264	75,840	83,124	83,366
Greece: Lignite	126	176	163	191	253
Hungary:					
Bituminous	1,238	1,380	1,400	1,600	18,800
Lignite	9,377	10,438	11,850	14,000	
Ireland: Bituminous and anthracite	172	129	172	177	182

For footnotes, see end of table.

TABLE 60.—World production of bituminous coal, anthracite, and lignite, 1948–52, by countries, in thousands of metric tons [1]—Continued

Country	1948	1949	1950	1951	1952
Europe—Continued					
Italy:					
Bituminous and anthracite	973	1,104	1,031	1,167	1,090
Lignite	901	863	781	861	839
Netherlands:					
Bituminous	11,032	11,705	12,247	12,424	12,532
Lignite	279	205	194	249	235
Poland:					
Bituminous	70,262	74,081	78,001	81,992	84,437
Lignite	5,040	4,621	4,837	4,591	[3] 5,495
Portugal:					
Bituminous and anthracite	387	443	426	418	442
Lignite	103	111	95	83	77
Rumania:					
Bituminous and anthracite	200	230	300	400	420
Lignite	2,631	2,576	2,900	3,440	3,480
Saar	12,567	14,262	15,091	16,128	16,235
Spain:					
Bituminous and anthracite	10,627	10,832	11,118	11,553	12,264
Lignite	1,400	1,332	1,316	1,497	1,600
Svalbard (Spitsbergen):					
Bituminous [4]	516	581	551	719	703
Sweden: Bituminous	374	317	309	276	336
Switzerland:					
Bituminous and anthracite	30	25	30	20	[2] 10
Lignite					(5)
U. S. S. R.:					
Bituminous and anthracite [2]	170,000	201,000	224,000	239,000	256,000
Lignite [2]	35,000	35,000	40,000	42,000	45,000
United Kingdom: Great Britain: Bituminous and anthracite	212,755	218,570	219,796	226,464	230,121
Northern Ireland:					
Bituminous	1	1	1	1	1
Lignite	(5)				
Yugoslavia:					
Bituminous	972	1,275	1,154	992	1,011
Lignite	9,751	10,833	11,712	11,050	11,087
Asia:					
Afghanistan: Bituminous	[3] 15	5	9	13	12
China: Bituminous, anthracite, and lignite	18,000	[2] 16,000	37,000	43,250	[3] 51,000
India: Bituminous	30,608	32,204	32,826	34,983	36,804
Indochina: Bituminous and anthracite	359	376	502	645	835
Indonesia: Bituminous	[6] 537	662	804	865	959
Iran: Bituminous	[2] 150	[7] 170	[2 7] 200	[2 7] 200	170
Japan:					
Bituminous and anthracite	33,720	37,968	38,461	43,320	43,356
Lignite	2,552	2,088	1,284	1,403	1,536
Korea:					
North Korea:					
Anthracite [2]	1,500	1,500	1,500	1,000	750
Lignite [2]	1,600	1,600	500	500	400
South Korea:					
Anthracite	799	981	564	112	577
Lignite	68	63	28	(5)	(5)
Malaya: Bituminous	381	393	422	389	320
Pakistan: Bituminous	245	337	444	513	609
Philippines: Bituminous	88	123	159	151	139
Taiwan (Formosa): Bituminous	1,629	1,649	1,402	1,657	2,286
Turkey:					
Bituminous	4,023	4,182	4,361	4,730	4,846
Lignite	1,010	1,272	1,204	1,255	1,375
U. S. S. R., including Sakhalin, southern: Bituminous	(8)	(8)	(8)	(8)	(8)
Africa:					
Algeria: Bituminous and anthracite	226	265	258	247	269
Belgian Congo: Bituminous and anthracite	117	152	160	219	253
French Morocco: Anthracite	290	341	368	394	460
Madagascar: Bituminous	(5)	(5)	2	5	4
Mozambique: Bituminous	9	13	56	78	130
Nigeria: Bituminous	618	559	593	559	590
Southern Rhodesia: Bituminous	1,695	1,918	2,128	2,300	2,559
Tunisia: Lignite	71	47	41	8	(5)
Union of South Africa: Bituminous	24,017	25,496	26,473	26,632	28,064

For footnotes, see end of table.

TABLE 60.—World production of bituminous coal, anthracite, and lignite, 1948–52, by countries, in thousands of metric tons [1]—Continued

Country	1948	1949	1950	1951	1952
Oceania:					
Australia:					
Bituminous	15,018	14,332	16,795	17,891	19,734
Lignite	6,800	7,494	7,445	7,962	8,234
New Zealand:					
Bituminous and anthracite	968	952	936	689	890
Lignite	1,853	1,907	1,777	1,786	1,892
Other countries (estimate)	100	100	100	100	100
Total all grades	1,715,000	1,656,000	1,814,000	1,923,000	1,932,000
Lignite (total of items shown above)	293,000	315,000	339,000	377,000	383,000
Bituminous coal and anthracite (by subtraction)	1,422,000	1,341,000	1,475,000	1,546,000	1,549,000

[1] This table incorporates a number of revisions of data published in previous Coal chapters.
[2] Estimate.
[3] Planned production.
[4] Includes the following quantities, in thousands of metric tons, produced in U. S. S. R.-controlled mines: 1948: 80 (estimate); 1949: 125; 1950: 187; 1951: 249; and 1952: 250 (estimate).
[5] Negligible.
[6] Excludes production of Ombilin mines in Sumatra.
[7] Year ended Mar. 20 of year following that stated.
[8] Output from U. S. S. R. in Asia included with U. S. S. R. in Europe.

Coal—Pennsylvania Anthracite

By J. A. Corgan, Marian I. Cooke, and J. A. Vaughan

GENERAL SUMMARY

PRODUCTION of Pennsylvania anthracite in 1952 was 40.6 million net tons,[1] 5 percent less than in 1951 and the lowest annual output since 1886. The year was marked by declines in the overall demand for anthracite in all major markets except Canada, which increased imports 3 percent over 1951. As the direct result of a material improvement in the fuel supply in Western Europe, total exports of anthracite slumped 23 percent from 1951. Competition from natural gas and fuel oil for space heating, mild weather in the principal anthracite marketing areas, and drastic curtailment of European purchases led to a generally slack demand for the domestic sizes (Pea and larger). Consequently, domestic sizes comprised only 55 percent of breaker shipments compared with 58 percent in 1951.

TABLE 1.—Salient statistics of the Pennsylvania anthracite industry, 1948–52

	1948	1949	1950	1951 [1]	1952 [1]
Production:					
Loaded at mines for shipment outside producing region:					
Breakers—net tons	47,816,627	35,653,628	37,658,864	36,204,268	33,807,596
Washeries—do	1,725,124	1,380,115	882,541	923,610	1,309,061
Dredges—do	941,441	655,753	488,739	379,460	310,964
Sold to local trade and used by employees—net tons	4,795,721	3,848,420	3,930,889	4,125,495	4,228,430
Used at collieries for power and heat—net tons	1,861,035	1,163,808	1,115,670	1,037,164	926,507
Total production—do	57,139,948	42,701,724	44,076,703	42,669,997	40,582,558
Value at breaker, washery, or dredge	$467,051,800	$358,008,451	$392,398,006	$405,817,963	$379,714,076
Average sales realization per net ton on breaker shipments to points outside producing region:					
Domestic	$11.05	$11.39	$11.94	$13.19	$13.07
Steam	$4.90	$5.05	$5.25	$5.48	$5.78
Total all sizes	$8.67	$8.90	$9.34	$9.94	$9.81
Percent of total breaker shipments to points outside producing region:					
Domestic	61.3	60.6	61.1	57.8	55.3
Steam	38.7	39.4	38.9	42.2	44.7
Producers' stocks at end of year [2]—net tons	963,839	975,457	1,268,300	982,396	1,708,887
Exports [3]—do	6,675,914	4,942,670	3,891,569	[4] 5,955,535	4,592,060
Imports [3]—do	945		18,289	26,812	29,370
Consumption (apparent)—do	50,200,000	37,700,000	39,900,000	37,000,000	35,300,000
Average number of days worked	265	195	211	208	201
Average number of men employed	76,215	75,377	72,624	68,995	65,923
Output per man per day—net tons	2.81	2.87	2.83	2.97	3.06
Output per man per year—do	745	560	597	618	615
Quantity cut by machines—do	1,016,757	557,599	611,734	496,085	386,128
Quantity mined by stripping—do	13,352,874	10,376,808	11,833,934	11,135,990	10,696,705
Quantity loaded by machines underground—net tons	15,742,368	11,858,088	12,335,650	10,847,787	10,034,464
Distribution:					
Total receipts in New England [5]—do	4,862,834	3,445,543	3,677,738	3,174,473	2,887,640
Exports to Canada [3]—do	[4] 4,933,593	[4] 3,583,297	3,798,285	3,484,800	3,606,618
Loaded into vessels at Lake Erie [6]—net tons	1,125,050	611,888	611,409	460,776	478,534
Receipts at Duluth-Superior [7]—do	538,992	271,854	297,814	[4] 156,917	226,956

[1] Figures for 1951–52 are not strictly comparable with those for previous years. See Production and Employment sections, Minerals Yearbook, 1951.
[2] Anthracite Committee. [3] U. S. Department of Commerce. [4] Revised figure.
[5] Commonwealth of Massachusetts, Division on the Necessaries of Life; and Association of American Railroads.
[6] Ore and Coal Exchange, Cleveland, Ohio. [7] U. S. Engineer Office, Duluth, Minn.

[1] All tonnage figures in this chapter are expressed in net tons of 2,000 pounds unless otherwise stated.

TABLE 2.—Statistical summary of monthly developments in the Pennsylvania anthracite industry in 1952

[All tonnage figures represent net tons]

	January	February	March	April	May	June	July	August	September	October	November	December	Year 1952	Change from 1951 (percent)	Year 1951
Production (including mine fuel, local sales, and dredge coal)	4,221,000	3,362,000	3,140,000	3,384,000	3,400,000	3,293,000	2,522,000	2,704,000	3,761,000	4,213,000	3,405,000	3,178,000	[1] 40,583,000	−4.9	[1] 42,670,000
Shipments (breakers and washeries only, all sizes):															
By rail [2]	2,971,504	2,441,094	2,207,284	2,592,703	2,679,947	2,518,677	2,104,530	2,361,041	3,026,116	3,369,727	2,563,612	2,173,940	31,010,175	−8.4	33,853,970
By truck [3]	754,019	645,000	593,950	445,256	536,685	423,065	249,878	420,513	515,339	549,250	476,968	606,513	6,216,436	−1.5	6,311,826
Carloadings [4]	60,629	48,623	45,545	49,738	50,667	50,904	41,493	44,551	62,052	63,938	51,030	45,492	614,662	−6.8	659,568
Distribution:															
Lake Erie loadings [5]				41,618	90,415	86,157	47,410	52,687	65,522	61,773	32,952		478,534	+3.9	460,776
Lake Ontario loadings [6]					3,582	16,649		2,232	7,420	12,019			41,902	−28.0	58,228
Receipts at Duluth-Superior [7]				25,453	29,202	22,890	29,529	21,016	41,440	49,770	7,656		226,956	+44.6	[8] 156,917
Upper Lake dock trade: [9]															
Receipts:															
Lake Superior				25,455	5,739	45,937	36,341	21,088	28,620	39,339	5,887	146	208,552	+26.0	165,467
Lake Michigan	1,998	1,523	9,824	16,652	55,677	69,774	22,538	20,899	35,096	18,201	30,947	2,932	286,061	−15.4	337,988
Deliveries (reloadings):															
Lake Superior	22,392	8,081	5,946	2,928	5,565	11,563	18,954	14,787	13,903	29,404	12,619	11,648	157,790	−27.6	217,997
Lake Michigan	38,627	26,344	20,318	12,662	17,823	35,873	14,541	21,296	25,493	33,559	15,883	17,708	280,127	−14.7	328,434
New England receipts:															
Tidewater [4]	3,851	2,213	3,225	8,649	1,643	4,351	6,133	5,911	4,426	860			41,262	+5.5	39,123
Rail [10]	268,018	218,571	208,239	236,453	262,711	241,041	202,028	238,271	262,009	272,217	258,399	178,421	2,846,378	−9.2	3,135,360
Exports [11]	534,242	391,243	390,767	294,737	339,649	359,816	233,122	422,763	496,302	498,404	464,526	166,489	4,592,060	−22.9	[8] 5,955,535
Imports [11]		3,053		4,782	2,598	5,017	4,010		3,008		2,994	3,908	29,370	+9.5	26,812
Industrial consumption and stocks:															
Railroads (Class 1 only): [4]															
Consumption	75,082	69,426	66,960	48,900	46,221	36,870	36,363	38,192	37,650	51,305	56,070	63,581	626,620	−7.6	678,229
Stocks	45,664	36,201	34,329	33,093	32,473	42,672	43,831	46,670	48,685	50,522	52,106	44,649	44,649	−9.1	49,097
Electric utilities: [12]															
Consumption	328,032	307,044	327,799	268,909	288,597	290,124	302,805	319,005	328,558	338,015	325,953	337,061	3,761,902	−2.8	3,869,512
Stocks	5,054,080	5,016,259	4,978,515	4,924,471	5,008,703	5,116,794	5,188,360	5,311,054	5,394,543	5,525,574	5,604,266	5,601,500	5,601,500	+9.3	5,125,369
Stocks on Upper Lake docks: [9]															
Lake Superior	43,247	35,199	29,358	47,161	51,466	93,833	111,154	117,613	129,107	139,042	132,291	120,842	120,842	+84.5	65,501
Lake Michigan	95,664	70,843	60,349	64,210	102,064	135,965	143,962	143,568	153,171	137,813	152,877	138,101	138,101	+4.4	132,289
Stocks in retail dealer yards [13]	2,397,000	2,012,000	1,774,000	2,286,000	2,581,000	2,746,000	2,734,000	2,786,000	3,012,000	3,191,000	3,397,000	2,967,000	2,967,000	+10.1	2,694,000
Producers' stocks [14]	939,191	1,017,940	1,023,682	1,025,507	1,148,742	1,263,631	1,446,891	1,419,756	1,314,203	1,299,798	1,478,933	1,708,887	1,708,887	+74.0	982,396
Sales of mechanical stokers: [11]															
Class 1 (capacity under 61 lb. of coal per hour)	365	408	364	411	525	689	690	1,149	1,102	1,315	648	402	8,068	+88.9	4,268
Class 2 (capacity 61 to 100 lb. of coal per hour)	60	25	20	24	37	54	38	73	54	83	43	32	543	+31.2	414

Wholesale price indexes (1947–49=100): [15]															
F. o. b. mines:															
Chestnut	128.3	128.3	128.3	118.4	118.9	120.5	122.6	124.8	125.7	129.8	129.8	141.5	126.4	--------	125.4
Pea	121.0	121.0	121.0	107.4	107.6	109.2	111.5	113.8	115.0	121.1	121.1	132.9	116.9	--------	118.8
Employee wages and hours: [15]															
Average weekly earnings	$73.68	$68.91	$67.12	$62.66	$74.59	$66.82	$59.27	$65.70	$76.73	$71.58	$80.91	$85.56	$71.19	+6.8	[8] $66.66
Average hourly earnings	$2.26	$2.23	$2.23	$2.23	$2.24	$2.22	$2.22	$2.25	$2.25	$2.23	$2.26	$2.48	$2.26	+2.7	$2.20
Average number hours worked per week	32.6	30.9	30.1	28.1	33.3	30.1	26.7	29.2	34.1	32.1	35.8	34.5	31.5	+4.0	30.3

[1] See footnote 1, table 1.
[2] Furnished by Anthracite Institute.
[3] Pennsylvania Department of Mines.
[4] Association of American Railroads.
[5] Ore and Coal Exchange, Cleveland, Ohio.
[6] Buffalo Branch, Ore and Coal Exchange, Cleveland, Ohio.
[7] U. S. Engineer Office, Duluth, Minn.
[8] Revised.
[9] Includes all commercial docks on Lake Superior and west shore of Lake Michigan as far south as Kenosha. Based on data courteously supplied by Maher Coal Bureau and direct reports to the Bureau of Mines.
[10] Furnished by Commonwealth of Massachusetts, Division on the Necessaries of Life.
[11] U. S. Department of Commerce.
[12] Federal Power Commission.
[13] Estimated from reports submitted by a selected list of retail dealers.
[14] Anthracite Committee. Represents coal in storage nearest available date to the end of the month.
[15] Bureau of Labor Statistics.

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TABLE 3.—Historical statistics of the Pennsylvania anthracite industry, 1890–1952

Year	Production (net tons)	Value of production	Average value per net ton	Exports [1] (net tons)	Imports [1] (net tons)	Apparent consumption [2] (net tons)	Average number of employees	Average number of days worked	Average tons per man per day	Average tons per man per year	Quantity cut by machines [3] (net tons)	Quantity produced by stripping [4] (net tons)	Quantity loaded mechanically underground [5] (net tons)
1890	46,468,641	$66,383,772	$1.43	889,655	16,962	45,596,000	126,000	200	1.85	369			
1891	50,665,431	73,944,735	1.46	964,601	42,120	49,743,000	126,350	203	1.98	401			
1892	52,472,504	82,442,000	1.57	953,836	72,865	51,592,000	129,050	198	2.06	407			
1893	53,967,543	85,687,078	1.59	1,493,281	60,220	52,534,000	132,944	197	2.06	406			
1894	51,921,121	78,488,063	1.51	1,613,500	100,876	50,408,000	131,603	190	2.08	395			
1895	57,999,337	82,019,272	1.41	1,647,195	158,297	56,510,000	142,917	196	2.07	406			
1896	54,346,081	81,748,651	1.50	1,512,000	113,892	52,948,000	148,991	174	2.10	365			
1897	52,611,681	79,301,954	1.51	1,454,620	27,478	51,185,000	149,884	150	2.34	351			
1898	53,382,645	75,414,537	1.41	1,513,062	3,527	51,873,000	145,504	152	2.41	367			
1899	60,418,005	88,142,130	1.46	1,912,732	68	58,505,000	139,608	173	2.50	433			
1900	57,367,915	85,757,851	1.49	1,853,163	132	55,515,000	144,206	166	2.40	398			
1901	67,471,667	112,504,020	1.67	2,232,504	320	65,239,000	145,309	196	2.37	464			
1902	41,373,595	76,173,586	1.84	1,016,934	190,636	40,547,000	148,141	116	2.40	279			
1903	74,607,068	152,036,448	2.04	2,249,920	196,837	72,554,000	150,483	206	2.41	496			
1904	73,156,709	138,974,020	1.90	2,495,799	81,232	70,742,000	155,861	200	2.35	469			
1905	77,659,850	141,879,000	1.83	2,497,581	38,350	75,201,000	165,406	215	2.18	470			
1906	71,282,411	131,917,694	1.85	2,483,005	36,236	68,836,000	162,355	195	2.25	439			
1907	85,604,312	163,584,056	1.91	3,021,841	11,085	82,594,000	167,234	220	2.33	512			
1908	83,268,754	158,178,849	1.90	3,082,641	18,462	80,205,000	174,174	200	2.39	478			
1909	81,070,359	149,181,587	1.84	3,183,840	3,574	77,890,000	[6] 171,195	205	[7] 2.31	[7] 474			
1910	84,485,236	160,275,302	1.90	3,384,222	9,180	81,110,000	169,497	229	2.17	498			
1911	90,464,067	175,189,392	1.94	3,980,479	2,759	86,486,000	172,585	246	2.13	524	69,907		
1912	84,361,598	177,622,626	2.11	4,131,444	1,870	80,232,000	174,030	231	2.10	485	246,216		
1913	91,524,922	195,181,127	2.13	4,652,912	1,004	85,474,000	175,745	257	2.02	520	555,776		
1914	90,821,507	188,181,399	2.07	4,289,873	17,696	84,041,000	179,679	245	2.06	505	916,596		
1915	88,995,061	184,653,498	2.07	3,965,255	814	88,144,000	176,552	230	2.19	504	1,307,756	1,121,603	
1916	87,578,493	202,009,561	2.31	4,665,530	6,000	87,118,000	159,869	253	2.16	548	1,839,506	1,987,800	
1917	99,611,811	283,650,723	2.85	6,007,306	13,000	94,068,000	154,174	285	2.27	646	1,955,223	2,301,588	
1918	98,826,084	336,480,347	3.40	4,967,808	37,272	92,775,000	147,121	293	2.29	672	1,857,514	2,360,183	
1919	88,092,201	364,926,950	4.14	4,976,598	82,818	81,518,000	154,571	266	2.14	570	1,575,205	2,006,879	
1920	89,598,249	434,252,198	4.85	5,403,749	31,748	85,786,000	145,074	271	2.28	618	938,073	2,054,441	
1921	90,473,451	452,304,903	5.00	4,677,368	8,894	81,950,000	159,499	271	2.09	567	979,145	2,027,790	
1922	54,683,022	273,700,125	5.01	2,649,457	233,528	56,799,000	156,849	151	2.31	349	502,793	949,745	
1923	93,339,009	506,786,768	5.43	5,090,138	300,360	86,914,000	157,743	268	2.21	592	1,208,542	2,263,098	
1924	87,926,862	477,230,852	5.43	4,017,785	117,951	80,717,000	160,009	274	2.00	550	1,423,884	1,865,677	
1925	61,817,149	327,664,512	5.30	3,179,006	382,894	64,061,000	160,312	182	2.12	386	941,189	1,578,478	
1926	84,437,452	474,164,252	5.62	4,029,683	813,956	77,221,000	165,386	244	2.09	511	931,650	2,401,356	
1927	80,095,564	420,941,726	5.26	3,325,507	119,030	74,672,000	165,259	225	2.15	485	1,171,888	2,153,156	[6] 2,223,281
1928	75,348,069	393,637,690	5.22	3,336,272	384,707	73,650,000	160,681	217	2.17	469	1,289,809	2,422,924	[6] 2,351,074
1929	73,828,195	385,642,751	5.22	3,406,369	487,172	71,457,000	151,501	225	2.16	487	1,159,910	1,911,766	3,470,158
1930	69,384,837	354,574,191	5.11	2,551,659	674,812	67,628,000	150,804	208	2.21	460	1,410,123	2,536,288	4,467,750

1931	59,645,652	296,354,586	4.97	1,778,308	637,951	58,408,000	139,431	181	2.37	428	1,587,265	3,813,237	4,384,780
1932	49,855,221	222,375,129	4.46	1,303,355	607,097	50,500,000	121,243	162	2.54	411	1,674,223	3,980,973	5,433,340
1933	49,541,344	206,718,405	4.17	1,034,562	456,252	49,600,000	104,633	182	2.60	473	1,648,249	4,932,069	6,557,267
1934	57,168,291	244,152,245	4.27	1,297,610	478,118	55,500,000	109,050	207	2.53	524	1,981,088	5,798,138	9,284,486
1935	52,158,783	210,130,565	4.03	1,608,549	571,439	51,100,000	103,269	189	2.68	505	1,848,095	5,187,072	9,279,057
1936	54,579,535	227,003,538	4.16	1,678,024	614,639	53,200,000	102,081	192	2.79	535	2,162,744	6,203,267	10,827,946
1937	51,856,433	197,598,849	3.81	1,914,173	395,737	50,400,000	99,085	189	2.77	523	1,984,512	5,696,018	10,683,837
1938	46,099,027	180,600,167	3.92	1,908,911	362,895	45,200,000	96,417	171	2.79	478	1,588,407	5,095,341	10,151,669
1939	51,487,377	187,175,324	3.64	2,590,000	298,153	49,700,000	93,138	183	3.02	553	1,881,884	5,486,479	11,773,833
1940	51,484,640	205,489,814	3.99	2,667,632	135,436	49,000,000	91,313	186	3.02	562	1,816,483	6,352,700	12,326,000
1941	[8] 56,368,267	240,275,126	4.26	3,380,189	74,669	52,700,000	88,054	203	[9] 3.04	617	1,855,422	7,316,574	13,441,987
1942	[8] 60,327,729	271,673,380	4.50	4,438,588	140,115	56,500,000	82,121	239	[9] 2.95	705	2,285,640	9,070,933	14,741,459
1943	[8] 60,643,620	306,816,018	5.06	4,138,680	166,020	57,100,000	79,153	270	[9] 2.78	751	1,624,883	8,989,387	14,745,793
1944	[8] 63,701,363	354,582,884	5.57	4,185,933	11,847	59,400,000	77,591	292	[9] 2.79	815	1,336,082	10,953,030	14,975,146
1945	[8] 54,933,909	323,944,435	5.90	3,691,247	149	51,600,000	72,842	269	[9] 2.79	751	1,210,171	10,056,325	13,927,955
1946	[8] 60,506,873	413,417,070	6.83	6,497,245	9,556	53,900,000	78,145	271	[9] 2.84	770	1,232,828	12,858,930	15,619,162
1947	[9] 57,190,009	413,019,486	7.22	8,509,995	10,350	48,200,000	78,600	259	[9] 2.78	720	1,209,983	12,603,545	16,054,011
1948	[8] 57,139,948	467,051,800	8.17	6,675,914	945	50,200,000	76,215	265	[9] 2.81	745	1,016,757	13,352,874	15,742,368
1949	[8] 42,701,724	358,008,451	8.38	4,942,670	----------	37,700,000	75,377	195	[9] 2.87	560	557,599	10,376,808	11,858,088
1950	[8] 44,076,703	392,398,006	8.90	3,891,569	18,289	39,900,000	72,624	211	[9] 2.83	597	611,734	11,833,934	12,335,650
1951 [10]	42,669,997	405,817,963	9.51	5,955,535	26,812	37,000,000	68,995	208	2.97	618	496,085	11,135,990	10,847,787
1952 [10]	40,582,558	379,714,076	9.36	4,592,060	29,370	35,300,000	65,923	201	3.06	615	386,128	10,696,705	10,034,464

[1] U. S. Department of Commerce.
[2] Before 1913 the figures of consumption take no account of producers' stocks, there being no data available for this item.
[3] Data first collected in 1911.
[4] Data first collected in 1915.
[5] Data first collected in 1929.
[6] As reported by the Commonwealth of Pennsylvania, Department of Mines.
[7] Calculated on basis of Pennsylvania Department of Mines employment data.
[8] Includes some "bootleg" coal purchased by authorized operators and prepared at their breakers.
[9] Output per man calculated on authorized tonnages only; bootleg purchases excluded.
[10] See footnote 1, table 1.

Despite increases in ceiling prices granted by the Office of Price Stabilization, the average realization on domestic sizes declined 14 cents per ton on breaker shipments. Steam sizes (Buckwheat No. 1 and smaller), which accounted for 45 percent of breaker shipments (3 percent more than in 1951) however increased 28 cents per ton and remained in such strong demand during the year that the market undoubtedly would have absorbed substantially more had the coal been available.

The decreased production was not consistent in all types of anthracite mining. The largest tonnage decline was in underground output, which fell from 62 percent of the 1951 total production to 61 percent in 1952. Output from culm banks increased from 11 percent of total production in 1951 to 12 percent in 1952 and represented the highest tonnage output attained since 1948, because of the increasing demand for the smaller industrial sizes. The overall gain in culm-bank production was attributable to increases in the Lehigh and Wyoming regions, which more than offset the decline in production in the Schuylkill region. Tonnage from strip pits declined but comprised 26 percent of total production, the same as in 1951, and accounted for 30 percent of the fresh-mined output, the highest percentage on record. Of the total strip-pit production, 56 percent was mined in the Schuylkill region, 24 percent in the Wyoming, and 20 percent in the Lehigh. Output from dredges operating in the Lehigh, Schuylkill, and Susquehanna Rivers and their tributaries again dropped sharply, reaching the lowest point since World War I. Production from dredging will eventually cease, as little coal is now entering streams because of improved preparation methods. A Pennsylvania law, which prohibits new operations from placing untreated breaker wastes into surface streams, has also been effective in reducing stream pollution.

Output per man per day increased from 2.97 tons in 1951 to 3.06 tons in 1952, the highest attained in the history of the industry, principally because of the efforts of the producing companies to reduce costs by expanding output from strip pits and culm banks where the productivity rate is higher than in underground operations. The Schuylkill region again led in total output because of its large production of strip and culm-bank coal. The percentage of underground production loaded mechanically was the same as in 1951 (41 percent). The Wyoming region remained in first place in underground production and in quantity of mechanically loaded coal because its relatively flat coal seams are more adaptable to mechanical loading than are the steeply pitching seams of the Lehigh and Schuylkill regions.

SCOPE OF REPORT

About 98 percent of the data in this chapter are submitted voluntarily to the Bureau of Mines by producers of Pennsylvania anthracite. However, free use has been made of relevant statistics released by the Pennsylvania Department of Mines, the Anthracite Institute, the Anthracite Committee, the Association of American Railroads, coal-trade sources, and other Government agencies. Although each contributing source has been acknowledged in tabular footnotes or by text references, the Bureau of Mines would like again to express its appreciation of their continued support and cooperation.

Pennsylvania anthracite is marketed as a cleaned and sized product; therefore, all tonnage figures shown refer only to commercial coal and not to run-of-mine material. The statistical tables in this chapter were designed to incorporate, where feasible, data for 1952 and for several preceding years.

The anthracite fields are in the following counties of northeastern Pennsylvania: Carbon, Columbia, Dauphin, Lackawanna, Luzerne, Northumberland, Schuylkill, Susquehanna, and Wayne, and this area is generally referred to as the region or as the producing region.

The producing fields are divided into three trade regions, the Wyoming, Lehigh, and Schuylkill, a regional division also recognized by the United Mine Workers of America in its organizational structure. UMWA District No. 1 embraces the Wyoming region, District 7 the Lehigh region, and District 9 the Schuylkill region. The area is also broken down by fields as the Northern, Eastern Middle, Western Middle, and Southern. The Wyoming region coincides with the Northern field. The Lehigh region is composed of the Eastern Middle field and that part of the Southern field lying east of Tamaqua (known as the Panther Creek Valley). The Schuylkill region includes the Western Middle field and that part of the Southern field west of Tamaqua. The total land area is about 484 square miles; the Northern field covers about 176 square miles, the Eastern Middle 33, the Western Middle 94, and the Southern about 181. On the basis of minable reserves, the Southern field ranks first, followed in descending order by the Western Middle, Northern, and Eastern Middle.

As the field boundaries conform more closely to actual geologic conditions, which so largely influence mining methods and costs of operation, the field classification is used most extensively in technical and research activities, whereas the regional classification is generally used in coal-trade circles. Therefore, to satisfy requirements of individual readers for data in terms of political subdivisions or trade usage, or by actual physical features, most of the statistical data in the chapter are presented by counties, regions, and fields.

Anthracite Institute.—The Anthracite Institute, in cooperation with the manufacturers of anthracite-burning equipment, presented displays and exhibits at many home and farm shows and expositions during 1952 as part of its publicity activities. Institute representatives appeared as witnesses before congressional committees and Federal and State agencies on matters involving the welfare or interest of the industry and offered advice and technical assistance to municipal officials and civic bodies concerned with the promulgation, improvement, or enforcement of antismoke ordinances. The field representatives also continued to contact military officials, Government agencies, school boards, architects, builders, etc., in an effort to further the use of anthracite.

Greater emphasis was placed on basic research and equipment development in the institute's research laboratory during 1952. Research projects were conducted on a cooperative basis with Pennsylvania State College, the Federal Bureau of Mines laboratory at Schuylkill Haven, Pa., the State of North Carolina, and private industry (see Technology part of this chapter).

Labor Relations.—There were no serious work suspensions in the anthracite industry in 1952, although a "memorial period" was ob-

served by the mine workers from August 23 until September 2. A new contract was signed by the anthracite operators and the United Mine Workers of America, effective November 16, 1952. An interim agreement reached on October 1, which increased the royalty payment for the Health and Welfare Fund of the UMWA from 30 to 50 cents per net ton of commercial production, was incorporated into the contract. Although the Wage Stabilization Board approved a wage increase for bituminous miners in an amount less than that negotiated by the bituminous operators and the UMWA, the President of the United States instructed the Board in early December 1952 to authorize the full amount of the increase called for in the bituminous contract. As the anthracite agreement stipulated an increase in wages for anthracite miners commensurate with any subsequently granted in the bituminous industry, the anthracite contract provided an increase of $1.90 per day distributed over the entire rate structure, including the contract rates. Termination date of the agreement was set for September 30, 1953, with each party signatory thereto having the right to terminate on that date by giving 60 days prior notice.

TABLE 4.—Pennsylvania anthracite produced, 1948–52, by field and type of plant, in net tons

[The figures of breaker product include a certain quantity of culm-bank coal, which amounted to 3,337,554 tons in 1952]

Field and type of plant	1948	1949	1950	1951 [1]	1952 [1]
Eastern Middle:					
Breakers	4,467,628	3,379,672	3,094,587	3,063,131	2,615,151
Washeries	298,601	238,532	195,387	243,744	330,354
Total Eastern Middle	4,766,229	3,618,204	3,289,974	3,306,875	2,945,505
Western Middle:					
Breakers	12,405,178	9,636,954	10,755,416	12,371,387	11,720,646
Washeries	240,157	135,670		11,709	62,447
Dredges	311,183	246,905	197,812	122,732	62,696
Total Western Middle	12,956,518	10,019,529	10,953,228	12,505,828	11,845,789
Southern:					
Breakers	11,622,538	8,776,671	8,660,440	8,245,800	8,102,147
Washeries	496,194	484,595	439,934	556,142	876,982
Dredges	664,350	603,217	406,002	431,836	304,243
Total Southern	12,783,082	9,864,483	9,506,376	9,233,778	9,283,372
Northern:					
Breakers	25,839,648	18,579,955	19,930,556	17,366,517	16,318,695
Washeries	719,676	584,463	354,129	221,237	160,027
Dredges	12,471	15,000	15,750	7,000	5,115
Total Northern	26,571,795	19,179,418	20,300,435	17,594,754	16,483,837
Total, excluding Sullivan County:					
Breakers	54,334,992	40,373,252	42,440,999	41,046,835	38,756,639
Washeries	1,754,628	1,443,260	989,450	1,032,832	1,429,810
Dredges	988,004	865,122	619,564	561,568	372,054
Total, excluding Sullivan County	57,077,624	42,681,634	44,050,013	42,641,235	40,558,503
Sullivan County: [2]					
Breakers	62,324	20,090	26,690	28,762	24,055
Grand total	57,139,948	42,701,724	44,076,703	42,669,997	40,582,558

[1] See footnote 1, table 1.

[2] For purposes of historical comparison and statistical convenience, the mines of Sullivan County are grouped with the Pennsylvania anthracite region, although the product is classified as semianthracite according to the American Society for Testing Materials Tentative Standard.

PRODUCTION

The output of 40.6 million net tons of Pennsylvania anthracite in 1952 includes coal produced from deep mines, strip pits, and culm banks and by dredges operating in the Lehigh, Schuylkill, and Susquehanna Rivers and their tributaries, as well as a small tonnage (24,055 tons) of semianthracite produced in the Bernice Basin, Sullivan County. For production and shipment data by fields, regions, and counties see tables 4 to 9. Tables 10 and 11 show percentages of various sizes in relation to total breaker production by region.

TABLE 5.—Pennsylvania anthracite shipped outside producing region, sold locally, and used as colliery fuel in 1952, by regions

Region and type of plant	Shipments outside region		Local sales		Colliery fuel		Total	
	Net tons	Value [1]	Net tons	Value	Net tons	Value	Net tons	Value [1]
Lehigh:								
Breakers	5,668,789	$53,439,427	408,533	$4,318,556	133,358	$978,829	6,210,680	$58,736,812
Washeries	383,014	1,257,384					383,014	1,257,384
Dredges	17,402	53,123					17,402	53,123
Total Lehigh	6,069,205	54,749,934	408,533	4,318,556	133,358	978,829	6,611,096	60,047,319
Schuylkill:								
Breakers	14,904,729	131,238,754	1,166,117	10,014,652	156,418	504,361	16,227,264	141,757,767
Washeries	848,928	2,986,556	36,743	160,754	1,098	1,849	886,769	3,149,159
Dredges	288,447	848,030	59,090	186,723	2,000	4,000	349,537	1,038,753
Total Schuylkill	16,042,104	135,073,340	1,261,950	10,362,129	159,516	510,210	17,463,570	145,945,679
Wyoming:								
Breakers	13,216,627	146,942,901	2,468,435	23,206,752	633,633	2,712,458	16,318,695	172,862,111
Washeries	77,119	319,921	82,908	314,871			160,027	634,792
Dredges	5,115	17,902					5,115	17,902
Total Wyoming	13,298,861	147,280,724	2,551,343	23,521,623	633,633	2,712,458	16,483,837	173,514,805
Total, excluding Sullivan County:								
Breakers	33,790,145	331,621,082	4,043,085	37,539,960	923,409	4,195,648	38,756,639	373,356,690
Washeries	1,309,061	4,563,861	119,651	475,625	1,098	1,849	1,429,810	5,041,335
Dredges	310,964	919,055	59,090	186,723	2,000	4,000	372,054	1,109,778
Total	35,410,170	337,103,998	4,221,826	38,202,308	926,507	4,201,497	40,558,503	379,507,803
Sullivan County:								
Breakers	17,451	137,169	6,604	69,104			24,055	206,273
Grand total:								
1952	35,427,621	337,241,167	4,228,430	38,271,412	926,507	4,201,497	40,582,558	379,714,076
1951	37,507,338	363,756,344	4,125,495	37,535,071	1,037,164	4,526,548	42,669,997	405,817,963
Change percent	−5.5	−7.3	+2.5	+2.0	−10.7	−7.2	−4.9	−6.4

[1] Value given for shipments is value at which coal left possession of producing company and does not include margins of separately incorporated sales companies.

Breakers and Washeries.—Anthracite mine-run consists of material ranging in size from dust to massive peices and contains varying amounts of impurities such as dirt, slate, rock, bone coal, and foreign bodies of wood or metal, all of which either must be removed or reduced to the limits allowed in the specifications for standard anthracite. As Pennsylvania anthracite is marketed only as a cleaned and sized product, the modern anthracite-preparation plant is equipped with facilities for crushing or breaking the larger lumps of coal and for separating the broken coal into the sizes required by the market. Impurities are removed in the preparation plant by cleaning devices such as jigs, tables, and dense-media separators operating on differences in specific gravity between clean coal and refuse. Froth-flotation equipment has been installed at several preparation plants in recent years to clean the fine-mesh particles. Of the 40.6 million tons of anthracite produced in 1952, 38.8 million tons were prepared at breakers, the remainder at washeries and dredges.

TABLE 6.—Pennsylvania anthracite produced in 1952, classified as fresh-mined, culm-bank, and river coal and as breaker, washery, and dredge product, by regions, in net tons

Region and type of plant	From mines			From culm banks	From river dredging	Total
	Underground		Strip pits			
	Mechanically loaded	Hand loaded				
Lehigh:						
Breakers	314,132	3,372,567	2,115,550	408,431		6,210,680
Washeries				383,014		383,014
Dredges					17,402	17,402
Total Lehigh	314,132	3,372,567	2,115,550	791,445	17,402	6,611,096
Schuylkill:						
Breakers	1,132,365	6,570,113	6,001,733	2,523,053		16,227,264
Washeries		1,848		884,921		886,769
Dredges					349,537	349,537
Total Schuylkill	1,132,365	6,571,961	6,001,733	3,407,974	349,537	17,463,570
Wyoming:						
Breakers	8,587,967	4,745,236	2,579,422	406,070		16,318,695
Washeries				160,027		160,027
Dredges					5,115	5,115
Total Wyoming	8,587,967	4,745,236	2,579,422	566,097	5,115	16,483,837
Total, excluding Sullivan County:						
Breakers	10,034,464	14,687,916	10,696,705	3,337,554		38,756,639
Washeries		1,848		1,427,962		1,429,810
Dredges					372,054	372,054
Total	10,034,464	14,689,764	10,696,705	4,765,516	372,054	40,558,503
Sullivan County: Breakers		24,055				24,055
Grand total	10,034,464	14,713,819	10,696,705	4,765,516	372,054	40,582,558

TABLE 7.—Pennsylvania anthracite produced in 1952, classified as fresh-mined, culm-bank, and river coal and as breaker, washery, and dredge product, by fields, in net tons

Field and type of plant	From mines			From culm banks	From river dredging	Total
	Underground		Strip pits			
	Mechanically loaded	Hand loaded				
Eastern Middle:						
Breakers	314,132	1,066,008	1,141,468	93,543	----------	2,615,151
Washeries	----------	----------	----------	330,354	----------	330,354
Total Eastern Middle	314,132	1,066,008	1,141,468	423,897	----------	2,945,505
Western Middle:						
Breakers	652,824	4,610,191	4,299,622	2,158,009	----------	11,720,646
Washeries	----------	----------	----------	62,447	----------	62,447
Dredges	----------	----------	----------	----------	62,696	62,696
Total Western Middle	652,824	4,610,191	4,299,622	2,220,456	62,696	11,845,789
Southern:						
Breakers	479,541	4,266,481	2,676,193	679,932	----------	8,102,147
Washeries	----------	1,848	----------	875,134	----------	876,982
Dredges	----------	----------	----------	----------	304,243	304,243
Total Southern	479,541	4,268,329	2,676,193	1,555,066	304,243	9,283,372
Northern:						
Breakers	8,587,967	4,745,236	2,579,422	406,070	----------	16,318,695
Washeries	----------	----------	----------	160,027	----------	160,027
Dredges	----------	----------	----------	----------	5,115	5,115
Total Northern	8,587,967	4,745,236	2,579,422	566,097	5,115	16,483,837
Total, excluding Sullivan County:						
Breakers	10,034,464	14,687,916	10,696,705	3,337,554	----------	38,756,639
Washeries	----------	1,848	----------	1,427,962	----------	1,429,810
Dredges	----------	----------	----------	----------	372,054	372,054
Total	10,034,464	14,689,764	10,696,705	4,765,516	372,054	40,558,503
Sullivan County: Breakers	----------	24,055	----------	----------	----------	24,055
Grand total	10,034,464	14,713,819	10,696,705	4,765,516	372,054	40,582,558

TABLE 8.—Pennsylvania anthracite shipped in 1952, by regions and sizes

Size	Breaker shipments [1]								
	Lehigh region			Schuylkill region			Wyoming region		
	Outside region	Local sales	Total	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS									
Lump [2] and Broken	17,465	40	17,505	35,623	2,100	37,723	36,266	25,637	61,903
Egg	108,083	537	108,620	276,820	2,009	278,829	320,478	4,027	324,505
Stove	1,126,828	13,322	1,140,150	2,468,849	100,234	2,569,083	3,742,546	78,903	3,821,449
Chestnut	1,206,855	93,099	1,299,954	2,922,781	222,692	3,145,473	3,930,426	366,891	4,297,317
Pea	398,568	134,817	533,385	1,146,142	260,508	1,406,650	952,470	797,579	1,750,049
Total domestic	2,857,799	241,815	3,099,614	6,850,215	587,543	7,437,758	8,982,186	1,273,037	10,255,223
Buckwheat No. 1	753,678	69,681	823,359	2,191,336	169,496	2,360,832	1,913,089	436,991	2,350,080
Buckwheat No. 2 (Rice)	426,218	78,553	504,771	1,377,139	102,485	1,479,624	966,439	286,201	1,252,640
Buckwheat No. 3 (Barley)	503,504	18,071	521,575	2,109,144	107,733	2,216,877	989,030	330,305	1,319,335
Buckwheat No. 4	464,383	413	464,796	1,179,673	150,419	1,330,092	187,928	3,006	190,934
Other (including silt)	663,207		663,207	1,197,222	48,441	1,245,663	177,955	138,895	316,850
Total steam	2,810,990	166,718	2,977,708	8,054,514	578,574	8,633,088	4,234,441	1,195,398	5,429,839
Grand total	5,668,789	408,533	6,077,322	14,904,729	1,166,117	16,070,846	13,216,627	2,468,435	15,685,062
VALUE									
Lump [2] and Broken	$234,600	$568	$235,168	$478,804	$28,773	$507,577	$483,282	$332,948	$816,230
Egg	1,462,789	7,879	1,470,668	3,681,817	27,632	3,709,449	4,227,206	53,984	4,281,190
Stove	15,519,586	193,956	15,713,542	33,069,357	1,273,325	34,342,682	51,012,296	1,122,857	52,135,153
Chestnut	16,615,135	1,335,599	17,950,734	38,718,101	2,917,915	41,636,016	53,435,626	5,216,978	58,652,604
Pea	4,111,786	1,517,447	5,629,233	11,328,668	2,674,310	14,002,978	9,920,521	8,833,914	18,754,435
Total domestic	37,943,896	3,055,449	40,999,345	87,276,747	6,921,955	94,198,702	119,078,931	15,560,681	134,639,612
Buckwheat No. 1	6,051,665	598,131	6,649,796	17,206,558	1,331,652	18,538,210	15,319,815	3,641,967	18,961,782
Buckwheat No. 2 (Rice)	2,766,952	560,894	3,327,846	8,541,312	630,492	9,171,804	6,213,616	1,893,654	8,107,270
Buckwheat No. 3 (Barley)	2,524,563	101,950	2,626,513	10,149,623	469,082	10,618,705	4,994,119	1,753,587	6,747,706
Buckwheat No. 4	1,848,816	2,132	1,850,948	4,221,044	525,090	4,746,134	790,127	12,592	802,719
Other (including silt)	2,303,535		2,303,535	3,843,470	136,381	3,979,851	546,293	344,271	890,564
Total steam	15,495,531	1,263,107	16,758,638	43,962,007	3,092,697	47,054,704	27,863,970	7,646,071	35,510,041
Grand total	53,439,427	4,318,556	57,757,983	131,238,754	10,014,652	141,253,406	146,942,901	23,206,752	170,149,653

AVERAGE VALUE PER TON									
Lump [3] and Broken	$13.43	$14.20	$13.43	$13.44	$13.70	$13.46	$13.33	$12.99	$13.19
Egg	13.53	14.67	13.54	13.30	13.75	13.30	13.19	13.41	13.19
Stove	13.77	14.56	13.78	13.39	12.70	13.37	13.63	14.23	13.64
Chestnut	13.77	14.35	13.81	13.25	13.10	13.24	13.60	14.22	13.65
Pea	10.32	11.26	10.55	9.88	10.27	9.95	10.42	11.08	10.72
Total domestic	13.28	12.64	13.23	12.74	11.78	12.66	13.26	12.22	13.13
Buckwheat No. 1	8.03	8.58	8.08	7.85	7.86	7.85	8.01	8.33	8.07
Buckwheat No. 2 (Rice)	6.49	7.14	6.59	6.20	6.15	6.20	6.43	6.62	6.47
Buckwheat No. 3 (Barley)	5.01	5.64	5.04	4.81	4.35	4.79	5.05	5.31	5.11
Buckwheat No. 4	3.98	5.16	3.98	3.58	3.49	3.57	4.20	4.19	4.20
Other (including silt)	3.47		3.47	3.21	2.82	3.19	3.07	2.48	2.81
Total steam	5.51	7.58	5.63	5.46	5.35	5.45	6.58	6.40	6.54
Grand total	9.43	10.57	9.50	8.81	8.59	8.79	11.12	9.40	10.85

See footnotes at end of table.

TABLE 8.—Pennsylvania anthracite shipped in 1952, by regions and sizes—Continued

Size	Breaker shipments [1]—Continued								
	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
	Outside region	Local sales	Total	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS									
Lump [2] and Broken				89,354	27,777	117,131	89,354	27,777	117,131
Egg				705,381	6,573	711,954	705,381	6,573	711,954
Stove	826	545	1,371	7,338,223	192,459	7,530,682	7,339,049	193,004	7,532,053
Chestnut	3,676	1,980	5,656	8,060,062	682,682	8,742,744	8,063,738	684,662	8,748,400
Pea	2,835	2,321	5,156	2,497,180	1,192,904	3,690,084	2,500,015	1,195,225	3,695,240
Total domestic	7,337	4,846	12,183	18,690,200	2,102,395	20,792,595	18,697,537	2,107,241	20,804,778
Buckwheat No. 1	2,025	868	2,893	4,858,103	676,168	5,534,271	4,860,128	677,036	5,537,164
Buckwheat No. 2 (Rice)				2,769,796	467,239	3,237,035	2,769,796	467,239	3,237,035
Buckwheat No. 3 (Barley)				3,601,678	456,109	4,057,787	3,601,678	456,109	4,057,787
Buckwheat No. 4				1,831,984	153,838	1,985,822	1,831,984	153,838	1,985,822
Other (including silt)	8,089	890	8,979	2,038,384	187,336	2,225,720	2,046,473	188,226	2,234,699
Total steam	10,114	1,758	11,872	15,099,945	1,940,690	17,040,635	15,110,059	1,942,448	17,052,507
Grand total	17,451	6,604	24,055	33,790,145	4,043,085	37,833,230	33,807,596	4,049,689	37,857,285
VALUE									
Lump [2] and Broken				$1,196,686	$362,289	$1,558,975	$1,196,686	$362,289	$1,558,975
Egg				9,371,812	89,495	9,461,307	9,371,812	89,495	9,461,307
Stove	$11,193	$7,414	$18,607	99,601,239	2,590,138	102,191,377	99,612,432	2,597,552	102,209,984
Chestnut	49,506	26,659	76,165	108,768,862	9,470,492	118,239,354	108,818,368	9,497,151	118,315,519
Pea	29,911	24,471	54,382	25,360,975	13,025,671	38,386,646	25,390,886	13,050,142	38,441,028
Total domestic	90,610	58,544	149,154	244,299,574	25,538,085	269,837,659	244,390,184	25,596,629	269,986,813
Buckwheat No. 1	15,739	6,750	22,489	38,578,038	5,571,750	44,149,788	38,593,777	5,578,500	44,172,277
Buckwheat No. 2 (Rice)				17,521,880	3,085,040	20,606,920	17,521,880	3,085,040	20,606,920
Buckwheat No. 3 (Barley)				17,668,305	2,324,619	19,992,924	17,668,305	2,324,619	19,992,924
Buckwheat No. 4				6,859,987	539,814	7,399,801	6,859,987	539,814	7,399,801
Other (including silt)	30,820	3,810	34,630	6,693,298	480,652	7,173,950	6,724,118	484,462	7,208,580
Total steam	46,559	10,560	57,119	87,321,508	12,001,875	99,323,383	87,368,067	12,012,435	99,380,502
Grand total	137,169	69,104	206,273	331,621,082	37,539,960	369,161,042	331,758,251	37,609,064	369,367,315

AVERAGE VALUE PER TON									
Lump [2] and Broken				$13.39	$13.04	$13.31	$13.39	$13.04	$13.31
Egg				13.29	13.62	13.29	13.29	13.62	13.29
Stove	$13.55	$13.60	$13.57	13.57	13.46	13.57	13.57	13.46	13.57
Chestnut	13.47	13.46	13.47	13.49	13.87	13.52	13.49	13.87	13.52
Pea	10.55	10.54	10.55	10.16	10.92	10.40	10.16	10.92	10.40
Total domestic	12.35	12.08	12.24	13.07	12.15	12.98	13.07	12.15	12.98
Buckwheat No. 1	7.77	7.78	7.77	7.94	8.24	7.98	7.94	8.24	7.98
Buckwheat No. 2 (Rice)				6.33	6.60	6.37	6.33	6.60	6.37
Buckwheat No. 3 (Barley)				4.91	5.10	4.93	4.91	5.10	4.93
Buckwheat No. 4				3.74	3.51	3.73	3.74	3.51	3.73
Other (including silt)	3.81	4.28	3.86	3.28	2.57	3.22	3.29	2.57	3.23
Total steam	4.60	6.01	4.81	5.78	6.18	5.83	5.78	6.18	5.83
Grand total	7.86	10.46	8.58	9.81	9.28	9.76	9.81	9.29	9.76

See footnotes at end of table.

TABLE 8.—Pennsylvania anthracite shipped in 1952, by regions and sizes—Continued

Size	Washery shipments			Dredge shipments			Grand total		
	Outside region	Local sales	Total	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS									
Lump [2] and Broken							89,354	27,777	117,131
Egg							705,381	6,573	711,954
Stove							7,339,049	193,004	7,532,053
Chestnut	553	440	993				8,064,291	685,102	8,749,393
Pea	1,429	510	1,939		515	515	2,501,444	1,196,250	3,697,694
Total domestic	1,982	950	2,932		515	515	18,699,519	2,108,706	20,808,225
Buckwheat No. 1	17,968	360	18,328		372	372	4,878,096	677,768	5,555,864
Buckwheat No. 2 (Rice)	26,176	205	26,381	600	640	1,240	2,796,572	468,084	3,264,656
Buckwheat No. 3 (Barley)	207,891	120	208,011	31,849	7,297	39,146	3,841,418	463,526	4,304,944
Buckwheat No. 4	641,249	35,108	676,357	41,635	11,716	53,351	2,514,868	200,662	2,715,530
Other (including silt)	413,795	82,908	496,703	236,880	38,550	275,430	2,697,148	309,684	3,006,832
Total steam	1,307,079	118,701	1,425,780	310,964	58,575	369,539	16,728,102	2,119,724	18,847,826
Grand total	1,309,061	119,651	1,428,712	310,964	59,090	370,054	35,427,621	4,228,430	39,656,051
VALUE									
Lump [2] and Broken							$1,196,686	$362,289	$1,558,975
Egg							9,371,812	89,495	9,461,307
Stove							99,612,432	2,597,552	102,209,984
Chestnut	$6,857	$5,456	$12,313				108,825,225	9,502,607	118,327,832
Pea	9,313	5,202	14,515		$2,820	$2,820	25,400,199	13,058,164	38,458,363
Total domestic	16,170	10,658	26,828		2,820	2,820	244,406,354	25,610,107	270,016,461
Buckwheat No. 1	113,758	2,664	116,422		2,098	2,098	38,707,535	5,583,262	44,290,797
Buckwheat No. 2 (Rice)	139,754	1,148	140,902	$1,200	3,125	4,325	17,662,834	3,089,313	20,752,147
Buckwheat No. 3 (Barley)	977,929	594	978,523	106,595	23,666	130,261	18,752,829	2,348,879	21,101,708
Buckwheat No. 4	1,988,341	145,690	2,134,031	149,818	31,952	181,770	8,998,146	717,456	9,715,602
Other (including silt)	1,327,909	314,871	1,642,780	661,442	123,062	784,504	8,713,469	922,395	9,635,864
Total steam	4,547,691	464,967	5,012,658	919,055	183,903	1,102,958	92,834,813	12,661,305	105,496,118
Grand total	4,563,861	475,625	5,039,486	919,055	186,723	1,105,778	337,241,167	38,271,412	375,512,579

AVERAGE VALUE PER TON									
Lump [2] and Broken							$13.39	$13.04	$13.31
Egg							13.29	13.62	13.29
Stove							13.57	13.46	13.57
Chestnut	$12.40	$12.40	$12.40				13.49	13.87	13.52
Pea	6.52	10.20	7.49		$5.48	$5.48	10.15	10.92	10.40
Total domestic	8.16	11.22	9.15		5.48	5.48	13.07	12.14	12.98
Buckwheat No. 1	6.33	7.40	6.35		5.64	5.64	7.93	8.24	7.97
Buckwheat No. 2 (Rice)	5.34	5.60	5.34	$2.00	4.88	3.49	6.32	6.60	6.36
Buckwheat No. 3 (Barley)	4.70	4.95	4.70	3.35	3.24	3.33	4.88	5.07	4.90
Buckwheat No. 4	3.10	4.15	3.16	3.60	2.73	3.41	3.58	3.58	3.58
Other (including silt)	3.21	3.80	3.31	2.79	3.19	2.85	3.23	2.98	3.20
Total steam	3.48	3.92	3.52	2.96	3.14	2.98	5.55	5.97	5.60
Grand total	3.49	3.98	3.53	2.96	3.16	2.99	9.52	9.05	9.47

[1] Figures of shipments from breakers include some culm-bank coal handled in breakers.
[2] Quantity of Lump included is insignificant.

TABLE 9.—Pennsylvania anthracite produced in 1952, by counties

County	Shipments outside producing regions		Sold to local trade		Colliery fuel		Total production	
	Net tons	Value [1]	Net tons	Value	Net tons	Value	Net tons	Value [1]
Carbon	1,775,417	$15,712,853	31,606	$321,241	37,752	$359,639	1,844,775	$16,393,733
Columbia	606,728	6,393,968	28,217	306,826	12,569	44,086	647,514	6,744,880
Dauphin and Wayne	29,665	236,779	73,230	391,257	----------	----------	102,895	628,036
Lackawanna	4,077,405	44,545,449	951,122	9,444,345	294,618	1,208,015	5,323,145	55,197,809
Lancaster, Lebanon, Northampton, and Snyder [2]	256,634	721,339	10,053	34,300	----------	----------	266,687	755,639
Luzerne	11,258,222	123,222,477	1,865,488	16,952,172	411,132	1,893,378	13,534,842	142,068,027
Northumberland	5,140,424	41,727,391	384,786	2,875,560	25,688	60,877	5,550,898	44,663,828
Schuylkill	12,265,675	104,543,742	877,324	7,876,607	144,748	635,502	13,287,747	113,055,851
Sullivan	17,451	137,169	6,604	69,104	----------	----------	24,055	206,273
Total	35,427,621	337,241,167	4,228,430	38,271,412	926,507	4,201,497	40,582,558	379,714,076

[1] Value given for shipments is value at which coal left possession of producing company and does not include margins of separately incorporated sales companies.
[2] Counties producing dredge coal only.

TABLE 10.—Sizes of Pennsylvania anthracite shipped from breakers to points outside and inside producing region in 1952, by regions, in percent of total

[Does not include shipments of dredge and washery coal]

Size	Percent of total shipments								
	Lehigh region			Schuylkill region			Wyoming region		
	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total
Lump [1] and Broken	0.3	(2)	0.3	0.2	0.2	0.2	0.3	1.0	0.4
Egg	1.9	0.1	1.8	1.9	.2	1.7	2.4	.2	2.1
Stove	19.9	3.3	18.7	16.6	8.6	16.0	28.3	3.2	24.4
Chestnut	21.3	22.8	21.4	19.6	19.1	19.6	29.8	14.9	27.4
Pea	7.0	33.0	8.8	7.7	22.3	8.8	7.2	32.3	11.1
Total domestic	50.4	59.2	51.0	46.0	50.4	46.3	68.0	51.6	65.4
Buckwheat No. 1	13.3	17.1	13.5	14.7	14.5	14.7	14.5	17.7	15.0
Buckwheat No. 2 (Rice)	7.5	19.2	8.3	9.2	8.8	9.2	7.3	11.6	8.0
Buckwheat No. 3 (Barley)	8.9	4.4	8.6	14.1	9.3	13.8	7.5	13.4	8.4
Buckwheat No. 4	8.2	.1	7.7	7.9	12.9	8.3	1.4	.1	1.2
Other (including silt)	11.7	----------	10.9	8.1	4.1	7.7	1.3	5.6	2.0
Total steam	49.6	40.8	49.0	54.0	49.6	53.7	32.0	48.4	34.6

Size	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
Lump [1] and Broken	----------	----------	----------	0.3	0.7	0.3	0.3	0.7	0.3
Egg	----------	----------	----------	2.1	.2	1.9	2.1	.1	1.9
Stove	4.7	8.3	5.7	21.7	4.7	19.9	21.7	4.8	19.9
Chestnut	21.1	30.0	23.5	23.8	16.9	23.1	23.8	16.9	23.1
Pea	16.2	35.1	21.4	7.4	29.5	9.8	7.4	29.5	9.8
Total domestic	42.0	73.4	50.6	55.3	52.0	55.0	55.3	52.0	55.0
Buckwheat No. 1	11.6	13.1	12.0	14.4	16.7	14.6	14.4	16.7	14.6
Buckwheat No. 2 (Rice)	----------	----------	----------	8.2	11.6	8.6	8.2	11.5	8.6
Buckwheat No. 3 (Barley)	----------	----------	----------	10.7	11.3	10.7	10.7	11.3	10.7
Buckwheat No. 4	----------	----------	----------	5.4	3.8	5.2	5.4	3.8	5.2
Other (including silt)	46.4	13.5	37.4	6.0	4.6	5.9	6.0	4.7	5.9
Total steam	58.0	26.6	49.4	44.7	48.0	45.0	44.7	48.0	45.0

[1] Quantity of Lump included is insignificant.
[2] Less than 0.05 percent.

TABLE 11.—Sizes of Pennsylvania anthracite shipped from breakers to points outside producing region, 1948–52, by regions, in percent of total

[Does not include shipments of dredge and washery coal]

Size	Percent of total shipments									
	Lehigh region					Schuylkill region				
	1948	1949	1950	1951	1952	1948	1949	1950	1951 [1]	1952 [1]
Lump [2] and Broken	0.8	0.4	0.4	1.0	0.3	0.7	0.3	0.2	0.4	0.2
Egg	5.7	2.9	3.6	3.7	1.9	5.8	3.1	3.5	3.6	1.9
Stove	20.5	20.6	22.0	20.1	19.9	16.5	17.5	18.1	16.2	16.6
Chestnut	21.6	22.8	22.7	22.4	21.3	21.0	22.3	22.4	19.6	19.6
Pea	8.2	7.7	7.9	7.7	7.0	8.0	8.3	7.9	8.0	7.7
Total domestic	56.8	54.4	56.6	54.9	50.4	52.0	51.5	52.1	47.8	46.0
Buckwheat No. 1	13.0	13.1	13.5	13.2	13.3	14.0	14.2	14.6	14.1	14.7
Buckwheat No. 2 (Rice)	8.6	8.1	7.9	8.0	7.5	8.7	8.9	8.6	8.9	9.2
Buckwheat No. 3 (Barley)	9.3	9.7	9.8	9.3	8.9	14.4	12.6	11.9	13.2	14.1
Buckwheat No. 4	6.4	7.9	6.1	7.3	8.2	6.8	6.3	6.2	7.5	7.9
Other (including silt)	5.9	6.8	6.1	7.3	11.7	4.1	6.5	6.6	8.5	8.1
Total steam	43.2	45.6	43.4	45.1	49.6	48.0	48.5	47.9	52.2	54.0

Size	Wyoming region					Sullivan County				
Lump [2] and Broken	0.2	0.2	0.3	0.9	0.3	------	------	------	------	------
Egg	6.3	3.4	3.3	3.9	2.4	------	------	------	------	------
Stove	28.3	29.4	29.3	27.8	28.3	20.5	32.0	15.1	9.9	4.7
Chestnut	29.4	31.7	31.2	30.7	29.8	30.9	38.0	25.5	20.0	21.1
Pea	6.5	6.7	6.6	6.6	7.2	10.9	10.0	20.5	15.4	16.2
Total domestic	70.7	71.4	70.7	69.9	68.0	62.3	80.0	61.1	45.3	42.0
Buckwheat No. 1	12.7	13.4	13.3	13.0	14.5	8.0	2.1	16.4	12.5	11.6
Buckwheat No. 2 (Rice)	6.8	7.0	7.0	6.6	7.3	------	------	------	42.2	------
Buckwheat No. 3 (Barley)	6.5	6.0	6.7	7.7	7.5	------	------	------	------	------
Buckwheat No. 4	1.4	1.1	1.2	1.6	1.4	------	------	------	------	------
Other (including silt)	1.9	1.1	1.1	1.2	1.3	29.7	17.9	22.5	------	46.4
Total steam	29.3	28.6	29.3	30.1	32.0	37.7	20.0	38.9	54.7	58.0

Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump [2] and Broken	0.5	0.2	0.3	0.7	0.3	0.5	0.2	0.3	0.7	0.3
Egg	6.0	3.2	3.4	3.7	2.1	6.0	3.2	3.4	3.7	2.1
Stove	22.5	23.2	23.7	21.5	21.7	22.5	23.2	23.7	21.5	21.7
Chestnut	24.9	26.5	26.4	24.5	23.8	24.9	26.5	26.4	24.5	23.8
Pea	7.4	7.5	7.3	7.4	7.4	7.4	7.5	7.3	7.4	7.4
Total domestic	61.3	60.6	61.1	57.8	55.3	61.3	60.6	61.1	57.8	55.3
Buckwheat No. 1	13.3	13.7	13.8	13.5	14.4	13.3	13.7	13.8	13.5	14.4
Buckwheat No. 2 (Rice)	7.8	7.9	7.8	7.9	8.2	7.8	7.9	7.8	7.9	8.2
Buckwheat No. 3 (Barley)	9.9	9.2	9.3	10.3	10.7	9.9	9.2	9.3	10.3	10.7
Buckwheat No. 4	4.3	4.4	3.9	5.1	5.4	4.3	4.4	3.9	5.1	5.4
Other (including silt)	3.4	4.2	4.1	5.4	6.0	3.4	4.2	4.1	5.4	6.0
Total steam	38.7	39.4	38.9	42.2	44.7	38.7	39.4	38.9	42.2	44.7

[1] See footnote 1, table 1.
[2] Quantity of Lump included is insignificant.

As washery plants process almost exclusively culm-bank material, which usually requires no crushing, the typical washery is equipped only with washing and screening facilities. Some older culm banks contained substantial quantities of large-size coal. Therefore, much of this material was initially processed in preparation plants to recover the large sizes; but, as the demand grew for progressively smaller sizes, many of the banks were reprocessed to recover the smaller sizes. As a result, Buckwheat No. 2 and larger totaled only about 3 percent of washery shipments in 1952, whereas the remainder was Barley and smaller, including some silt.

Underground Operations.—For a number of years underground operations have contributed a decreasing proportion of anthracite, a trend accentuated since the end of World War II, a period of high labor and material costs. As recently as 1947 underground operations yielded 65 percent of the total output. By 1951 the percentage had declined to 62 percent and for 1952 was 61 percent. Increased output from strip pits and culm banks, where output per man per day is considerably higher than in deep mines, also resulted in increased productivity from 2.97 tons per man-day in 1951 to 3.06 tons in 1952, the highest rate achieved in the history of the industry.

Strip-Pit Coal.—When strip mining in the anthracite region was begun on a small scale in the early 1800's, recovery by surface mining was extremely small, as the overburden and coal were removed by manual labor or horse-drawn scrapers. In the absence of mechanical equipment, the coal was mined from the outcrops most readily accessible or from seams lying close to tihe surface. However, with the development of the internal-combust on engine, strip mining increased, and its relatively rapid rise in the Pennsylvania anthracite region, although impelled primarily by the necessity of reducing overall production costs, was made possible by technological advances in metallurgy, machinery design, and the capacity of earth-moving equipment. Aside from geologic and engineering problems, the primary consideration in strip mining is the ratio between overburden and recoverable coal—or, the number of feet of earth, slate, or rock to be removed to recover a certain tonnage of coal relative to the total production cost per ton of output and to the market price of coal. Advances in enlarging the capacity of shovels and draglines and in applying successively gasoline, electric, and diesel power to mining operations, plus improvement in haulage methods and equipment, has enabled operators to mine economically at ever-increasing depths.

The thick pitching beds in the Lehigh and Schuylkill regions are more adaptable to stripping than the comparatively level coal seams of the Wyoming region. Therefore, although the Wyoming region led in the total quantity produced until 1951, the Lehigh and Schuylkill regions have surpassed it for many years in the percentage of coal obtained from strip pits.

Culm-Bank Coal.—No appreciable market existed for the smaller sizes of anthracite, especially for Pea and smaller, during the early years of anthracite mining, as the anthracite-burning equipment in use was designed to burn the larger coal only. Consequently, tremendous quantities of the small sizes and some large masses of refuse containing good coal were piled in large spoil, or culm, banks in the anthracite

region. Less than 1 percent of all sizes made by typical producers in the Lehigh and Wyoming regions in 1879 was smaller than Pea. However, introduction of automatic stokers and improvements in grates, boilers, and firing techniques at industrial and commercial installations created a growing demand for the smaller sizes. By 1952 over half of the anthracite shipped from breakers was Pea and smaller sizes. As the increasing demand for smaller sizes developed, the culm banks became a more important source of small coal, since the cost of production from banks was considerably lower than from deep or strip mining. Hence, over the past few decades the culm banks have contributed a substantial output, with a record of 9.6 million tons set in 1944.

Anthracite recovered from culm banks in 1952 reached the highest level since 1948—12 percent of total production compared with 11 percent in 1951. The strong demand for the steam sizes in industrial power plants and public-utility installations was largely responsible for the increase. As a result of substantial increases in production in the Lehigh and Wyoming regions (which more than compensated for a slight decline in the Schuylkill region), the culm banks were the only source of production to show increased tonnage over 1951.

TABLE 12.—Culm-bank coal put through breakers, 1948–52, by fields, in net tons

Year	Northern	Eastern Middle	Western Middle	Southern	Total
1948	393,787	152,827	1,871,847	1,571,119	3,989,580
1949	371,787	193,565	1,366,775	1,081,585	3,013,712
1950	[1] 213,577	35,270	1,388,760	840,253	2,477,860
1951	263,555	107,064	2,526,144	700,605	3,597,368
1952	406,070	93,543	2,158,009	679,932	3,337,554

[1] A small quantity of culm-bank coal was put through breakers in Sullivan County.

TABLE 13.—Production of Pennsylvania anthracite from culm banks, by regions 1935–52, in net tons

Year	Lehigh	Schuylkill	Wyoming	Sullivan County	Total
1935	192,790	1,748,960	760,718	----------	2,702,468
1936	136,058	2,532,116	525,798	----------	3,193,972
1937	101,239	2,178,482	442,878	----------	2,722,599
1938	53,037	1,941,896	345,511	----------	2,340,444
1939	64,180	2,159,548	360,086	----------	2,583,814
1940	192,878	2,109,557	480,603	----------	2,783,038
1941	326,755	2,881,049	449,062	----------	3,656,866
1942	745,934	3,529,757	459,373	----------	4,735,064
1943	1,944,047	4,577,917	1,041,841	19,893	7,583,698
1944	2,125,317	5,787,036	1,673,994	13,833	9,600,180
1945	2,086,864	4,936,907	1,728,440	34,448	8,786,659
1946	1,875,590	4,752,141	1,780,874	22,487	8,431,092
1947	1,044,501	3,947,016	1,409,217	2,912	6,403,646
1948	796,114	3,729,542	1,098,123	----------	5,623,779
1949	694,763	2,778,131	956,250	----------	4,429,144
1950	366,069	2,533,535	565,829	1,877	3,467,310
1951	566,613	3,578,795	484,792	----------	4,630,200
1952	791,445	3,407,974	566,097	----------	4,765,516

Dredge Coal.—The rivers and creeks that traverse the anthracite fields of Pennsylvania have been dredged for the recovery of anthracite since the late 1800's. In the early history of the anthracite industry, Grate, Egg, Stove, and Chestnut were the principal sizes prepared. Coal smaller than Chestnut was usually discarded as useless and was either dumped with the breaker wastes into surface streams or piled into large culm (spoil) banks. Part of the culm-bank material was subsequently washed into streams by wind and rainstorms. Eventually the beds of the Susquehanna, Lehigh, and Schuylkill Rivers and such creeks as the Shamokin, Mahanoy, Wiconisco, and Swatara were covered with considerable quantities of anthracite.

The first commercial recovery of river coal was as a byproduct of sand and gravel production in the Susquehanna River, which, with its tributaries, has provided the greater part of the river coal produced. With the advent of improved grates and boilers, heating and power plants were equipped to burn the fine coal taken from the streams. Around 1890 river coal began to assume importance as an industrial and power-plant fuel—especially in the field of electric-power generation. From 1909, when production reports were first submitted, to 1940, inclusive, dredge operators reported the recovery of almost 18 million tons and from 1941 through 1952 an additional 12 million tons. Although these figures are but a small fraction of the total output, they are important from the standpoint of conservation of natural resources.

Weekly and Monthly Data.—Weekly and monthly figures on the production of Pennsylvania anthracite are published regularly by the Federal Bureau of Mines in the Weekly Anthracite and Beehive Coke Report. The production data in this report are estimated from railroad carloadings and other factors. The production data in tables 14 and 15 have been adjusted to the total production figure obtained by the annual mail canvass of the anthracite operators.

TABLE 14.—Estimated weekly production of Pennsylvania anthracite in 1952 [1]

Week ended—	Thousands of net tons	Week ended—	Thousands of net tons	Week ended—	Thousands of net tons	Week ended—	Thousands of net tons
Jan. 5	[2] 595	Apr. 12	642	July 19	697	Oct. 25	1,000
12	1,009	19	725	26	671	Nov. 1	862
19	1,003	26	1,044	Aug. 2	725	8	943
26	911	May 3	861	9	724	15	931
Feb. 2	905	10	765	16	722	22	821
9	793	17	764	23	965	29	663
16	690	24	798	30	154	Dec. 6	757
23	858	31	754	Sept. 6	709	13	772
Mar. 1	843	June 7	784	13	939	20	717
8	778	14	788	20	891	27	496
15	727	21	785	27	872	31	[2] 436
22	722	28	921	Oct. 4	876		
29	740	July 5	54	11	897	Total	40,583
Apr. 5	580	12	529	18	975		

[1] Estimated from weekly carloadings as reported by the Association of American Railroads. Adjusted to annual production total from Bureau of Mines canvass.

[2] Figures represent output of working days in that part of week included in the calendar year 1952. Preliminary production for week of Jan. 3, 1953, was 514,000 tons. Revised total for week of Jan. 5, 1952, was 769,000 tons.

TABLE 15.—Estimated monthly production of Pennsylvania anthracite, 1945–52, in thousands of net tons [1]

Month	1945	1946	1947	1948	1949	1950	1951 [2]	1952 [2]
January	4,219	4,968	5,172	4,929	3,725	2,893	4,316	4,221
February	4,471	4,774	4,254	4,682	2,930	2,563	3,621	3,362
March	5,269	5,476	4,984	4,935	2,375	4,847	2,244	3,140
April	5,124	5,069	4,293	4,445	3,725	3,331	2,675	3,384
May	2,083	5,453	4,564	4,874	4,407	4,228	3,723	3,400
June	5,667	3,625	4,624	4,597	3,406	4,166	3,848	3,293
July	4,944	5,248	4,098	4,372	3,925	2,855	2,847	2,522
August	4,656	5,428	5,011	5,129	3,710	4,386	3,612	2,704
September	4,640	5,033	5,158	5,015	2,114	3,835	3,267	3,761
October	5,304	5,393	5,524	4,969	4,979	4,282	4,675	4,213
November	4,559	4,975	4,629	4,687	4,657	3,355	4,129	3,405
December	3,998	5,065	4,879	4,506	2,749	3,336	3,713	3,178
Total	54,934	60,507	57,190	57,140	42,702	44,077	42,670	40,583

[1] Production is estimated from weekly carloadings as reported by the Association of American Railroads and includes mine fuel, coal sold locally, and dredge coal.
[2] See footnote 1, table 1.

VALUE OF SALES

The Office of Price Stabilization authorized several increases in the ceiling prices of Pennsylvania anthracite during 1952 to compensate the industry for increased labor and material costs and to correct inequities in the price structure among prices of the various sizes. Despite the advances in ceiling prices, the average value f. o. b. mine per net ton on anthracite from all sources declined from $9.51 per ton in 1951 to $9.36 in 1952. On breaker shipments of all sizes to points outside the producing region, the decline in average value was 13 cents per ton and on shipments within the region it was 30 cents.

The decline in average realizations for total production was due entirely to lower values of the domestic sizes, as the 1952 average of shipments of steam sizes to points outside the region was 30 cents greater than in 1951 and to points within the producing region 6 cents greater. The lower average value for the domestic sizes reflected the effects of supply and demand on prices received for the various sizes. Producers experienced no difficulty during the year in meeting requirements of domestic sizes but were pressed, at times, to supply the demand for certain steam sizes.

TABLE 16.—Average sales realization per net ton of Pennsylvania anthracite shipped from breakers to points outside and inside producing region in 1952, by regions and sizes

[Value does not include margins of separately incorporated sales companies]

Size	Lehigh region			Schuylkill region			Wyoming region		
	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total
Lump [1] and Broken	$13.43	$14.20	$13.43	$13.44	$13.70	$13.46	$13.33	$12.99	$13.19
Egg	13.53	14.67	13.54	13.30	13.75	13.30	13.19	13.41	13.19
Stove	13.77	14.56	13.78	13.39	12.70	13.37	13.63	14.23	13.64
Chestnut	13.77	14.35	13.81	13.25	13.10	13.24	13.60	14.22	13.65
Pea	10.32	11.26	10.55	9.88	10.27	9.95	10.42	11.08	10.72
Total domestic	13.28	12.64	13.23	12.74	11.78	12.66	13.26	12.22	13.13
Buckwheat No. 1	8.03	8.58	8.08	7.85	7.86	7.85	8.01	8.33	8.07
Buckwheat No. 2 (Rice)	6.49	7.14	6.59	6.20	6.15	6.20	6.43	6.62	6.47
Buckwheat No. 3 (Barley)	5.01	5.64	5.04	4.81	4.35	4.79	5.05	5.31	5.11
Buckwheat No. 4	3.98	5.16	3.98	3.58	3.49	3.57	4.20	4.19	4.20
Other (including silt)	3.47	-------	3.47	3.21	2.82	3.19	3.07	2.48	2.81
Total steam	5.51	7.58	5.63	5.46	5.35	5.45	6.58	6.40	6.54
Total all sizes	9.43	10.57	9.50	8.81	8.59	8.79	11.12	9.40	10.85

Size	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
Lump [1] and Broken	-------	-------	-------	$13.39	$13.04	$13.31	$13.39	$13.04	$13.31
Egg	-------	-------	-------	13.29	13.62	13.29	13.29	13.62	13.29
Stove	$13.55	$13.60	$13.57	13.57	13.46	13.57	13.57	13.46	13.57
Chestnut	13.47	13.46	13.47	13.49	13.87	13.52	13.49	13.87	13.52
Pea	10.55	10.54	10.55	10.16	10.92	10.40	10.16	10.92	10.40
Total domestic	12.35	12.08	12.24	13.07	12.15	12.98	13.07	12.15	12.98
Buckwheat No. 1	7.77	7.78	7.77	7.94	8.24	7.98	7.94	8.24	7.98
Buckwheat No. 2 (Rice)	-------	-------	-------	6.33	6.60	6.37	6.33	6.60	6.37
Buckwheat No. 3 (Barley)	-------	-------	-------	4.91	5.10	4.93	4.91	5.10	4.93
Buckwheat No. 4	-------	-------	-------	3.74	3.51	3.73	3.74	3.51	3.73
Other (including silt)	3.81	4.28	3.86	3.28	2.57	3.22	3.29	2.57	3.23
Total steam	4.60	6.01	4.81	5.78	6.18	5.83	5.78	6.18	5.83
Total all sizes	7.86	10.46	8.58	9.81	9.28	9.76	9.81	9.29	9.76

[1] Quantity of Lump included is insignificant.

TABLE 17.—Average sales realization per net ton of Pennsylvania anthracite shipped from breakers to points outside producing region, 1948–52, by regions and sizes

[Value does not include margins of separately incorporated sales companies]

Size	Lehigh region					Schuylkill region				
	1948	1949	1950	1951	1952	1948	1949	1950	1951[1]	1952[1]
Lump[2] and Broken	$11.47	$11.98	$12.27	$13.26	$13.43	$11.09	$11.56	$12.14	$13.31	$13.44
Egg	11.42	11.81	12.20	13.51	13.53	11.22	11.57	12.06	13.40	13.30
Stove	11.44	11.80	12.46	13.98	13.77	11.34	11.56	12.20	13.48	13.39
Chestnut	11.45	11.81	12.44	13.96	13.77	11.38	11.62	12.14	13.31	13.25
Pea	9.50	9.86	10.24	10.91	10.32	9.33	9.56	9.77	10.00	9.88
Total domestic	11.16	11.53	12.12	13.50	13.28	11.03	11.27	11.79	12.83	12.74
Buckwheat No. 1	6.52	6.64	6.90	7.68	8.03	6.39	6.43	6.64	7.38	7.85
Buckwheat No. 2 (Rice)	5.53	5.56	5.70	6.05	6.49	5.37	5.46	5.53	5.77	6.20
Buckwheat No. 3 (Barley)	4.14	4.36	4.50	4.75	5.01	4.03	4.26	4.37	4.58	4.81
Buckwheat No. 4	2.96	3.23	3.43	3.73	3.98	2.84	3.11	3.24	3.43	3.58
Other (including silt)	2.50	2.79	2.83	3.10	3.47	2.68	2.91	3.06	3.21	3.21
Total steam	4.73	4.80	5.08	5.40	5.51	4.68	4.79	4.94	5.15	5.46
Total all sizes	8.38	8.47	9.07	9.85	9.43	7.98	8.12	8.51	8.82	8.81

Size	Wyoming region					Sullivan County				
Lump[2] and Broken	$11.06	$11.66	$12.10	$12.96	$13.33	------	------	------	------	------
Egg	11.15	11.54	12.03	13.27	13.19	------	------	------	------	------
Stove	11.24	11.61	12.21	13.79	13.63	$9.67	$10.96	$11.74	$12.56	$13.55
Chestnut	11.20	11.60	12.20	13.62	13.60	9.59	10.98	11.50	13.14	13.47
Pea	9.31	9.70	9.98	10.62	10.42	7.86	8.88	9.50	10.33	10.55
Total domestic	11.04	11.42	11.99	13.37	13.26	9.31	10.71	10.89	12.06	12.35
Buckwheat No. 1	6.50	6.63	6.83	7.55	8.01	5.99	5.00	6.25	7.39	7.77
Buckwheat No. 2 (Rice)	5.48	5.63	5.76	6.04	6.43	------	------	------	3.80	------
Buckwheat No. 3 (Barley)	4.15	4.37	4.58	4.89	5.05	------	------	------	------	------
Buckwheat No. 4	3.01	3.32	3.54	3.94	4.20	------	------	------	------	------
Other (including silt)	2.13	2.81	2.72	3.00	3.07	4.10	3.26	4.00	------	3.81
Total steam	5.30	5.63	5.77	6.17	6.58	4.50	3.44	4.95	4.62	4.60
Total all sizes	9.35	9.77	10.17	11.20	11.12	7.50	9.26	8.58	7.99	7.86

Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump[2] and Broken	$11.19	$11.71	$12.15	$13.12	$13.39	$11.19	$11.71	$12.15	$13.12	$13.39
Egg	11.22	11.60	12.07	13.36	13.29	11.22	11.60	12.07	13.36	13.29
Stove	11.30	11.63	12.25	13.72	13.57	11.29	11.63	12.25	13.72	13.57
Chestnut	11.30	11.64	12.21	13.56	13.49	11.29	11.64	12.21	13.56	13.49
Pea	9.36	9.67	9.94	10.38	10.16	9.35	9.67	9.94	10.38	10.16
Total domestic	11.05	11.39	11.94	13.19	13.07	11.05	11.39	11.94	13.19	13.07
Buckwheat No. 1	6.46	6.55	6.76	7.49	7.94	6.46	6.55	6.76	7.49	7.94
Buckwheat No. 2 (Rice)	5.45	5.54	5.65	5.91	6.33	5.45	5.54	5.65	5.90	6.33
Buckwheat No. 3 (Barley)	4.09	4.31	4.46	4.69	4.91	4.09	4.31	4.43	4.69	4.91
Buckwheat No. 4	2.89	3.18	3.33	3.56	3.74	2.89	3.18	3.33	3.56	3.74
Other (including silt)	2.49	2.87	2.96	3.17	3.28	2.50	2.87	2.97	3.17	3.29
Total steam	4.90	5.05	5.25	5.48	5.78	4.90	5.05	5.25	5.48	5.78
Total all sizes	8.67	8.90	9.34	9.94	9.81	8.67	8.90	9.34	9.94	9.81

[1] See footnote 1, table 1.
[2] Quantity of Lump included is insignificant.

TABLE 18.—Average value per net ton of Pennsylvania anthracite from all sources, 1951–52, by regions [1]

[Data include washery and dredge coal]

Region	1951 [2]				1952 [2]			
	Shipped outside region	Local sales	Colliery fuel	Total production	Shipped outside region	Local sales	Colliery fuel	Total production
Lehigh	$9.52	$10.65	$6.81	$9.52	$9.02	$10.57	$7.34	$9.08
Schuylkill	8.52	7.72	2.88	8.40	8.42	8.21	3.20	8.36
Wyoming	11.14	9.61	4.22	10.66	11.07	9.22	4.28	10.53
Total, excluding Sullivan County	9.70	9.10	4.36	9.51	9.52	9.05	4.53	9.36
Sullivan County	7.99	9.72		8.58	7.86	10.46		8.58
Grand total	9.70	9.10	4.36	9.51	9.52	9.05	4.53	9.36

[1] Value given for shipments is value at which coal left possession of producing company and does not include margins of separately incorporated sales companies.
[2] See footnote 1, table 1.

EMPLOYMENT

In recent years declining anthracite production has resulted in decreased employment. The average number of men employed in the industry in 1952 dropped to 65,923, compared with 68,995 in 1951. As recently as 1947, average employment was 78,600; for 1926 employment was over 165,000. Of the 1952 labor force, 65 percent were employed at underground operations, 11 percent at strip pits, and 24 percent at preparation plants and other surface installations. The average number of men employed in preparation plants increased slightly over 1951; all other operations had losses, the largest occurring in underground mining. Employment by regions was as follows: 50 percent in the Wyoming region, 34 percent in the Schuylkill, and 16 percent in the Lehigh. These data indicate a 1-percent increase in employment in the Schuylkill region, a similar decline in the Wyoming, and no change in the Lehigh.

Detailed labor data are presented in tables 19 and 20.

TABLE 19.—Men employed and days worked at operations producing Pennsylvania anthracite in 1952, by regions and type of plants

[Includes operations of strip contractors]

Region and type of plant	Average number of men employed								Average number of days plant operated	Man-days of labor	Average tons per man per day
	Underground			Surface				Grand total			
	Miners and their laborers	Other	Total underground	In strip pits	In preparation plants	Other	Total surface				
Lehigh:											
Breaker	4,223	2,553	6,776	1,412	853	1,332	3,597	10,373	181	1,878,701	3.31
Washery [1]	-------	-------	-------	-------	31	45	76	76	213	16,186	23.66
Dredge	-------	-------	-------	-------	2	4	6	6	182	1,092	15.94
Total Lehigh	4,223	2,553	6,776	1,412	886	1,381	3,679	10,455	181	1,895,979	3.49
Schuylkill:											
Breaker	7,728	3,633	11,361	4,265	2,453	3,919	10,637	21,998	201	4,412,761	3.68
Washery [1]	-------	-------	-------	-------	131	297	428	428	186	79,631	11.14
Dredge	-------	-------	-------	-------	58	112	170	170	212	36,055	9.69
Total Schuylkill	7,728	3,633	11,361	4,265	2,642	4,328	11,235	22,596	200	4,528,447	3.86
Wyoming:											
Breaker	16,391	8,549	24,940	1,423	1,531	4,846	7,800	32,740	208	6,821,180	2.39
Washery [1]	-------	-------	-------	-------	26	37	63	63	202	12,704	12.60
Dredge	-------	-------	-------	-------	10	3	13	13	78	1,016	5.03
Total Wyoming	16,391	8,549	24,940	1,423	1,567	4,886	7,876	32,816	208	6,834,900	2.41
Total, excluding Sullivan County:											
Breaker	28,342	14,735	43,077	7,100	4,837	10,097	22,034	65,111	201	13,112,642	2.96
Washery [1]	-------	-------	-------	-------	188	379	567	567	191	108,521	13.18
Dredge	-------	-------	-------	-------	70	119	189	189	202	38,163	9.75
Total	28,342	14,735	43,077	7,100	5,095	10,595	22,790	65,867	201	13,259,326	3.06
Sullivan County:											
Breaker	30	13	43	-------	10	3	13	56	190	10,640	2.26
Grand total	28,372	14,748	43,120	7,100	5,105	10,598	22,803	65,923	201	13,269,966	3.06

[1] Represents washeries for which production and employment were separately reported.

TABLE 20.—Men employed at operations producing Pennsylvania anthracite, 1951–52,[1] by counties

[Includes operations of strip contractors]

County	1951	1952	County	1951	1952
Carbon	3,019	3,208	Luzerne	28,846	27,213
Columbia	1,286	1,061	Northumberland	6,140	5,788
Dauphin, Susquehanna, and Wayne [2]	167	143	Schuylkill	19,457	19,132
Lackawanna	9,886	9,210	Sullivan	72	56
Lancaster, Lebanon, Northampton, and Snyder [3]	122	112	Total	68,995	65,923

[1] See footnote 1, table 1.
[2] None employed in Susquehanna in 1952.
[3] Counties producing dredge coal only.

MINING METHODS AND EQUIPMENT

Mechanical Loading.—Of the total Pennsylvania anthracite produced underground in 1952, 41 percent was loaded mechanically—the same percentage as in 1951. There was no significant change in underground loading in the various fields. The Eastern Middle, Western Middle, and Southern fields combined, as in 1951, accounted for only 14 percent of the total production loaded mechanically and the Northern field 86 percent. The coal seams of the Northern field are flatter than those of the other fields and thus more adaptable to mechanical loading. Data on mechanical loading underground are shown in tables 21 to 23. Figure 1 illustrates the historical trends in mechanical loading, hand loading, and stripping of Pennsylvania anthracite, 1928–52.

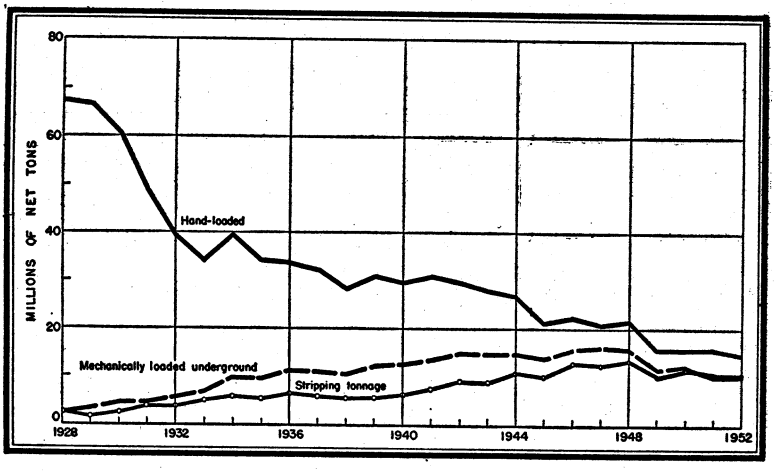

FIGURE 1.—Trends in mechanical loading, hand loading, and stripping of Pennsylvania anthracite, 1928–52.

Cutting Machines.—The quantity of anthracite cut by machine continued to decline; the 1952 total was 22 percent under 1951. Each of the 146 cutting machines used was of the "permissible" type.

TABLE 21.—Pennsylvania anthracite loaded mechanically underground, 1948–52

Year	Scrapers		Mobile loaders		Conveyors [1] and pit-car loaders		Total loaded mechanically	
	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded
1948	643	2,721,180	19	60,657	3,562	12,960,531	4,224	15,742,368
1949	589	1,950,503	27	80,104	3,618	9,827,481	4,234	11,858,088
1950	556	1,900,185	30	89,191	3,460	10,346,274	4,046	12,335,650
1951	528	1,693,656	43	79,032	3,282	9,075,099	3,853	10,847,787
1952	456	1,321,930	54	85,843	3,232	8,626,691	3,742	10,034,464

[1] Includes duckbills and other self-loading conveyors.

TABLE 22.—Pennsylvania anthracite loaded mechanically underground, 1951–52, by fields, in net tons

Field	Scraper loaders [1]		Pit-car loaders		Hand-loaded face conveyors, all types [2]		Total mechanically loaded	
	1951	1952	1951	1952	1951	1952	1951	1952
Northern	1,552,784	1,206,136	33,735	42,162	7,784,212	7,339,669	9,370,731	8,587,967
Eastern Middle	13,574	34,011	53,442	----------	280,670	280,121	347,686	314,132
Western Middle	163,272	106,058	4,423	12,070	559,878	534,696	727,573	652,824
Southern	43,058	61,568	----------	----------	358,739	417,973	401,797	479,541
Total	1,772,688	1,407,773	91,600	54,232	8,983,499	8,572,459	10,847,787	10,034,464

[1] Includes mobile loaders.
[2] Shaker chutes, etc., including those equipped with duckbills.

TABLE 23.—Relative growth of mechanical loading, hand loading, and stripping in Pennsylvania anthracite mines, 1927–52

[Mechanical loading includes coal handled on pit-car loaders and hand-loaded face conveyors]

Year	Net tons			Index: 1937=100		
	Underground		Stripping	Underground		Stripping
	Mechanical loading	Hand loading		Mechanical loading	Hand loading	
1927	[1] 2,223,281	71,434,537	2,153,156	20	224	38
1928	[1] 2,351,074	67,373,788	2,422,924	22	211	43
1929	3,470,158	66,493,690	1,911,766	32	209	34
1930	4,467,750	60,458,344	2,536,288	42	190	45
1931	4,384,780	49,074,722	3,813,237	41	154	67
1932	5,433,340	38,400,820	3,980,973	51	120	70
1933	6,557,267	34,474,844	4,932,069	61	108	87
1934	9,284,486	39,290,255	5,798,138	87	123	102
1935	9,279,057	34,503,819	5,187,072	87	108	91
1936	10,827,946	33,898,560	6,203,267	101	106	109
1937	10,683,837	31,882,514	5,696,018	100	100	100
1938	10,151,669	27,990,628	5,095,341	95	88	89
1939	11,773,833	30,797,715	5,486,479	110	97	96
1940	12,326,000	29,190,837	6,352,700	115	92	112
1941	13,441,987	30,435,277	7,316,574	126	95	128
1942	14,741,459	30,495,240	9,070,933	138	96	159
1943	14,745,793	27,990,005	8,989,387	138	88	158
1944	14,975,146	26,800,270	10,953,030	140	84	192
1945	13,927,955	20,957,744	10,056,325	130	66	177
1946	15,619,162	22,465,295	12,858,930	146	70	226
1947	16,054,011	20,909,101	12,603,545	150	66	221
1948	15,742,368	21,432,923	13,352,874	147	67	234
1949	11,858,088	15,172,562	10,376,808	111	48	182
1950	12,335,650	15,820,245	11,833,934	115	50	208
1951	10,847,787	15,494,452	11,135,990	102	49	196
1952	10,034,464	14,713,819	10,696,705	94	46	188

[1] As reported by Commonwealth of Pennsylvania, Department of Mines.

Strip-Pit Operations.—In 1952 the output from strip pits was over 30 percent of the total fresh-mined production. In 1920, when stripping operations were only 2.5 percent of the fresh-mined total production, less than 1 percent of the output in the Wyoming region was mined from strip pits, whereas strip-mine production for the Lehigh and Schuylkill regions was 9 and 3 percent, respectively. By 1952 strip-coal production had grown to 16 percent of the fresh-mined total in the Wyoming region, 37 percent in the Lehigh, and almost 44 percent in the Schuylkill. Table 24 presents relevant statistics on stripping operations for selected years in the period 1915–52 and figure 2 charts the growth of strip-pit production, by regions, 1928–52.

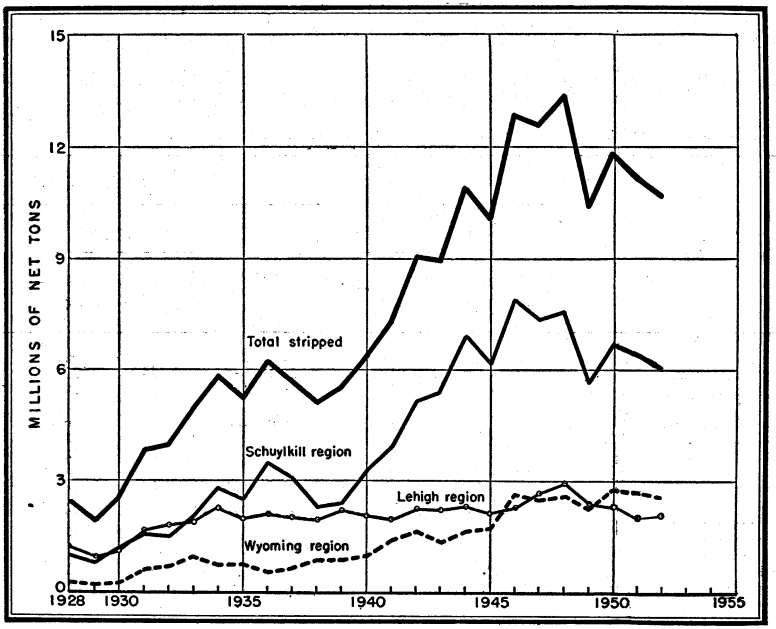

FIGURE 2.—Pennsylvania anthracite mined from strip pits, by regions, 1928–52.

TABLE 24.—Relative growth of Pennsylvania anthracite mined from strip pits, 1915, 1920, 1925, 1930, and 1947–52

	Net tons mined by stripping	Percent of fresh-mined total that was stripped	Number of men employed	Average number of days worked
1915	1,121,603	[1]	[1]	[1]
1920	2,054,441	2.5	[1]	[1]
1925	1,578,478	2.7	[1]	[1]
1930	2,536,288	3.7	[1]	[1]
1947	12,603,545	25.4	7,264	242
1948	13,352,874	26.5	7,005	260
1949	10,376,808	27.7	7,386	198
1950	11,833,934	29.6	7,949	212
1951	11,135,990	29.7	7,647	220
1952:				
Lehigh region	2,115,550	36.5	1,412	207
Schuylkill region	6,001,733	43.8	4,265	203
Wyoming region	2,579,422	16.2	1,423	243
Total [2]	10,696,705	30.2	7,100	212

[1] Data not available.
[2] No production by stripping in Sullivan County in 1952.

TABLE 25.—Power shovels and draglines used in stripping Pennsylvania anthracite, 1950–52, by type of power

Type of power	1950			1951			1952		
	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total
Gasoline	53	11	64	47	7	54	51	7	58
Electric	48	47	95	55	50	105	53	57	110
Diesel	195	259	454	195	241	436	158	226	384
Total	296	317	613	297	298	595	262	290	552

Dredge Operations.—In 1941 output of river coal reached a record peak of 1.5 million tons valued at $1.8 million. However, production slipped below the 1-million-ton level in 1948 and has declined consistently since that date. Production was below 400,000 tons in 1952, the lowest output since the close of World War I. As recently enacted Pennsylvania laws forbid deposit of untreated breaker wastes from new operations into surface streams and modern preparation equipment prevents any substantial quantity of good coal reaching the culm banks, continued decline in the output of river coal is expected.

TABLE 26.—Pennsylvania anthracite produced by dredges in 1952, by rivers (including tributaries)

River	Production (net tons)	Value	
		Total	Average
Lehigh	17,402	$53,123	$3.05
Schuylkill	30,407	104,427	3.43
Susquehanna	324,245	952,228	2.94
Total	372,054	1,109,778	2.98

TABLE 27.—Pennsylvania anthracite produced by dredges, 1909–52, by rivers (including tributaries)

Year	Net tons				Value	
	Lehigh River	Schuylkill River	Susquehanna River	Total	Total	Average per ton
1909	(1)	(1)	(1)	107,788	(1)	(1)
1910				102,853		
1911				106,005		
1912				96,009		
1913				150,064		
1914				115,257		
1915				138,421	$100,744	$0.73
1916				160,507	110,831	.69
1917				170,672	206,754	1.21
1918				282,930	366,565	1.30
1919				693,093	868,746	1.25
1920				740,453	862,296	1.16
1921				623,329	650,654	1.04
1922				904,108	989,709	1.09
Total, 1909–22 [2]	(1)	(1)	(1)	4,391,489	[2] 4,156,299	1.12
1923	106,092	97,254	753,022	956,368	811,065	.85
1924	80,301	74,359	670,734	825,394	681,181	.83
1925	99,614	173,639	742,455	1,015,708	929,292	.16
1926	58,544	131,654	724,566	914,764	828,398	.91
1927	85,177	127,705	758,935	971,817	794,807	.82
1928	89,304	157,449	696,648	943,401	821,530	.87
1929	87,241	133,720	495,983	716,944	626,187	.87
1930	60,219	138,236	444,836	643,291	538,268	.84
1931	33,014	90,855	334,881	458,750	379,682	.83
1932	42,091	105,990	331,969	480,050	445,799	.93
1933	51,083	106,004	381,837	538,924	452,153	.84
1934	91,346	100,873	459,961	652,180	636,038	.98
1935	78,578	73,326	438,563	590,467	517,304	.88
1936	63,327	31,669	451,688	546,684	581,679	1.06
1937	[3] 95,065	([3])	665,409	760,474	842,052	1.11
1938	[3] 123,452	([3])	447,572	571,024	570,579	1.00
1939	62,134	67,539	574,187	703,860	746,000	1.06
1940	[3] 78,947	([3])	863,997	942,944	1,097,000	1.16
1941	47,838	396,522	1,073,203	1,517,563	1,839,784	1.21
1942	9,385	268,919	1,006,729	1,285,033	1,478,719	1.15
1943	37,452	342,815	954,470	1,334,737	1,972,777	1.48
1944	40,894	494,371	837,472	1,372,737	2,084,431	1.52
1945	41,409	366,161	797,656	1,205,226	1,924,148	1.60
1946	37,441	247,757	847,196	1,132,394	2,091,324	1.85
1947	46,478	158,102	1,015,126	1,219,706	2,480,068	2.03
1948	54,284	67,871	865,849	988,004	2,291,752	2.32
1949	22,131	52,012	790,979	865,122	2,131,096	2.46
1950	21,877	34,222	563,465	619,564	1,677,508	2.71
1951	25,344	27,454	508,770	561,568	1,576,576	2.81
1952	17,402	30,407	324,245	372,054	1,109,778	2.98
Total, 1923–52	1,787,464	4,096,885	19,822,403	25,706,752	34,956,975	1.36
Grand total	(1)	(1)	(1)	30,098,241	(1)	(1)

[1] Data not available.
[2] Figures for value cover 1915–22.
[3] Schuylkill included with Lehigh in 1937, 1938, and 1940.

DISTRIBUTION

Shipments of anthracite reported directly to the Bureau of Mines by producers, dock operators, and American and Canadian wholesalers totaled 40 million tons for the 1951–52 coal year, a 4-percent decline from 1950–51. The coal year was characterized by sharp declines in shipments to American and Canadian markets and a substantial increase in exports to Europe. Shipments to points in the United States were down 11 percent from the 1950–51 coal year, whereas exports to Canada fell from 3.8 million tons in the 1950–51 coal year to 3.4 million tons in 1951–52.

Competition from other fuels and mild weather conditions are the most significant reasons for the rapid decline in anthracite production since the 1947–48 coal year. The winter of 1951–52 was the fourth successive season of generally mild weather in the major anthracite market areas. Increased sales efforts by natural-gas and oil interests to procure additional business in the space-heating field caused a large part of the loss in demand for the larger, space-heating sizes of anthracite. Over the same period, a decline also occurred in shipments of the smaller sizes, but the percentage of these sizes increased in relation to total shipments. For instance, the smaller sizes were 43 percent of all shipments reported for the 1947–48 coal year and 47 percent of the 1951–52 coal year.

Of the 1951–52 total shipments, 84 percent went to points in the United States, 9 percent to Canada, and the remainder to other foreign countries (table 28). Shipments of the domestic sizes to Canada during the 1951–52 coal year were 392,000 tons under the 1950–51 total, indicating that it imported more of the smaller steam sizes. European purchases of Pennsylvania anthracite had a stabilizing effect upon the industry during the 1951–52 coal year, as production of the unusually large amounts of domestic sizes for European countries provided more of the smaller sizes for other markets.

Monthly reports of the Pennsylvania Department of Mines indicate that 33.5 million tons of anthracite were shipped during the 1952 calendar year. Of this total, slightly less than 19 percent was shipped by truck and the remainder by rail; however, an unknown part of the rail tonnage, shown in table 29, is reshipped by lake or tidewater carriers. The pattern of truck distribution remained relatively unchanged from that of 1951; 55 percent of the total was destined to points within the producing region and the remainder to Pennsylvania points outside the region and other States. Truck shipments, by months and States of destination, are shown in table 30.

TABLE 28.—Distribution of Pennsylvania anthracite, April 1, 1951, to March 31, 1952, by States, Provinces, and other countries of destination, in net tons

Destinations	Domestic sizes						Steam sizes					Total all sizes	Percent of total
	Broken	Egg	Stove	Chestnut	Pea	Total domestic	Buckwheat No. 1	Buckwheat No. 2 (Rice)	Buckwheat No. 3 (Barley)	All other sizes	Total steam		
United States:													
New England States:													
Connecticut	334	8,689	235,604	256,757	20,686	522,070	39,718	44,191	8,038	4,495	96,442	618,512	1.55
Maine		11,082	95,264	80,286	2,226	188,858	22,441	9,865		776	33,082	221,940	.55
Massachusetts	1,323	115,678	776,538	395,302	29,614	1,318,455	154,722	67,775	58,967	29,982	311,446	1,629,901	4.07
New Hampshire	43	7,752	77,451	50,296	2,672	138,214	21,957	17,286	72,354	492	112,089	250,303	.63
Rhode Island		8,200	98,083	61,606	4,818	172,707	12,659	9,138		5,849	27,646	200,353	.50
Vermont	1,143	4,928	82,607	59,108	6,950	154,736	36,734	19,870	20,395		76,999	231,735	.58
Total	2,843	156,329	1,365,547	903,355	66,966	2,495,040	288,231	168,125	159,754	41,594	657,704	3,152,744	7.88
Middle Atlantic States:													
New Jersey	15,242	30,209	563,594	1,323,049	358,572	2,290,666	620,940	442,642	1,055,594	521,640	2,640,816	4,931,482	12.32
New York	14,251	349,133	2,507,639	2,149,414	896,794	5,917,231	2,710,688	866,290	923,475	805,277	5,305,730	11,222,961	28.05
Pennsylvania [1]	49,832	91,001	836,828	2,245,198	1,888,571	5,111,430	1,315,963	1,293,176	1,751,321	2,553,760	6,914,220	12,025,650	30.06
Total	79,325	470,343	3,908,061	5,717,661	3,143,937	13,319,327	4,647,591	2,602,108	3,730,390	3,880,677	14,860,766	28,180,093	70.43
South Atlantic States: [2]													
Delaware		6,732	49,183	137,293	10,969	204,177	4,578	6,197	23,244	7,061	41,080	245,257	.61
District of Columbia		6,430	48,228	62,960	6,054	123,672	18,704	1,365		45	20,114	143,786	.36
Maryland	1,159	13,668	166,479	188,418	34,633	404,357	77,911	9,322	16,241	925	104,399	508,756	1.27
Virginia		985	21,537	38,025	6,362	66,909	27,045	197	8	475	27,725	94,634	.24
Total	1,159	27,815	285,427	426,696	58,018	799,115	128,238	17,081	39,493	8,506	193,318	992,433	2.48
Lake States: [3]													
Illinois	7,194	13,395	26,354	52,733	699	100,375	31,370	14,915	12,138	35,765	94,188	194,563	.49
Michigan		10,397	78,650	52,198	1,283	142,528	16,332	14,747	59	8,845	39,983	182,511	.46
Minnesota		49	8,472	10,868	1,227	20,616	1,141	141		32,137	33,419	54,035	.13
Ohio	50	3,850	3,878	27,445	843	36,066	21,874	18,763	7,493	23,151	71,281	107,347	.27
Wisconsin	85	22	125,808	166,044	14,759	306,718	13,003	3,112		247,147	263,262	569,980	1.42
Total	7,329	27,713	243,162	309,288	18,811	606,303	83,720	51,678	19,690	347,045	502,133	1,108,436	2.77
All other States		14,782	8,427	76,699	3,033	102,941	16,784	7,395	4,138	122,526	150,843	253,784	.64
Total United States	90,656	696,982	5,810,624	7,433,699	3,290,765	17,322,726	5,164,564	2,846,387	3,953,465	4,400,348	16,364,764	33,687,490	84.20
Canada:													
Ontario	291	52,081	1,332,644	922,069	53,960	2,361,045	91,815	86,538	14,160	2,655	195,168	2,556,213	6.39
Quebec	96	19,253	266,457	143,562	8,899	438,267	218,778	127,384	50,207	662	397,031	835,298	2.09
Other Provinces	353	3,691	11,916	15,754	267	31,981	665	9,213		59	9,937	41,918	.10
Total Canada	740	75,025	1,611,017	1,081,385	63,126	2,831,293	311,258	223,135	64,367	3,376	602,136	3,433,429	8.58
Other countries	203,412	440,508	154,613	242,683	147,035	1,188,251	22,148	349,757	247,441	1,081,725	[4] 2,889,322	1,701,071	7.22
Grand total	294,808	1,212,515	7,576,254	8,757,767	3,500,926	21,342,270	5,497,970	3,419,279	4,265,273	5,485,449	18,667,971	40,010,241	100.00

[1] Includes "Local sales."
[2] Shipments to other States generally referred to as being in the South Atlantic area are included in "All other States."
[3] Shipments to Indiana are included in "All other States."
[4] France received approximately 56 percent; The Netherlands, 20 percent; Belgium and Norway each about 7 percent, and other countries, 10 percent.

TABLE 29.—Rail shipments of Pennsylvania anthracite, 1949–52, by destination, in net tons [1]

[Pennsylvania Department of Mines]

Destination	1949	1950	1951	1952
New England States	3,277,034	3,551,489	2,955,785	2,725,609
New York	10,804,020	10,589,197	9,095,169	8,889,094
New Jersey	4,522,749	4,613,659	4,140,095	3,927,830
Pennsylvania	6,935,710	6,740,610	6,026,258	6,260,242
Delaware	237,479	245,097	222,750	200,389
Maryland	396,561	431,546	397,129	358,567
District of Columbia	152,940	177,754	135,742	123,322
Virginia	84,275	73,809	75,982	71,820
Ohio	50,673	94,022	85,303	118,378
Indiana	66,773	80,209	58,155	47,206
Illinois	152,791	211,366	207,291	143,085
Wisconsin	463,625	489,784	355,852	275,058
Minnesota	47,944	61,353	28,340	34,295
Michigan	235,703	249,088	171,315	138,440
Other States	57,148	86,213	144,861	144,762
Total United States	27,485,425	27,695,196	24,100,027	23,458,097
Canada	3,154,387	3,620,573	3,199,775	3,175,125
Other foreign countries	671,350	35,139	1,724,439	667,213
Grand total	31,311,162	31,350,908	29,024,241	27,300,435

[1] Does not include dredge coal.

TABLE 30.—Truck shipments of Pennsylvania anthracite in 1952, by months and by States of destination, in net tons [1]

Destination	January	February	March	April	May	June	July
Pennsylvania:							
Within region	438,727	388,013	345,466	276,656	284,751	216,890	120,043
Outside region	218,837	176,793	166,683	114,276	182,160	135,389	88,368
New York	46,941	38,494	36,628	24,220	31,172	29,637	20,634
New Jersey	40,879	36,423	34,373	28,150	36,698	39,506	19,541
Delaware	3,968	1,785	2,785	893	504	321	242
Maryland	2,054	2,074	4,920	616	450	438	828
District of Columbia	2,613					82	
Other States		1,418	3,095	445	950	802	222
Total: 1952	754,019	645,000	593,950	445,256	536,685	423,065	249,878
1951	748,886	678,371	534,370	414,363	456,736	413,452	259,890

Destination	August	September	October	November	December	Total	Percent of total trucked
Pennsylvania:							
Within region	222,899	249,435	279,827	264,146	347,368	3,434,221	55.3
Outside region	133,599	162,060	180,491	143,204	178,985	1,880,845	30.3
New York	27,902	24,721	38,465	32,010	38,924	389,748	6.3
New Jersey	33,699	37,091	44,297	32,694	35,673	419,024	6.7
Delaware	653	1,362	2,135	2,058	2,106	18,812	.3
Maryland	1,033	1,688	2,512	1,723	2,245	20,581	.3
District of Columbia			179	114		2,988	(2)
Other States	728	38,982	1,344	1,019	1,212	50,217	.8
Total: 1952	420,513	515,339	549,250	476,968	606,513	6,216,436	100.0
1951	398,198	403,066	616,714	683,881	703,899	6,311,826	100.0

[1] Compiled from reports of Pennsylvania Department of Mines. Does not include dredge coal.
[2] Less than 0.05 percent.

Data compiled from reports of the Massachusetts Division on the Necessaries of Life and of the Association of American Railroads on the movement of anthracite to New England are shown in table 31. New England rail receipts of Pennsylvania anthracite decreased 9

percent from 1951, whereas tidewater receipts were up about 6 percent.

The volume of anthracite moved by Lake carriers in 1952 changed slightly from 1951. Lake Erie loadings, approximately 18,000 tons greater than in 1951, were offset by the decline of loadings over Lake Ontario docks of about the same amount. Receipts at the upper Lake docks totaled 495,000 tons, compared with 503,000 tons in 1951.

Shipments of anthracite from the Lehigh, Schuylkill, and Wyoming regions 1890–1952 are shown graphically in figure 3.

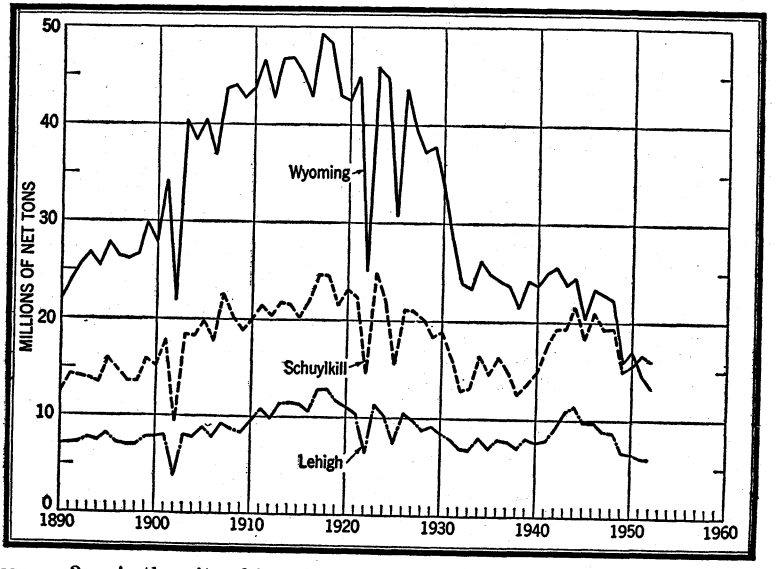

FIGURE 3.—Anthracite shipped from the Lehigh, Schuylkill, and Wyoming regions, 1890–1952.

TABLE 31.—Receipts of anthracite in New England, 1917, 1920, 1923, 1927, and 1940–52, in thousands of net tons

Year	Receipts by tidewater	Receipts by rail [1]	Imports [2]	Total receipts of Pennsylvania anthracite [3]	Year	Receipts by tidewater [4]	Receipts by rail [1]	Imports [2]	Total receipts of Pennsylvania anthracite [3]
1917	[1] 4,421	7,259	1	11,679	1945	331	4,750	(5)	5,081
1920	[1] 3,521	7,804	1	11,324	1946	399	5,244	----------	5,643
1923	[1] 4,082	8,102	145	12,039	1947	240	4,498	----------	4,738
1927	[1] 2,421	6,725	106	9,040	1948	217	4,646	----------	4,863
1940	[1] 648	4,174	135	4,687	1949	110	3,336	----------	3,446
1941	[1] 682	4,870	75	5,477	1950	81	3,615	18	3,678
1942	[4] 581	5,393	139	5,835	1951	66	3,135	27	3,174
1943	[4] 575	5,310	164	5,721	1952	70	2,847	29	2,888
1944	[4] 398	5,836	12	6,222					

[1] Commonwealth of Massachusetts, Division on the Necessaries of Life.
[2] U. S. Department of Commerce.
[3] Total receipts by rail and by tidewater less imports.
[4] Association of American Railroads.
[5] Less than 500 tons.

CONSUMPTION

The 5-percent decline in production of Pennsylvania anthracite in 1952 was accompanied by an equivalent drop in apparent consumption (calculated on the basis of production, imports, exports, and changes in producers' stocks). As the result of a 14-percent decline in the production of coke, the quantity of anthracite mixed with bituminous coal in the manufacture of coke fell 13 percent under 1951. The consumption of anthracite by the briquetting industry also declined, as that industry again decreased its output. Consumption reported by public utilities was 3.8 million tons, slightly less than 3 percent under 1951. It was felt that consumption by the public utilities would have been higher in 1952 if assurance could have been given the utilities as to the adequacy of future supplies of the smaller sizes. The tonnage of anthracite used by railroads also dropped to 8 percent less than 1951.

TABLE 32.—Apparent consumption of anthracite and selected competitive fuels in the principal anthracite markets, 1949–52

[Thousands of net tons]

Fuel	New England	New York	New Jersey	Pennsylvania	Delaware	Maryland	District of Columbia	Total	Percent of total fuels
Anthracite (all users):									
Pennsylvania: [1]									
1949	3,277	[2] 11,191	[2] 4,896	12,194	255	429	153	32,395	40.0
1950	3,552	[2] 11,054	[2] 5,007	12,690	266	464	179	33,212	37.4
1951	2,956	[2] 9,482	[2] 4,519	11,512	240	422	136	29,267	33.0
1952	2,726	[2] 9,279	[2] 4,347	11,575	219	379	126	28,651	32.2
Imported: [3]									
1949								18	(4)
1950	18							27	(4)
1951	27							29	(4)
1952	29								
Briquets (for domestic use):									
1949	25	21	21	39	(5)	15	1	122	.2
1950	36	23	13	39	(5)	22	3	136	.2
1951	42	17	25	27	(5)	17	2	130	.1
1952	31	12	11	22	(5)	14	1	91	.1
Imported: [3]									
1949								(5)	(4)
1950								(5)	(4)
1951								(5)	(4)
1952								(5)	(4)
Coke (for domestic use):									
1949	592	510	281	168	(5)	1		1,552	1.9
1950	617	545	348	186	(5)	1		1,697	1.9
1951	542	343	321	168	(5)	1		1,375	1.6
1952	525	264	298	134	(5)	1		1,222	1.4
Imported: [3]									
1949	1	83						84	.1
1950	56	30						86	.1
1951	(5)	9		4				13	(4)
1952	(5)	159						159	.2
Oil: Heating and range: [6]									
1949	17,353	14,086	7,735	4,418	433	2,048	713	46,786	57.8
1950	19,807	15,877	8,558	5,686	476	2,454	783	53,641	60.4
1951	21,302	16,846	8,701	6,637	558	2,979	990	58,013	65.3
1952	21,367	16,957	8,666	6,990	606	3,115	1,104	58,805	66.1
Total:									
1949	21,248	25,891	12,933	16,819	688	2,493	867	80,939	100.0
1950	24,086	27,529	13,926	18,601	742	2,941	965	88,790	100.0
1951	24,869	26,697	13,566	18,348	798	3,419	1,128	88,825	100.0
1952	24,678	26,671	13,322	18,721	825	3,509	1,231	88,957	100.0

[1] Pennsylvania Department of Mines.
[2] An important but undetermined part of anthracite shown as shipped to New Jersey is reshipped to New York City.
[3] U. S. Department of Commerce.
[4] Less than 0.05 percent.
[5] Less than 500 tons.
[6] Converted to coal equivalent upon basis of 4 barrels of fuel oil equaling 1 ton of coal.

Data of the Pennsylvania Department of Mines indicate that shipments to the primary anthracite market area (New England and Middle Atlantic States, Delaware, Maryland, and the District of Columbia), which received 97 percent of total shipments to United States destinations in 1952, declined 615,000 tons from 1951. As the losses mentioned for the industrial users (public utilities, coke ovens, railroads, etc.) comprised only part of the total decline in apparent consumption in 1952; it is assumed that the greater losses occurred in the space-heating field, particularly in the primary market area. Data are not available on the consumption of all fuels in the primary market area, however, table 32 presents the apparent consumption of anthracite, domestic coke, briquets, and heating and range oil, in terms of coal equivalent.

Mechanical Stokers.—Factory sales of class I stokers (with a burning capacity under 61 pounds of coal per hour) totaled 8,068 in 1952, an increase of 89 percent over 1951, according to reports of the Bureau of the Census, United States Department of Commerce. Sales of class 2 stokers increased from 414 units in 1951 to 543 units in 1952.

STOCKS

Stocks of anthracite held by producing companies at the end of December 1952 increased 74 percent over 1951, according to data compiled by the Anthracite Committee. Because of the slack market demand for domestic sizes, producer stocks of these sizes continued to increase, and, by the close of the year, constituted almost the entire inventory. Stocks of Rice and Barley remained near the minimum level all year owing to strong demand from consumers.

Stocks on the upper Lake docks also increased materially, totaling 259,000 tons at the close of December 1952 compared to 198,000 tons in 1951. Anthracite stocks at electric utility plants were up 9 percent over 1951; they exceeded 5 million tons during each month of the year, except March and April. Stocks of Class I railroads declined 9 percent from 1951.

Anthracite in retail dealers' yards on December 31, 1952, was estimated by the Bureau of Mines to be 3 million tons—1.6 million tons of Egg, Stove, and Chestnut sizes combined, 297,000 tons of Pea, and 1.1 million tons of Buckwheat Nos. 1 and 2. These figures represented increases over stocks held on December 31, 1951, of 3 percent for Egg, Stove, and Chestnut sizes, 5 percent for Pea, and 25 percent for Buckwheat Nos. 1 and 2—an overall increase of 10 percent.

PRICES

Prices of Pennsylvania anthracite were regulated throughout 1952 by the Office of Price Stabilization under Ceiling Price Regulation 4. The ceilings established were based upon the specifications for standard anthracite approved by the Anthracite Committee (see table 33) and continued the customary industry practice of making extra charges for special services, such as partitioning cars, calcium chloride treatment, pocket loading of trucks, etc. Producers who had sold coal from certain seams or breakers at a premium (usually 25 cents per ton) were authorized by the regulation to add the extra charge to ceiling prices.

As the result of a survey conducted by the Office of Price Stabilization on production costs and earnings in the anthracite industry,

TABLE 33.—Standard anthracite specifications approved and adopted by the Anthracite Committee, effective July 28, 1947

	Round test mesh, inches	Percent					
		Oversize, maximum	Undersize		Maximum impurities [1]		
			Maximum	Minimum	Slate	Bone or ash [2]	
Broken	Through 4⅜				1½	2	11
	Over 3¼ to 3		15	7½			
Egg	Through 3¼ to 3	5			1½	2	11
	Over 2⅞		15	7½			
Stove	Through 2⅞	7½			2	3	11
	Over 1⅝		15	7½			
Chestnut	Through 1⅝	7½			3	4	11
	Over 1³⁄₁₆		15	7½			
Pea	Through 1³⁄₁₆	10			4	5	12
	Over ⅝		15	7½			
Buckwheat No. 1	Through ⅝	10					13
	Over 5⁄16		15	7½			
Buckwheat No. 2 (Rice)	Through 5⁄16	10					13
	Over ⅜		17	7½			
Buckwheat No. 3 (Barley)	Through ⅜	10					15
	Over ³⁄₃₂		20	10			
Buckwheat No. 4	Through ³⁄₃₂	20					15
	Over ³⁄₆₄		30	10			
Buckwheat No. 5	Through ³⁄₆₄	30	No limit				16

[1] When slate content in the sizes from Broken to Chestnut, inclusive, is less than above standards, bone content may be increased by 1½ times the decrease in the slate content under the allowable limits, but slate content specified above shall not be exceeded in any event.

A tolerance of 1 percent is allowed on the maximum percentage of undersize and the maximum percentage of ash content.

The maximum percentage of undersize is applicable only to anthracite as it is produced at the preparation plant. Slate is defined as any material which has less than 40 percent fixed carbon.

Bone is defined as any material which has 40 percent or more, but less than 75 percent fixed carbon.

[2] Ash determinations are on a dry basis.

Ceiling Price Regulation 4 was amended August 12 to provide an increase of 75 cents per net ton, f. o. b. mine or preparation plant, on Buckwheat No. 1, Rice, Barley, Buckwheat No. 4, and smaller sizes. Effective October 1, CPR 4 was amended further (Amendment 5) to authorize an increase of 20 cents per ton on ceiling prices for all sizes of anthracite to compensate producers for their increased contribution to the Anthracite Welfare Fund. As the OPS found that the industry was entitled to an increase under the industry earnings standard formula and was unable to absorb additional labor costs imposed by the new contract with the mine workers, CPR 4 was again amended (Amendment 6) effective November 16.

Ceiling prices for standard anthracite, per net ton f. o. b. mines, at the end of December 1952 were as follows: Broken, $15.75; Egg, $16; Stove, $16.25; Chestnut, $16.15; Pea, $12.85; Buckwheat No. 1, $10.10; Rice, $8.35; Barley, $6.55; and Buckwheat No. 4 and smaller, $5.45. Ceiling prices on substandard anthracite were $1.15 per ton lower for Broken through Chestnut sizes: $1 lower for Pea, $0.70 for Buckwheat No. 1, $0.60 for Rice, $0.50 for Barley, and $0.40 for smaller sizes. According to Saward's Journal, circular prices quoted by the trade at the close of the year were within the following limits: Egg, $15.95–$16.25; Stove, $15.75–$16.50; Chestnut, $15.55–$16.40; Pea, $12.15–$12.85; Buckwheat No. 1, $9.80–$10.20; Buckwheat No. 2 (Rice), $7.85–$8.20; and Buckwheat No. 3 (Barley), $5.70–$6.00. Monthly data compiled from reports of the Bureau of Labor Statistics, United States Department of Labor, on retail prices of fuels in selected cities for 1952 are shown in table 34.

TABLE 34.—Retail prices of selected fuels in 1952, by months, for various cities

[Coal and coke, per net ton; heating oil, per 100 gallons]

City and fuel	January	February	March	April	May	June	July	August	September	October	November	December
Baltimore, Md.:												
Anthracite:												
Stove	$22.70	$22.70	$22.70	$22.11	$21.73	$21.73	$22.03	$22.11	$22.56	$22.93	$23.25	$24.31
Buckwheat No. 1	15.80	15.80	15.80	15.75	15.62	15.62	15.66	15.66	15.85	16.75	16.88	17.77
Heating oil: Fuel oil No. 2	12.44	12.44	12.44	12.44	12.44	12.44	13.57	13.57	13.57	13.57	13.57	13.57
Boston, Mass.:												
Anthracite:												
Stove	25.78	25.78	25.78	25.78	24.20	24.20	25.20	25.70	25.70	26.31	26.31	27.88
Buckwheat No. 1	18.08	18.08	18.08	18.08	18.05	18.05	18.25	18.25	18.25	18.74	18.74	20.54
Coke: Egg	23.20	23.20	23.20	23.20	22.20	22.20	23.00	23.00	23.20	23.50	23.50	25.25
Heating oil: Fuel oil No. 2	12.60	12.60	12.60	12.60	12.60	12.60	13.40	13.40	13.40	13.40	13.40	13.40
Buffalo, N. Y.:												
Anthracite:												
Stove	24.41	24.41	24.41	22.67	22.62	23.11	23.96	23.95	24.52	25.02	25.16	26.47
Buckwheat No. 1	16.86	16.86	16.86	16.88	16.88	17.07	17.07	17.26	17.38	18.05	18.25	19.39
Coke: Nut	21.29	21.29	21.29	21.29	21.13	21.13	21.13	21.13	20.96	19.38	19.39	22.27
Heating oil:												
Fuel oil No. 2	13.74	13.74	14.04	14.04	14.04	14.04	14.85	14.85	14.85	14.85	14.85	14.85
Fuel oil No. 3	13.74	13.74	14.04	14.04	14.04	14.04	14.85	14.85	14.85	14.85	14.85	14.85
Milwaukee, Wis.:												
Anthracite: Stove	25.86	25.86	25.86	25.86	25.42	25.82	25.82	26.07	26.07	26.27	26.53	26.53
Bituminous coal: Low-volatile Stove	20.59	20.59	20.59	20.59	20.30	20.30	20.47	20.47	20.72	20.90	21.08	21.08
Coke: Nut	22.25	22.25	22.25	22.25	22.25	22.25	22.25	22.25	22.25	22.25	22.35	22.41
Heating oil:												
Fuel oil No. 2	14.01	14.10	14.10	14.10	14.10	14.10	14.10	14.10	14.10	14.10	14.10	14.10
Fuel oil No. 3	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
New York, N. Y.:												
Anthracite:												
Stove	25.29	25.29	25.29	25.29	23.69	23.69	24.20	24.20	24.59	25.44	25.70	27.19
Buckwheat No. 1	15.88	15.88	15.88	15.88	15.58	15.58	15.83	15.83	16.29	16.86	17.14	18.27
Coke: Nut	23.42	23.42	23.42	23.42	23.42	23.42	24.65	24.65	24.65	24.68	25.06	25.37
Heating oil: Fuel oil No. 2	12.71	12.71	12.71	12.71	12.71	12.71	13.58	13.58	13.58	13.58	13.58	13.58
Philadelphia, Pa.:												
Anthracite:												
Stove	22.60	22.60	22.60	22.60	20.46	20.34	21.08	21.15	21.71	22.98	23.09	23.09
Buckwheat No. 1	15.13	15.13	15.13	15.13	14.98	14.98	14.98	15.03	15.13	15.90	15.90	16.30
Coke: Nut	20.95	20.95	20.95	20.20	19.74	20.48	20.74	20.74	20.74	21.28	21.28	22.44
Heating oil: Fuel oil No. 2	12.20	12.20	12.20	12.20	12.20	12.20	13.00	13.00	13.00	13.00	13.00	13.00
Portland, Maine:												
Anthracite:												
Stove	23.75	23.75	23.75	23.75	23.75	23.75	23.95	23.95	23.95	24.30	24.45	25.46
Buckwheat No. 1	17.15	17.15	17.15	17.15	17.15	17.15	17.35	17.35	17.35	17.85	18.23	19.25
Coke: Egg	21.82	21.82	21.82	21.82	21.82	21.82	22.01	22.01	22.00	22.30	22.30	23.42
Heating oil: Fuel oil No. 2	12.40	12.40	12.40	12.40	12.40	12.40	13.20	13.20	13.20	13.20	13.20	13.20

Washington, D. C.:												
Anthracite:												
Stove	23.50	23.50	23.50	23.50	22.45	22.77	23.00	23.32	23.55	24.16	24.26	25.28
Buckwheat No. 1	16.17	16.17	16.17	16.17	16.17	16.37	16.37	16.37	16.58	17.24	17.34	18.16
Bituminous coal: Low-volatile Stove	18.32	18.32	18.32	18.32	18.32	18.42	18.47	18.47	18.47	18.78	18.88	18.88
Heating oil: Fuel oil No. 2	12.85	12.85	12.85	12.85	12.85	12.85	13.67	13.67	13.67	13.67	13.77	13.80

[1] Compiled from reports of Bureau of Labor Statistics. Prices are as of the 15th of each month. State and local taxes included wherever applicable.

TECHNOLOGY

As the production of anthracite has declined, the role of practical and basic research has assumed increasing importance. If the decline is to be halted, or if output is to eventually increase, the improvement will result from research devoted to finding new uses, the development of new equipment for burning anthracite, and improvement in mining methods and equipment.

The reversal in relative demand for various sizes of anthracite in the past several years will have paramount importance in future, not only in determining the course of anthracite mining and marketing practices but in charting the course of future research. It is significant that, while shipments of the space-heating or domestic sizes of anthracite have been declining, the steam sizes, which comprised only 29 percent of the breaker shipments in 1930, accounted for 45 percent in 1952. Should the demand for the steam sizes continue to show a material increase, the industry may have to meet the demand either by crushing large coal or by producing more of the smaller sizes on first mining. To meet this problem, research will be necessary to devise the mining methods and equipment that will not only increase output per man per day but will ultimately supply more of the smaller sizes of anthracite to the industrial market at a price competitive with other fuels.

The anthracite fields have contributed heavily to our country's fuel requirements and are of primary importance to our national economy. Five billion tons of anthracite has been mined and marketed from a relatively small area in northeastern Pennsylvania during the past 150 years, yet the extraction of this vast amount has not exhausted the reserves. Estimates indicate that enough coal remains to support current production for 200 years. It was with these thoughts in mind that the Bureau's research program for anthracite was planned.

Before completion of the Anthracite Research Laboratory at Schuylkill Haven, Pa., in 1951 the Bureau's work in anthracite research was concentrated on underground mining, as it was thought that improved mining methods offered the quickest means of reducing cost of production, which, in turn, might place anthracite in a better competitive position with other fuels. Another consideration was that mining research could be conducted in the mines and would require a minimum of office and laboratory space. Research relating to preparation and utilization has been accelerated as rapidly as possible since the laboratory was completed. The formal establishment of industry committees for mining, preparation, and utilization studies was of valuable assistance in 1952 in selection and completion of various projects.

Beginning in 1944, practical research was conducted in cooperation with the industry on several mining projects. Tests were run on scraper-shaker loading machines for driving gangways and on the Eickoff shearing machine, model DEK, to obtain data on its power requirements in cutting anthracite. Experiments were conducted with the Korfmann Universal shearing machine, model SK 20, to determine its power characteristics, maneuverability, and general qualifications for cutting anthracite. Tests were made also on

pneumatic packing with a Brieden machine. Much of the research completed in the past years has been discussed in Minerals Yearbook chapters on Pennsylvania anthracite and various publications related to the work have been referred to in those chapters.

There has been little change in basic timbering methods in anthracite mines during the past 75 years. To obtain detailed information on the subject, the Bureau cooperated with an anthracite producer in the Northern field in an investigation of pneumatic packing. Pneumatic packing was introduced in Germany about 30 years ago and has gained considerable favor in Europe where, in many instances, it has replaced other methods of roof support. Foreign publications indicate that pneumatic backfilling is superior to conventional caving and hand-packing methods for maintaining control of overlying strata. The Bureau's research on the subject has been promising enough to prompt the cooperating company to pack first-mined areas in another bed at the same colliery.[2]

During the past 5 years the Bureau's work on the use of machines for underground development work in pitching anthracite beds provided data that show that about one-half of the face-working time is required to provide support for the roof and sides of rooms. Engineers engaged in this work suggested the possibility of using a movable, telescopic steel shield at the face instead of conventional wooden props to reduce the time so consumed. Face workers could be provided maximum protection from falls of roof and ribs and the entire labor force used to produce coal if such a shield were perfected. Permanent timbering, set up independently of the facework, could be placed behind the shield as the face was advanced. The design of a shield would depend necessarily upon the loads that it would be required to support. As little information was available on the subject, special electric cells and automatic recorders were made and placed on the collars of three timber roof supports to measure loads. Although the results of the tests are sufficient for a preliminary shield design, it has not been determined fully whether the loads measured were higher, lower, or near the average for general underground conditions. Therefore, further tests, supplemented by a study of strata behavior, will be necessary.[3]

Other mining and machinery design projects in progress during 1952 were: (1) A study of the transmission, distribution, and storage of compressed air in underground anthracite mines; (2) the use of yielding steel supports in mining thick, flat beds to eliminate wooden props and improve roof conditions; (3) the development of lightweight-aggregate roof supports of maximum strength; (4) the design and construction of a vibrating-blade coal-planer unit similar to the German coal plough (tests will be made on the ability of this machine to cut anthracite successfully); and (5), work on the design of a large-diameter coal drill or auger similar to those used in bituminous-coal mines.

In coal preparation, the various types of crushers were investigated to determine which would reduce the domestic sizes of anthracite to

[2] Landsidle, Clayton A., Hartley, John C., and Buch, John W., Anthracite Mechanical Mining Investigations, Progress Report 6, Preliminary Testing of Brieden Pneumatic Packing Machine: Bureau of Mines Rept. of Investigations 4978, 1953, 13 pp.

[3] Allan, Andrew, Jr., Kaar, Paul H., and Cooner, John D., Sr., Anthracite Mechanical Mining Investigations, Progress Report 9, Measurement of Loads Borne by Underground-Roadway Supports: Bureau of Mines Rept. of Investigations 4946, 1953, 12 pp.

the larger steam sizes with the least amount of fines. Investigations were under way also on launder screens for cleaning fine sizes of anthracite. The stoker-boiler units in the laboratory at Schuylkill Haven have been studied for about 2 years to determine operating characteristics under varying weather and load conditions.

The Bureau of Mines began a study of underground water pools in the anthracite region in 1945 as part of its technologic investigations of the mine-water problem. Since that time, the Bureau has cooperated closely with the anthracite producers and the Commonwealth of Pennsylvania in obtaining information on the complex problems relating to underground mine water. The mines in the anthracite region handle over 200 billion gallons of mine water annually, of which more than 150 billion gallons is pumped to the surface. To obtain criteria upon which engineering studies of this problem could be based, the Bureau gathered data on all factors involved, such as the quantity of water impounded in abandoned and active mines, the amount of water pumped from each mine, chemical characteristics of the water, the effect of mine water upon surface streams, and the physical condition of barrier pillars, which, in abandoned mines, serve as protection for active workings. Many of the data on mine water obtained by the Safety Branch of the Health and Safety Division of the Bureau of Mines have been published by that division in numerous Bureau of Mines publications.[4] The mine-water problem has been discussed briefly also in previous anthracite chapters of Minerals Yearbooks.

In 1952 the Anthracite Institute laboratory placed greater emphasis on basic research and equipment development. A study was conducted on the use of anthracite as a filter aid in commercial and industrial processes, which was complemented by similar work done independently by some large industrial users of filtering material. A comprehensive survey was made on the industrial uses of carbon and a report on the findings was prepared for those interested in anthracite as a possible source of industrial carbon. In the realm of cooperative research, the institute laboratory carried out projects with the Pennsylvania State College, the Bureau of Mines laboratory at Schuylkill Haven, Pa., the Imperial Tobacco Co. of Canada, and the State of North Carolina.

FOREIGN TRADE

Data of the United States Department of Commerce indicate that exports of Pennsylvania anthracite dropped 23 percent in 1952 to 4.6 million net tons. Shipments to Canada were 3 percent greater than in 1951, but European purchases tumbled from 2.4 million tons to about 923,000 tons in 1952, a 62-percent decrease. The increased shipments to Canada were attributable to a desire to build up stockpiles, as the early winter weather in eastern Canada was warmer

[4] Ash, S. H., Doherty, R. Emmet, Miller, P. S., Romischer, W. M., and Smith, J. D., Core Drilling at Shaft Sites of Proposed Mine-Water Drainage Tunnel, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 513, 1952, 43 pp.
Ash, S. H., Davies, B. S., Jenkins, H. E., and Romischer, W. M., Barrier Pillars in Lackawanna Basin, Northern Field, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 517, 1952, 114 pp.
Ash, S. H., Eaton, W. L. and Whaite, R. H., Surface-Water Seepage into Anthracite Mines in the Lackawanna Basin, Northern Field, Anthracite Region of Pennsylvania: Bureau of Mines Bull. 518, 1952, 37 pp.

than normal and competition from Welsh anthracite was about 18 percent above the 1951 level. The fuel-supply situation in Europe began to ease early in 1952, and the need for imported coal became less acute. The bulk of the tonnage exported to Europe in 1952 was shipped during the first 6 months. During the latter half of the year only isolated cargoes were moving in that direction, principally to Yugoslavia. Export data are shown in detail in table 35.

Imports of anthracite for consumption in the United States totaled 29,370 net tons in 1952; all came from Great Britain except for minor quantities received from Italy and French Morocco. Import statistics for 1951 and 1952 are shown in table 36.

TABLE 35.—Anthracite exported from the United States, 1951–52, by countries and customs districts, in net tons

[U. S. Department of Commerce]

Country	1951	1952	Customs district	1951	1952
North America:			North Atlantic:		
Bermuda	476	445	Maine and New Hampshire	9,686	12,596
British West Indies	62	225	Massachusetts	25	25
Canada	3,484,800	3,606,618	New York	3,501	792
Cuba	22,788	41,317	Philadelphia	[1] 2,466,448	989,652
Mexico	16,023	15,723	South Atlantic:		
South America:			Maryland	576	111
Brazil	679	518	Virginia	3,248	235
Chile	1,276	----	Gulf Coast:		
Colombia	77	105	El Paso	----	48
Peru	1,209	3,720	Galveston	----	54
Uruguay	[1] 2,853	----	Mobile	697	----
Venezuela	13	9	New Orleans	14	----
Europe:			Mexican border: Laredo	47	501
Austria	32,516	10,496	Northern border:		
Belgium-Luxembourg	226,780	10,159	Buffalo	2,354,024	2,371,145
Denmark	1,946	----	Dakota	36	96
France	[1] 1,333,798	486,139	Duluth and Superior	1,854	----
Germany	14	----	Michigan	225	54
Ireland	6,666	----	Montana and Idaho	14	58
Italy	45,302	10,867	Ohio	8,153	18,466
Netherlands	490,545	339,704	Rochester	17,396	18,499
Norway	190,269	----	St. Lawrence	1,086,779	1,169,848
Switzerland	84,553	1,670	Vermont	2,812	9,880
Yugoslavia	10,618	63,598			
Asia:			Total	[1] 5,955,535	4,592,060
Japan	20	724			
Saudi Arabia	14	----			
Africa:					
Belgian Congo	2,238	----			
Other Africa	----	23			
Total	[1] 5,955,535	4,592,060			

[1] Revised figure.

TABLE 36.—Anthracite imported for consumption in the United States, 1951–52, by countries and customs districts, in net tons

[U. S. Department of Commerce]

Country	1951	1952	Customs district	1951	1952
French Morocco	----	49	Massachusetts	26,812	29,299
Italy	----	22	New York	----	71
United Kingdom	26,812	29,299	Total	26,812	29,370
Total	26,812	29,370			

WORLD PRODUCTION

World production of anthracite in 1952 was at a slightly higher level than in 1951. Increased output was reported in all major producing countries except Japan, North Korea, and the United States. Although the Union of Soviet Socialist Republics does not release data on coal production, reliable estimates indicate that Russia surpassed the United States in anthracite production for the first time in 1948 and has since led the world in total output. Data on world production for the period 1947–52 are shown in table 37.

TABLE 37.—World production of anthracite, in thousands of metric tons,[1] [2] 1947–52

[Compiled by Pauline Roberts]

Country	1947	1948	1949	1950	1951	1952
Belgium	[3] 5,121	[3] 5,853	[3] 5,839	[3] 5,712	[3] 6,500	6,869
Bulgaria [3]	27	27	27	30	35	35
China	878	[3] 600	[3] 1,000	[3] 2,000	[3] 4,000	[3] 4,000
France	8,042	9,299	10,446	[3] 8,800	[3] 9,800	[3] 11,075
French Morocco	269	290	341	368	394	460
Germany:						
East Germany [3]	198	204	217	238	238	238
West Germany	[3] 5,216	[3] 6,183	[3] 7,433	[3] 7,800	[3] 8,300	8,839
Indochina	248	359	376	502	645	860
Ireland	122	89	48	98	106	[3] 100
Italy	120	87	75	69	82	82
Japan	648	852	776	686	1,089	1,013
Korea:						
Korea, Republic of	475	799	981	564	104	576
North Korea [3]	1,340	1,500	1,500	1,500	1,000	750
New Zealand	2	2	2	2	1	-------
Peru	82	42	28	33	64	85
Portugal	370	387	443	426	418	442
Rumania	24	[3] 25	35	[3] 30	[3] 35	[3] 50
Spain	1,411	1,463	1,439	1,504	1,601	1,824
Switzerland	15	[3] 15	[3] 10	[3] 10	[3] 10	[3] 10
U. S. S. R.[3]	45,975	52,425	58,975	66,000	67,760	68,000
United Kingdom	3,657	3,855	3,783	3,713	3,791	4,251
United States (Pennsylvania)	51,882	51,836	38,738	39,986	38,709	36,816
Total (estimate)	126,120	136,200	132,500	140,100	144,700	146,400

[1] An undetermined amount of semianthracite is included in the figures for some countries.
[2] This table incorporates a number of revisions of data published in previous anthracite tables.
[3] Estimate.

Coke and Coal Chemicals

By J. A. DeCarlo, J. A. Corgan, and Maxine M. Otero

GENERAL SUMMARY

PRODUCTION of oven and beehive coke in the United States is geared closely to production of iron and steel; hence, work stoppages in the steel industry in the early summer of 1952 resulted in a 14-percent decrease in coke output from the record established in 1951. The close relationship between the coke and the steel industries was indicated clearly by the similarity in their operating rates in 1952. The American Iron and Steel Institute reported that blast furnaces operated at 84.2 percent of capacity in 1952, while slot-type coke ovens, as reported to the Bureau of Mines by coke-plant operators, averaged 84 percent.

Slot-type coke ovens were operated at near capacity at the beginning of 1952, and oven-coke production averaged 97.7 percent of capacity for the first quarter. In April, however, production started to decline and dropped to the low point of the year in July because of work stoppages at the "furnace" oven-coke plants, where the operating rate in July dropped to 28 percent of capacity, the lowest rate since October 1949. "Merchant" oven-coke plants also reduced their operating rates, although not as drastically, and averaged 74.8 percent of capacity in July. Settlement of the steel strike in the last week of July accelerated coking operations and output of oven coke rose steadily to reach an average daily output of 202,900 tons in December, an alltime high. Beehive-coke production, however, did not increase as rapidly because a number of steel companies that purchase part or all of their blast-furnace coke from beehive ovens had stocked large quantities in the first quarter of the year; purchases of coke immediately after settlement of the wage controversy were therefore unnecessary. As a result, the average daily output of beehive coke during the last half of the year declined far below the first-quarter average. Hence, beehive-coke production, which was 9 percent of the total coke production in 1951, was only 6 percent in 1952.

Although output of coke decreased in 1952, there was no general shortage of metallurgical coke, as the banking of iron blast furnaces during the steel strike reduced their coke requirements. Extension of natural-gas pipelines, particularly in New York, also reduced requirements of coke for manufacturing water gas and resulted in permanent retirement of 2 oven-coke plants. The distribution of coke in 1952, by principal end uses, closely followed the 1951 pattern. According to reports from producing companies, 86 percent was utilized by iron

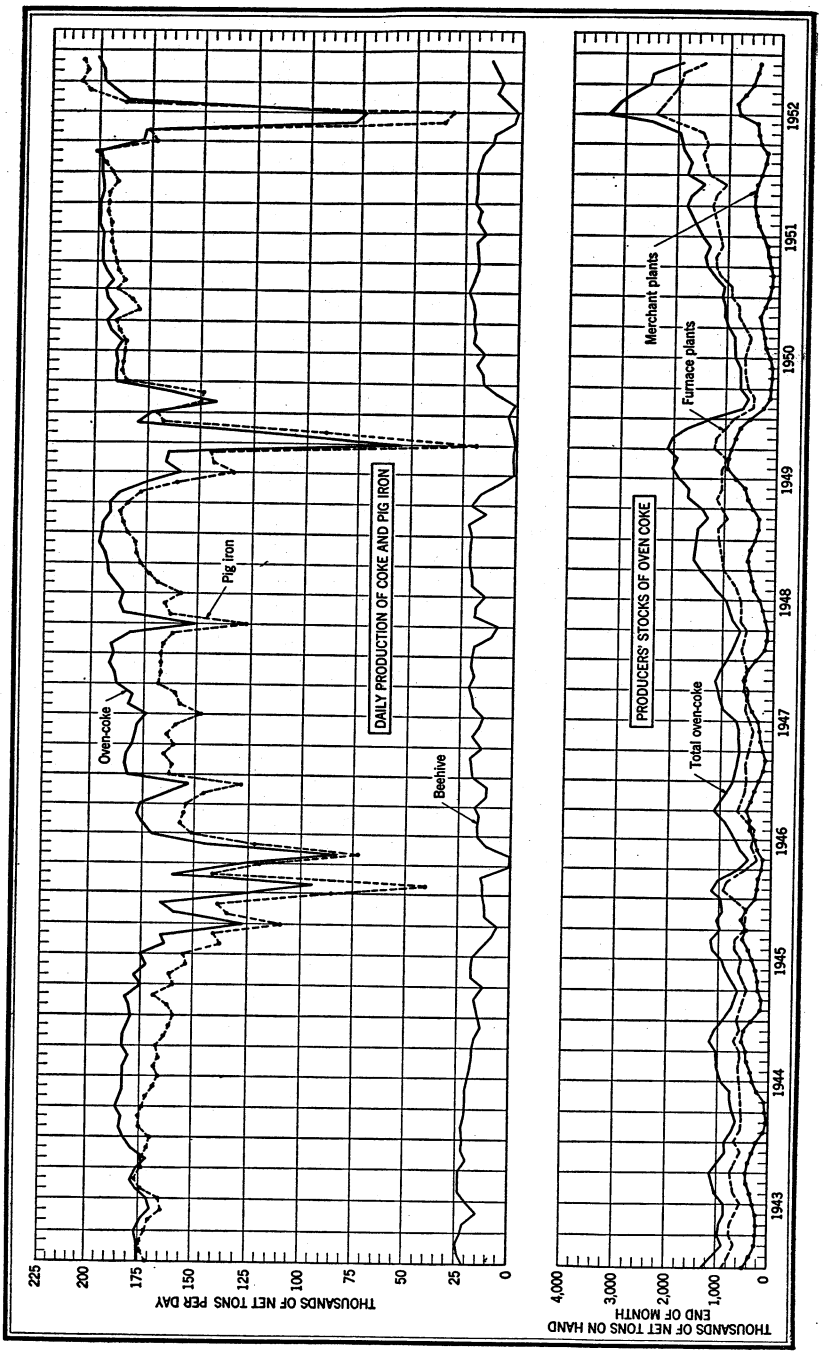

FIGURE 1.—Average daily production of oven and beehive coke and pig iron and of producers' stocks of oven coke, 1943–52, by months.

blast furnaces, 4 percent each by iron foundries and for gas manufacture, and 3 percent each for miscellaneous industrial uses (nonferrous smelting, chemical processing, etc.) and for residential heating.

The program for expansion of oven-coke capacity also was hampered by work stoppages in 1952. The silica-brick supply increased during the year, with the installation of additional brickmaking facilities. However, the steel strike slowed delivery of essential steel and delayed a large part of the new capacity scheduled for 1952 beyond the end of the year. In spite of these obstacles, the coke industry experienced one of the greatest construction years in its history. Coke producers reported that 947 new ovens with an annual coke capacity of 5.3 million tons were completed and 1,075 ovens with a designed annual coke capacity of 6 million tons were under construction on December 31, 1952. However, all new ovens completed in 1952 did not represent additional capacity, as a large number were replacements of old ovens previously dismantled. Although 658 ovens with an annual coke capacity of 2.9 million tons were taken out of production for rebuilding or permanent retirement, the industry achieved a net gain of 289 ovens during the year. At the end of 1952, 15,608 slot-type ovens were active with a potential annual coke capacity of 76.4 million tons. It was therefore apparent that, if the 84-million-ton capacity goal by 1954, as established by the Defense Production Administration in December 1951, was to be attained, a rapid rate of construction would have to be maintained.

Manufacturing costs for beehive and oven coke increased during 1952, as coal and labor costs advanced. The average cost of coal delivered to oven-coke plants increased $0.29 per ton (3 percent) over 1951 to reach a new peak of $9.23, and at beehive plants the cost rose from $6.15 to $6.26 per ton (2 percent). Although precise data on average hourly and weekly earnings of production workers in the oven- and beehive-coke industries are not available, the Bureau of Labor Statistics, United States Department of Labor, published information on production workers for "Coke and other petroleum and coal products." [1] According to this source, the average hourly earnings of these workers increased from $1.66 in 1951 to $1.76 in 1952 and average weekly earnings from $69.39 to $73.73.

There were only minor changes in the labor force in the coke industry in 1952. According to the Bureau of Mines' survey of injuries and employment, there was an average of 21,919 men working daily in the oven-coke industry. The number of man-hours worked totaled 58.6 million, a decrease of 5.5 million (9 percent) from 1951. In the beehive-coke industry, an average of 3,322 men worked daily, and the man-hours totaled 4.2 million, reductions of 335 (9 percent) and 1.9 million (31 percent), respectively, from 1951.

Production of the primary coal-chemical materials and derivatives at oven-coke plants were correspondingly curtailed by the interruptions in oven operations in 1952. Output of each of crude tar, crude light oil, and gas dropped 12 percent below the 1951 totals, while ammonia production (NH_3 content of sulfate and liquor) fell 11 percent. The substantial decrease in supplies of crude tar and light oil resulted in smaller production of the various derivatives. Output of benzol (excluding motor grade) decreased 10 percent from 1951;

[1] U. S. Department of Labor, Bureau of Labor Statistics: Hours and Earnings, April 1953, p. 32.

toluol and xylol, 11 percent each; creosote oil, 8 percent; and crude chemical oil, 18 percent. Supplies of benzol, toluol, naphthalene, and pyridine were of vital concern to Government and industry in 1952 because of their important role in the chemical field. Although benzol, toluol, and naphthalene were scarce at the beginning of 1952, by December 31 supplies were nearer demand than since early in 1950. This was not true of refined (2° grade) pyridine, however, which remained scarce throughout the year. A coal-tar base that received considerable attention in 1952 was gamma-picoline, when the antituberculosis drug—isoniazid—was introduced. Tar bases and their derivatives have an extensive and varied application in the preparation of pharmaceuticals, stabilizers for vapor degreasing solvents, plastics, waterproofing agents for textiles, manufacture of dyes and dye intermediates, denaturants, and other uses.

Prices for coke and coal chemicals during the year were under Government control and were governed by Supplementary Regulation 13 to the General Ceiling Price Regulation. Although numerous amendments were issued during the year by the Office of Price Stabilization, the most important adjustment in ceiling prices on coke and coal chemicals was Amendment 13 to SR 13, effective November 21, 1952.

TABLE 1.—Salient statistics of the coke industry in the United States, 1937 and 1951–52

	1937	1951	1952
Coke produced:			
Oven—net tons	49,210,748	71,987,172	63,850,115
Beehive—do	3,164,721	7,343,530	4,403,994
Total—do	52,375,469	79,330,702	68,254,109
Percent oven	94.0	90.7	93.5
Exports, all coke—net tons	526,683	1,026,730	792,072
Imports, all coke—do	286,364	161,639	312,519
Apparent consumption, all coke—do	51,271,929	78,093,353	67,355,871
Disposal, all coke sold or used:			
Blast furnace—do	36,751,969	67,440,987	58,182,747
Foundry—do	2,038,822	3,805,686	3,102,446
Other industrial (including producer and water gas)—net tons	4,597,894	5,603,262	4,648,077
Domestic—do	8,107,518	2,087,934	1,932,369
Producers' stocks of coke, Dec. 31—do	2,595,287	1,482,972	1,901,657
Receipts per ton of coke sold (merchant sales):			
Blast furnace	$4.22	$14.99	$15.76
Foundry	$7.91	$21.81	$22.18
Water gas	$6.25	$15.73	$15.73
Other industrial	$5.48	$14.09	$13.82
Domestic	$6.43	$14.43	$14.74
Coal-chemical materials produced:			
Tar—gallons	603,053,288	795,311,283	703,889,653
Ammonium sulfate or equivalent—pounds	1,506,431,251	1,995,546,999	1,781,301,348
Gas—M cubic feet	757,628,942	1,052,280,603	922,631,185
Burned in coking process—percent	37.04	36.19	35.80
Surplus sold or used—do	61.12	62.09	62.47
Wasted—do	1.84	1.72	1.73
Crude light oil—gallons	187,054,346	284,496,933	249,283,837
Yield of coal-chemical materials per ton of coal:			
Tar—do	8.67	7.78	7.74
Ammonium sulfate or equivalent—pounds	21.84	19.82	19.92
Gas—M cubic feet	10.89	10.29	10.15
Crude light oil—gallons	2.86	2.82	2.79
Value of coal-chemical materials sold:			
Tar	$18,456,483	$43,546,155	$37,803,630
Ammonia (sulfate and liquor)	$16,048,325	$36,032,105	$35,523,713
Gas (surplus)	$72,961,697	$138,300,299	$122,982,113
Crude light oil and derivatives	$20,215,404	$78,024,932	$68,478,169
Other coal-chemical materials [1]	$4,442,929	$28,044,466	$24,453,136
Total value of all products [2]	$411,706,484	$1,474,406,800	$1,305,675,499

[1] Naphthalene, tar derivatives, intermediate light oil, and miscellaneous materials.
[2] Includes value of coke and breeze produced and tar used as fuel by producers.

This amendment permitted producers to increase ceiling prices on oven coke and coal-chemical products by 3.75 percent, to be spread among their various products, subject to a maximum limit of 10 percent on any one ceiling price. The order also provided that the gross amount of relief granted be apportioned by each producer between coke and coal chemicals in the same proportion in which these products contributed sales revenue in the 12-month period ended April 30, 1952. Although several producing companies increased prices on some of their products following issuance of this order, there was no general price advance on an industry-wide basis.

Amendment 13 to SR 13 did not cover beehive coke, and to bring prices of this product in line with those for oven coke, the Office of Price Stabilization issued Amendment 15 to SR 13 on January 12, 1953. This amendment permitted operators of beehive-coke ovens to increase the ceiling prices of their product by an amount equivalent to 6 percent of their sales revenue during the 12-month period ended April 30, 1952. Although the order permitted a beehive-coke producer to make adjustments in beehive-coke prices retroactive to September 29, 1952, there was no indication on the 1952 annual reports, submitted to the Bureau of Mines by the producers, that this action was taken.

The total value of coal-chemical materials sold amounted to $289.2 million, a decrease of 11 percent from 1951. The value of all coke-oven products, whether used by producers or sold, totaled $1.3 billion, a drop of more than 168 million dollars (11 percent) from 1951.

TABLE 2.—Statistical summary of the coke industry in the United States in 1952

	Slot-type ovens	Beehive ovens	Total
Coke produced—			
At merchant plants:			
Net tons	11,721,209	(2)	(2)
Value	$196,983,761		
At furnace plants: [1]			
Net tons	52,128,906		
Value	$728,316,687		
Total:			
Net tons	63,850,115	4,403,994	68,254,109
Value	$925,300,448	$61,282,146	$986,582,594
Breeze produced:			
Net tons	4,639,369	64,261	4,703,630
Value	$18,500,418	$135,874	$18,636,292
Coal carbonized:			
Bituminous:			
Net tons	90,702,635	6,911,647	97,614,282
Value	$837,598,846	$43,258,781	$880,857,627
Average per ton	$9.23	$6.26	$9.02
Anthracite:			
Net tons	206,860	----------	206,860
Value	$1,701,876	----------	$1,701,876
Average per ton	$8.23	----------	$8.23
Total:			
Net tons	90,909,495	6,911,647	97,821,142
Value	$839,300,722	$43,258,781	$882,559,503
Average per ton	$9.23	$6.26	$9.02
Average yield in percent of total coal carbonized:			
Coke	70.23	63.72	69.77
Breeze (at plants actually recovering)	5.10	2.74	5.04
Ovens:			
In existence January 1	15,319	20,458	35,777
In existence December 31	15,608	17,551	33,159
Dismantled during year	658	[3] 3,235	3,893
In course of construction December 31	1,075	56	1,131
Annual coke capacity December 31 ----------net tons	76,428,000	12,004,800	88,432,800

For footnotes, see end of table.

TABLE 2.—Statistical summary of the coke industry in the United States in 1952—Continued

	Slot-type ovens	Beehive ovens	Total
Coke used by producers—			
In blast furnaces:			
Net tons	39,636,150	295,669	39,931,819
Value	$547,167,058	$4,511,081	$551,678,139
In foundries:			
Net tons	52,459	----------	52,459
Value	$882,032	----------	$882,032
To make producer gas:			
Net tons	479,963	----------	479,963
Value	$6,346,617	----------	$6,346,617
To make water gas:			
Net tons	953,534	----------	953,534
Value	$9,629,097	----------	$9,629,097
For other purposes:			
Net tons	358,489	4,011	362,500
Value	$4,585,433	$59,169	$4,644,602
Coke sold—			
To financially affiliated companies—			
For blast-furnace use:			
Net tons	9,348,611	1,358,180	10,706,791
Value	$134,943,448	$17,089,479	$152,032,927
For foundry use:			
Net tons	55,034	----------	55,034
Value	$1,067,998	----------	$1,067,998
For manufacture of water gas:			
Net tons	602,891	----------	602,891
Value	$9,230,618	----------	$9,230,618
For other purposes:			
Net tons	185,282	----------	185,282
Value	$2,689,708	----------	$2,689,708
To other consumers—			
For blast-furnace use:			
Net tons	5,452,898	2,091,239	7,544,137
Value	$88,842,439	$30,024,707	$118,867,146
For foundry use:			
Net tons	2,864,592	130,361	2,994,953
Value	$64,431,471	$2,009,656	$66,441,127
For manufacture of water gas:			
Net tons	278,820	131,765	410,585
Value	$4,520,640	$1,937,142	$6,457,782
For other industrial use:			
Net tons	1,285,549	367,773	1,653,322
Value	$17,538,244	$5,317,406	$22,855,650
For domestic use:			
Net tons	1,916,609	15,760	1,932,369
Value	$28,272,441	$204,032	$28,476,473
Disposal of breeze:			
Used by producers—			
For steam raising:			
Net tons	2,894,374	5,094	2,899,468
Value	$10,507,030	(4)	(5)
To make producer or water gas:			
Net tons	71,682	----------	71,682
Value	$405,265	----------	$405,265
For other purposes:			
Net tons	760,473	13	760,486
Value	$2,735,825	(4)	(5)
Sold:			
Net tons	1,131,858	62,293	1,194,151
Value	$5,572,413	$165,104	$5,737,517
Average receipts per ton sold (merchant sales):			
Blast-furnace coke	$16.29	$14.36	$15.76
Foundry coke	$22.49	$15.42	$22.18
Water-gas coke	$16.21	$14.70	$15.73
Other industrial coke	$13.64	$14.46	$13.82
Domestic coke	$14.75	$12.95	$14.74
Breeze	$4.92	$2.65	$4.80
Producers' stocks, Dec. 31:			
Blast-furnace coke, net tons	1,526,776	22,611	1,549,387
Foundry coke, do	15,613	740	16,353
Domestic and other coke, do	334,876	1,041	335,917
Breeze, do	754,167	2,526	756,693

[1] Plants associated with iron blast furnaces (refer to definition in section on Production by Merchant and Furnace Plants).
[2] Not separately recorded.
[3] Idle and not expected to resume production; removed from list of available ovens.
[4] Included with value of breeze sold to avoid disclosure of individual company operations.
[5] Withheld to avoid disclosure of individual company operations.

TABLE 3.—Summary of coke-oven operations in the United States in 1952, by States

State	Oven coke						
	In existence Dec. 31 [1]		Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Alabama	7	1,383	8,269,788	69.07	5,712,102	$66,887,735	$11.71
California	1	135	995,659	61.27	610,080	(2)	(2)
Colorado	1	266	1,210,678	67.41	816,140	(2)	(2)
Illinois	8	910	4,720,529	71.83	3,390,773	57,959,512	17.09
Indiana	5	1,960	10,612,392	71.72	7,611,090	139,053,346	18.27
Maryland	1	496	3,440,998	72.39	2,490,859	(2)	(2)
Massachusetts	1	204	1,501,547	70.30	1,055,529	(2)	(2)
Michigan	4	621	3,859,733	74.17	2,862,873	44,721,081	15.62
Minnesota	3	212	1,197,742	72.51	868,523	14,614,548	16.83
New Jersey	2	341	2,041,129	72.13	1,472,245	(2)	(2)
New York	5	973	6,254,964	69.43	4,342,583	65,232,116	15.02
Ohio	15	2,411	13,752,696	70.09	9,638,904	131,405,472	13.63
Pennsylvania	14	3,900	21,956,852	68.77	15,100,698	196,491,704	13.01
Tennessee	1	44	346,895	73.31	254,319	(2)	(2)
Texas	2	125	900,539	72.42	652,179	(2)	(2)
Utah	2	308	1,778,169	63.31	1,125,729	(2)	(2)
West Virginia	5	768	5,302,280	71.63	3,798,215	44,519,412	11.72
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	5	551	2,766,905	73.99	2,047,274	34,523,271	16.86
Undistributed						129,892,251	15.32
Total 1952	82	15,608	90,909,495	70.23	63,850,115	925,300,448	14.49
At merchant plants	25	2,781	16,225,788	72.24	11,721,209	196,983,761	16.81
At furnace plants	57	12,827	74,683,707	69.80	52,128,906	728,316,687	13.97
Total 1951	83	15,319	102,267,417	70.39	71,987,172	1,017,065,551	14.13

State	Beehive coke						Total	
	Ovens in existence Dec. 31	Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens		Coke produced (net tons)	Value of coke at ovens
					Total	Per ton		
Alabama							5,712,102	$66,887,735
California							610,080	(2)
Colorado	20	935	64.00	600	(2)	(2)	816,740	(2)
Illinois							3,390,773	57,959,512
Indiana							7,611,090	139,053,346
Maryland							2,490,859	(2)
Massachusetts							1,055,529	(2)
Michigan							2,862,873	44,721,081
Minnesota							868,523	14,614,548
New Jersey							1,472,245	(2)
New York							4,342,583	65,232,116
Ohio							9,638,904	131,405,472
Pennsylvania	14,589	5,811,523	64.54	3,750,606	$51,417,946	$13.71	18,851,304	247,909,650
Tennessee	90						254,319	(2)
Texas							652,179	(2)
Utah	797	151,279	56.26	85,111	(2)	(2)	1,210,840	(2)
Virginia	848	342,454	59.08	202,328	3,068,379	15.17	202,328	3,068,379
West Virginia	1,012	468,862	60.56	283,942	4,135,770	14.57	4,082,157	48,655,182
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	195	136,594	59.60	81,407	(2)	(2)	2,128,681	(2)
Undistributed					2,660,051	15.92		167,075,573
Total 1952	17,551	6,911,647	63.72	4,403,994	61,282,146	13.92	68,254,109	986,582,594
Total 1951	20,458	11,418,465	64.31	7,343,530	102,408,135	13.95	79,330,702	1,119,473,686

[1] Does not include plants retired permanently during year.
[2] Included with "Undistributed" to avoid disclosure of individual company operations.

SCOPE OF REPORT

The statistics in this chapter, except where otherwise noted, are based on data voluntarily supplied to the Bureau of Mines by coke-plant operators in the continental United States. Except for minor variations, the same basic arrangement of material developed in prior years is followed in this chapter, which continues the Bureau's series on coke and coal-chemical materials through 1952. For purposes of comparison, most of the statistical tables herein include data for 3 or 4 selected years.

In addition to the annual surveys of the coke industry, initiated in 1879 by the Geological Survey, the Bureau of Mines conducts a weekly canvass of railroads for carloadings of beehive coke and a monthly canvass of oven- and beehive-coke producers. The weekly survey is used to estimate the beehive-coke-production data published in the Weekly Anthracite and Beehive-Coke Report. Monthly canvasses of oven- and beehive-coke producers were initiated in 1917 and 1942, respectively, and are designed to provide the following information: The quantities of coal carbonized and stocks of coal at end of month; coke produced and stocks at end of month; number of new ovens completed, under construction, and idle during month; distribution of coke by principal end uses; and the production, consumption at producing plants, interplant transfers, merchant sales, and stocks of 13 coal chemicals. A further breakdown by commercial grades is obtained also on some of the coal chemicals. The canvass is restricted to coke-plant operators only, as coal-chemical processing plants operated other than by coke producers are canvassed by the United States Tariff Commission.

Primary data obtained from the Bureau's canvasses on coke and coal chemicals are released to industry, research organizations, colleges, and the general public in the Minerals Yearbook and the Monthly Coke Report. Final annual data are also published in multilithed form as a Mineral Market Report to make the data available shortly after the tabulations are completed, and a preprint chapter on Coke and Coal Chemicals is released in advance of the Yearbook. In addition to the publications mentioned, directories showing the name, location, and capacity of all oven- and beehive-coke plants in the United States are also released.

The statistics in this chapter are confined to products made by carbonizing coal in high-temperature slot-type and beehive-coke ovens. However, in order to present available data on the carbonization of coal by other processes, salient statistics for coal-gas retorts are shown in table 4. As less than three operators of low-temperature-carbonization plants reported to the Bureau of Mines in 1952, data on their operations are withheld to avoid disclosure of individual company figures. When compared with the production of coke and related

products from slot-type and beehive-coke ovens, retorts and low-temperature-carbonization processes are not important factors in supplying total requirements of these products in the United States.

Some coke is made by processes not included in this chapter, principally by refining petroleum and crude tar. Data compiled by the Bureau of Mines indicate that production of petroleum coke totaled 3.6 million net tons in 1952 and output of pitch coke, as published by the United States Tariff Commission, 36,000 net tons.

The standard unit of measurement in the coke industry of the United States is the short or net ton of 2,000 pounds. Unless otherwise specified, this unit is employed throughout this chapter.

The term "coke" as used in this chapter refers only to the larger sizes (usually one-half inch plus) from which the smaller sizes have been screened. The smaller sizes are known in the industry as "breeze," and this term is used by the Bureau of Mines in referring to this material.

RETORT COKE

TABLE 4.—Salient statistics of the coal-gas industry in the United States in 1952 [1]

	Horizontal retorts	Vertical retorts	Total
Coke produced:			
Net tons	28,494	16,420	44,914
Value	$416,025	$215,903	$631,928
Breeze produced, net tons	2,828	1,859	4,687
Coal carbonized:			
Net tons	45,064	26,960	72,024
Value	$515,576	$324,323	$839,899
Average per ton	$11.44	$12.03	$11.66
Average yield in percent of coal carbonized:			
Coke	63.23	60.91	62.36
Breeze (at plants actually recovering)	7.07	6.90	7.00
Retorts:			
In existence Dec. 31	108	37	145
In operation Dec. 31	99	6	105
Annual coal capacity, net tons	52,900	65,000	117,900
Coke used by producers:			
Net tons	20,232	6,222	26,454
Value	$305,645	$79,545	$385,190
Coke sold to other consumers			
Net tons	4,412	9,926	14,338
Value	$56,714	$132,944	$189,658
Stocks, Dec. 31:			
Coke, net tons	6,198	8,937	15,135
Breeze, do	469	1,044	1,513
Tar:			
Production, gallons	524,327	390,790	915,117
Sales:			
Gallons	515,431	469,789	985,220
Value	$36,662	$33,065	$69,727
Stocks, Dec. 31, gallons	100,080	46,503	146,583
Per ton of coal carbonized, do	11.64	14.50	12.71

[1] Additional data in Bureau of Mines, Production of Coke and Coal Chemicals from Coal-Gas Retorts in 1952; Mineral Market Rept. 2160, April 1953, 2 pp.

OVEN AND BEEHIVE COKE AND BREEZE

MONTHLY AND WEEKLY PRODUCTION

Statistics on monthly production of coke in tables 5 to 7 are based upon reports received from producers. Weekly production of beehive coke in table 8 was estimated from reports of carloadings received from all coke-carrying railroads. The totals in these tables have been adjusted to the total ascertained by an annual canvass of the producers.[2]

TABLE 5.—Coke produced in the United States and average per day, 1937 and 1950–52, by months, in net tons [1]

Month	1937		1950		1951		1952	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
Oven coke:								
January	4,360,700	140,700	5,388,500	173,800	6,092,700	196,500	6,186,700	199,600
February	3,992,900	142,600	3,977,900	142,100	5,414,700	193,400	5,787,900	199,600
March	4,495,500	145,000	5,014,400	161,800	6,058,300	195,400	6,221,300	200,700
April	4,350,900	145,000	5,699,000	190,000	5,926,800	197,600	5,389,700	179,700
May	4,479,700	144,500	5,910,900	190,700	6,138,900	198,000	5,556,200	179,200
June	4,024,800	134,200	5,699,200	190,000	5,959,200	198,600	2,368,600	78,900
July	4,423,900	142,700	5,912,000	190,700	6,120,700	197,400	2,311,300	74,600
August	4,573,400	147,500	5,812,400	187,500	6,170,700	199,100	5,808,300	187,400
September	4,427,800	147,600	5,710,200	190,300	5,941,500	198,100	5,804,800	193,500
October	4,035,100	130,200	6,045,300	195,000	6,132,600	197,800	6,137,900	198,000
November	3,222,300	107,400	5,702,700	190,100	5,899,660	196,700	5,986,700	199,600
December	2,823,800	91,100	6,018,100	194,100	6,131,500	197,800	6,290,700	202,900
Total	49,210,800	134,800	66,890,600	183,200	71,987,200	197,200	63,850,100	174,500
Beehive coke:								
January	274,300	10,600	128,400	4,200	733,200	23,700	625,000	20,100
February	294,600	12,300	42,000	1,500	607,900	21,700	574,000	19,800
March	357,300	13,200	307,500	9,900	629,100	20,300	563,100	18,200
April	309,700	11,900	498,700	16,600	559,300	18,600	414,000	13,800
May	326,500	12,600	534,800	17,200	609,000	19,700	400,200	12,900
June	274,800	10,600	588,400	19,600	627,700	21,000	113,100	3,800
July	285,100	11,000	506,600	16,400	531,400	17,200	59,300	1,900
August	259,000	10,000	659,200	21,300	613,000	19,700	220,500	7,100
September	253,900	9,800	619,700	20,700	553,400	18,400	354,900	11,800
October	225,500	8,700	679,100	21,900	632,900	20,400	302,400	9,800
November	168,800	6,500	606,000	20,200	622,700	20,700	345,100	11,500
December	135,200	5,200	657,000	21,200	623,900	20,100	432,400	14,000
Total	3,164,700	10,200	5,827,400	16,000	7,343,500	20,100	4,404,000	12,000
Total:								
January	4,635,000	151,300	5,516,900	178,000	6,825,900	220,200	6,811,700	219,700
February	4,287,500	154,900	4,019,900	143,600	6,022,600	215,100	6,361,900	219,400
March	4,852,800	158,200	5,321,900	171,700	6,687,400	215,700	6,784,400	218,900
April	4,660,600	156,900	6,197,700	206,600	6,486,100	216,200	5,803,700	193,500
May	4,806,200	157,100	6,445,700	207,900	6,747,900	217,700	5,956,400	192,100
June	4,299,600	144,800	6,287,600	209,600	6,586,900	219,600	2,481,700	82,700
July	4,709,000	153,700	6,418,600	207,100	6,652,100	214,600	2,370,600	76,500
August	4,832,400	157,500	6,471,600	208,800	6,783,700	218,800	6,028,800	194,500
September	4,681,700	157,400	6,329,900	211,000	6,494,960	216,500	6,159,700	205,300
October	4,260,600	138,900	6,724,400	216,900	6,765,500	218,200	6,440,300	207,800
November	3,391,100	113,900	6,308,700	210,300	6,522,300	217,400	6,331,800	211,100
December	2,959,000	96,300	6,675,100	215,300	6,755,400	217,900	6,723,100	216,900
Grand total	52,375,500	145,000	72,718,000	199,200	79,330,700	217,300	68,254,100	186,500

[1] Before 1941 daily average production of beehive coke was calculated by subtracting Sundays and holidays in each month; 1942–52 daily average has been calculated by dividing total monthly production by total number of days in month.

[2] Data on weekly production of beehive coke are published by the Bureau of Mines in the Weekly Anthracite and Beehive-Coke Report, and monthly data for both oven and beehive coke are summarized in the Monthly Coke Report available upon request to the Publications Distribution Section, Bureau of Mines, Washington 25, D. C.

TABLE 6.—Oven coke produced in the United States in 1952, by States and months, in net tons

[Based on reports from producers]

State	January	February	March	April	May	June	July
Alabama	549,600	515,500	547,500	497,200	493,000	222,100	210,700
California	49,800	46,600	50,500	50,100	52,600	51,200	52,600
Colorado	91,500	85,100	73,400	49,500	58,300	5,400	
Illinois	322,600	304,700	326,300	296,400	304,800	162,500	165,300
Indiana	769,700	728,200	777,000	616,100	636,300	151,100	144,600
Maryland	240,100	228,400	248,000	201,800	237,900	73,400	61,900
Massachusetts	93,900	88,600	91,800	84,200	89,600	84,100	87,100
Michigan	247,900	241,400	257,100	245,000	248,000	171,600	171,700
Minnesota	83,800	79,000	82,800	76,400	76,600	51,700	50,000
New Jersey	131,600	119,500	130,100	125,600	129,600	124,700	106,800
New York	461,100	433,400	460,400	412,100	395,800	193,500	158,600
Ohio	953,300	890,300	946,500	799,400	784,500	276,400	309,200
Pennsylvania	1,485,500	1,378,600	1,506,100	1,282,500	1,347,300	357,500	374,500
Tennessee	21,900	20,600	22,400	21,800	22,000	21,500	20,400
Texas	56,300	58,600	60,800	42,700	52,300	38,000	37,200
Utah	114,200	91,100	122,000	101,200	163,400	29,700	25,500
West Virginia	329,100	304,200	336,500	308,800	335,800	211,500	212,200
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	184,800	174,100	182,100	178,900	188,400	142,700	123,000
Total	6,186,700	5,787,900	6,221,300	5,389,700	5,556,200	2,368,600	2,311,300
At merchant plants	1,083,600	1,010,800	1,072,900	1,032,900	1,032,500	892,900	824,700
At furnace plants	5,103,100	4,777,100	5,148,400	4,356,800	4,523,700	1,475,700	1,486,600

State	August	September	October	November	December	Total
Alabama	527,300	517,300	560,100	521,100	550,700	5,712,100
California	52,600	48,100	52,000	50,800	53,200	610,100
Colorado	82,600	93,700	92,000	92,500	92,100	816,100
Illinois	303,600	288,400	307,600	301,700	306,900	3,390,800
Indiana	725,800	747,500	776,800	748,800	789,200	7,611,100
Maryland	238,000	249,800	244,000	231,600	236,000	2,490,900
Massachusetts	87,500	85,600	88,600	87,300	87,200	1,055,500
Michigan	239,600	235,100	255,000	268,700	281,800	2,862,900
Minnesota	71,200	70,300	76,800	74,500	75,400	868,500
New Jersey	100,700	123,200	129,700	122,500	128,200	1,472,200
New York	372,800	348,900	359,900	354,400	391,700	4,342,600
Ohio	910,800	910,900	950,400	925,900	981,300	9,638,900
Pennsylvania	1,441,800	1,405,600	1,500,500	1,465,200	1,555,600	15,100,700
Tennessee	19,900	20,000	20,900	21,100	21,800	254,300
Texas	57,900	61,100	63,200	60,400	63,700	652,200
Utah	109,700	80,900	114,900	115,900	117,200	1,125,700
West Virginia	318,000	343,300	364,500	360,700	373,600	3,798,200
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	148,500	175,100	181,000	183,600	185,100	2,047,300
Total	5,808,300	5,804,800	6,137,900	5,986,700	6,290,700	63,850,100
At merchant plants	896,600	933,700	983,900	965,900	990,800	11,721,200
At furnace plants	4,911,700	4,871,100	5,154,000	5,020,800	5,299,900	52,128,900

TABLE 7.—Beehive coke produced in the United States in 1952, by States and months, in net tons

[Based on reports from producers]

State	January	February	March	April	May	June	July
Colorado	100	300	200				
Kentucky	10,400	10,000	9,200	7,600	9,400	3,900	4,600
Pennsylvania	548,300	501,800	484,700	348,800	330,100	64,700	28,400
Utah	6,300	4,500	8,800	5,700	8,100	8,400	7,300
Virginia	26,400	26,300	28,500	24,800	23,800	14,400	7,000
West Virginia	33,500	31,100	31,700	27,100	28,800	21,700	12,000
Total	625,000	574,000	563,100	414,000	400,200	113,100	59,300

TABLE 7.—Beehive coke produced in the United States in 1952, by States and months, in net tons—Continued

[Based on reports from producers]

State	August	September	October	November	December	Total
Colorado						600
Kentucky	4,700	5,500	3,600	4,300	8,200	81,400
Pennsylvania	186,300	310,200	274,500	298,400	374,400	3,750,600
Utah	7,000	7,500	5,400	7,000	9,100	85,100
Virginia	6,600	11,400	7,400	10,600	15,100	202,300
West Virginia	15,900	20,300	11,500	24,800	25,600	284,000
Total	220,500	354,900	302,400	345,100	432,400	4,404,000

TABLE 8.—Beehive coke produced in the United States in 1952, by weeks

[Estimated from railroad shipments]

Week ended—	Net tons	Week ended—	Net tons	Week ended—	Net tons
Jan. 5	[1] 93,700	May 17	106,000	Sept. 27	83,900
Jan. 12	146,500	May 24	107,100	Oct. 4	85,600
Jan. 19	142,800	May 31	92,300	Oct. 11	81,900
Jan. 26	142,600	June 7	41,400	Oct. 18	94,300
Feb. 2	133,700	June 14	20,800	Oct. 25	27,800
Feb. 9	141,800	June 21	17,400	Nov. 1	63,600
Feb. 16	136,800	June 28	20,400	Nov. 8	82,300
Feb. 23	134,600	July 5	4,200	Nov. 15	78,900
Mar. 1	132,400	July 12	9,400	Nov. 22	92,800
Mar. 8	139,700	July 19	18,300	Nov. 29	79,800
Mar. 15	134,500	July 26	19,100	Dec. 6	92,400
Mar. 22	127,600	Aug. 2	23,300	Dec. 13	84,100
Mar. 29	127,700	Aug. 9	46,500	Dec. 20	98,400
Apr. 5	105,100	Aug. 16	66,200	Dec. 27	91,100
Apr. 12	57,900	Aug. 23	88,400	Jan. 3, 1953	[2] 51,200
Apr. 19	102,200	Aug. 30	28,900		
Apr. 26	109,100	Sept. 6	60,300	Total	4,404,000
May 3	77,100	Sept. 13	84,100		
May 10	85,100	Sept. 20	90,900		

[1] 5 days only.

[2] 4 days only.

PRODUCTION BY FURNACE AND MERCHANT PLANTS

In 1922 the Bureau of Mines began classifying oven-coke plants into two groups, "furnace" and "merchant." This grouping is maintained in the interest of those who wish to follow the carbonizing activity of the iron and steel industry proper and is used wherever applicable throughout the chapter. "Furnace" plants are those under direct ownership of or having a financial affiliation with iron and steel companies whose main business is production of coke for use in their own blast furnaces. All other plants are classified as "merchant" and include those that manufacture metallurgical, industrial, and domestic grades of coke for sale on the open market; coke plants associated with chemical companies; gas utilities; and those affiliated with local iron works where only a minor part, less than 50 percent of their annual output, is used in affiliated blast furnaces.

During the past decade furnace plants have produced a steadily increasing proportion of total output. This group, although more affected by work stoppages in the iron and steel industry than the merchant group, still contributed 82 percent of total oven-coke output in 1952. One principal reason for the declining number of merchant plants has been the extension of natural-gas pipelines into areas

formerly served by coke-oven gas. As quickly as natural gas became available in certain areas, the competing gas-utility companies either closed their coke plants or sold them to iron and steel companies if near blast-furnace installations. In 1952, 2 gas utilities in New York State discontinued coke-plant operations, reducing the number of merchant plants in existence on December 31, 1952, to 25, the lowest number since 1923. Meanwhile, the number of active furnace plants increased, and with the addition of the Fairless plant of the United States Corp. at Morrisville, Pa., totaled 57 at the end of the year, the highest number on record.

TABLE 9.—Number and production of oven-coke plants in the United States, 1913, 1918, 1937, and 1950–52, by type of plant

Year	Number of active plants[1]		Coke produced (net tons)		Percent of production	
	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants
1913	20	16	9,277,832	3,436,868	73.0	27.0
1918	36	24	19,220,342	6,777,238	73.9	26.1
1937	43	42	36,134,209	13,076,539	73.4	26.6
1950	55	30	54,543,796	12,346,822	81.5	18.5
1951	56	28	58,796,622	13,190,550	81.7	18.3
1952	57	27	52,128,906	11,721,209	81.6	18.4

[1] Includes plants operating any part of year.

TABLE 10.—Monthly and average daily production of oven coke in the United States, 1937 and 1951–52, by type of plant, in net tons

Month	1937		1951		1952	
	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants
Monthly production:						
January	3,241,600	1,119,100	4,950,800	1,141,900	5,103,100	1,083,600
February	2,996,500	996,400	4,393,000	1,021,700	4,777,100	1,010,800
March	3,355,000	1,140,500	4,930,700	1,127,600	5,148,400	1,072,900
April	3,310,300	1,040,600	4,839,500	1,087,300	4,356,800	1,032,900
May	3,375,600	1,104,100	5,008,300	1,130,600	4,523,700	1,032,500
June	2,917,500	1,107,300	4,864,800	1,094,400	1,475,700	892,900
July	3,316,100	1,107,800	5,001,500	1,119,200	1,486,600	824,700
August	3,469,300	1,104,100	5,046,600	1,124,100	4,911,700	896,600
September	3,334,700	1,093,100	4,865,700	1,075,800	4,871,100	933,700
October	2,910,500	1,124,600	5,026,300	1,106,300	5,154,000	983,900
November	2,142,700	1,079,600	4,830,400	1,069,200	5,020,800	965,900
December	1,764,400	1,059,400	5,039,000	1,092,500	5,299,900	990,800
Total	36,134,200	13,076,600	58,796,600	13,190,600	52,128,900	11,721,200
Average daily production:						
January	104,600	36,100	159,700	36,800	164,600	35,000
February	107,000	35,600	156,900	36,500	164,700	34,900
March	108,200	36,800	159,000	36,400	166,100	34,600
April	110,300	34,700	161,300	36,300	145,200	34,500
May	108,900	35,600	161,500	36,500	145,900	33,300
June	97,300	36,900	162,100	36,500	49,200	29,700
July	107,000	35,700	161,300	36,100	48,000	26,600
August	111,900	35,600	162,800	36,300	158,500	28,900
September	111,200	36,400	162,200	35,900	162,400	31,100
October	93,900	36,300	162,100	35,700	166,300	31,700
November	71,400	36,000	161,000	35,700	167,400	32,200
December	56,900	34,200	162,500	35,300	171,000	31,900
Average for year	99,000	35,800	161,100	36,100	142,500	32,000

PRODUCTION BY STATES AND DISTRICTS

Coke was produced in 23 States in 1952, as in 1951. Only oven coke was produced in 17 of these States, both oven and beehive coke in 5 States, and beehive coke alone in 1 State. Production of coke declined in all but four States in 1952. California, Missouri, Tennessee, and Wisconsin each increased production slightly over 1951. The leading coke-producing States suffered the largest losses in tonnage, with output dropping 4.8 million tons in Pennsylvania, 1.5 million in Ohio, 1.3 million in New York, and 1.2 million in Indiana. In spite of the general decline in coke output, there was little change among the States in order of production. Pennsylvania continued to lead by a wide margin, producing 24 percent of the total oven-coke output and 85 percent of the beehive coke. Ohio remained in second place, with 15 percent of all oven coke. Indiana followed with 12 percent, and Alabama and New York retained fourth and fifth places with 9 and 7 percent, respectively. Tables 11 to 14 show production of oven coke by geographical regions and districts.

TABLE 11.—Coke produced in the United States, 1937 and 1949–52, by States, in net tons

State	1937	1949	1950	1951	1952
Oven coke:					
Alabama	4,259,771	5,161,397	5,833,142	6,291,280	5,712,102
California		346,552	512,790	568,216	610,080
Colorado	486,945	729,516	804,979	995,332	816,140
Illinois	2,998,663	3,195,645	3,590,502	3,685,662	3,390,773
Indiana	5,467,061	7,533,290	8,255,622	8,843,452	7,611,090
Maryland	1,513,651	2,039,957	2,367,233	2,855,209	2,490,859
Massachusetts	1,130,620	891,400	855,217	1,108,826	1,055,529
Michigan	2,283,518	2,484,409	2,730,847	2,920,082	2,862,873
Minnesota	704,631	781,943	833,861	971,913	868,523
New Jersey	1,015,073	1,345,094	1,481,030	1,538,953	1,472,245
New York	4,946,964	5,164,790	5,412,318	5,610,975	4,342,583
Ohio	6,737,881	8,911,140	10,313,767	11,151,201	9,638,904
Pennsylvania	13,701,262	14,768,809	16,332,998	17,250,217	15,100,698
Tennessee	89,451	213,378	243,950	250,658	254,319
Texas		497,019	686,407	755,418	652,179
Utah	149,659	901,829	1,140,737	1,226,536	1,125,729
Washington	14,656				
West Virginia	1,817,993	3,182,857	3,388,626	3,829,879	3,798,215
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	1,892,949	2,073,456	2,106,592	2,133,363	2,047,274
Total	49,210,748	60,222,481	66,890,618	71,987,172	63,850,115
Beehive coke:					
Colorado	64,222			716	600
Kentucky		48,583	49,233	123,753	81,407
Pennsylvania	2,559,048	2,898,683	5,193,191	6,396,480	3,750,606
Tennessee	14,982			1,638	
Utah	6,657	132,762	84,808	101,672	85,111
Virginia	240,425	157,812	197,879	287,116	202,328
West Virginia	279,387	177,108	302,309	432,155	283,942
Total	3,164,721	3,414,948	5,827,420	7,343,530	4,403,994
Grand total	52,375,469	63,637,429	72,718,038	79,330,702	68,254,109

TABLE 12.—Oven coke produced, 1937, 1940, and 1949–52, by geographic areas, in net tons

Geographic area	1937	1940	1949	1950	1951	1952
Connecticut, Massachusetts, and Rhode Island	1,717,558	1,779,306	1,543,356	1,541,161	1,791,090	1,723,879
Maryland, New Jersey, New York, and Pennsylvania	21,176,950	22,641,242	23,318,650	25,593,579	27,255,354	23,406,385
Ohio	6,737,881	7,897,929	8,911,140	10,313,767	11,151,201	9,638,904
Illinois, Indiana, and Missouri	8,730,680	9,660,017	10,948,153	12.074,629	12,745,599	11,277,727
Michigan, Minnesota, and Wisconsin	3,589,795	3,944,410	3,809,174	4,093,952	4,424,789	4,265,192
Alabama, Kentucky, Tennessee, and West Virginia	6,606,624	7,328,908	9,217,092	10,128,617	11,073,637	10,333,900
California, Colorado, Texas, Utah, and Washington	651,260	762,497	2,474,916	3,144,913	3,545,502	3,204,128
Total	49,210,748	54,014,309	60,222,481	66,890,618	71,987,172	63,850,115

TABLE 13.—Oven coke produced in the United States in 1952, by steel-producing districts [1]

District	In existence Dec. 31		Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Eastern	19	3,526	21,300,877	71.36	15,201,304	$224,852,149	$14.79
Pittsburgh-Youngstown	21	4,612	28,634,580	68.64	19,654,142	244,291,222	12.43
Cleveland-Detroit	10	1,831	9,907,804	72.11	7,144,074	105,658,342	14.79
Chicago	18	3,378	17,564,506	72.19	12,680,046	228,388,099	18.01
Southern	10	1,552	9,517,222	69.54	6,618,600	79,971,809	12.08
Western	4	709	3,984,506	64.05	2,551,949	42,138,827	16.51
Total	82	15,608	90,909,495	70.23	63,850,115	925,300,448	14.49

[1] As defined by American Iron and Steel Institute.

TABLE 14.—Coke produced in Pennsylvania in 1952, by districts

District	In existence Dec. 31		Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Oven coke:							
Eastern [1]	6	883	4,619,629	72.50	3,349,120	$50,883,302	$15.19
Western [2]	8	3,017	17,337,223	67.78	11,751,578	145,608,402	12.39
Total	14	3,900	21,956,852	68.77	15,100,698	196,491,704	13.01
Beehive coke:							
Fayette County	67	9,845	4,140,316	64.94	2,688,795	36,048,246	13.41
Westmoreland County	45	3,453	1,276,352	63.85	814,947	11,979,356	14.70
Other counties [3]	8	1,291	394,855	62.52	246,864	3,390,344	13.73
Total	120	14,589	5,811,523	64.54	3,750,606	51,417,946	13.71
Grand total	134	18,489	27,768,375	67.89	18,851,304	247,909,650	13.15

[1] Includes plants at Bethlehem, Chester, Morrisville, Philadelphia, Steelton, and Swedeland.
[2] Includes plants at Aliquippa, Clairton, Erie, Johnstown, Midland, Monessen, Neville Island, and Pittsburgh.
[3] Beaver, Bedford, Greene, and Indiana.

COKE BREEZE

TABLE 15.—Coke breeze recovered at coke plants in the United States in 1952, by States

State	Yield per ton of coal [1] (percent)	Produced		Used by producers— For steam raising		Used by producers— For other purposes (including water gas)		Sold		Wasted (net tons)	On hand Dec. 31 (net tons)
		Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value		
Oven coke:											
Alabama	4.10	339,412	$2,318,846	127,884	$782,252	47,611	$318,330	192,715	$1,455,188	----------	20,136
California	5.16	51,334	(2)	----------	----------	41,467	(2)	6,585	(2)	----------	10,845
Colorado	6.76	81,861	(2)	----------	----------	42,009	(2)	42,516	(2)	----------	2,128
Illinois	5.45	257,197	889,276	91,437	264,010	14,564	59,487	162,749	593,210	----------	25,200
Indiana	5.05	535,788	1,840,723	308,711	984,808	129,486	374,733	86,370	449,763	----------	105,466
Maryland	7.28	250,430	(2)	214,297	(2)	23,202	(2)	18	(2)	----------	132,943
Massachusetts	6.67	100,218	(2)	102,442	(2)	----------	----------	----------	----------	----------	----------
Michigan	5.01	193,431	794,257	122,779	444,891	44,883	(2)	26,334	181,980	----------	5,626
Minnesota	4.25	50,862	216,044	29,584	88,140	7,479	(2)	21,274	116,212	----------	14,408
New Jersey	6.35	129,588	(2)	116,788	(2)	----------	----------	60	(2)	----------	21,967
New York	5.99	374,805	2,060,336	242,244	1,365,543	94,458	507,109	30,857	168,652	----------	146,387
Ohio	5.60	770,825	2,921,439	354,232	1,257,380	187,776	590,351	254,642	1,159,218	4,592	52,819
Pennsylvania	4.50	987,360	2,820,594	910,923	2,509,295	77,311	240,116	143,150	474,690	----------	122,588
Tennessee	1.52	5,264	(2)	1,873	(2)	----------	----------	7,605	(2)	----------	----------
Texas	3.43	30,922	(2)	----------	----------	21,042	(2)	12,951	(2)	----------	354
Utah	8.31	147,730	(2)	6,386	(2)	62,420	(2)	75,490	(2)	----------	8,610
West Virginia	3.64	193,028	436,895	133,597	296,603	38,447	83,556	50,181	120,595	----------	76,216
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	5.04	139,314	541,715	131,197	466,349	----------	----------	18,361	112,572	----------	8,474
Undistributed	----------	----------	3,660,293	----------	2,047,759	----------	967,408	----------	740,333	----------	----------
Total 1952	5.10	4,639,369	18,500,418	2,894,374	10,507,030	832,155	3,141,090	1,131,858	5,572,413	4,592	754,167
At merchant plants	5.03	816,851	4,226,271	633,627	2,976,273	51,793	324,929	163,647	1,109,044	1,676	91,674
At furnace plants	5.12	3,822,518	14,274,147	2,260,747	7,530,757	780,362	2,816,161	968,211	4,463,369	2,916	662,493
Total 1951	5.01	5,125,834	19,832,315	3,228,179	11,446,224	974,229	3,566,792	1,237,788	5,800,200	3,253	820,892
Beehive coke:											
Pennsylvania	2.35	39,560	56,268	2,917	(3)	----------	----------	32,226	48,541	7,334	2,496
Utah	4.31	6,516	(2)	----------	----------	----------	----------	17,893	(2)	----------	----------
Virginia	1.35	2,464	29,385	----------	----------	13	(3)	2,421	(2)	----------	30
West Virginia	4.84	15,721	(2)	2,177	(3)	----------	----------	9,753	(2)	3,791	----------
Undistributed	----------	----------	50,221	----------	----------	----------	----------	----------	116,563	----------	----------
Total 1952	2.74	64,261	135,874	5,094	(3)	13	(3)	62,293	165,104	[4] 11,125	2,526

[1] Computed by dividing production of breeze by coal carbonized at plants actually recovering breeze.
[2] Included with "Undistributed" to avoid disclosure of individual company operations.
[3] Included with value of sales to avoid disclosure of individual company operations.
[4] As reported; quantity produced but not used was undoubtedly greater. See Mineral Resources of the United States, 1922, pt. II, pp. 726-727.

NUMBER AND TYPE OF OVENS

Slot-Type Ovens.—Since the outbreak of war in Korea, the expansion in blast-furnace capacity has increased the requirements of coke substantially which in 1952 caused the greatest construction effort of the oven-coke industry since 1918–19. During the year, 947 new slot-type ovens were placed in operation, and 658 ovens were taken out—a net gain of 289. Most of the 658 ovens taken out of production were dismantled for rebuilding the old batteries, although two plants were closed permanently, and a few other ovens were retired and will not produce again unless completely rebuilt. Materials shortages and work stoppages hampered oven construction during the year. Production of silica brick for oven linings was inadequate to meet the demand early in the year but increased during the summer as additional brickmaking facilities were installed. The steel strike, however, slowed the flow of essential steel for oven construction and delayed a number of new coke-oven batteries scheduled for completion in 1952.

At the end of 1952, 15,608 slot-type coke ovens were in place, of which 33 percent were Koppers; 42 percent, Koppers-Becker; 11 percent, Semet-Solvay; 13 percent, Wilputte; and 1 percent, other types. The gain in number of ovens since pre-Korea has not been large because of the obsolete condition of many ovens when the defense mobilization program was begun. A survey of the physical condition of all slot-type coke ovens in existence in the summer of 1950, made by the National Security Resources Board, indicated that about 25 percent of the ovens in place at that time had less than 5 years' life. Developments since that time have generally confirmed the estimate made in this survey. During 1950–52, 2,217 new ovens were completed, with a net gain of only 504 ovens as most of the ovens constructed during this period were replacements. It seems likely that this high rate of replacement will continue several years, as a substantial part of the 1,075 ovens under construction on December 31, 1952, were to replace worn-out ovens.

Beehive Ovens.—The number of beehive ovens in existence reported at the end of each year during the past decade has fluctuated widely according to the demand for blast-furnace coke. This change is not significant, however, as operators may report certain ovens in existence one year and not the next, according to industrial activity and general business conditions. As plants change management from time to time, reports received from the respective operators may differ as to the total number of ovens in existence at the same plant. Before 1950 no distinction was made between operable ovens and the total number in existence. Since 1950 the number and capacity of operable ovens at the end of each year have been shown. (See table 19 for 1952 data.) Since 16 percent of the total number in existence were considered inoperable without extensive repairs and rebuilding, for practical purposes only those ovens in operating condition could be considered available sources of coke.

TABLE 16.—Slot-type coke ovens completed and abandoned in the United States in 1952 and number in existence at end of year, by States

State	Plants in existence Dec. 31	Ovens						
		In existence Dec. 31		New		Abandoned during year [1]	Under construction Dec. 31	
		Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)		Number	Annual coke capacity (net tons)
Alabama	7	1,383	6,596,800	125	645,300	82	25	94,000
California	1	135	566,000				90	466,500
Colorado	1	266	1,000,000					
Connecticut	1	70	425,000					
Illinois	8	910	3,941,400	15	73,000	5	27	155,000
Indiana	5	1,960	9,709,700	75	480,000	70	70	346,100
Kentucky	1	120	720,900				76	515,000
Maryland	1	496	2,770,400	65	412,000	120	126	824,000
Massachusetts	1	204	1,260,000					
Michigan	4	621	3,298,800	37	195,700		70	480,000
Minnesota	3	212	881,700	29	121,000	57	29	121,000
Missouri	1	96	365,000	40	153,300			
New Jersey	2	341	1,500,000					
New York	5	973	5,459,400	76	492,000	218		
Ohio	15	2,411	11,825,700	171	963,700	45	133	700,500
Pennsylvania	14	3,900	18,888,800	251	1,357,400	61	429	2,281,500
Rhode Island	1	65	250,000					
Tennessee	1	44	250,000					
Texas	2	125	688,500					
Utah	2	308	1,212,300					
West Virginia	5	768	4,297,600	63	424,000			
Wisconsin	1	200	520,000					
Total 1952	82	15,608	76,428,000	947	5,317,400	658	1,075	5,983,600
At merchant plants	25	2,781	12,779,700	40	153,300	217	101	609,000
At furnace plants	57	12,827	63,648,300	907	5,164,100	441	974	5,374,600
Total 1951	83	15,319	74,228,400	696	3,869,100	359	1,446	8,134,500

[1] Includes ovens dismantled for rebuilding.

TABLE 17.—Age of slot-type coke ovens in the United States on December 31, 1952[1]

Age	Merchant plants		Furnace plants		Total			
	Number of ovens	Annual coke capacity (net tons)	Number of ovens	Annual coke capacity (net tons)	Number of ovens	Percent of total	Annual coke capacity (net tons)	Percent of total
Under 5 years	285	1,454,300	2,375	13,129,700	2,660	17.0	14,584,000	19.1
From 5 to 10 years	157	695,800	1,832	9,834,200	1,989	12.8	10,530,000	13.8
From 10 to 15 years	351	1,816,800	2,119	11,815,800	2,470	15.8	13,632,600	17.8
From 15 to 20 years	157	611,400	861	4,757,200	1,018	6.5	5,368,600	7.0
From 20 to 25 years	288	1,628,200	379	2,099,800	667	4.3	3,728,000	4.9
25 years and over	1,543	6,573,200	5,261	22,011,600	6,804	43.6	28,584,800	37.4
Total	2,781	12,779,700	12,827	63,648,300	15,608	100.0	76,428,000	100.0

[1] Age dates from first entry into operation or from last date of rebuilding.

TABLE 18.—Number of slot-type coke ovens in the United States on December 31, 1952, by States and kinds

State	Koppers	Koppers-Becker	Semet-Solvay	Wilputte	All others	Total
Alabama	492	646	180	65		1,383
California		135				135
Colorado	120	146				266
Connecticut		70				70
Illinois	366	246	120	178		910
Indiana	340	891	161	568		1,960
Kentucky			120			120
Maryland	120	376				496
Massachusetts		149		55		204
Michigan		259	362			621
Minnesota	65	127		20		212
Missouri	56				[1] 40	96
New Jersey	165	176				341
New York	186	379	180	228		973
Ohio	1,321	475	301	314		2,411
Pennsylvania	1,635	1,579	88	478	[2] 120	3,900
Rhode Island	40	25				65
Tennessee			24	20		44
Texas		125				125
Utah		308				308
West Virginia	154	469		145		768
Wisconsin	100		100			200
Total	5,160	6,581	1,636	2,071	160	15,608
At merchant plants	647	941	750	403	40	2,781
At furnace plants	4,513	5,640	886	1,668	120	12,827

[1] Simon-Carves. [2] Cambria.

TABLE 19.—Beehive-coke ovens reconstructed and abandoned in the United States in 1952 and number in existence at end of year, by States

State	Plants in existence Dec. 31	Ovens								
		In existence Dec. 31		In operating condition Dec. 31		Not in operating condition Dec. 31		Rebuilt or repaired	Abandoned or dismantled during year	In course of reconstruction Dec. 31
		Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)			
Colorado	1	20	6,000	9	2,700	11	3,300			
Kentucky	1	195	180,000	194	179,100	1	900			
Pennsylvania	120	14,589	10,430,800	12,766	9,153,900	1,823	1,276,900	380	[1] 3,235	17
Tennessee	1	90	54,000	26	15,600	64	38,400			
Utah	2	797	285,000	297	100,000	500	185,000			
Virginia	5	848	424,200	652	327,700	196	96,500	100		
West Virginia	9	1,012	624,800	853	525,400	159	99,400			39
Total	139	17,551	12,004,800	14,797	10,304,400	2,754	1,700,400	480	[1] 3,235	56

[1] Idle and not expected to resume production; removed from list of available ovens.

TABLE 20.—Average number of beehive-coke ovens active in the United States in 1952, by months

Month	Number	Month	Number	Month	Number
January	12,570	May	9,960	September	7,798
February	12,385	June	8,408	October	8,263
March	11,669	July	3,887	November	8,386
April	10,945	August	7,980	December	9,138

CAPACITY OF OVEN-COKE PLANTS

The potential annual coke capacity of slot-type ovens increased 3 percent during 1952 and at year's end totaled 76.4 million tons—a new record. The potential maximum annual coke capacity of a plant may vary from year to year, depending on the age and condition of the ovens, the character and quality of coal carbonized, the grade of coke required, and other economic factors. The capacity, as reported to the Bureau of Mines by coke-producing companies, may differ, therefore, from the designed or rated capacity estimated by coke-oven builders at the time of construction. However, the potential capacity as shown in table 21 is probably a reliable measure of the practical operating capacity for the years given.

The gain in coke-production capacity in recent years was due to new installations at furnace plants, as capacity of merchant plants has decreased steadily. On December 5, 1951, to meet increasing coke requirements of blast furnaces and steelmaking facilities the Defense Production Administration established a goal of 84 million tons of oven-coke capacity to be attained by December 31, 1953. Installed oven-coke capacity on December 31, 1952, was 8 million tons short of this goal. Completion of 6 million tons of capacity under construction at the end of the year will help considerably in attaining the goal; but, as obsolescence and greater use of natural gas will take some ovens out of production in 1953, it appears that the goal will be attained much later than was first anticipated.

The percentage of coke capacity utilized each month is computed by the Bureau of Mines from data supplied by coke producers and is shown for 1952 and several preceding years in table 22. Oven operations fluctuated widely during 1952 because of work stoppages. The lengthy strike in the iron and steel industry drastically reduced oven operations at furnace plants, and the rate of coke production during June and July was the lowest since October 1949.

TABLE 21.—Potential maximum annual coke capacity of all oven-coke plants in existence in the United States, 1937 and 1948–52

Year	Merchant plants				Furnace plants				Total			
	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1937 (percent)	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1937 (percent)	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1937 (percent)
	Plants	Ovens			Plants	Ovens			Plants	Ovens		
1937	42	3,419	15,731,900	-----	45	9,299	46,995,200	----	87	12,718	62,727,100	-----
1948	31	2,983	14,199,900	−9.7	55	12,156	60,300,000	+28.3	86	15,139	74,499,900	+18.8
1949	30	3,057	14,209,200	−9.7	55	12,047	59,500,900	+26.6	85	15,104	73,710,100	+17.5
1950	29	3,036	13,959,300	−11.3	55	11,946	58,528,900	+24.5	84	14,982	72,488,200	+15.6
1951	27	2,958	13,535,500	−14.0	56	12,361	60,692,900	+29.1	83	15,319	74,228,400	+18.3
1952	25	2,781	12,779,700	−18.8	57	12,827	63,648,300	+35.4	82	15,608	76,428,000	+21.8

TABLE 22.—Relationship of production to potential maximum capacity[1] at oven-coke plants in the United States, 1937 and 1949–52, by months, in percent

Month	1937	1949	1950	1951	1952	Month	1937	1949	1950	1951	1952
January	83.0	95.2	85.6	97.8	97.7	August	86.0	80.3	91.8	96.5	90.2
February	83.5	95.0	70.0	95.5	97.7	September	86.1	79.8	94.0	96.2	92.9
March	84.9	93.3	79.3	96.2	97.7	October	76.0	26.9	96.2	95.4	94.3
April	84.9	93.3	92.9	96.7	86.5	November	62.8	55.8	93.8	95.3	95.0
May	84.6	90.8	92.7	97.6	86.1	December	53.1	86.2	95.8	95.8	95.7
June	78.6	84.9	92.4	97.9	38.1						
July	83.2	77.0	93.7	97.3	36.1	Year	78.8	79.7	90.0	96.5	84.0

[1] Capacity of all ovens in existence, whether active or idle, based upon maximum daily capacity times days in month.

QUANTITY AND COST OF COAL CARBONIZED

Interruptions in coke-oven operations during the second and third quarters of 1952 (previously discussed in this chapter) resulted in a 14-percent reduction from 1951 in tonnage of coal carbonized in coke ovens. In spite of this decrease, coke ovens maintained their position as the leading bituminous-coal-consuming industry in 1952 and used 21 percent of the bituminous-coal output. The decrease in coal consumption was greater for beehive ovens (39 percent) than for slot-type ovens because many beehive-coke plants that shut down during the steel strike did not resume operations after the dispute was settled in the last week of July. For this reason, monthly consumption of coal by beehive ovens in the latter months of 1952 did not attain the level of the first quarter. Completion of new slot-type ovens and heavy demand for oven coke in the latter months of 1952 resulted in a steady rise in coal consumption; by December the oven-coke industry consumed 288,200 tons per day, the highest daily consumption rate on record.

The geographic use pattern of coal for coke manufacture changed little from 1951. Pennsylvania led by consuming 24 percent of all bituminous coal carbonized in slot-type ovens and 84 percent of the total used in beehives. Ohio followed with 15 percent, and Indiana, Alabama, and New York combined used 28 percent. These 5 States, therefore, consumed 67 percent of the total coal used in slot-type ovens compared with 33 percent for the other 17 States where oven coke was produced. In addition to bituminous coal, 206,860 tons of anthracite was used in 1952. The practice of mixing a small percentage of anthracite fines with bituminous coal which originated during World War II was continued at 13 plants in 1952.

Cost of coal is extremely important to coke manufacturers because coal usually represents about 80 percent of the total operating expense. The average value of coal delivered to oven-coke plants increased slightly (3 percent) over 1951 and was $9.23 per ton. As in past years, the average value reported by merchant plants was higher than for furnace plants and was $9.84 per ton compared with $9.10 for the latter. Transportation or freight cost is one of the principal factors that determines the value of coal delivered to an oven-coke plant.

A large part of the coal used at oven-coke plants, particularly merchant plants, must be hauled great distances, thus increasing its cost. Of the States for which figures on values of coal can be shown, Indiana, Minnesota, Illinois, and New York, in the order named, had the highest; while Alabama, West Virginia, and Pennsylvania had the lowest because of their proximity to the coal fields.

The average value of coal for making beehive coke was $6.26 per ton, a new alltime high. Most of the coal used in beehive ovens, particularly in the famous Connellsville field of Pennsylvania, was trucked from various mines. In some instances coal was transported as far as 40 miles. Because of trucking expenses in Pennsylvania, this State led all others in the value of coal carbonized in beehive ovens. The average value of coal for the beehive industry as a whole was influenced by the 2-percent increase in Pennsylvania, which carbonized 84 percent of the coal used in that industry.

TABLE 23.—Bituminous coal carbonized in coke ovens in the United States, 1937 and 1951–52, by months, in net tons

Month	1937			1951			1952		
	Slot type	Beehive	Total	Slot type	Beehive	Total	Slot type	Beehive	Total
Jan	6,198,700	426,600	6,625,300	8,627,000	1,131,600	9,758,600	8,796,100	979,500	9,775,600
Feb	5,679,900	458,500	6,138,400	7,658,400	941,300	8,599,700	8,207,200	904,400	9,111,600
Mar	6,387,000	556,800	6,943,800	8,577,600	983,800	9,561,400	8,845,300	878,800	9,724,100
Apr	6,183,800	480,800	6,664,600	8,406,900	872,800	9,279,700	7,660,900	647,600	8,308,500
May	6,368,500	509,700	6,878,200	8,702,900	948,400	9,651,300	7,895,200	627,300	8,522,500
June	5,729,200	430,500	6,159,700	8,458,200	969,600	9,427,800	3,343,400	182,400	3,525,800
July	6,217,200	441,700	6,658,900	8,699,500	826,900	9,526,400	3,301,700	99,100	3,400,800
Aug	6,425,800	401,100	6,826,900	8,735,700	963,800	9,699,500	8,295,300	343,600	8,638,900
Sept	6,220,700	392,800	6,613,500	8,448,800	862,300	9,311,100	8,265,400	561,500	8,826,900
Oct	5,664,800	351,600	6,016,400	8,686,300	985,000	9,671,300	8,676,900	471,500	9,148,400
Nov	4,527,000	264,000	4,791,000	8,361,600	965,300	9,326,900	8,481,100	539,600	9,020,700
Dec	3,972,800	212,700	4,185,500	8,667,400	967,700	9,635,100	8,934,100	676,300	9,610,400
Total	69,575,400	4,926,800	74,502,200	102,030,300	11,418,500	113,448,800	90,702,600	6,911,600	97,614,200

TABLE 24.—Anthracite carbonized at oven-coke plants in the United States, 1945–52, by months, in net tons

Month	1945 [1]	1946	1947	1948	1949	1950	1951	1952
January	17,959	20,725	13,903	19,938	18,863	8,871	13,521	18,394
February	15,484	23,505	15,095	17,357	17,258	7,512	12,013	16,764
March	24,876	20,984	19,606	19,238	19,251	14,234	18,861	16,566
April	29,652	20,976	24,558	19,069	20,870	12,393	22,592	16,645
May	28,969	19,426	22,589	22,106	11,702	17,433	23,945	18,117
June	27,902	25,561	22,093	24,346	12,921	14,642	21,031	16,413
July	30,061	19,556	21,678	22,841	9,972	16,863	20,481	14,448
August	30,379	20,686	20,695	25,015	11,028	19,679	19,065	14,880
September	27,912	20,179	25,454	23,213	11,779	14,531	20,001	15,193
October	26,610	20,664	28,362	23,078	14,383	16,034	23,262	17,949
November	29,907	14,598	27,533	20,556	14,749	14,166	22,762	23,422
December	32,890	11,952	20,630	19,418	10,049	12,917	19,602	18,069
Total	322,601	238,812	262,196	256,175	172,825	169,275	237,136	206,860

[1] First year statistics on anthracite at coke plants collected.

TABLE 25.—Quantity and value at ovens of coal carbonized in the United States in 1952, by States

State	Coal carbonized (net tons)	Value of coal		Coal per ton of coke	
		Total	Per ton	Net tons	Cost
Oven coke:					
Alabama	8,269,788	$58,413,517	$7.06	1.45	$10.23
California	995,659	(1)	(1)	1.63	(1)
Colorado	1,210,678	(1)	(1)	1.48	(1)
Illinois	4,720,529	50.013.320	10.59	1.39	14.75
Indiana	10,612,392	120.248,325	11.33	1.39	15.80
Maryland	3,440,998	(1)	(1)	1.38	(1)
Massachusetts	1,501,547	(1)	(1)	1.42	(1)
Michigan	3,859,733	36,736.492	9.52	1.35	12.83
Minnesota	1,197,742	12.709,296	10.61	1.38	14.63
New Jersey	2,041,129	(1)	(1)	1.39	(1)
New York	6,254.964	64,602,388	10.33	1.44	14.88
Ohio	13,752.696	123,245,609	8.96	1.43	12.79
Pennsylvania	21,956.852	177,045,943	8.06	1.45	11.72
Tennessee	346,895	(1)	(1)	1.36	(1)
Texas	900.539	(1)	(1)	1.38	(1)
Utah	1,778.169	(1)	(1)	1.58	(1)
West Virginia	5,302,280	37,796,734	7.13	1.40	9.95
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	2,766.905	27,748,324	10.03	1.35	13.55
Undistributed		130,740,774	10.70		15.42
Total	90,909.495	839,300.722	9.23	1.42	13.14
At merchant plants	16,225.788	159,589.151	9.84	1.38	13.62
At furnace plants	74.683,707	679,711,571	9.10	1.43	13.04
Beehive coke:					
Colorado	935	(1)	(1)	1.56	(1)
Kentucky	136,594	(1)	(1)	1.68	(1)
Pennsylvania	5,811,523	36,999,749	6.37	1.55	9.87
Utah	151.279	(1)	(1)	1.78	(1)
Virginia	342,454	1,995,476	5.83	1.69	9.86
West Virginia	468,862	2,626,233	5.60	1.65	9.25
Undistributed		1,637,323	5.67		9.80
Total	6,911,647	43,258,781	6.26	1.57	9.82

[1] Included with "Undistributed" to avoid disclosure of individual company operations.

TABLE 26.—Average value per net ton of coal carbonized at oven-coke plants in the United States, 1937 and 1948–52, by States

State	1937	1948	1949	1950	1951	1952
Alabama	$2.33	$6.48	$6.81	$6.96	$7.39	$7.06
Illinois	4.62	9.38	9.75	9.98	10.25	10.59
Indiana	4.71	9.35	9.71	9.87	10.13	11.33
Michigan	4.16	8.26	8.99	9.01	9.18	9.52
Minnesota	5.24	9.90	10.10	10.21	10.44	10.61
New York	4.55	9.48	9.83	9.85	10.15	10.33
Ohio	3.76	8.11	8.42	8.51	8.70	8.96
Pennsylvania	2.98	7.22	7.64	7.82	8.02	8.06
West Virginia	2.54	6.14	6.37	6.72	6.54	7.13
Other States [1]	4.53	8.88	9.42	9.57	10.10	10.58
United States average	3.74	8.13	8.52	8.67	8.94	9.23
Value of coal per ton of coke	5.27	11.58	12.18	12.30	12.70	13.14

[1] California, Colorado, Connecticut, Kentucky, Maryland, Massachusetts, Missouri, New Jersey, Rhode Island, Tennessee, Texas, Utah, and Wisconsin.

TABLE 27.—Value of coal and products per net ton of coal carbonized in the United States, 1918, 1929, 1937, and 1948–52

Year	Oven coke					Beehive coke	
		Value per ton of coal					
	Value of coal per ton	Coke produced	Breeze produced	Coal-chemical materials used or sold [1]	Total	Value of coal per ton	Value per ton of coal
1918	$4.23	$5.24	$0.33	$2.02	$7.59	$2.31	$3.93
1929	3.50	3.34	.14	2.33	5.81	1.84	2.25
1937	3.74	3.56	.11	1.99	5.66	2.01	2.77
1948	8.13	8.73	.21	2.89	11.83	5.11	7.71
1949	8.52	9.28	.20	2.91	12.39	5.42	8.21
1950	8.67	9.48	.19	2.98	12.65	5.70	8.50
1951	8.94	9.94	.19	3.28	13.41	6.15	8.97
1952	9.23	10.18	.20	3.31	13.69	6.26	8.87

[1] Includes value of surplus gas and tar burned.

PREPARATION AND SOURCE OF COAL

Washed and Unwashed Coal.—The proportion of washed bituminous coal carbonized in slot-type ovens in 1952 was the highest on record and represented 54 percent of the total tonnage carbonized compared with 50 percent in 1951. Washed coal represented 34 percent of the total charged into beehive ovens during the year. Coal cleaning is generally done at the mines; in 1952 washed coal from this source was used by 61 oven- and 20 beehive-coke plants and provided 87 percent of the cleaned coal carbonized. The remainder (6,945,722 tons) was cleaned at coke plants having the necessary facilities.

The coke industry has more rigid standards and exacting specifications than any other of the major coal-consuming industries in the United States as to type of coal consumed, because the quality of coke depends to a greater degree upon the character and quality of coal carbonized than upon oven design and carbonizing practice. The steady increase in the proportion of cleaned coal carbonized in recent years has largely resulted from diminishing reserves of the better quality coals and also from accelerated coal-mine mechanization. Mechanical mining and loading of coal, although increasing productivity and reducing mining costs, often result in more refuse in the run-of-mine coal, necessitating extensive cleaning in some areas. All coal mined and carbonized in Colorado and Alabama was washed. Over half of the coal from Pennsylvania was also washed before being carbonized, and a substantial tonnage of the West Virginia coal was upgraded in preparation plants.

TABLE 28.—Washed and unwashed coal carbonized in the United States in 1952, by States, in net tons

State	Slot-type ovens				Beehive ovens		
	Bituminous		Anthracite	Total	Bituminous		
	Washed	Unwashed			Washed	Unwashed	Total
Alabama	7,966,090	303,698		8,269,788			
California	862,362	133,297		995,659			
Colorado	1,210,678			1,210,678		935	935
Illinois	2,184,837	2,516,057	19,635	4,720,529			
Indiana	7,258,313	3,354,079		10,612,392			
Maryland		3,440,998		3,440,998			
Massachusetts		1,481,879	19,718	1,501,597			
Michigan	1,194,675	2,665,058		3,859,733			
Minnesota	374,615	804,752	18,315	1,197,712			
New Jersey	653,087	1,362,463	25,579	2,041,129			
New York	2,371,539	3,883,232	193	6,254,964			
Ohio	8,692,597	5,058,460	1,639	13,752,696			
Pennsylvania	12,253,686	9,632,570	70,596	21,956,852	1,821,947	3,989,576	5,811,523
Tennessee		3,706,895		3,706,895			
Texas	697,845	202,694		900,539			
Utah		1,778,169		1,778,169	151,279		151,279
Virginia					135,711	206,743	342,454
West Virginia	1,966,204	3,333,506	2,570	5,302,280	214,345	254,517	468,862
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	1,719,543	998,777	48,585	2,766,905	54,143	82,451	136,594
Total	49,406,131	41,296,504	206,860	90,909,495	2,377,425	4,534,222	6,911,647
At merchant plants	5,998,833	10,066,517	160,438	16,225,788			
At furnace plants	43,407,298	31,229,987	46,422	74,683,707			

TABLE 29.—Yield of coke from coal in the United States, 1937 and 1950–52, by States, in percent

State	1937		1950		1951		1952	
	Oven coke	Beehive coke	Oven coke	Beehive coke	Oven coke	Beehive coke	Oven coke	Beehive coke
Alabama	72.37		70.95		71.85		69.07	
California			60.60		61.46		61.27	
Colorado	67.36	55.71	68.12		68.55	55.08	67.41	64.00
Illinois	70.54		70.07		70.69		71.83	
Indiana	72.04		73.70		71.78		71.72	
Maryland	72.62		71.72		72.19		72.39	
Massachusetts	69.99		71.63		71.01		70.30	
Michigan	71.05		73.37		72.98		74.17	
Minnesota	70.27		72.77		72.59		72.51	
New Jersey	70.78		71.83		72.44		72.13	
New York	71.75		68.70		69.31		69.43	
Ohio	71.61		70.20		70.32		70.09	
Pennsylvania	68.83	65.50	69.08	64.42	68.65	64.79	68.77	64.54
Tennessee	69.00	53.89	73.38		77.84	47.62	73.31	
Texas			71.40		72.51		72.42	
Utah	56.67	54.25	64.10	54.61	63.41	55.31	63.31	56.26
Virginia		58.33		61.29		58.35		59.08
Washington	56.11							
West Virginia	70.67	61.74	70.96	62.59	71.36	62.98	71.63	60.56
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	73.57		73.49	74.92	74.29	69.06	73.99	59.60
United States average	70.73	64.23	70.47	64.12	70.39	64.31	70.23	63.72

Sources.—Sources of suitable coking coal are extremely important to coke-plant operators because all coal will not fuse and form a coherent, strong, and porous structure when heated to high temperatures (above 900° C.) in the absence of air. The most important deposits of coking coal in the United States are found in the Appalachian region, which extends from Alabama to Pennsylvania. States comprising this region furnished 94 percent of all coal carbonized in slot-type ovens in 1952. West Virginia alone supplied 36 percent and had the widest distribution, shipping coal to 18 other States. Pennsylvania, however, provided a greater proportion of total coal consumed supplying 33 percent of the coal used in slot-type ovens and 84 percent in beehives. Bituminous-coal fields in eastern Kentucky are an important source of high-volatile coals and supplied 13 percent of the coal used in oven-coke plants. All but 95,537 of the 7.5 million tons of coal from Alabama was carbonized within the State. Expansion of the coke industry in the Far West in recent years has increased demand for western coals; to satisfy this demand fields in Utah, Colorado, and New Mexico have accelerated production and shipments of coking coals accordingly. As shown in table 30, the bulk of the high-volatile and medium-volatile coals are obtained from West Virginia, Pennsylvania, eastern Kentucky, and Alabama. Low-volatile coals, which are important in improving the physical properties of metallurgical coke, particularly its strength, are mined largely in West Virginia and to a smaller extent in central Pennsylvania, eastern Oklahoma, and western Arkansas.

Many of the oven-coke companies, particularly those connected with iron and steel works, own or control coal mines. These mines, referred to as "captive" mines, supplied 58 percent of the total quantity used in slot-type ovens in 1952. Captive mines supplied furnace plants with 63 percent of their requirements and merchant plants with only 35 percent.

Blending.—All oven-coke plants mixed or blended coals before charging them into coke ovens. Coals of different volatile content, however, were mixed at 79 of the 84 active plants in 1952. Of these, 58 used high- and low-volatile coals; 16, high-, medium-, and low-; 3, high- and medium-; and 2, low- and medium-. Of those that did not mix coals of different volatile content, 2 plants used straight high-volatile and 3 medium-volatile. The proportion of low-volatile coal used in coke-plant admixtures varies from plant to plant, depending on local conditions, and ranged from 10 to over 50 percent. Data compiled from individual oven-coke plant reports for 1952 on coal received for carbonization showed that 64 percent was high-volatile; 11 percent, medium-volatile; and 25 percent, low-volatile.

Because it is difficult to obtain a single coal with all desired characteristics, blending or mixing of two or more coals is practiced. A better coke can usually be obtained from a proper blend of 2, 3, or more different coals than from any one type alone. It also permits the use of a coal that has good coking properties but is unsuitable as a 100-percent charge because of excessive ash, sulfur, or phosphorus content. Thus, in addition to providing a means of controlling the quality and strength of the coke and the yield of coproducts, blending permits flexibility in operative procedure at oven-coke plants and the use of a far wider selection of coals.

TABLE 30.—Coal received for manufacturing oven coke in the United States in 1952, by fields of origin and volatile content, in net tons

State and field [1] where coal was produced	Volatile content [2]			Total
	High	Medium	Low	
Alabama	502,671	7,019,248		7,521,919
Arkansas			507,299	507,299
Colorado	875,121			875,121
Georgia			2,497	2,497
Illinois	439,310			439,310
Indiana	10,359			10,359
Kentucky:				
Elkhorn	5,994,685			5,994,685
Harlan	5,862,067			5,862,067
Kenova-Thacker	315,035			315,035
Maryland			103	103
New Mexico	537,112			537,112
Ohio		44,783		44,783
Oklahoma	560,467	259,131	168,141	987,739
Pennsylvania:				
Anthracite			150,855	150,855
Bituminous:				
Central Pennsylvania	598,263	28,043	5,433,546	6,059,852
Connellsville	9,167,232	5,110		9,172,342
Freeport	2,803,904			2,803,904
Pittsburgh	11,188,643			11,188,643
Somerset			360,985	360,985
Westmoreland	373,854			373,854
Tennessee	45,243	239,640		284,883
Utah	2,117,417			2,117,417
Virginia:				
Buchanan	130,744	56,980		187,724
Clinch Valley	482,620	185,773		668,393
Pocahontas			920,123	920,123
Southwestern	1,204,634	71,119		1,275,753
West Virginia:				
Coal River	397,292			397,292
Fairmont	4,573,198			4,573,198
Kanawha	6,493,667	464,561		6,958,228
Kenova-Thacker	26,854			26,854
Logan	2,649,731	735,457		3,385,188
New River	215,476	55,837	329,902	601,215
Pocahontas			11,993,046	11,993,046
Preston-Taylor		1,773		1,773
Randolph-Barbour	593,044	110,084		703,128
Tug River			358,995	358,995
Webster-Gauley	483,061	854,189		1,337,250
Winding Gulf		55,073	2,145,844	2,200,917
Total	58,641,704	10,186,801	22,371,336	91,199,841

[1] As defined by the United States Coal Commission of 1922.
[2] High-volatile—dry volatile matter over 31 percent; medium-volatile—dry volatile matter 31 percent or less and over 22 percent; low-volatile—dry volatile matter 22 percent or less and over 14 percent.

TABLE 31.—Coal received for manufacturing oven coke in the United States in 1952, by producing and consuming States, in net tons

Coal consumed in—	Coal produced in—															
	Alabama	Arkansas	Colorado	Georgia	Illinois	Indiana	Kentucky	Maryland	New Mexico	Ohio	Oklahoma	Pennsylvania	Tennessee	Utah	Virginia	West Virginia	Total
Alabama:																	
Merchant plants	1,033,673															171,678	1,205,351
Furnace plants	6,392,709															15,794	6,408,503
Total Alabama	7,426,382															187,472	7,613,854
California: Furnace plant		62,529							100,578		72,384			769,843			1,005,334
Colorado: Furnace plant		174,279	869,549						396,343								1,440,171
Illinois:																	
Merchant plants							71,312					22,254				696,342	789,908
Furnace plants					439,310		1,876,756					400			105,546	1,529,223	3,951,235
Total Illinois					439,310		1,948,068					22,654			105,546	2,225,565	4,741,143
Indiana:																	
Merchant plants						10,359									52,451	940,293	1,003,103
Furnace plants							4,901,651								969,123	4,048,261	9,919,035
Total Indiana						10,359	4,901,651								1,021,574	4,988,554	10,922,138
Maryland: Furnace plant												582,886			50,976	2,951,059	3,584,921
Massachusetts: Merchant plant							38,795									1,443,034	1,481,829
Michigan:																	
Merchant plants												211,841			13,475	687,870	913,186
Furnace plants							1,476,859					11,644			359,029	1,245,164	3,092,696
Total Michigan							1,476,859					223,485			372,504	1,933,034	4,005,882
Minnesota:																	
Merchant plant												18,200				221,473	239,673
Furnace plants							391,674			44,783						490,367	926,824
Total Minnesota							391,674			44,783		18,200				711,840	1,166,497
New Jersey: Merchant plants							40,287					25,579			247,059	1,706,489	2,019,414
New York:																	
Merchant plants							341,014					456,317	39,961		195,510	853,276	1,886,078
Furnace plants							446,684					2,682,943			247,928	729,616	4,107,171
Total New York							787,698					3,139,260	39,961		443,438	1,582,892	5,993,249

Ohio:																	
Merchant plants							178,280								223,386	1,108,966	1,510,632
Furnace plants							2,004,906					5,619,731			342,972	4,262,153	12,229,762
Total Ohio							2,183,186					5,619,731			566,358	5,371,119	13,740,394
Pennsylvania:																	
Merchant plants												14,538			47,654	752,971	815,163
Furnace plants							277,129	103				17,725,715				3,497,621	21,500,568
Total Pennsylvania							277,129	103				17,740,253			47,654	4,250,592	22,315,731
Tennessee: Furnace plant				2,497									244,922		71,157	21,715	340,291
Texas: Furnace plants	95,537										792,425						887,962
Utah: Furnace plants		270,491	5,572						40,191		122,930			1,347,574		81,968	1,868,726
West Virginia:																	
Merchant plants												114,564				1,079,619	1,194,183
Furnace plants												2,585,381				1,603,603	4,188,984
Total West Virginia												2,699,945				2,683,222	5,383,167
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin: Merchant plants							126,440					38,442			125,727	2,398,529	2,689,138
Grand Total	7,521,919	507,299	875,121	2,497	439,310	10,359	12,171,787	103	537,112	44,783	987,739	30,110,435	284,883	2,117,417	3,051,993	32,537,084	91,199,841
At merchant plants	1,033,673					10,359	796,128					901,735	39,961		905.262	12,060,540	15,747,658
At furnace plants	6,488,246	507,299	875,121	2,497	439,310		11,375,659	103	537,112	44,783	987,739	29,208,700	244,922	2,117,417	2,146,731	20,476,544	75,452,183

TABLE 32.—Coal received for manufacturing oven coke in the United States in 1952, by States where consumed and volatile content [1]

Coal consumed in—	High-volatile		Medium-volatile		Low-volatile		Total coal received (net tons)
	Net tons	Percent of total	Net tons	Percent of total	Net tons	Percent of total	
Alabama:							
Merchant plants	394,071	32.7	639,602	53.1	171,678	14.2	1,205,351
Furnace plants	13,063	.2	6,379,646	99.5	15,794	.3	6,408,503
Total Alabama	407,134	5.3	7,019,248	92.2	187,472	2.5	7,613,854
California: Furnace plant	870,421	86.6			134,913	13.4	1,005,334
Colorado: Furnace plant	1,265,892	87.9			174,279	12.1	1,440.171
Illinois:							
Merchant plants	120,067	15.2	362,376	45.9	307,465	38.9	789.908
Furnace plants	2,801,522	70.9			1,149,713	29.1	3,951,235
Total Illinois	2,921,589	61.6	362,376	7.7	1,457,178	30.7	4,741,143
Indiana:							
Merchant plants	455,959	45.5	107,524	10.7	439,620	43.8	1,003.103
Furnace plants	5,518,251	55.6			4,400,784	44.4	9,919,035
Total Indiana	5,974,210	54.7	107,524	1.0	4,840,404	44.3	10,922,138
Maryland: Furnace plant	2,269,939	63.3			1,314,982	36.7	3,584,921
Massachusetts: Merchant plant	775,918	52.4	392,233	26.5	313,678	21.1	1,481,829
Michigan:							
Merchant plants	503,212	55.1	13,475	1.5	396,499	43.4	913,186
Furnace plants	2,123,847	68.7			968,849	31.3	3,092,696
Total Michigan	2,627,059	65.6	13,475	.3	1,365,348	34.1	4,005,882
Minnesota:							
Merchant plant	112,800	47.1	25,329	10.6	101,544	42.3	239,673
Furnace plants	441,535	47.6	132,155	14.3	353,134	38.1	926,824
Total Minnesota	554,335	47.5	157,484	13.5	454,678	39.0	1,166,497
New Jersey: Merchant plants	1,244,337	61.6	357,615	17.7	417,462	20.7	2,019,414
New York:							
Merchant plants	1,525,846	80.9	29,816	1.6	330,416	17.5	1,886,078
Furnace plants	2,928,942	71.3	357,836	8.7	820,393	20.0	4,107,171
Total New York	4,454,788	74.3	387,652	6.5	1,150,809	19.2	5,993,249
Ohio:							
Merchant plants	873,120	57.8	148,135	9.8	489,377	32.4	1,510,632
Furnace plants	8,990,478	73.5	196,306	1.6	3,042,978	24.9	12,229,762
Total Ohio	9,863,598	71.8	344,441	2.5	3,532,355	25.7	13,740,394
Pennsylvania:							
Merchant plants	333,133	40.9	311,108	38.2	170,922	20.9	815,163
Furnace plants	16,537,974	76.9	181,351	.9	4,781,243	22.2	21,500,568
Total Pennsylvania	16,871,107	75.6	492,459	2.2	4,952,165	22.2	22,315,731
Tennessee: Furnace plant	76,439	22.5	239,640	70.4	24,212	7.1	340,291
Texas: Furnace plants	533,074	60.0	259,131	29.2	95,757	10.8	887,962
Utah: Furnace plants	1,516,267	81.1			352,459	18.9	1,868,726
West Virginia:							
Merchant plants	1,079,619	90.4			114,564	9.6	1,194,183
Furnace plants	3,472,679	82.9			716,305	17.1	4,188,984
Total West Virginia	4,552,298	84.6			830,869	15.4	5,383,167
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin: Merchant plants	1,863,299	69.3	53,523	2.0	772,316	28.7	2,689.138
Grand total	58,641,704	64.3	10,186,801	11.2	22,371,336	24.5	91,199,841
At merchant plants	9,281,381	58.9	2,440,736	15.5	4,025,541	25.6	15,747,658
At furnace plants	49,360,323	65.4	7,746,065	10.3	18,345,795	24.3	75,452,183

[1] High-volatile—dry volatile matter over 31 percent; medium-volatile—dry volatile matter 31 percent or less and over 22 percent; low-volatile—dry volatile matter 22 percent or less and over 14 percent.

SHIPMENTS BY RAIL, WATER, AND TRUCK

The quantities of coke and breeze shipped in 1952 by each of the major methods of transportation are given in tables 33 and 34. Most of the coke and breeze shipped from producing plants moved by rail (94 percent of all coke and 84 percent of the breeze). Four percent of the coke and 13 percent of the breeze moved by truck. Only 2 percent of the coke was transported by boats. Large reductions in sales of coke for domestic heating in the past decade have drastically reduced the proportion of coke transported by truck. In the midthirties truck shipments averaged about 3 million tons per year.

Normally, only about 40 percent of the oven coke produced is shipped from the producing plant because many of the larger oven-coke plants are integrated with iron blast furnaces. Therefore, all metallurgical coke is transferred to the blast furnaces without leaving the establishment. In 1952 only 23 percent of all coke produced at furnace plants moved outside the plant. Merchant plants, which market the bulk of their production, shipped 86 percent of their output to various consuming points. Beehive coke, however, is produced in plants at or near coal mines, and virtually all of the production is shipped to centers of consumption. There were no shipments of beehive coke by water in 1952, and all moved by rail except a small quantity transported by truck.

TABLE 33.—Coke and breeze loaded at plants in the United States for shipment in 1952, in net tons

State	Coke				Breeze			
	In railroad cars	In boats	In trucks	Total	In railroad cars	In boats	In trucks	Total
Oven coke:								
Alabama	1,008,675		3,443	1,012,118	192,368		347	192,715
California					6,585			6,585
Colorado	130,242		2,647	132,889	42,457		59	42,516
Illinois	1,564,290		10,167	1,574,457	117,450		45,299	162,749
Indiana	2,142,826		26,359	2,169,185	33,259		53,111	86,370
Maryland					18			18
Massachusetts	525,903	1,094	227,782	754,779				
Michigan	833,466	45,279	50,561	929,306	21,243	4,993	98	26,334
Minnesota	257,769		227	257,996	21,274		60	21,274
New Jersey	1,020,741	88,955	237,026	1,346,722				60
New York	1,953,484	139,301	160,760	2,253,545	29,756	320	781	30,857
Ohio	2,316,087	20,384	35,701	2,372,172	210,546	16,360	27,736	254,642
Pennsylvania	6,336,672	138,851	158,715	6,634,238	124,966	17,239	945	143,150
Tennessee	86,454			86,454	7,605			7,605
Texas	72,867			72,867	12,951			12,951
Utah	132,520		5,367	137,887	75,490			75,490
West Virginia	541,508		322	541,830	50,103		78	50,181
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	1,587,627	55,914	246,068	1,889,609	9,805	661	7,895	18,361
Total	20,511,131	489,778	1,165,145	22,166,054	955,876	39,573	136,409	1,131,858
At merchant plants	8,670,684	312,715	1,048,562	10,031,961	118,439	34,580	10,628	163,647
At furnace plants	11,840,447	177,063	116,583	12,134,093	837,437	4,993	125,781	968,211
Beehive coke:								
Colorado	600			600				
Kentucky	81,407			81,407				
Pennsylvania	3,740,854		2,725	3,743,579	26,702		5,524	32,226
Utah	83,871		178	84,049	15,463		2,430	17,893
Virginia	201,958		132	202,090	2,421			2,421
West Virginia	278,991		31	279,022	4,226		5,527	9,753
Total	4,387,681		3,066	4,390,747	48,812		13,481	62,293

TABLE 34.—Beehive coke loaded for shipment on originating railroads, waterways, and trucks in the United States in 1952, by routes, as reported by producers

Route	Producing State	Net tons		Percent of total
		By States	Total	
Railroads:				
Baltimore & Ohio	Pennsylvania	884,594	1,035,841	23.6
	West Virginia	151,247		
Chesapeake & Ohio	Kentucky	81,407	93,997	2.1
	West Virginia	12,590		
Denver & Rio Grande Western	Colorado	600	84,471	1.9
	Utah	83,871		
Huntingdon & Broadtop Mountain	Pennsylvania	2,720	2,720	0.1
Interstate	Virginia	180,270	180,270	4.1
Monongahela	Pennsylvania	941,540	941,540	21.5
New York Central	West Virginia	115,154	115,154	2.6
Norfolk & Western	Virginia	21,688	21,688	0.5
Pennsylvania	Pennsylvania	1,894,011	1,894,011	43.1
Pittsburgh & Lake Erie	do	17,989	17,989	0.4
Total railroad shipments		4,387,681	4,387,681	99.9
Waterways				
Trucks	(1)	3,066	3,066	0.1
Grand total		4,390,747	4,390,747	100.0

[1] Pennsylvania, Utah, Virginia, and West Virginia.

DISTRIBUTION OF OVEN AND BEEHIVE COKE

Table 35 shows the geographic distribution of coke and breeze in 1952 according to State of final destination and principal end use. Coke is used primarily as an industrial fuel, particularly by the iron and steel industry, and location of these heavy industries governs the distribution pattern. The heavy concentration of iron blast furnaces at Pittsburgh, Chicago, Cleveland, in the Ohio valley, at Buffalo, and Birmingham makes these areas the principal consumers of coke. Pennsylvania led all States by a wide margin in coke consumption, using 26 percent of the total consumed in the United States. Ohio, although contributing only 14 percent to total production, consumed 19 percent. Indiana, Illinois, Alabama, and New York combined used 31 percent. Because of the large quantities of coke used in blast furnaces, these six States consumed over three-quarters of all coke used within the United States.

Foundry coke was distributed to all but two States in 1952; Michigan alone consumed one-fifth of the total. Ohio and Pennsylvania together also consumed another fifth. Coke was used in 8 States for manufacturing producer gas and in 20 States for producing water gas. A significant change in water-gas-coke consumption was the drastic drop in New York because of increasing substitution of natural gas for manufactured gas there. Thus, West Virginia supplanted New York as the largest consumer of water-gas coke. Coke for other industrial uses was shipped to all States and the District of Columbia, and 37 States received coke for household heating.

TABLE 35.—Distribution of oven and beehive coke and breeze in 1952, in net tons

[Based upon reports from producers showing destination and principal end use of coke used or sold. Does not include imported coke which totaled 312,519 tons in 1952]

Consuming State	Coke							Breeze
	Blast-furnace use	Foundry use	Making producer gas	Making water gas	Other industrial use	Domestic use	Total	
Alabama	4,774,021	187,046			63,676	26,621	5,051,364	254,556
Arizona		5,220			778		5,998	79
Arkansas		2,305			1,754		4,059	5,927
California	692,001	58,857			59,715	75	810,648	51,096
Colorado	701,969	13,325			21,596	209	737,099	44,457
Connecticut		55,457	87,642	119,118	7,855	104,279	374,351	50,985
Delaware		5,131			209	372	5,712	2,111
District of Columbia		24			22		46	
Florida		2,159		24,327	637	917	28,040	29,266
Georgia		14,372		4,063	12,983	12,206	43,624	1,350
Idaho		592			8,748	131	9,471	51,451
Illinois	5,076,704	273,936		12,183	48,513	77,863	5,489,199	333,799
Indiana	5,768,595	172,369		4,470	94,233	73,222	6,112,889	465,180
Iowa		63,406			29,430	3,558	96,394	619
Kansas		11,746			672	59	12,477	2,419
Kentucky	487,704	47,781			45,361	26,299	607,145	47,500
Louisiana		5,279			42,314	684	48,277	392
Maine		3,886		12,763	508	15,014	32,171	
Maryland	2,607,049	22,080		252	9,340	478	2,639,199	241,238
Massachusetts	118,291	52,163	134,757	86,506	15,835	342,326	749,878	111,819
Michigan	1,828,511	570,540		28	187,469	293,559	2,880,107	190,472
Minnesota	558,210	32,542	1,845	74	19,398	20,537	632,606	72,104
Mississippi		1,124			69		1,193	173
Missouri		80,532			26,362	3,870	110,764	3,975
Montana		975			21,368		22,343	32,577
Nebraska		4,453			3,627	24	8,104	1,189
Nevada					5,652		5,652	33
New Hampshire		3,714		5,322	164	15,558	24,758	
New Jersey		93,752	37,437	126,555	72,088	298,260	628,092	126,261
New Mexico		1,412			393		1,805	570
New York	3,593,307	128,266	115,904	169,555	187,510	263,612	4,458,154	379,717
North Carolina		13,400		1,582	5,525	2,100	22,607	4,889
North Dakota		241			153	690	1,084	
Ohio	11,561,841	334,438		323,904	259,650	60,254	12,540,087	690,271
Oklahoma		5,079			240		5,319	9,356
Oregon		5,662			16,772		22,434	11,940
Pennsylvania	16,836,416	258,048	64,527	12,640	332,806	133,666	17,638,103	1,120,624
Rhode Island		17,446	37,569	46,624	8,092	42,280	152,011	21,642
South Carolina		4,723		2,388	25,537	1,609	34,257	5,187
South Dakota		364			321	132	817	
Tennessee	155,382	92,946			96,654	3,969	348,951	144,329
Texas	574,081	49,538			53,810		677,429	61,343
Utah	1,122,529	17,845			51,979	3,365	1,195,718	82,605
Vermont		7,316			340	5,783	13,439	
Virginia	76,872	55,553		346,561	60,514	2,196	541,696	4,848
Washington		8,536			6,656		15,192	13,055
West Virginia	1,503,192	7,193		652,393	69,961	30	2,232,769	201,339
Wisconsin		161,453	282		9,689	59,478	230,932	32,163
Wyoming					2,677		2,677	
Total	58,036,675	2,954,255	479,963	1,951,308	1,989,655	1,895,285	67,307,141	4,904,906
Exported	146,072	148,191		15,702	211,449	37,084	558,498	20,881
Grand total	58,182,747	3,102,446	479,963	1,967,010	2,201,104	1,932,369	67,865,639	4,925,787

CONSUMPTION OF COKE

The apparent consumption of coke, considering imports, exports, and changes in producers' stocks, decreased 14 percent from the record established in 1951, owing principally to the strike in the iron and steel industry in the first half of the year and to substitution of natural gas for fuel and for chemical synthesis formerly dependent on water gas from coke. The quantity of coke consumed by iron blast furnaces dropped 13 percent from 1951, and coke for all other uses

decreased 18 percent. It is significant that, although interruptions in blast-furnace operations reduced coke requirements drastically, the proportion of coke used by the furnaces (86 percent) was the highest on record.

The fuel efficiency of blast furnaces improved slightly over 1951 (table 37) because of improvements in blast-furnace technology, quality of coal and coke, and nature of ores actually charged into the furnaces. The quantity of coke required to produce 1 ton of pig iron declined 5.3 pounds from 1951 to 1,843.4 pounds; for pig iron, including ferroalloys, the reduction was also 5.3 pounds to 1,865.4.

Tables 38 and 39 summarize the distribution of oven and beehive coke in 1952 by principal end uses. A large proportion of the oven-coke output, particularly from furnace plants, is used by the producers in integrated blast furnaces, whereas most of the coke made at merchant oven-coke plants and beehive ovens is sold and shipped outside the producing plants to consumers. In 1952 furnace oven-coke plants sold only 23 percent of their production, while merchant plants sold 86 percent. Merchant plants supplied most of the coke used in iron foundries, for gas manufacture, in miscellaneous industrial application, and for residential heating. Beehive coke was sold mostly for metallurgical purposes, and 88 percent of the beehive production was shipped to blast furnaces and iron foundries in 1952.

TABLE 36.—Apparent consumption of coke in the United States, 1913, 1918, 1937, and 1949–52, in net tons

Year	Total production	Imports	Exports	Net change in stocks	Apparent United States consumption [1]	Consumption			
						Iron furnaces [2]		All other purposes	
						Quantity	Percent	Quantity	Percent
1913	46,299,530	101,212	987,395	([3])	45,413,347	37,192,287	81.9	8,221,060	18.1
1918	56,478,372	30,168	1,687,824	([3])	54,820,716	45,703,594	83.4	9,117,122	16.6
1937	52,375,469	286,364	526,683	+863,221	51,271,929	37,599,911	73.3	13,672,018	26.7
1949	63,637,429	277,507	548,256	+176,015	63,190,665	51,356,617	81.3	11,834,048	18.7
1950	72,718,038	437,585	[4] 397,801	−658,742	[4] 73,416,564	61,039,227	83.1	[4] 12,377,337	16.9
1951	79,330,702	161,639	1,026,730	+372,258	78,093,353	66,623,205	85.3	11,470,148	14.7
1952	68,254,109	312,519	792,072	+418,685	67,355,871	57,969,044	86.1	9,386,827	13.9

[1] Production plus imports minus exports, plus or minus net change in stocks.
[2] American Iron and Steel Institute; figures include coke consumed in manufacture of ferroalloys.
[3] Data not available.
[4] Revised figure.

TABLE 37.—Coke and coking coal consumed per net ton of pig iron produced in the United States, 1913, 1918, 1937, and 1950–52

Year	Coke per net ton of pig iron and ferroalloys [1] (pounds)	Yield of coke from coal (percent)	Coking coal per net ton of pig iron and ferroalloys (pounds calculated)	Year	Coke per net ton of pig iron and ferroalloys [1] (pounds)	Yield of coke from coal (percent)	Coking coal per net ton of pig iron and ferroalloys (pounds calculated)
1913	2,172.6	66.9	3,247.5	1950	1,865.5	69.9	2,668.8
1918	2,120.7	66.4	3,193.8	1951	1,870.7	69.8	2,680.1
1937	1,830.6	70.3	2,604.0	1952	1,865.4	69.8	2,672.5

[1] American Iron and Steel Institute; consumption per ton of pig iron only, excluding furnaces making ferroalloys, was 2,172.6 pounds in 1913, 2,120.7 in 1918, 1,806.7 in 1937, 1,843.1 in 1950, 1,848.7 in 1951, and 4,843.4 in 1952.

TABLE 38.—Beehive coke produced, used by producers, and sold in the United States in 1952, by States

State	Produced		Used by producers—				Sold [1]	
			In blast furnaces		For other purposes		Blast furnace [2]	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Colorado	600	(3)						
Kentucky	81,407	(3)					61,391	(3)
Pennsylvania	3,750,606	$51,417,946	280,787	(3)	4,011	$59,169	3,186,932	$43,355,150
Utah	85,111	(3)	14,882	(3)				
Virginia	202,328	3,068,379					78,686	(3)
West Virginia	283,942	4,135,770					122,410	1,726,727
Undistributed		2,660,051		$4,511,081				2,032,309
Total: 1952	4,403,994	61,282,146	295,669	4,511,081	4,011	59,169	3,449,419	47,114,186
1951	7,343,530	102,408,135	370,732	5,675,482	1,579	22,632	6,044,209	82,893,032

State	Sold [1]—Continued							
	Foundry		Other industrial (including water gas [4])		Domestic [5]		Total	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Colorado			600	(3)			600	(3)
Kentucky	20,016	(3)					81,407	(3)
Pennsylvania	80,114	$1,221,772	182,376	$2,437,610	13,370	$165,463	3,462,792	$47,179,995
Utah			69,167	(3)			69,167	(3)
Virginia	16,239	(3)	104,775	1,558,241	2,390	38,569	202,090	3,065,185
West Virginia	13,992	254,656	142,620	2,085,020			279,022	4,066,403
Undistributed		533,228		1,173,677				2,270,839
Total: 1952	130,361	2,009,656	499,538	7,254,548	15,760	204,032	4,095,078	56,582,422
1951	228,096	3,667,223	669,653	9,755,156	27,237	354,701	6,969,195	96,670,112

[1] Includes intracompany transfers.
[2] Includes 1,358,180 tons valued at $17,089,479 sold to financially affiliated companies.
[3] Included with "Undistributed" to avoid disclosure of individual company operations.
[4] Includes 131,765 tons valued at $1,937,142 sold to other consumers for the manufacture of water gas.
[5] Household and commercial.

TABLE 39.—Oven coke produced, used by producers, and sold in the United States in 1952, by States

State	Produced		Used by producers—				Sold [1]	
			In blast furnaces		For other purposes [2]		Blast furnace [3]	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Alabama	5,712,102	$66,887,735	4,695,727	$48,577,788	20,668	$213,127	213,070	$3,561,419
California	610,080	(4)	604,333	(4)	525	(4)		
Colorado	816,140	(4)	701,909	(4)	3,440	(4)	102,277	(4)
Illinois	3,390,773	57,959,512	1,742,848	27,419,661	18,841	257,265	1,244,594	23,233,335
Indiana	7,611,090	139,053,346	5,448,843	96,454,370	34,222	539,783	1,562,336	30,483,826
Maryland	2,490,859	(4)	2,503,632	(4)	6,990	(4)		
Massachusetts	1,055,529	(4)	118,291	(4)	142,175	(4)	247,092	(4)
Michigan	2,862,873	44,721,081	1,765,176	(4)	104,072	1,596,204	31,562	(4)
Minnesota	868,523	14,614,548	558,210	(4)	4,099	38,195	61,738	(4)
New Jersey	1,472,245	(4)			140,440	(4)	760,564	(4)
New York	4,342,583	65,232,116	1,741,660	(4)	306,960	4,000,017	1,827,187	25,908,324
Ohio	9,638,904	131,405,472	7,176,297	94,124,106	83,060	1,297,395	1,411,319	19,954,623
Pennsylvania	15,100,698	196,491,704	8,166,471	100,099,888	133,848	1,479,302	5,996,491	81,312,429
Tennessee	254,319	(4)	155,382	(4)	21,030	(4)	60,573	(4)
Texas	652,179	(4)	574,081	(4)	6,052	(4)	46,372	(4)
Utah	1,125,729	(4)	995,831	(4)	2,075	(4)	71,701	(4)
West Virginia	3,798,215	44,519,412	2,687,390	33,494,900	672,767	5,605,752	265,375	4,014,154
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	2,047,274	34,523,271			143,190	1,940,961	899,258	12,966,219
Undistributed		129,892,251		146,996,345		4,475,178		22,351,558
Total 1952	63,850,115	925,300,448	39,636,150	547,167,058	1,844,445	21,443,179	14,801,509	223,785,887
At merchant plants	11,721,209	196,983,761	118,291	(4)	1,548,456	17,772,157	4,078,264	66,021,100
At furnace plants	52,128,906	728,316,687	39,517,859	(4)	295,989	3,671,022	10,723,245	157,764,787
Total 1951	71,987,172	1,017,065,551	44,629,127	595,477,226	2,005,220	24,657,796	16,396,919	239,497,271

State	Sold [1]—Continued							
	Foundry [2]		Other industrial (including water gas [3])		Domestic [7]		Total	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Alabama	554,637	$11,279,812	174,774	$2,849,182	69,637	$778,872	1,012,118	$18,469,285
California								
Colorado	6,229	(4)	24,115	(4)	268	(4)	132,889	(4)
Illinois	205,107	(4)	67,262	844,551	57,494	(4)	1,574,457	29,422,867
Indiana	420,226	(4)	109,198	1,724,190	77,425	(4)	2,169,185	42,754,982
Maryland								
Massachusetts	81,968	(4)	102,592	(4)	323,127	(4)	754,779	(4)
Michigan	390,837	(4)	186,884	(4)	320,023	4,081,944	929,306	16,520,841
Minnesota	130,281	(4)	36,246	(4)	29,731	(4)	257,996	(4)
New Jersey	105,057	(4)	120,387	(4)	360,714	(4)	1,346,722	(4)
New York	25,975	(4)	202,853	(4)	197,530	2,801,836	2,253,545	32,324,081
Ohio	238,210	5,517,220	665,255	9,621,929	74,576	1,014,928	2,389,360	36,108,700
Pennsylvania	279,330	6,363,770	220,816	2,876,801	137,601	2,082,242	6,634,238	92,635,242
Tennessee	19,275	(4)	6,300	(4)	306	(4)	86,454	(4)
Texas	3,034	(4)	23,461	(4)			72,867	(4)
Utah			62,090	(4)	3,496	(4)	137,887	(4)
West Virginia	2,281	(4)	80,363	490,268	855	(4)	348,874	4,560,812
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	457,179	10,639,623	269,346	4,270,265	263,826	4,317,231	1,889,609	32,193,338
Undistributed		31,699,044		11,293,024		13,105,388		46,546,859
Total 1952	2,919,626	65,490,469	2,352,542	33,979,210	1,916,609	28,272,441	21,990,286	351,537,007
At merchant plants	2,652,813	59,599,824	1,780,282	27,703,770	1,520,602	23,480,092	10,031,961	176,804,786
At furnace plants	266,813	5,899,645	572,260	6,275,440	396,007	4,792,349	11,958,325	174,732,221
Total 1951	3,518,193	77,872,589	2,986,207	44,165,929	2,060,697	29,770,954	24,962,016	391,306,743

[1] Includes intracompany transfers.
[2] Comprises 52,459 tons valued at $882,032 used in foundries; 479,963 tons, $6,346,617 to make producer gas; 953,534 tons, $9,629,097 to make water gas; and 358,489 tons, $4,585,433 for other purposes.
[3] Includes 9,348,611 tons valued at $134,043,448 sold to financially affiliated companies.
[4] Included with "Undistributed" to avoid disclosure of individual company operations.
[5] Includes 55,034 tons valued at $1,067,908 sold to financially affiliated companies.
[6] Includes 602,891 tons valued at $9,230,618 for manufacture of water gas and 185,282 tons, $2,689,708 for other industrial use sold to financially affiliated companies; and 278,820 tons, $4,520,640 for manufacture of water gas sold to other consumers.
[7] Household and commercial.

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STOCKS OF COKE AND COKING COAL

Producers' stocks of coke increased for the second consecutive year in 1952 and on December 31 totaled 1.9 million tons. As shown in table 40, all but 1 percent of the coke inventories were at oven-coke plants. Stocks of oven coke at both furnace and merchant plants increased substantially during June and July (table 42) because blast furnaces were banked during the strike. Consequently, in July oven-coke stocks marked the highest point since the 1930's. With resumption in August of capacity operations of blast furnaces, stocks of coke at both merchant and furnace plants started to decline. By December 31 coke stocks at oven-coke plants had dropped from 3.3 million tons in July to 1.9 million and were equivalent to 9 days' production. Producers' stocks of beehive coke represented 2 days' production at the rate prevailing in December.

Stocks of bituminous coal at oven-coke plants declined slightly during 1952 and on December 31 sufficed for 50 days' supply at the rate of consumption prevailing at that time. Coal stocks fluctuated from a high of 16.9 million tons at the end of June to 13.6 in November. Because of the continuous nature of the carbonization process, the maintenance of adequate stocks of bituminous coal at oven-coke plants is essential. A 30-day supply is the minimum desired by most oven-coke plant operators as a safeguard against disruption in the flow of coal to the ovens. Coke plants on the upper Lakes, which are supplied principally by boat, build up inventories during the shipping season to have an adequate tonnage for the winter. These plants usually have an aggregate of 4 to 5 months' supply at the end of the Lake shipping season.

TABLE 40.—Producers' year-end stocks of coke at all coke plants in the United States, 1937, and 1948–52, in net tons

	1937 [1]	1948	1949	1950	1951	1952
Oven-coke plants:						
Blast-furnace	610,840	940,727	838,718	756,199	1,011,989	1,526,776
Foundry	29,828	7,003	13,120	8,466	16,140	15,613
Domestic and other	1,878,652	612,851	864,720	327,997	439,270	334,876
Total	2,519,320	1,560,581	1,716,558	1,092,662	1,467,399	1,877,265
Beehive-coke plants:						
Blast-furnace	13,542	30,629	51,580	17,068	14,129	22,611
Foundry	13,264	964	1,118	884	1,344	740
Domestic and other	49,161	1,267	200	100	100	1,041
Total	75,967	32,860	52,898	18,052	15,573	24,392
Total:						
Blast-furnace	624,382	971,356	890,298	773,267	1,026,118	1,549,387
Foundry	43,092	7,967	14,238	9,350	17,484	16,353
Domestic and other	1,927,813	614,118	864,920	328,097	439,370	335,917
Grand total	2,595,287	1,593,441	1,769,456	1,110,714	1,482,972	1,901,657

[1] Revised figures.

TABLE 41.—Producers' stocks of coke and breeze in the United States on December 31, 1952, by States, in net tons

State	Coke				Breeze
	Blast-furnace	Foundry	Domestic and other	Total	
Oven coke:					
Alabama	134,632	6,164	7,439	148,235	20,136
California	25,712			25,712	10,845
Colorado	10,169			10,169	2,128
Illinois	91,230	678	1,660	93,568	25,200
Indiana	73,888	1,068	20,717	95,673	105,466
Maryland	45,122			45,122	132,943
Massachusetts	52,512	270	63,272	116,054	
Michigan	110,963	375	16,581	127,919	5,626
Minnesota	48,158	429	16,124	64,711	14,408
New Jersey	482	214	60,248	60,944	21,967
New York	143,945		802	144,747	146,387
Ohio	131,581	1,280	15,155	148,016	52,819
Pennsylvania	472,936	614	46,684	520,234	122,588
Tennessee	5,331	96	2,946	8,373	
Texas	1,462	278	1,888	3,628	354
Utah	39,957		576	40,533	8,610
West Virginia	105,788		28,714	134,502	76,216
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	32,908	4,147	52,070	89,125	8,474
Total	1,526,776	15,613	334,876	1,877,265	754,167
At merchant plants	147,832	14,300	270,085	432,217	91,674
At furnace plants	1,378,944	1,313	64,791	1,445,048	662,493
Beehive coke:					
Colorado					
Kentucky					
Pennsylvania	15,060	111	1,021	16,192	2,496
Tennessee					
Utah	1,207			1,207	
Virginia	906	73	20	999	30
West Virginia	5,438	556		5,994	
Total	22,611	740	1,041	24,392	2,526

TABLE 42.—Producers' month-end stocks of oven coke in the United States, 1951–52, in net tons

[Includes blast-furnace, foundry, and domestic coke]

Month	Furnace plants		Merchant plants		Total	
	1951	1952	1951	1952	1951	1952
January	904,740	1,421,459	195,417	388,946	1,100,157	1,810,405
February	931,600	1,455,488	137,098	309,875	1,068,698	1,765,363
March	1,134,048	1,529,813	131,841	302,162	1,265,889	1,831,975
April	1,219,317	1,459,313	190,905	413,451	1,410,222	1,872,764
May	1,211,354	1,537,618	233,309	423,814	1,444,663	1,961,432
June	1,135,097	2,006,680	260,297	549,997	1,395,394	2,556,677
July	1,175,311	2,478,853	343,143	818,618	1,518,454	3,297,471
August	1,203,936	2,293,595	422,453	848,064	1,626,389	3,141,659
September	1,298,040	2,132,274	465,761	705,656	1,763,801	2,837,930
October	1,305,892	1,957,307	508,694	583,254	1,814,586	2,540,561
November	1,263,728	1,920,322	494,601	524,390	1,758,329	2,444,712
December	1,026,019	1,445,048	441,380	432,217	1,467,399	1,877,265

TABLE 43.—Month-end stocks of bituminous coal at oven-coke plants in the United States, 1937 and 1950–52, in net tons

Month	1937	1950	1951	1952
January	8,030,871	7,087,355	16,960,185	14,827,371
February	8,687,389	3,448,610	16,366,139	15,786,416
March	9,638,317	4,847,923	16,751,447	16,726,606
April	8,543,774	7,490,871	16,464,045	16,652,421
May	8,187,883	9,572,167	16,179,877	16,799,063
June	7,770,256	11,279,551	16,254,127	16,894,290
July	7,432,741	10,385,780	14,034,705	16,135,572
August	7,455,932	12,339,744	14,448,916	16,066,471
September	7,760,533	13,964,334	14,426,401	15,728,472
October	8,066,938	15,665,689	14,953,056	14,436,545
November	8,114,094	16,329,150	15,123,117	13,637,219
December	7,273,403	16,776,070	15,257,762	14,429,783

TABLE 44.—Month-end stocks of anthracite at oven-coke plants in the United States, 1945–52, in net tons

Month	1945 [1]	1946	1947	1948	1949	1950	1951	1952
January	55,540	61,563	50,793	64,430	47,418	68,715	31,618	46,933
February	34,274	56,445	40,659	48,898	33,362	60,899	26,094	38,495
March	29,451	37,822	33,187	25,344	23,929	49,900	22,634	34,719
April	36,402	45,848	30,740	27,110	16,707	41,873	24,406	30,506
May	31,858	46,452	29,871	35,922	41,416	67,687	32,971	29,399
June	28,956	45,714	38,403	51,022	53,585	29,710	44,193	42,216
July	45,731	46,162	36,409	48,396	71,609	28,703	44,036	41,583
August	49,758	46,428	35,798	57,204	76,438	28,671	46,191	45,300
September	72,356	51,201	65,151	62,867	75,230	29,388	39,280	43,865
October	80,383	65,366	88,136	68,476	81,369	34,260	51,656	50,148
November	91,706	59,997	83,803	73,630	74,792	35,710	58,903	58,422
December	78,447	58,873	79,314	62,081	69,580	33,496	57,122	54,720

[1] First year statistics on anthracite at coke plants collected.

VALUE AND PRICE

The term "value", as used in this chapter, is the value of coke at the ovens as reported by producers. For that part of the output sold, the value is the amount received for the coke f. o. b. ovens. However, the greater part of the coke produced in the United States is made in ovens owned and operated by corporations which not only mine their coal but also operate blast furnaces and steel mills that consume the entire output of coke. Under such conditions the value of coal charged and of coke produced is governed by established accounting procedures. For example, at some plants the cost of coke to the furnace department equals the cost of production; at others, a margin of profit is added; or the reported value is based on what the coke would cost if purchased elsewhere. The line between sales and interdepartmental transfers is difficult to draw among such affiliated interests, as a large part of the furnace coke reported as sold actually goes to iron furnaces that are in some way associated with the coke producers.

The average value of all coke produced in 1952, as reported by producers, was $14.45 per ton, the highest figure ever recorded and 2 percent greater than in 1951 (table 45). The average price received per ton of coke sold, f. o. b. ovens (merchant sales), in 1952 established a new record and was 3 percent over the 1951 figure.

Table 46 shows average receipts from sales by use and by State. The average realization per ton on merchant sales of oven coke for

"blast-furnace," "foundry," and "domestic" uses increased over the 1951 figures, while coke for "other industrial" uses declined. The price of beehive coke sold for blast-furnace use increased slightly over 1951, but the average receipts per ton of beehive coke sold for all other purposes decreased.

TABLE 45.—Average value per net ton of coke produced and average receipts per net ton from coke sold (merchant sales) in the United States, 1937 and 1948–52

Year	Value per ton produced			Receipts per ton sold		
	Oven coke	Beehive coke	Total	Oven coke	Beehive coke	Total
1937	$5.03	$4.31	$4.98	$6.45	$4.25	$6.10
1948	12.43	12.10	12.40	14.74	12.80	14.22
1949	13.26	12.87	13.24	15.12	13.52	14.85
1950	13.45	13.25	13.43	15.66	13.63	15.15
1951	14.13	13.95	14.11	17.04	14.33	16.25
1952	14.49	13.92	14.45	17.26	14.43	16.72

TABLE 46.—Average receipts per net ton of coke sold (merchant sales) in the United States in 1952, by States

State	Oven coke				Beehive coke			
	Blast-furnace	Foundry	Other industrial (including water gas)	Domestic [1]	Blast-furnace	Foundry	Other industrial (including water gas)	Domestic [1]
Alabama	$17.98	$20.34	$16.30	$11.18				
California, Colorado, Texas, and Utah	18.52	19.79	13.52	7.75			(2)	
Connecticut, Massachusetts, and Rhode Island	15.94	22.04	16.63	16.23				
Illinois	17.10	(2)	12.59	(2)				
Indiana	(2)	(2)	17.63	(2)				
Kentucky, Missouri, and Tennessee	13.66	23.58	14.88	11.72	(2)	(2)		
Michigan, Minnesota, and Wisconsin	17.74	23.39	14.20	13.41				
New Jersey and New York	16.28	22.51	14.23	15.28				
Ohio	16.53	23.18	12.29	13.61				
Pennsylvania	15.72	22.81	13.17	15.13	$14.36	$15.25	$13.37	$12.38
Virginia					(2)	(2)	(2)	16.14
West Virginia	(2)	(2)	6.21	(2)	14.11	18.20	14.62	
Undistributed	17.55	22.84		13.11	14.51	14.71	15.65	
United States average, 1952	16.29	22.49	14.10	14.75	14.36	15.42	14.52	12.95
At merchant plants	16.19	22.53	15.67	15.44				
At furnace plants	16.60	22.16	10.98	12.10				
United States average, 1951	15.64	22.19	14.44	14.45	14.20	16.08	14.57	13.02

[1] Household and commercial.
[2] Included with "Undistributed" to avoid disclosure of individual company operations.

FOREIGN TRADE [3]

Imports.—Imports of coke in 1952 increased 93 percent over 1951 but were still 125,066 tons (29 percent) less than quantity imported in 1950. Although the total quantity of coke imported in 1952

[3] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

amounted to less than 1 percent of the apparent consumption in the United States, imports in certain areas, particularly in the northwestern part of the country, alleviated local shortages. Canada was the principal source and contributed 99 percent of the coke entering United States customs districts. Most of the coke imported in 1952 passed through the Buffalo, Montana-Idaho, and Michigan customs districts. Coke entering through the Buffalo and Michigan gateways probably was used for miscellaneous industrial application and for residential heating, while that entering through the Montana-Idaho district was used for smelting nonferrous metals.

Exports.—Exports of coke decreased 23 percent in 1952 from 1951 but were about double the 1950 figure. As in past years, Canada received 67 percent of all shipments destined to points outside the United States. Exports to European countries, which reached an alltime high in 1951, declined 48 percent in 1952 but were still greater than in any year before 1951. Exports of metallurgical grades of coke to foreign countries other than Canada were subject to Government control throughout 1952. An export quota of 15,000 short tons for each quarter was established by the Office of International Trade, United States Department of Commerce. This agency announced, at the time the quotas were established, that additional shipments would be licensed if, after consultation with the National Production Authority and the Defense Solid Fuels Administration, it was found that production in the United States exceeded require-

TABLE 47.—Coke imported for consumption in the United States, 1950–52, by countries and customs districts

[U. S. Department of Commerce]

	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
Brazil			23	$95		
Canada	365,615	$4,315,394	157,631	1,872,437	308,803	$4,462,891
Germany	3,140	48,676	54	821		
Netherlands	68,810	932,245			3,696	62,862
Netherlands Antilles					9	375
Peru	20	198				
United Kingdom			3,931	58,932	11	465
Total	437,585	5,296,513	161,639	1,932,285	312,519	4,526,593
CUSTOMS DISTRICT						
Buffalo	27,593	425,636	3,696	57,331	144,368	2,707,502
Chicago	17,035	75,062	54	821		
Dakota	290	1,740	1,097	14,787	17,044	87,522
Duluth and Superior	44,796	190,326	44	355		
Los Angeles	7,034	156,184				
Maine and New Hampshire	305	4,229	291	4,735	259	3,444
Massachusetts	55,347	673,451				
Michigan	203,445	2,837,749	63,339	799,930	47,044	531,786
Montana and Idaho	70,859	781,001	80,889	904,481	80,057	874,210
New York	20	198	23	95	11	465
Philadelphia			3,931	58,932		
Puerto Rico	3,736	44,783			3,696	62,862
St. Lawrence	2,454	34,646	4,971	78,398	13,918	231,372
San Francisco	2,693	57,827			9	375
Vermont	363	5,589	141	2,270	87	1,770
Washington	1,577	7,474	3,163	10,150	6,026	25,285
Total	[1] 437,585	[1] 5,296,513	161,639	1,932,285	312,519	4,526,593

[1] Includes shipments on vessels operated by the U. S. Army or Navy, as follows: 38 tons; value $618.

ments. As the supply of beehive and oven coke along the east coast permitted, tonnages exceeding the established quota were shipped each quarter to European and South American countries where shortages existed.

TABLE 48.—Coke exported from the United States, 1950–52, by countries and customs districts

[U. S. Department of Commerce]

	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
North America:						
Canada	361,555	$5,621,051	610,343	$9,671,585	533,832	$8,497,230
Mexico	30,570	352,165	20,504	382,911	21,592	482,543
Panama	51	2,862	56	3,553	93	3,503
West Indies:						
Cuba	2,910	74,429	8,020	169,276	15,743	272,642
Trinidad and Tobago			207	4,572	220	5,762
Other North America	1,134	31,462	1,065	45,722	924	37,015
South America:						
Argentina			3,358	72,157	5,583	117,107
Bolivia	101	3,651	897	34,457	616	26,712
Brazil			22,359	593,337	22,389	755,670
Chile	10	350	875	21,759	1,019	21,711
Ecuador	30	1,310	68	2,462	269	10,847
Peru			839	19,156	855	23,757
Uruguay			1,431	46,832	104	4,556
Venezuela	187	6,714	527	18,695	481	23,154
Other South America	100	3,970	11	605	71	3,035
Europe:						
Denmark	6	118	13	329		
Finland			150,987	2,964,883	22,652	468,619
France					4,800	115,703
Germany			20	300	2,616	32,901
Ireland			1,369	31,399		
Norway			1,699	23,938	35,732	550,638
Spain			78,310	1,381,359	54,868	925,433
Yugoslavia			121,641	2,160,840	62,762	1,228,820
Other Europe			263	5,863	34	1,077
Asia:						
Lebanon					18	1,925
Philippines	1,147	61,125	296	16,355	1,608	52,684
Thailand			451	18,714		
Other Asia			6	584	152	6,650
Africa:						
Egypt			1,115	22,888	3,005	57,970
Other Africa					34	801
Total	397,801	6,159,207	1,026,730	17,714,531	792,072	13,728,465
CUSTOMS DISTRICT						
Buffalo	170,512	2,482,995	301,866	4,663,010	224,566	3,591,567
Dakota	13,230	244,005	14,951	289,106	12,862	269,928
Duluth and Superior	5,133	99,342	8,319	142,622	6,148	120,289
El Paso	255	895	280	3,874	300	1,802
Florida	2,767	70,761	3,420	95,490	1,849	52,417
Laredo	26,821	314,295	18,594	335,441	20,019	447,977
Los Angeles	2,413	12,596				
Maryland	70	2,792	171,072	3,174,366	28,367	641,877
Michigan	151,362	2,497,641	250,730	4,232,747	252,523	4,209,477
Mobile			6,949	247,163	1,033	24,386
Montana and Idaho	42	856	71	1,669	36	852
New Orleans	1,945	60,595	4,071	166,757	6,343	242,325
New York	96	4,012	92,834	1,609,962	101,340	1,781,801
Ohio	15,381	202,542	31,056	261,901	30,878	200,631
Philadelphia	10	350	114,337	2,289,978	87,095	1,749,279
St. Lawrence	2,657	32,513	252	4,440	5,397	69,801
San Diego	556	10,214	791	14,651	717	14,093
San Francisco	579	24,920	33	1,545		
South Carolina					4,800	115,703
Vermont	189	4,451				
Virginia	205	17,024	3,566	88,697	5,960	146,227
Washington	3,049	56,706	3,058	75,193	1,422	34,685
Other districts	529	19,702	480	15,919	417	13,348
Total	397,801	6,159,207	1,026,730	17,714,531	792,072	13,728,465

TECHNOLOGY

Considerable fundamental research work was done in 1952 on coke-oven products by industry and Government as expanding markets necessitated improved processing technique, equipment, and new products. Although results of all of the outstanding developments that occurred during the year were not published, a few of those published of interest to individuals, research groups, and concerns engaged in coke plant technology are as follows:

A catalytic refining process installed in a coke plant in the Ruhr district of Germany was reported to have increased the yield of pure benzol from crude light oil by 10 percent over the older method of sulfuric acid treatment.[4] The new process proved so successful that the original 5,000-ton-per-day installation erected in 1950 was expanded to 15,000 tons in 1951.

A new method of drying and carbonizing fine coal in entrained and fluidized state was developed by the Bureau of Mines Denver, Colo., laboratories.[5] Commercial application of this process is planned by the Texas Power & Light Co. in a power plant under construction for the Aluminum Corp. of America at Rockdale, Tex. The significance of this development is the fact that it is believed that power can be produced competitively from lignite in an area where oil and natural gas are readily available.

An article published in 1952 proposed the use of carbon monoxide in blast-furnace gas as a chemical reagent to convert benzol into benzaldehyde—a higher priced finished product.[6] As most blast furnaces in the United States are integrated with coke-oven installations, such a process should be attractive because both reagents (benzol from coke ovens and carbon monoxide in the form of blast-furnace gas) are already available, and only the catalyst would have to be brought from outside.

The Mellon Institute of Industrial Research, in its Thirty-ninth Annual Report, for the fiscal year ended February 29, 1952, summarized studies on problems relating to coke-plant technology, tar distillation and products, and basic coal-chemical research.[7]

An excellent summary of the coke-evaluation project, initiated on April 3, 1948, under sponsorship of the American Iron and Steel

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[4] Chemical Engineering, Germans Up Pure Benzene Yield: Vol. 59, No. 9, September 1952, p. 220.

[5] Parry, V. F., Landers, W. S., Wagner, E. O., Goodman, J. B., and Lammers, G. C., Drying and Carbonizing Fine Coal in Entrained and Fluidized State: Bureau of Mines Rept. of Investigations 4954, 1953, 43 pp.

[6] Boyle, J. L., A New Product From Benzene and Blast-Furnace Gas: Blast Furnace and Steel Plant, vol. 40, No. 12, December 1952, pp. 1443–1447.

[7] Weidlein, E. R. (president), Research Proceeding of Mellon Institute, 1951–52: 39th Annual Rept. of the President, to the Board of Trustees of the Institution, for the Fiscal Year Ended February 29, 1952, pp. 26–27 and 44–45.

Institute and the American Coke and Coal Chemicals Institute, was published in 1952.[8]

WORLD PRODUCTION

Production of oven and beehive coke, for all countries for which figures are available, is shown in table 49. In addition, data on all other types of coke are shown for the first time in this chapter in table 50. World production of oven and beehive coke, by far the most important industrial solid fuel made by carbonization of coal, increased 3 million metric tons in 1952 to an estimated total of 207 million, a new record. Although production of oven and beehive coke in the United States decreased approximately 10 million tons in 1952, the combined increase for all other countries more than offset this decline. In spite of the substantial reduction in output of coke in the United States in 1952, this country still produced nearly one-third of the world total. Production of hard coke in West Germany continued to increase; and this country ranked second, with 18 percent of the total. Although precise data on coke production in the Soviet Union are not available, estimates based on various Government reports placed that country third, with 16 percent of the total world production. Other leading coke-producing countries were the United Kingdom, France (including the Saar), Poland, Belgium, and Czechoslovakia, which combined produced 24 percent of the total.

The countries of Europe contributed almost two-thirds to the total world production. The North American countries, of which the United States contributed the major proportion, produced 32 percent and all other continental groups 6 percent.

In the United States, gashouse coke is no longer an important factor in the supply of solid fuels but remains important to the economy of the United Kingdom, Germany, France, Japan, India, and several other countries. The availability of natural gas in virtually all areas of the United States has contributed to its decline in this country, whereas manufactured gas (including coal gas) is still extensively used in many countries where natural-gas supplies do not exist or are limited. Low-temperature coke is made in many countries, but only in India, Germany, and France are substantial quantities produced.

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[8] Campbell, R. W., A Study of Tests for the Evaluation of Coke: Blast Furnace and Steel Plant, vol. 40, Nos. 6 and 7, June and July 1952, pp. 643–649 and 779–786.

TABLE 49.—World production of oven and beehive coke (excluding breeze), 1948–52, by countries, in thousands of metric tons[1]

[Compiled by Pauline Roberts]

Country	1948	1949	1950	1951	1952
North America:					
Canada	3,116	3,041	3,154	3,086	3,260
Mexico	408	375	392	389	463
United States	67,913	57,731	65,968	71,967	61,919
South America:					
Brazil	266	272	287	286	[2] 350
Chile				249	232
Peru	2				[3] 5
Europe:					
Austria	591	776	987	1,083	1,230
Belgium	5,587	5,007	4,585	6,106	6,419
Bulgaria [2]	9	8	10	10	15
Czechoslovakia	4,099	4,686	4,876	[2] 5,076	[2] 5,800
France	6,247	6,903	7,035	8,079	9,216
Saar	2,740	3,328	3,227	3,766	3,887
Germany:					
East Germany [2]	225	275	300	300	300
West Germany	20,266	25,140	27,333	33,626	37,236
Italy	1,309	1,511	1,510	2,181	2,470
Netherlands	2,240	2,474	2,804	2,973	3,228
Poland	5,091	5,751	5,976	6,336	7,400
Rumania [2]	80	100	120	150	150
Spain	848	967	946	995	1,176
Sweden	74	83	72		56
Trieste	98	[2] 103	99	99	120
U. S. S. R. [2]	20,000	24,000	27,000	30,000	33,500
United Kingdom	15,670	15,740	15,628	16,358	17,378
Asia:					
China [2]	[3] 93	[3] 100	1,000	1,300	1,500
India	1,779	2,038	2,251	2,183	2,077
Iran [2]	4	[4] 4	[4] 3	5	7
Japan	1,932	2,580	2,712	3,864	3,996
Korea:					
Korea, Republic of	11	4	5	3	3
North Korea [2]	300	400	500	250	250
Taiwan (Formosa)	32	36	39	87	144
Turkey	271	293	308	306	370
Africa:					
Southern Rhodesia	79	81	96	94	110
Union of South Africa	802	956	1,036	1,254	[2] 1,300
Oceania:					
Australia [5]	1,406	1,168	1,183	1,612	[2] 1,700
New Caledonia [2]	80	80	80	80	80
New Zealand		5	6	6	[2] 6
Total (estimate)	164,000	166,000	182,000	204,000	207,000

[1] Includes revisions of data published previously.
[2] Estimate.
[3] National Resources Commission only.
[4] Year ended Mar. 20 of year following that stated.
[5] Year ended June 30 of year stated.

TABLE 50.—World production of gashouse, low-, and medium-temperature coke (excluding breeze), 1949–52, by countries, in thousands of metric tons [1]

[Compiled by Pauline Roberts]

Country [2]	1949	1950	1951	1952
North America:				
Canada	239	220	222	159
United States	344	158	115	41
South America:				
Argentina [3]	50	50	50	50
Chile	124	122	116	113
Peru, medium-temperature	[3] 20	[3] 20	[3] 20	20
Uruguay	28	33	34	[3] 34
Europe:				
Austria	564	556	457	454
Belgium	34	28	23	21
Czechoslovakia [3]	400	450	450	450
Denmark	378	363	408	417
Finland	68	68	76	115
France:				
Gashouse	1,510	1,441	1,572	1,485
Low-temperature	236	252	272	280
Saar:				
Gashouse	2	1		
Low-temperature	38	51	87	94
Germany:				
East Germany	[3] 335	[4] 335	[4] 336	[3] 335
West Germany:				
Gashouse	2,705	3,139	3,696	4,203
Low-temperature	602	665	691	702
Greece	16	[3] 25	31	[3] 31
Hungary [3]	110	115	120	120
Ireland (Eire)	79	78	90	[3] 90
Italy	982	1,067	1,092	1,113
Luxembourg	30	31	33	32
Netherlands	1,015	996	958	1,062
Norway [5]	59	61	61	[3] 62
Poland:				
Gashouse [3]	375	400	400	400
Low-temperature	85	[3] 90	[3] 90	[3] 95
Portugal	15	25	27	[3] 32
Spain	214	200	216	[3] 215
Sweden	579	576	608	608
Switzerland [5]	396	410	466	460
United Kingdom	11,624	11,994	12,522	12,733
Northern Ireland [3]	122	122	122	122
Yugoslavia	31	37	[3] 40	[3] 40
Asia:				
Ceylon	13	14	15	[3] 15
India:				
Gashouse	81	77	76	[3] 80
Low-temperature	1,042	1,289	1,278	[3] 1,444
Japan:				
Gashouse	1,308	1,332	1,692	1,884
Low-temperature [3]	175	175	190	120
Korea, Republic of	6	[3] 6	[3] 3	1
Malaya	11	11	14	[3] 15
Taiwan (Formosa)	1	[3] 1	[3] 1	[3] 1
Turkey:				
Gashouse	54	56	[3] 60	[3] 60
Low-temperature	71	69	[3] 70	[3] 70
Africa:				
Algeria	87	88	96	92
Canary Islands	1	1	(6)	(6)
Egypt	23	23	27	[3] 27
Tunisia	19	13	13	[3] 13
Union of South Africa [3]	70	70	75	75
Oceania:				
Australia [7]	1,200	1,004	1,058	[3] 1,150
New Zealand	97	100	61	[3] 60
Total (estimate)	30,000	31,000	33,000	34,000

[1] Gashouse coke unless otherwise specified.
[2] Production data for China, Mexico, Rumania, and U. S. S. R., are not available; estimates for these countries included in total.
[3] Estimate.
[4] Planned production.
[5] Includes breeze.
[6] Less than 500 tons.
[7] Year ended June 30 of year stated.

COAL-CHEMICAL MATERIALS

GENERAL SUMMARY

When bituminous coal is subjected to high temperatures in slot-type coke ovens, the products recovered from the resulting gases and vapors are commonly called "coal chemicals." The primary products—tar, ammonia, and light oil—are processed into a wide range of valuable materials by highly scientific methods in special equipment. This processing yields a relatively small number of chemicals, such as naphthalene, benzol, toluol, xylol, pyridine, phenol, etc., which in turn are basic raw materials for making explosives, synthetic rubber, fibers, detergents, dyes, pharmaceuticals, and countless other end products that are indispensable to our economy in both peace and war.

In recent years the rapid growth in the chemical field has increased the requirements for coal chemicals. Expanded markets have created greater interest in the production of the various chemicals and influenced the gross financial returns therefrom. Table 52 shows significant shifts in the gross values assigned to the various coal-chemical materials since 1937.

Surplus gas, although not processed to any great extent in the United States for the recovery of chemicals, continued to lead all coal-chemical materials in gross value in 1952, but its margin has declined sharply since 1937 owing to competition of light oil and derivatives. In 1937 surplus gas contributed 53 percent of the $1.99 credited to coal-chemical materials per ton of coal carbonized; tar and derivatives, 20 percent; light oil and derivatives, 15 percent; and ammonia, 12 percent. In 1952, however, surplus gas supplied only 41 percent, whereas light oil and derivatives rose to 24 percent, tar and derivatives increased to 23 percent, and ammonia remained at 12 percent. In evaluating these changes, the fact must be considered that the average values credited to the various products represented the composite of all oven-coke plants. This composite includes not only the value of materials actually sold but also the value credited by the producing companies to the materials they consumed in their operations. If returns from market sales of coal-chemical materials were considered, receipts from sales of gas distributed through city mains and sold for industrial purposes in 1937 just about equaled receipts from sales of light oil and tar (including their derivatives) combined. In 1952, however, receipts from merchant sales of light oil and tar (including their derivatives) were each

greater than those for coke-oven gas. In 1937 the value of gas sales was 45.6 million dollars; light oil and derivatives, 20.2 million; and tar and derivatives, 21.3 million; while in 1952, gas sales totaled 51.1 million; light oil, 68.5 million; and tar and derivatives, 54.1 million. These changes were due to the smaller proportion of gas sales to total gas production and to more extensive processing of tar and light oil by coke-plant operators.

It is significant that the increases in values credited to the coal-chemical materials have not paced coal costs, despite the gains made by sales of light oil and tar products. Table 53 shows the value of the various coal-chemical materials, expressed as percentages of coal costs. These data show that the slight gains made by light oil and tar did not offset the drastic decline for gas and that average values of coal chemicals per ton of coal dropped from 53 percent of coal costs in 1937 to 36 percent in 1952. In other words, while average coal costs increased 147 percent between 1937 and 1952, the total value credited to coal-chemical materials increased only 66 percent. Coke, however, influenced by the rise in coal costs, increased 186 percent in value in this period. If the values of all products are combined the gain was 142 percent, which more nearly approximated the gain in coal costs. Detailed statistics on coal-chemical materials for 1952 are presented in tables 51 to 65.

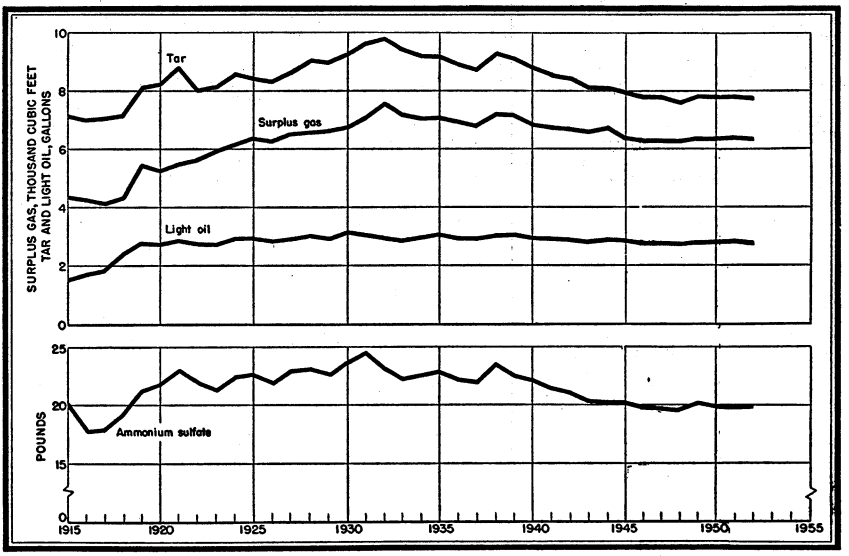

FIGURE 2.—Average yield of principal coal-chemical materials per net ton of coal carbonized in coke ovens, 1915–52. Yields of light oil and ammonium sulfate equivalent represent average for plants recovering these products.

TABLE 51.—Coal-chemical materials produced at coke-oven installations in the United States in 1952 [1]

[Exclusive of breeze]

Product	Production	Sales			On hand Dec. 31
		Quantity	Value		
			Total	Average	
Tar—gallons	703,889,653	377,147,738	$37,803,630	$0.100	31,145,404
Tar deovtives:					
Creosote oil, distillate as such—do	33,604,537	33,309,079	5,979,715	.180	1,347,029
Creolote oil, in coal-tar solution—do	5,817,810	5,533,459	864,880	.156	145,498
Crudochemical oil—do	20,403,933	20,460,094	5,732,353	.280	403,920
Phenol—pounds	7,681,341	5,834,187	866,623	.149	151,520
Pitch oi tar:[2]					
Soft—net tons	468,050	3,414	71,708	21.004	5,415
Medium—do	14,769	14,668	511,444	34.868	241
Hard—do	263,536	25,576	522,911	20.445	835
Other tar rivatives [3]			1,699,423		
Ammonia:					
Sulfate [4]—pounds	1,604,824,708	1,605,092,441	33,960,125	.021	81,012,684
Liquor (NH_3 content)—do	44,119,160	39,451,490	1,563,588	.040	1,633,287
Total			35,523,713		
Sulfate equivalentof all forms—pounds	1,781,301,348	1,762,898,401			87,545,832
NH_3 equivalent of all forms—do	445,325,337	440,724,600			21,886,458
Gas:					
Used under boilers, etc.—M cubic feet	[5] 922,631,185	45,479,955	5,939,637	.131	
Used in steel or allied plants—do		367,510,295	65,939,749	.179	
Distributed through city mains—do		120,172,674	44,295,161	.369	
Sold for industrial use—do		43,195,440	6,807,566	.158	
Total	[5] 922,631,185	576,358,364	122,982,113	.213	
Crude light oil—gallons	[6] 249,283,837	14,654,903	3,258,449	.222	3,990,324
Light oil derivatives:					
Benzol:					
Specification grades (1°, 2°, and 90 percent)—gallons	150,242,163	147,819,994	50,247,002	.340	5,138,866
Other industrial grades—do	4,872,164	5,038,680	1,623,237	.322	144,622
Motor grade—do	[7]	[7]	[7]	[7]	[7]
Toluol (all grades)—do	30,522,451	30,345,629	9,181,820	.303	917,544
Xylol (all grades)—do	8,093,761	8,037,314	2,564,008	.319	572,476
Solvent napthacrude and refined—do	4,681,057	4,624,233	1,087,640	.235	330,705
Other light-oil products—do	6,188,990	3,935,871	516,013	.131	340,157
Total	204,600,586	199,801,721	65,219,720	.326	7,444,370
Intermediate light oil—gallons	746,951	750,693	142,540	.190	56,401
Naphthalene (crude):					
Solidifying at less than 74° C.—pounds	46,979,403	47,306,112	1,831,714	.039	2,465,380
Solidifying at 74° and less than 79° C.—pounds	59,924,103	49,151,700	3,129,943	.064	3,137,193
Pyridine:					
Crude bases (dry basis)—gallons	419,531	422,777	783,238	1.853	115,954
Refined (2° C.)—pounds	1,242,184	1,221,294	1,194,544	.978	32,169
Picolines—do	618,757	687,986	237,205	.345	38,263
Sodium phenolate—gallons	2,257,163	2,235,173	564,040	.252	811,444
Sulfur—pounds	8,189,100	8,147,100	108,357	.013	1,786,000
Other coal-chemical materials [8]			212,498		
Value of all coal-chemical materials sold			289,240,761		

[1] Includes products of tar distillation conducted by coke-oven operators under same corporate name.
[2] Soft pitch: water-softening point, less than 110° F.; medium pitch: water-softening point, 110°–160° F.; hard pitch: water-softening point, above 160° F.
[3] Cresols, cresylic acid, fuel oil, pitch coke, road tar, tar paint, and topped, or refined, tar.
[4] A small amount of sulfate from purchased synthetic ammonia was produced and sold by 2 producers but is not included.
[5] Includes gas used for heating ovens and gas wasted.
[6] 237,312,046 gallons refined by coke-oven operators to make derived products shown.
[7] Included with "Other light-oil products" to avoid disclosure of individual company operations.
[8] Ammonium thiocyanate and secondary oil.

TABLE 52.—Value of coal-chemical materials, coke, and breeze per ton of coal carbonized in the United States, 1937 and 1949–52

Product	1937	1949 [1]	1950	1951	1952
Ammonia and its compounds	$0.231	$0.390	$0.330	$0.352	$0.391
Light oil and its derivatives (including naphthalene)	.307	.471	.613	.830	.808
Surplus gas sold or used	1.049	1.410	1.393	1.353	1.353
Tar and its derivatives:					
Sold	.307	.478	.526	.597	.594
Tar burned by producers	.090	.141	.091	.107	.123
Other products	.005	.024	.028	.036	.036
Total	1.989	2.914	2.981	3.275	3.305
Coke produced	3.555	9.283	9.477	9.945	10.178
Breeze produced	.114	.197	.196	.194	.204
Grand total	5.658	12.394	12.654	13.414	13.687

[1] Revised figures.

TABLE 53.—Percentage of value of coal recovered by coal-chemical materials in the United States, 1937 and 1949–52

	Coal value recovered (percent)				
	1937	1949	1950	1951	1952
Product:					
Ammonia and its compounds	6.2	4.6	3.8	3.9	4.2
Light oil and its derivatives (including naphthalene)	8.2	5.5	7.1	9.3	8.7
Surplus gas sold or used	28.1	16.5	16.1	15.1	14.7
Tar and its derivatives	10.6	7.3	7.1	7.9	7.8
Other products	.1	.3	.3	.4	.4
Total	53.2	34.2	34.4	36.6	35.8
Value of coal per net ton	$3.74	$8.52	$8.67	$8.94	$9.23

TABLE 54.—Coal equivalent of the thermal materials, except coke, produced at oven-coke plants in the United States, 1913, 1914, 1918, 1937, and 1949–52

Year	Materials produced				Estimated equivalent in heating value [1] (billion B. t. u.)					Coal equivalent (net tons)
	Coke breeze (thousand net tons)	Surplus gas (billion cubic feet)	Tar (thousand gallons)	Light oil (thousand gallons)	Coke breeze	Surplus gas	Tar	Light oil	Total	
1913	735	64	115,145	3,000	14,700	35,200	17,272	390	67,562	2,600,000
1914	667	61	109,901	8,464	13,340	33,550	16,485	1,100	64,475	2,461,000
1918	1,999	158	263,299	87,562	39,980	86,900	39,495	11,383	177,758	6,785,000
1937	3,884	463	603,053	187,054	77,680	254,650	90,458	24,317	447,105	17,065,000
1949	4,929	546	672,407	228,754	98,580	300,300	100,861	29,738	529,479	20,209,000
1950	5,173	603	739,869	260,857	103,460	331,650	110,980	33,911	580,001	22,137,000
1951	5,126	653	795,311	284,497	102,520	359,150	119,297	36,985	617,952	23,586,000
1952	4,639	576	703,890	249,284	92,780	316,800	105,584	32,407	547,571	20,900,000

[1] Breeze, 10,000 B. t. u. per pound; gas, 550 B. t. u. per cubic foot; tar, 150,000 B. t. u. per gallon; and light oil, 130,000 B. t. u. per gallon.

COKE-OVEN GAS

The volume of coke-oven gas produced in 1952 decreased 12 percent from the record output in 1951. Over one-third of the total production was used to heat the ovens, and the remainder (surplus gas), (1) was used as fuel in metallurgical furnaces and under boilers, (2) was consumed by neighboring industries, or (3) was pumped through city mains for residential and commercial heating. At coke plants integrated with iron and steel works, most of the surplus gas is consumed by producers, and its value is determined by established accounting procedures. Gas utilities and, to a large extent, merchant plants market most of their gas production through city mains for which higher prices are usually realized. In 1952 the average unit value of surplus gas from furnace plants was $0.182 per thousand cubic feet, whereas it was $0.338 for merchant plants. Furnace plants consumed 86 percent of their surplus gas, most of which was used as open-hearth fuel. Merchant plants, including the coke plants owned by gas utilities, used only 14 percent of their surplus gas, selling the remainder mostly for residential heating.

TABLE 55.—Production and distribution of coke-oven gas in the United States in 1952, by States, in thousands of cubic feet

State	Produced	Used in heating ovens	Surplus sold or used			Wasted
			Quantity	Value		
				Total	Average	
Alabama	77,898,914	37,183,351	38,247,935	$4,393,400	$0.115	2,467,628
California	11,374,060	32,444	10,590,611	(1)	(1)	751,005
Colorado	14,087,305	6,972,709	7,043,841	(1)	(1)	70,755
Illinois	46,903,882	16,802,861	29,473,552	4,283,558	.145	627,469
Indiana	100,912,761	34,988,382	64,904,105	16,282,356	.251	1,020,274
Maryland	35,376,680	8,334,460	26,511,580	(1)	(1)	530,640
Massachusetts	15,599,300	2,271,177	13,328,123	(1)	(1)	
Michigan	38,203,765	5,719,749	32,145,615	4,963,113	.154	338,401
Minnesota	11,888,610	5,080,682	6,620,325	1,583,607	.239	187,603
New Jersey	22,641,870	6,218,775	16,423,095	(1)	(1)	
New York	66,597,956	23,473,343	42,398,917	12,833,241	.303	725,696
Ohio	138,795,565	58,561,154	77,888,314	14,256,105	.183	2,346,097
Pennsylvania	220,983,957	89,264,883	130,139,550	27,797,556	.214	1,579,524
Tennessee	3,081,416	1,352,091	1,729,325	(1)	(1)	
Texas	10,178,687	4,404,743	4,434,415	(1)	(1)	1,339,529
Utah	20,645,941	5,679,008	13,496,976	(1)	(1)	1,469,957
West Virginia	58,400,607	15,279,258	41,814,577	6,776,182	.162	1,306,772
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	29,059,909	8,687,363	19,167,508	6,411,551	.335	1,205,038
Undistributed				23,401,444	.250	
Total 1952	922,631,185	330,306,433	576,358,364	122,982,113	.213	15,966,388
At merchant plants	165,778,572	46,183,892	117,100,146	39,529,347	.338	2,494,534
At furnace plants	756,852,613	284,122,541	459,258,218	83,452,766	.182	13,471,854
Total 1951	1,052,280,603	380,797,148	653,350,685	138,300,299	.212	18,132,770

[1] Included with "Undistributed" to avoid disclosure of individual company operations.

TABLE 56.—Surplus coke-oven gas sold and used by producers in the United States in 1952, by States, in thousands of cubic feet

State	Used by producers—						Sold					
	Under boilers			In steel or allied plants			Distributed through city mains			For industrial purposes		
	Quantity	Value		Quantity	Value		Quantity	Value		Quantity	Value	
		Total	Average		Total	Average		Total	Average		Total	Average
Alabama	9,510,875	$930,734	$0.098	21,581,989	$2,727,878	$0.126	6,100,548	$634,958	$0.104	1,054,523	(1)	(1)
California	64,716	(1)	(1)	10,525,895	(1)	(1)						
Colorado				7,043,841	(1)	(1)						
Illinois	5,850,280	687,553	.118	7,295,091	1,282,168	.176	16,328,181	2,313,837	.142			
Indiana	3,990,091	708,858	.178	43,653,634	9,293,150	.213	7,079,109	3,938,970	.556	10,181,271	(1)	(1)
Maryland				26,511,580	(1)	(1)						
Massachusetts	511	(1)	(1)				13,327,612	(1)	(1)			
Michigan	1,637,845	(1)	(1)	28,484,906	4,355,905	.153				2,022,864	(1)	(1)
Minnesota	710,011	63,071	.089	2,566,343	(1)	(1)	2,344,639	(1)	(1)	999,332	(1)	(1)
New Jersey				93	(1)	(1)	16,423,002	(1)	(1)			
New York	1,796,687	253,910	.141	15,906,304	3,618,675	.227	24,491,165	8,869,473	.362	204,761	$91,183	$0.445
Ohio	7,197,333	1,389,965	.193	60,717,807	11,511,826	.190	1,313,978	(1)	(1)	8,659,196	921,448	.106
Pennsylvania	4,941,434	773,269	.156	92,417,180	17,143,900	.186	20,593,379	8,210,729	.399	12,187,557	(1)	(1)
Tennessee	342,849	(1)	(1)				1,386,476	(1)	(1)			
Texas	3,158,576	(1)	(1)	1,235,497	(1)	(1)				40,342	(1)	(1)
Utah	34,406	(1)	(1)	13,126,016	(1)	(1)				336,554	(1)	(1)
West Virginia	4,816,768	506,853	.105	36,444,119	6,200,655	.170				553,690	(1)	(1)
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	1,427,573	232,391	.163				10,784,585	5,170,878	.479	6,955,350	1,008,282	.145
Undistributed		393,033	.075		9,805,592	.161		15,156,316	.436		4,786,653	.175
Total 1952	45,479,955	5,939,637	.131	367,510,295	65,939,749	.179	120,172,674	44,295,161	.369	43,195,440	6,807,566	.158
At merchant plants	9,799,466	1,054,966	.108	6,701,374	1,435,859	.214	83,538,904	34,452,421	.412	17,060,402	2,586,101	.152
At furnace plants	35,680,489	4,884,671	.137	360,808,921	64,503,890	.179	36,633,770	9,842,740	.269	26,135,038	4,221,465	.162
Total 1951	42,131,852	5,355,614	.127	428,652,885	73,824,951	.172	137,617,776	51,850,508	.377	44,948,172	7,269,226	.162

[1] Included with "Undistributed" to avoid disclosure of individual company operations.

TABLE 57.—Coke-oven gas and other gases used in heating coke ovens in 1952, by States, in thousands of cubic feet [1]

State	Coke-oven gas	Producer gas	Blue-water gas	Blast-furnace gas	Other gases [2]	Total coke-oven gas equivalent
Alabama	37,183,351				73,283	37,256,634
California	32,444			4,546,121		4,578,565
Colorado	6,972,709				41,030	7,013,739
Illinois	16,802,861			3,944,408	2,028,668	22,775,937
Indiana	34,988,382			2,023,229	2,981,776	39,993,387
Maryland	8,334,460			6,167,105		14,501,565
Massachusetts	2,271,177	4,058,479				6,329,656
Michigan	5,719,749			9,787,917	5,778	15,513,444
Minnesota	5,080,682	98,407	901		9,750	5,189,740
New Jersey	6,218,775	1,203,770			2,351,946	9,774,491
New York	23,473,343	4,945,012		141,335	1,373,610	29,933,300
Ohio	58,561,154			2,283,097	327,849	61,172,100
Pennsylvania	89,264,883	2,135,458		3,479,627	439,071	95,319,039
Tennessee	1,352,091					1,352,091
Texas	4,404,743					4,404,743
Utah	5,679,008			2,772,867		8,451,875
West Virginia	15,279,258			6,954,897	2,015,200	24,249,355
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	8,687,363	3,777,532			337,788	12,802,683
Total	330,306,433	16,218,658	901	42,100,603	11,985,749	400,612,344
At merchant plants	46,183,892	15,479,011			10,730,941	72,393,844
At furnace plants	284,122,541	739,647	901	42,100,603	1,254,808	328,218,500

[1] Adjusted to an equivalent of 550 B. t. u. per cubic foot.
[2] Butane, liquefied petroleum, natural, propane, refinery oil, and spillage gases.

CRUDE COAL TAR AND DERIVATIVES

All oven-coke plants recover tar, and production depends on the rate of oven operations. The decline in operating rates in 1952 reduced tar output 11 percent from the peak output of 1951. The average yield of tar per ton of coal carbonized also dropped in 1952 to 7.74 gallons compared with 7.78 in 1951. The yield of tar varies widely from plant to plant, depending on the kind of coal used, the temperature at which ovens are operated, efficiency of recovery equipment, and other factors. This wide variation is indicated in table 58, which shows production and yield of tar by States.

There has been little change in the use pattern of tar in recent years. Most tar produced is processed, but 109.4 million gallons (16 percent) of the total production was used as fuel in 1952. Tar is processed both by producers and by chemical companies operating tar refineries independently of coke-oven operations. Coke-oven operators topped or refined 49 percent of coal tar processed during the year. Primarily, topping strips from crude tar the low-boiling fraction (distillation range, usually under 300° C.), which is rich in tar acids, bases, and naphthalene. The distillate (crude chemical oil) was sold to tar refiners for further processing. The residual tar (soft pitch) was generally used by the producers as open-hearth fuel.

TABLE 58.—Coke-oven tar produced, used by producers, and sold in the United States in 1952, by States, in gallons

State	Produced		Used by producers				Sold					On hand Dec. 31
	Total	Per ton of coal coked	For refining or topping [1]	As fuel under boilers	In open hearth or allied plants	Otherwise	For use as fuel [2]	For refining into tar products	Total			
									Quantity	Value		
										Total	Average	
Alabama	58,305,779	7.05	1,257,303	477,689	21,895,112	212,136		34,568,556	34,568,556	$3,326,912	$0.096	2,186,241
California	9,409,128	9.45	8,210,137					1,085,708	1,085,708	(3)	(3)	346,528
Colorado	11,383,937	9.40	9,777,822		1,447,084	13,016		89,716	89,716	(3)	(3)	528,953
Illinois	31,501,840	6.67	11,784,200	898,469		639,500		27,743,565	27,743,565	2,963,665	.107	1,983,456
Indiana	64,659,126	6.09	12,514,734		7,731,157	908,706	83,526	43,785,436	43,868,962	4,198,770	.096	4,112,318
Maryland	26,757,704	7.78			24,103,814			3,082,985	3,082,985	(3)	(3)	1,654,504
Massachusetts	11,288,867	7.52						11,351,961	11,351,961	(3)	(3)	135,729
Michigan	25,979,835	6.73				550		26,318,802	26,318,802	2,552,987	.097	1,155,537
Minnesota	8,250,740	6.90			3,523,891			4,709,927	4,709,927	(3)	(3)	706,872
New Jersey	16,442,493	8.06						16,257,893	16,257,893	(3)	(3)	845,000
New York	46,753,654	7.47	14,355,814			12,800	170,126	32,990,130	33,160,256	3,411,924	.103	1,656,007
Ohio	101,905,958	7.41	4,046,483	197,250	13,345,542	238,525	4,214,351	77,992,585	82,206,936	8,322,418	.101	4,111,281
Pennsylvania	197,373,514	8.99	139,093,409	92,918	21,721,593	690,226	723,893	31,527,115	32,251,008	3,366,776	.104	8,603,942
Tennessee	2,393,500	6.90				700		2,389,602	2,389,602	(3)	(3)	53,450
Texas	5,360,291	5.95			400	41,055		5,247,707	5,247,707	(3)	(3)	411,895
Utah	17,168,044	9.65			9,542,640	820		7,179,932	7,179,932	(3)	(3)	1,114,794
West Virginia	48,879,363	9.22	18,852,218		4,422,927			25,546,163	25,546,163	2,945,525	.115	701,244
Connecticut, Kentucky, Missouri, Rhode Island, and Wisconsin	20,066,880	7.25						20,088,059	20,088,059	2,052,405	.102	837,653
Undistributed										4,662,248	.091	
Total 1952	703,889,653	7.74	219,892,120	1,666,326	107,734,160	2,758,034	5,191,896	371,955,842	377,147,738	37,803,630	.100	31,145,404
At merchant plants	123,462,931	7.61	1,257,303			12,800		122,858,975	122,858,975	12,059,556	.098	3,868,192
At furnace plants	580,426,722	7.77	218,634,817	1,666,326	107,734,160	2,745,234	5,191,896	249,096,867	254,288,763	25,744,074	.101	27,277,212
Total 1951	795,311,283	7.78	252,292,042	1,804,704	106,631,063	2,068,129	14,624,238	424,109,106	438,733,344	43,546,155	.099	30,741,516

[1] Includes 5,688,945 gallons also shown under "Sold—for refining into tar products".
[2] Comprises 5,021,770 gallons sold to affiliated companies and 170,126 gallons sold to other purchasers.
[3] Included with "Undistributed" to avoid disclosure of individual company operations.

The principal commercial tar products produced by coke-plant operators are creosote oil and crude chemical oil. Production of creosote oil (distillate as such and in coal-tar solution), used mainly for wood preservation, totaled 39.4 million gallons in 1952, an 8-percent decrease from 1951. Sales of creosote oil represented 42 percent of the returns from all tar products in 1952. Production of crude chemical oil declined 18 percent from 1951 and was 20.4 million gallons; however, because of the higher unit sales price of this material, the financial returns almost equaled those obtained from creosote. In processing tar, more pitch than any other product is derived. However, as most of the tar-processing plants are located at coke plants integrated with steel operations, pitch is usually burned, resulting in the small volume of sales reported in table 51.

COKE-OVEN AMMONIA

Ammonia is recovered at coke plants, either in water solution (ammonia liquor) or as a crystallized ammonium sulfate. In 1952, 79 of the 84 active plants recovered ammonia, 65 made ammonium sulfate, and 16 made ammonia liquor (2 plants produced both sulfate and liquor). Most ammonia recovered at coke plants is converted into ammonium sulfate, as less than 10 percent of the total recovered in 1952 was in the form of ammonia liquor. Virtually all sulfate produced in the coke industry is marketed for agricultural purposes. Ammonia liquor is employed for chemical as well as agricultural purposes. Although data on the quantity of ammonia liquor consumed by use are not available, it is estimated that about half is used industrially in the manufacture of soda ash, ammonium chloride, and sulfuric acid. Until recent years nearly all ammonium sulfate produced in the United States came from coke ovens. However, a few of the primary synthetic-ammonia producers have installed facilities to make ammonium sulfate, and production has increased rapidly since World War II. In 1952 coke ovens furnished about 51 percent of the total United States production; the remainder was supplied by synthetic-ammonia producers. After the end of World War II, a few coke-oven operators, to augment their production of coke-oven sulfate, purchased synthetic anhydrous ammonia for conversion into sulfate in their facilities. Data on this synthetic material were shown separately from the sulfate produced from the coke-oven ammonia; but in 1952, as only 2 coke plants were producing synthetic sulfate, figures are withheld to avoid disclosure of individual company figures. The average unit price on ammonia liquor in 1952 did not change from 1951 but sulfate advanced $4 per ton or $0.002 per pound.

TABLE 59.—Coke-oven ammonia produced and sold in the United States in 1952, by States, in pounds

State	Active plants [1]	Produced				Sold as—				On hand Dec. 31	
		Sulfate equivalent	Per ton of coal coked	As sulfate	As liquor (NH_3 content)	Sulfate		Liquor (NH_3 content)		Sulfate	Liquor (NH_3 content)
						Quantity	Value	Quantity	Value		
Alabama	7	179,914,813	21.76	171,298,257	2,154,139	171,293,603	$3,889,183	2,163,761	(2)	960,993	33,297
California	1	25,094,316	25.20	25,094,316		25,052,360	(2)			106,990	
Colorado	1	27,813,020	22.97	27,813,020		29,350,700	(2)			3,684,444	
Illinois	6	81,732,097	19.66	81,732,097		84,680,460	1,751,466			2,032,585	
Indiana	5	174,833,967	16.47	154,144,659	5,172,327	157,777,140	3,189,129	4,073,305	$152,862	7,700,944	260,938
Maryland	1	69,306,520	20.14	69,306,520		68,555,580	(2)			4,887,100	
Massachusetts	1	28,139,720	18.74	28,139,720		27,785,340	(2)			631,040	
Michigan	4	71,589,073	18.55	25,462,729	11,531,586	25,289,560	(2)	9,694,514	(2)	464,938	516,295
Minnesota	3	20,892,148	17.44	20,892,148		21,517,950	439,986			1,102,439	
New Jersey	2	37,924,165	18.58	37,924,165		38,843,700	(2)			2,217,960	
New York	7	126,632,881	20.25	105,414,097	5,304,696	108,079,505	2,268,239	4,990,739	(2)	7,056,497	114,489
Ohio	15	271,625,684	19.75	222,136,792	12,372,223	226,229,324	4,558,899	11,056,196	424,222	7,552,184	283,059
Pennsylvania	13	451,904,289	20.62	449,196,057	677,058	432,902,115	8,727,216	695,308	(2)	38,395,154	46,592
Tennessee	1	6,869,577	19.80	6,869,577		6,950,910	(2)			81,241	
Texas	2	19,121,354	21.23	19,121,354		18,478,880	(2)			764,256	
Utah	2	44,515,014	25.03	44,515,014		46,697,404	(2)			944,086	
West Virginia	4	98,985,946	20.76	98,985,946		98,615,670	1,981,044			2,259,853	
Connecticut, Kentucky, Missouri, and Wisconsin	4	44,406,764	18.29	16,778,240	6,907,131	16,992,240	376,331	6,777,667	259,859	170,000	378,617
Undistributed							6,778,632		726,645		
Total 1952	79	1,781,301,348	19.92	1,604,824,708	44,119,160	1,605,092,441	33,960,125	39,451,490	1,563,588	81,012,684	1,633,287
At merchant plants	24	313,193,017	20.51	202,084,789	27,777,057	204,607,655	4,437,953	30,159,339	1,182,485	6,589,561	1,270,371
At furnace plants	55	1,468,108,331	19.80	1,402,739,919	16,342,103	1,400,484,786	29,522,172	9,292,151	381,103	74,423,123	362,916
Total 1951	80	1,995,546,999	19.82	1,796,525,451	49,755,387	1,823,499,518	34,240,859	45,295,654	1,791,246	82,689,087	1,744,378

[1] Number of plants that recovered ammonia.
[2] Included with "Undistributed" to avoid disclosure of individual company operations.

CRUDE LIGHT OIL AND DERIVATIVES

In 1952 all but 5 of the 84 active oven-coke plants stripped crude light oil from the coke-oven gas. Benzol, toluol, and xylol are the principal constituents of light oil, although small quantities of many other compounds are present. The yield of light oil depends on the quality and kind of coal carbonized, design and condition of ovens, operating temperature, and type of scrubbing equipment used. The yield ranged between 1 and 3½ gallons per ton of coal carbonized in 1952 and averaged 2.79 gallons for the entire industry compared with 2.82 gallons in 1951. The decline in yield, coupled with the drastic reduction in quantity of coal carbonized in slot-type ovens, caused output to decrease 12 percent from the 1951 record.

Unlike coal tar, which is processed largely by companies (tar refiners) operated independently of the coke industry, most coke-oven light oil is refined by the coke producers themselves. In 1952, 95 percent of the total output was refined, and 204.6 million gallons (86 percent) of the quantity of light oil entering the stills was recovered in the form of salable products. Yields of the major products are shown in table 61. As indicated in this table, benzol is the principal constituent of light oil—accounting for 76 percent of the total quantity of light-oil derivatives produced in 1952. Of the 155.1 million gallons of benzol produced, 97 percent was the specification or chemical grades (1°, 2°, 90 percent). In previous chapters, a semirefined grade known in the trade as motor benzol was shown. However, as only a small amount of this grade was actually going into automotive fuel, the Bureau of Mines asked each producer reporting motor benzol in 1952 to designate its end use. Results of this survey revealed that only two companies were actually selling benzol for use as automotive fuel and thus statistics are withheld to prevent disclosure of individual company figures. According to the United States Tariff Commission, the total production of specification grades of benzol in the United States amounted to 251.7 million gallons. Coke-oven operators produced 62 percent of this total; tar refiners, 24 percent; and petroleum refiners, the remainder. The supply of benzol from domestic sources was not adequate to meet essential requirements, and 23.7 million gallons of crude benzol and light oil were imported. Virtually all this material was processed by tar distillers into the specification grades of benzol and included in the figures submitted to the United States Tariff Commission. Requirements of benzol for phenol, styrene, nylon, and other intermediate chemicals have increased substantially for several years. A breakdown on the end use of benzol, compiled by the National Production Authority, is given in table 63. Consumption was slightly higher than production in 1952, as requirements were drawn from inventories during the steel strike.

Toluol is another light-oil derivative having many important applications in the chemical field. It is used extensively in manufacturing dye intermediates and as a solvent in many diversified fields, particularly for lacquers. In wartime, it finds important application in the manufacture of explosives such as trinitrotoluene (TNT). Estimates on consumption of toluol, by principal end uses in 1950–52, compiled by NPA, are shown in table 64. Coal carbonization was the only source of toluol until World War II, when it became apparent that supply from this source could not meet essential civilian and military requirements for this aromatic material, and processes were developed and facilities constructed in the early 1940's to make it synthetically from petroleum. In 1952 coke-oven operators produced 29 percent of the total United States output.

Xylol is another aromatic chemical produced by coke-plant operators that has important applications in the chemical field. However, the petroleum industry has been producing xylol in increasing quantities since the beginning of World War II, and in 1952 only 11 percent of total United States production was supplied by coke-plant operators.

TABLE 60.—Coke-oven crude light oil produced in the United States and derived products produced and sold in 1952, by States, in gallons

State	Active plants [1]	Crude light oil				Derived products		
		Produced	Per ton of coal coked	Refined on premises [2]	On hand Dec. 31	Produced	Sold [3]	
							Quantity	Value
Alabama	7	20,371,204	2.46	19,982,908	327,174	17,159,867	16,427,347	$5,248,562
California	1	3,107,391	3.12	3,114,279	11,516	2,673,195	2,346,035	[4]
Colorado	1	4,093,528	3.38	4,017,593	50,064	3,448,071	3,558,694	[4]
Illinois	7	12,279,927	2.65	8,680,651	261,545	7,359,219	7,229,746	2,321,319
Indiana	5	24,519,837	2.31	24,717,751	428,199	21,543,021	21,816,605	6,993,636
Maryland	1	11,429,927	3.32	13,303,475	201,176	11,749,404	11,822,006	[4]
Michigan	4	9,919,739	2.57	5,342,962	165,627	4,634,425	4,182,073	1,411,536
New York	7	17,503,561	2.80	24,725,222	313,642	21,167,829	21,421,035	7,560,692
Ohio	15	40,602,573	2.95	36,648,144	537,650	29,938,037	29,735,741	9,777,062
Pennsylvania	13	66,477,842	3.03	64,754,722	1,167,762	57,334,974	55,785,801	17,498,775
Tennessee	1	853,958	2.46	853,878	3,990	803,279	367,778	[4]
Texas	2	2,195,450	2.44	2,190,830	11,059	1,944,676	1,949,511	[4]
Utah	2	6,289,401	3.54	6,276,460	99,915	4,989,697	4,886,087	[4]
West Virginia	5	16,193,850	3.05	14,516,377	94,103	12,672,873	11,107,631	3,767,329
Connecticut, Kentucky, Massachusetts, Minnesota, Missouri, New Jersey, and Wisconsin	8	13,445,649	2.16	8,186,794	316,902	7,182,019	7,165,631	2,425,184
Undistributed								8,215,625
Total 1952	79	249,283,837	2.79	237,312,046	3,990,324	204,600,586	199,801,721	65,219,720
At merchant plants	25	34,945,542	2.21	29,073,178	988,736	25,800,617	24,278,340	8,088,138
At furnace plants	54	214,338,295	2.91	208,238,868	3,001,588	178,799,969	175,523,381	57,131,582
Total 1951	80	284,496,933	2.82	270,541,072	4,270,644	234,308,450	229,849,331	74,296,592

[1] Number of plants that recovered crude light oil.
[2] Comprises 234,364,313 gallons of crude light oil from own production and 2,947,733 gallons purchased from other coke plants.
[3] Excludes 14,654,903 gallons of crude light oil valued at $3,258,449 sold as such.
[4] Included with "Undistributed" to avoid disclosure of individual company operations.

TABLE 61.—Yield of light oil-products from refining crude light oil at oven-coke plants in the United States, 1937 and 1941–52, in percent

Year	Benzol		Toluol, crude and refined	Xylol, crude and refined	Solvent naphtha	Other light-oil products
	Motor	All other grades				
1937	52.5	11.9	11.5	2.5	3.1	4.5
1941	47.2	16.8	13.0	3.4	2.3	3.6
1942	26.8	35.3	13.4	3.9	2.2	3.8
1943	8.6	53.9	13.1	3.6	2.1	3.6
1944	7.1	56.6	12.9	3.3	2.1	3.5
1945	12.3	53.9	11.5	3.2	2.0	3.3
1946	13.8	55.3	8.3	3.0	2.2	3.8
1947	6.5	60.1	10.9	3.0	2.3	3.5
1948	3.7	61.7	11.7	3.0	2.4	3.3
1949	9.5	55.6	12.5	3.3	2.3	3.2
1950	3.2	63.1	12.5	3.3	2.5	2.8
1951	1.9	63.9	12.7	3.4	2.2	2.6
1952	(1)	65.4	12.9	3.4	2.0	2.6

[1] Included with "Other light-oil products" to avoid disclosure of individual company operations.

TABLE 62.—Benzol and toluol produced at oven-coke plants in the United States, 1941–52, by grades, in gallons

Year	Benzol				Toluol		
	Motor	Nitration or 1° C.	Pure commercial or 2° C.	All other	Nitration or 1° C.	Pure commercial or 2° C.	All other
1941	106,372,000	15,414,500	18,286,400	4,182,600	14,689,800	13,268,500	1,378,900
1942	64,797,600	25,624,400	53,617,900	6,014,700	25,160,200	5,044,800	2,109,600
1943	21,267,900	35,047,800	93,216,600	4,144,800	27,152,300	2,394,700	2,725,600
1944	18,556,600	41,285,800	102,436,500	3,187,600	29,771,100	2,149,600	1,607,500
1945	28,788,100	39,166,500	86,237,300	1,266,700	23,355,400	2,219,700	1,494,200
1946	27,398,900	35,739,300	71,681,700	2,308,000	12,518,000	2,796,400	1,205,400
1947	15,802,700	42,475,300	100,111,800	2,470,800	20,514,100	4,989,500	892,800
1948	9,014,300	43,541,200	103,356,300	3,101,400	22,899,700	5,280,800	267,800
1949	20,923,700	28,988,700	91,717,300	2,035,600	20,808,300	6,317,200	545,100
1950	7,727,300	41,324,900	110,114,300	3,027,200	22,108,600	7,785,800	770,400
1951	5,103,700	45,057,500	123,315,700	4,476,100	24,772,500	8,689,700	839,300
1952	(1)	46,211,300	104,030,800	4,872,200	21,342,000	7,613,400	1,567,100

[1] Withheld to avoid disclosure of individual company operations.

TABLE 63.—Estimated consumption of benzol (including motor grade) in the United States, 1950–52, by uses, in millions of gallons

[Chemical Division, National Production Authority]

Use	1950	1951	1952
Phenol	45	57	50
Styrene	64	84	83
Aniline	13	17	13
Maleic anhydride	5	7	5
DDT	11	15	14
Synthetic detergents	12	15	16
Benzene hexachloride	5	8	6
Chlorobenzene (di- and mono-[1])	13	17	16
Miscellaneous[2]	23	57	58
Total	191	277	261

[1] Refers to monochlorobenzene for uses other than as an intermediate for phenol, aniline, and DDT.
[2] Combines several end uses of benzene, the disclosure of which may indicate the extent of individual company data. Also includes nitrobenzene for uses other than as an intermediate for aniline.

TABLE 64.—Estimated consumption of toluol (all grades) in the United States, 1950–52, by uses, in millions of gallons

[Chemical Division, National Production Authority]

Use	1950	1951	1952
Aviation gasoline	28	32	27
Chemical synthesis	14	16	13
Paints, lacquers, and solvents	30	35	29
Explosives	1	7	24
Other uses	3	4	3
Total	76	94	96

NAPHTHALENE

Crude naphthalene has become one of the most important basic raw materials of the aromatic-chemical industry because of the large number of essential products made from it. Its principal derivative is phthalic anhydride, which is used in the production of smokeless powder, alkyd paint resins, dyestuffs, insecticides, etc. Naphthalene is recovered at coke plants from the refining of crude light oil or tar and to a smaller extent from the final coolers. The commercial grades of crude naphthalene are defined in terms of melting points. Crude grades ranging from 74° to 79° C. are suitable for some industrial uses without further refining. Crude below 74° C. has virtually no direct commercial use and is sold by the coke-plant operators to tar refiners for upgrading or refining. As shown in table 51, 44 percent of the total amount of naphthalene recovered at coke plants in 1952 was less than 74° C. The production of all crude grades (below 79° C.) in 1952 totaled 106.9 million pounds, a 15-percent decrease from the 1951 output. Production of naphthalene at coke plants should increase substantially in the future because additional facilities were being constructed at some operations for recovering it from coke-oven tar.

TABLE 65.—Crude naphthalene produced and sold by coke-plant operators in the United States, 1937 and 1948–52

Year	Produced (pounds)	Sold			
		Pounds	Value		
			Total	Average per pound	Average per ton of coal
1937	60,797,108	60,315,581	$1,182,992	$0.020	$0.017
1948	103,431,811	100,442,631	4,619,374	.046	.048
1949	70,823,436	56,643,829	2,654,815	.047	.031
1950	99,729,587	102,657,724	4,425,894	.043	.047
1951	125,579,578	130,200,785	6,849,831	.053	.067
1952	106,903,506	96,457,812	4,961,657	.051	.055

COKE OVENS OWNED BY CITY GAS COMPANIES

(PUBLIC UTILITIES)

In all preceding tables of this chapter, products from slot-type coke ovens owned and operated by gas utilities have been included with those produced in similar type coke ovens owned by steel companies, chemical concerns, etc. In table 66, however, statistics on products from gas utilities are shown separately for those who are interested in the coking activities of public utility plants only and may wish to follow changes or developments in that field. There has been a definite decline in carbonizing activity of the gas utilities in recent years because of substitution of natural gas for coke-oven gas in many areas. Extension of natural-gas pipelines, particularly in New York, resulted in the closing down of two oven-coke plants in that State in 1952. The Brooklyn Union Gas Co. closed its plant at Greenpoint on May 18, and on August 7 the Rochester Gas & Electric Corp. retired its ovens at Rochester. The closing of these 2 plants left only 6 city-gas coke plants in operation at the end of the year. Production of oven coke at gas utility plants was 4 percent of the total national production of oven coke, 5 percent of the crude tar and coke-oven gas, and 2 percent of the crude light oil.

TABLE 66.—Coke, breeze, and coal-chemical materials produced in the United States at oven-coke plants owned by city gas companies (public utilities)[1] compared with all other oven-coke plants, 1951–52

Product	1951			1952		
	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total
Number of active plants	75	9	84	76	8	84
Coke:						
Production net tons	68,313,148	3,674,024	71,987,172	61,120,358	2,729,757	63,850,115
Value	$955,730,967	$61,334,584	$1,017,065,551	$878,383,963	$46,916,485	$925,300,448
Average per ton	$13.99	$16.69	$14.13	$14.37	$17.19	$14.49
Breeze:						
Production net tons	4,805,349	320,485	5,125,834	4,394,518	244,851	4,639,369
Sales do	1,227,822	9,966	1,237,788	1,121,829	10,029	1,131,858
Value of sales	$5,754,176	$46,024	$5,800,200	$5,505,452	$66,961	$5,572,413
Average per ton	$4.69	$4.62	$4.69	$4.91	$6.68	$4.92
Coal carbonized:						
Bituminous net tons	96,852,479	5,177,802	102,030,281	86,899,003	3,803,632	90,702,635
Anthracite do	217,714	19,422	237,136	178,933	27,927	206,860
Total do	97,070,193	5,197,224	102,267,417	87,077,936	3,831,559	90,909,495
Value	$860,976,525	$53,166,177	$914,142,702	$798,716,344	$40,584,378	$839,300,722
Average per ton	$8.87	$10.23	$8.94	$9.17	$10.59	$9.23
Coke—						
Used by producers:						
Net tons	45,763,077	871,270	46,634,347	41,028,732	451,863	41,480,595
Value	$608,298,343	$11,836,679	$620,135,022	$562,395,338	$6,214,899	$568,610,237
Sold:						
Net tons	22,239,814	2,722,202	24,962,016	19,659,908	2,330,378	21,990,286
Value	$343,178,010	$48,128,733	$391,306,743	$309,997,836	$41,539,171	$351,537,007
Coal-chemical materials:						
Tar:						
Production gallons	751,712,284	43,598,999	795,311,283	672,125,418	31,764,235	703,889,653
Sales do	395,114,544	43,618,800	438,733,344	344,973,433	32,174,305	377,147,738
Value of sales	$39,177,897	$4,368,258	$43,546,155	$34,627,261	$3,176,369	$37,803,630
Ammonia:						
Production (NH_3 equivalent of all forms) pounds	476,751,230	22,135,520	498,886,750	428,181,551	17,143,786	445,325,337
Liquor (NH_3 content):						
Production do	47,895,032	1,860,355	49,755,387	42,628,776	1,490,384	44,119,160
Sales do	43,825,653	1,470,001	45,295,654	38,658,032	793,458	39,451,490
Value of sales	$1,743,003	$48,243	$1,791,246	$1,536,410	$27,178	$1,563,588
Sulfate:						
Production pounds	1,715,424,792	81,100,659	1,796,525,451	1,542,211,099	62,613,609	1,604,824,708
Sales do	1,739,872,378	83,627,140	1,823,499,518	1,540,840,496	64,251,945	1,605,092,441
Value of sales	$32,643,149	$1,597,710	$34,240,859	$32,612,999	$1,347,126	$33,960,125

For footnote, see end of table.

TABLE 66.—Coke, breeze, and coal-chemical materials produced in the United States at oven-coke plants owned by city gas companies (public utilities)[1] compared with all other oven-coke plants, 1951–52—Continued

Product	1951			1952		
	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total
Coal-chemical materials—Continued						
Gas:						
Production—M cubic feet	995,178,072	57,102,531	1,052,280,603	880,978,590	41,652,595	922,631,185
Disposal of surplus:						
Used under boilers:						
M cubic feet	42,122,902	8,950	42,131,852	45,479,955	----------	45,479,955
Value	$5,352,732	$2,882	$5,355,614	$5,939,637	----------	$5,939,637
Average per M cubic feet	$0.127	$0.322	$0.127	$0.131	----------	$0.131
Used in steel or allied plants:						
M cubic feet	428,650,905	1,980	428,652,885	367,510,295	----------	367,510,295
Value	$73,823,716	$1,235	$73,824,951	$65,939,749	----------	$65,939,749
Average per M cubic feet	$0.172	$0.624	$0.172	$0.179	----------	$0.179
Distributed through city mains:						
M cubic feet	87,564,497	50,053,279	137,617,776	83,601,103	36,571,571	120,172,674
Value	$32,892,440	$18,958,068	$51,850,508	$31,441,668	$12,853,493	$44,295,161
Average per M cubic feet	$0.376	$0.379	$0.377	$0.376	$0.351	$0.369
Sold for industrial use:						
M cubic feet	43,092,408	1,855,764	44,948,172	41,431,595	1,763,845	43,195,440
Value	$6,458,278	$810,948	$7,269,226	$6,072,963	$734,603	$6,807,566
Average per M cubic feet	$0.150	$0.437	$0.162	$0.147	$0.416	$0.158
Crude light oil:						
Production—gallons	277,374,026	7,122,907	284,496,933	244,950,744	4,333,093	249,283,837
Sales—do	12,976,931	4,690,639	17,667,570	11,272,740	3,382,163	14,654,903
Value of sales	$2,877,774	$850,566	$3,728,340	$2,591,206	$667,243	$3,258,449
Light-oil derivatives:						
Production—gallons	231,809,205	2,499,245	234,308,450	203,675,384	925,202	204,600,586
Sales—do	227,293,164	2,556,167	229,849,331	198,661,238	1,140,483	199,801,721
Value of sales	$73,555,727	$740,865	$74,296,592	$64,878,328	$341,392	$65,219,720
Naphthalene (crude):						
Production—pounds	[2] 124,572,531	1,007,047	[2] 125,579,578	106,445,786	457,720	106,903,506
Sales—do	129,193,738	1,007,047	130,200,785	96,000,092	457,720	96,457,812
Value of sales	$6,809,039	$40,792	$6,849,831	$4,943,477	$18,180	$4,961,657
All other coal-chemical materials, value	$21,027,225	$167,410	$21,194,635	$19,434,549	$56,930	$19,491,479

[1] Coke ovens built by city gas companies, some of which are operated in conjunction with coal- and water-gas plants. Does not include independent oven-coke plants that may sell gas to public utility companies for distribution.

[2] Revised figure.

Fuel Briquets and Packaged Fuel[1]

By J. A. Corgan and Golden V. Chiriaco

GENERAL SUMMARY

THE PRODUCTION of fuel briquets decreased 5 percent in 1952 to 2,280,000 net tons, whereas production of packaged fuel decreased 20 percent to 96,000 tons. Shipments of briquets totaled 1,970,000 tons and were destined to 36 States and the District of Columbia. According to the United States Department of Commerce, exports (chiefly to Canada) totaled 133,000 tons. Imports (all from Canada) totaled 168 tons.

Although bituminous coal was the principal raw fuel used in manufacturing fuel briquets and packaged fuel, a considerable quantity of Pennsylvania anthracite was employed in making briquets. Asphaltic binders were used exclusively in making briquets; asphalt, starch, and a small amount of cement were used as binders in the manufacture of packaged fuel.

The fuel-briquetting industry produces a small, hard pillow briquet suitable for shipment. The packaged-fuel industry produces rectangular blocks, more or less friable, wrapped (usually 6 to 8 to the package) in sturdy paper suitable for local consumption but not for transportation over long distances. Although most of these blocks are 3- to 4-inch cubes, some are less than 3 inches in width and as much as 11 inches in length.

[1] Briquets made from charcoal, wood scrap, and fruit pits are not included in Bureau of Mines review.

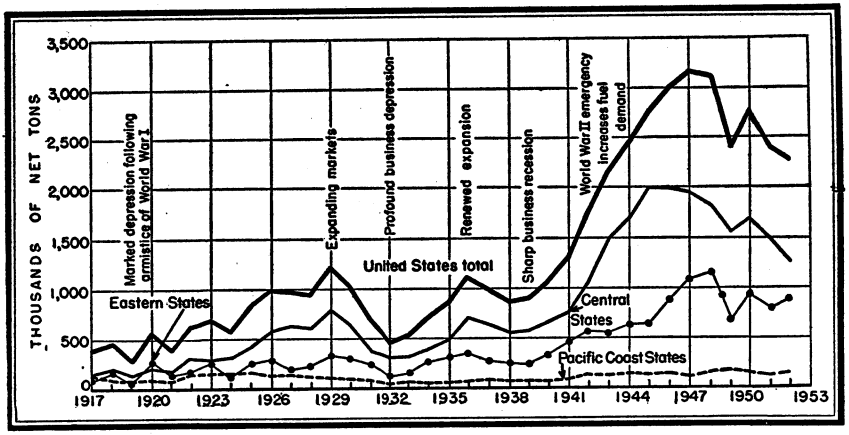

FIGURE 1.—Production of fuel briquets in the United States, 1917–52, by regions.

TABLE 1.—Salient statistics of the fuel-briquetting industry in the United States, 1935–39 (average) and 1948–52

	1935–39 (average)	1948	1949	1950	1951	1952
Production:						
Eastern States_net tons	285,248	1,151,041	674,938	934,635	796,359	886,627
Central States_do	588,573	1,820,074	1,557,819	1,691,914	1,464,185	1,250,365
Pacific Coast States_do	75,196	157,362	171,214	143,471	126,675	142,764
Total_do	949,017	3,128,477	2,403,971	2,770,020	2,387,219	2,279,756
Imports [1]_do	11,792	329	365	804	123	[2] 168
Exports [1]_do	[3] 18,206	207,885	167,140	175,768	168,780	[2 4] 132,786
Apparent consumption [5]_do	942,603	2,920,921	2,237,196	2,595,056	2,218,562	2,147,138
Plants in operation	32	36	33	31	28	28
Value of production	$6,083,308	$36,011,322	$28,641,424	$32,039,379	$27,454,638	$26,743,120
Average value per net ton f. o. b. plant:						
Eastern States	$4.28	$9.55	$9.65	$9.50	$9.79	$10.00
Central States	$7.08	$12.58	$12.59	$12.46	$12.31	$12.79
Pacific Coast States	$9.23	$13.51	$14.67	$14.49	$12.90	$13.23
World production_net tons	68,000,000	[6] 75,000,000	[6] 78,000,000	[6] 90,000,000	[6] 97,000,000	[2] 99,000,000

[1] Compiled from records of U. S. Department of Commerce.
[2] Preliminary; subject to revision.
[3] 1937–39 average; not reported separately before 1937.
[4] Exports, as reported by the producers directly to Bureau of Mines, totaled 290,575 net tons.
[5] Production plus imports minus exports. (See footnote 4.)
[6] Revised figure.

FUEL BRIQUETS

Pertinent data on the fuel-briquetting industry from 1948 to 1952 are summarized in table 1. Production, by regions, from 1917 to 1952 is illustrated in figure 1.

DOMESTIC PRODUCTION

Production of fuel briquets in the United States dropped 5 percent in 1952; a total of 2,280,000 net tons was produced compared with 2,387,000 tons reported for 1951. Except for 1950, when output increased 15 percent over the previous year, the manufacture of fuel briquets has declined consistently from 1947, a peak year.

Twenty-eight plants [2] operating in 13 States contributed to the 1952 production. The 6 plants in the Eastern States (Pennsylvania and West Virginia) produced about 39 percent of the total output. Wisconsin, with 10 plants and 37 percent of the national output, was the largest individual fuel-briquet-producing State. West Virginia followed, with 2 plants, and Pennsylvania was third, with 4 plants operating. Other producing States, in order of output, were: Missouri, Oregon, Illinois, Michigan, Indiana, Washington, North Dakota, Kansas, Arkansas, and Minnesota.

The total value of the 1952 production of fuel briquets was $26,743,000, 3 percent less than in 1951.

Capacity.—The industry operated at 51 percent of capacity in 1952. This rate of production is slightly lower than in 1951, when the industry produced at 54 percent of capacity (see table 3). Nine plants, each with an annual capacity of 200,000 tons or more, furnished 1,690,000 tons, or about 74 percent of the total production, utilizing about 54 percent of their combined capacity. Seventeen

[2] Directories of fuel-briquet and packaged-fuel operations and a list of manufacturers of briquetting machinery, M.M. S. 2156, 2161, and 2162, respectively, are obtainable on request from the Bureau of Mines, Washington 25, D. C.

plants, each with an annual capacity of 100,000 tons or more, supplied 92 percent of the total production in 1952, utilizing about 53 percent of their combined capacity.

Raw Fuels.—For many years bituminous coal and Pennsylvania anthracite have been the principal raw fuels employed in manufacturing fuel briquets. In 1952 these fuels were 84 percent of the total raw fuels used. Other raw fuels ranked as follows in importance: Residual carbon from the manufacture of oil gas, petroleum coke, anthracite other than Pennsylvania anthracite, lignite char, and semianthracite. Yard screenings used at 11 plants were the source of 20 percent of raw fuels consumed during the year.

TABLE 2.—Production of fuel briquets in the United States, 1951–52, by areas

Area [1]	1951			1952			Change from 1951 (percent)	
	Active plants	Production (net tons)	Value	Active plants	Production (net tons)	Value	Tonnage	Value
Eastern States	6	796,359	$7,795,910	6	886,627	$8,867,042	+11.3	+13.7
Central States, Pacific Coast States	22	[2] 1,590,860	[2] 19,658,728	22	[2] 1,393,129	[2] 17,876,078	[2] −12.4	[2] −9.1
Total	28	2,387,219	27,454,638	28	2,279,756	26,743,120	−4.5	−2.6

[1] Eastern States include Pennsylvania and West Virginia; Central States, Arkansas, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, North Dakota, and Wisconsin; Pacific Coast States, Oregon and Washington.
[2] Combined to avoid disclosure of individual operations.

TABLE 3.—Annual capacity and production of briquetting plants in the United States, 1948–52

	Active plants	Annual capacity (net tons)	Production	
			Net tons	Percent of annual capacity
1948	36	4,670,510	3,128,477	67.0
1949	33	4,616,360	2,403,971	52.1
1950	31	4,455,000	2,770,020	62.2
1951	28	4,406,680	2,387,219	54.2
1952:				
Plants with capacity of—				
Less than 25,000 tons	3	38,000	10,930	28.8
25,000 to less than 100,000 tons	8	418,500	172,380	41.2
100,000 to less than 200,000 tons	8	876,000	406,050	46.4
200,000 to less than 400,000 tons	6	1,610,000	898,648	55.8
400,000 or more tons	3	1,500,000	791,748	52.8
Total	28	4,442,500	2,279,756	51.3
Plants with production of—				
Less than 5,000 tons	3	56,500	4,552	8.1
5,000 to less than 10,000 tons	2	[1] 200,000	[1] 37,112	[1] 18.6
10,000 to less than 25,000 tons	2			
25,000 to less than 100,000 tons	13	1,395,000	568,817	40.8
100,000 or more tons	8	2,791.000	1,669,275	59.8
Total	28	4,442,500	2,279,756	51.3

[1] Combined to avoid disclosure of individual operations.

TABLE 4.—Raw fuels used in making fuel briquets in the United States, 1952

Type of raw fuel	Plants using raw fuels	Raw fuels used (net tons)	Source of raw fuel	Plants using raw fuels	Net tons		
					Yard screenings	Other raw fuels	Total
Anthracite:							
Pennsylvania anthracite.	13	465,239	Yard screenings	3	46,856		46,856
Other than Pennsylvania anthracite.	2	[1] 53,014	Raw fuels (other than yard screenings).	17		1,242,472	1,242,472
Semianthracite	3		Yard screenings and other raw fuels.	8	376,257	472,420	848,677
Bituminous coal:							
Low-volatile	16	1,231,773					
High-volatile	4	94,523					
Petroleum coke	3	124,622					
Residual carbon from the manufacture of oil gas.	2	[1] 168,834					
Semicoke (lignite char)	1						
Total	[2] 28	2,138,005	Total	28	423,113	1,714,892	2,138,005

[1] Combined to avoid disclosure of individual operations.
[2] A number of plants used more than one kind of raw fuel; hence, the sum of the plants is greater than the actual number of plants active (28) in 1952.

Bituminous coal was used widely in the Eastern and Central States; Pennsylvania anthracite was employed extensively, either alone or in combination with bituminous coal, in Pennsylvania and Wisconsin. Residual carbon from the manufacture of oil gas was the only raw material used in the Pacific Coast States.

Binders.—Asphalt was the only binder employed in making briquets in the United States in 1952, when 26 operators used 142,000 net tons. Two operators used no binder. The percentage of binder in the briquets ranged generally from 5 to 11 percent. Eighteen plants, producing 86 percent of the year's output, used binders from 6 to 8 percent of the weight of the briquet; 4 plants, supplying 8 percent of the production, used binders representing less than 6 percent of the weight and 6 plants 8 to 11 percent.

Weight and Shape.—Briquets ranged in weight from 1⅞ to 11 ounces in 1952, when 26 plants produced pillow-shaped briquets, all under 5 ounces, except for an 11-ounce bituminous high-volatile pillow. The remaining 2 plants produced 2½-ounce cylindrical (barrel-shaped) briquets.

TABLE 5.—Briquetting plants in the United States, 1948–52, by type of binder used

Type of binder	Plants using binder				
	1948	1949	1950	1951	1952
No binder [1]	2	2	2	2	2
Asphalt	31	30	28	26	26
Asphalt and coal-tar pitch	1	1	1		
Oil-gas tar pitch	1				
Rosin and wax	1				
Total	36	33	31	28	28

[1] Residual carbon from manufacture of oil gas was used at plants employing no binder.

TABLE 6.—Shipments of fuel briquets in the United States, 1951–52, by States of destination, in net tons [1]

State	Shipments (net tons)		State	Shipments (net tons)	
	1951	1952		1951	1952
Arkansas	2,775	2,351	New Jersey	25,260	10,840
California	1,314	36	New Mexico		446
Connecticut	2,099	1,945	New York	17,441	12,150
Delaware	162	122	North Carolina	22,266	33,031
District of Columbia	1,786	1,143	North Dakota	95,423	73,217
Florida	227	385	Ohio	78,319	91,897
Idaho		34	Oklahoma	52	
Illinois	173,191	152,913	Oregon	59,904	48,015
Indiana	116,672	148,230	Pennsylvania	26,778	21,856
Iowa	71,256	59,218	Rhode Island	1,369	908
Kansas	7,587	7,686	South Carolina	2,784	4,441
Kentucky	5,718	6,550	South Dakota	86,394	79,709
Maine	6,070	6,036	Tennessee	2,757	2,811
Maryland	17,163	13,843	Texas	109	
Massachusetts	27,074	18,312	Vermont	2,194	1,955
Michigan	219,939	231,965	Virginia	30,423	39,857
Minnesota	312,851	244,137	Washington	17,628	19,631
Missouri	271,957	238,802	West Virginia	2,070	2,009
Nebraska	21,778	19,035	Wisconsin	440,797	372,632
New Hampshire	3,007	2,203			
			Total	2,174,599	1,970,351

[1] For shipments outside the United States, *see* export statistics, table 8.

SHIPMENTS

Shipments of fuel briquets within the United States in 1952 totaled 1,970,000 tons destined to 36 States and the District of Columbia. Wisconsin, Minnesota, Missouri, and Michigan received 1,088,000 tons of the total quantity shipped. The difference between production and shipments within the United States (310,000 tons) represents the total quantity destined for export, as reported by producers directly to the Bureau of Mines,[3] briquets used at plants for power or heat, and changes in producers' stocks. Although briquets are used almost entirely for space heating, almost 5,000 tons were used by operators in 1952 for power or heat at their plants.

Of the 2,261,000 tons of fuel briquets reported shipped in 1952 (domestic and foreign), 87 percent went to 36 States and the District of Columbia; 79 percent of the total shipments moved by rail and 21 percent by truck and barge. In the Eastern States, 98 percent was shipped by rail and 2 percent by truck; in the Central States, 68 percent by rail and 32 percent by truck; and in Pacific Coast States, 52 percent by rail and 48 percent by truck and barge.

PRICES

The average value per ton of briquets (f. o. b. plant) produced in the United States in 1952 increased 2 percent compared with 1951.

Gross realization per ton (f. o. b. plant) varies considerably, depending upon various factors, the most important of which is the freight charge involved in transporting the raw material used in manufacturing the briquets. In the Eastern States, where the plants are relatively near the coal fields, the price (f. o. b. plant) is lower, whereas in the

[3] Exports reported by producers directly to Bureau of Mines totaled 290,575 net tons in 1952 (*see* table 1, footnote 4).

Central States, where briquets usually are made at plants greater distances from the original source of coal, raw-fuel costs include larger freight charges, which are reflected in higher prices per ton (f. o. b. plant). The highest plant values are in the Pacific Coast States, where the raw fuel used is residual carbon from the manufacture of oil gas.

The f. o. b. plant values vary widely from the prices paid for briquets by customers, as retail prices include transportation costs and retail dealers' margins.

TABLE 7.—Shipments of fuel briquets, in the United States, 1951–52, by method of transportation, in net tons [1]

Origin	1951			1952		
	Rail	Truck	Total	Rail	Truck	Total
Eastern States	777,134	20,342	797,476	861,341	19,964	881,305
Central States [2] / Pacific Coast States [2]	1,054,347	[3] 521,725	1,576,072	917,681	[3] 462,051	1,379,732
Total	1,831,481	[3] 542,067	[4] 2,373,548	1,779,022	[3] 482,015	2,261,037

[1] Includes shipments destined for export as reported by producers directly to Bureau of Mines. (Differs somewhat from export statistics compiled from records of U. S. Department of Commerce).
[2] Combined to avoid disclosure of individual operations.
[3] Includes quantities shipped by scow in 1951 and by barge in 1952.
[4] An additional 8,073 tons was used by 3 producers as fuel at their plants in 1951 and 4,990 tons by 4 producers in 1952.

TABLE 8.—Fuel briquets (coal and coke) exported from the United States, 1950–52, by countries of destination and customs districts

[U. S. Department of Commerce]

	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
Afghanistan			3	$180		
Canada	175,768	$2,617,007	168,676	2,387,477	132,751	$2,258,558
Cuba					30	2,131
Dominican Republic					5	129
El Salvador			101	2,000		
Total	175,768	2,617,007	168,780	2,389,657	132,786	2,260,818
CUSTOMS DISTRICT						
Buffalo	97,550	1,545,754	85,488	1,392,942	62,586	1,106,583
Dakota	28,249	357,911	24,324	302,515	25,050	327,619
Duluth and Superior	21,834	272,951	21,196	267,837	12,406	173,529
Maine and New Hampshire	498	8,124	1,077	18,955	1,885	32,274
Michigan	1,839	17,783	4,941	44,605	2,731	30,353
Montana and Idaho	1,779	22,726				
New Orleans			101	2,000		
New York			16,741	65,391	35	2,260
Philadelphia	448	5,951				
Rochester	800	11,098				
St. Lawrence	12,268	269,258	14,855	294,632	27,995	587,148
San Francisco			3	180		
Vermont	11	120	54	600	98	1,052
Washington	10,492	105,331				
Total	175,768	2,617,007	168,780	2,389,657	132,786	2,260,818

FOREIGN TRADE [4]

Imports, all from Canada, increased slightly in 1952 and totaled 168 tons, whereas exports, virtually all of which went to Canada, totaled 133,000 tons, a 21-percent decrease from 1951. The value of 1952 exports was $2,261,000, a decrease of about 5 percent from 1951.

PACKAGED FUEL

Salient statistics of the packaged-fuel industry in the United States from 1948 to 1952 are given in table 9.

TABLE 9.—Salient statistics of the packaged-fuel industry in the United States, 1935–39 (average) and 1948–52

	1935–39 (average)	1948	1949	1950	1951	1952
Production:						
Eastern States, net tons	5,052	1,859	[1] 125,948	[1] 135,682	[1] 119,535	[1] 96,267
Central States, do	116,218	155,154				
Pacific Coast States, do	1,563					
Total, do	122,833	157,013	125,948	135,682	119,535	96,267
Plants in operation	63	62	57	54	53	43
Value of production	$1,050,566	$2,735,861	$2,236,748	$2,430,847	$2,169,539	$1,780,471
Average value per net ton f. o. b. plant:						
Eastern States	$9.45	$17.64	$17.77	$17.19	$18.08	[1] $18.50
Central States	$8.50	$17.42	$17.76	$17.92	$18.15	
Pacific Coast States	$9.91					

[1] Combined to avoid disclosure of individual operations.

DOMESTIC PRODUCTION

Forty-three plants operating in 9 States reported a total production of 96,000 net tons of packaged fuel for 1952, a 20-percent decline from 1951. With the exception of 1945 and 1950, when slight increases were evident, the production of packaged fuel in the United States has declined rather steadily since 1940 when a peak production of 285,000 tons was reached.

Michigan, with 15 plants and about 40 percent of the national output, was the largest packaged-fuel-producing State. Wisconsin followed with 4 plants and Ohio ranked third with 13 plants operating. The 3 States named contributed 77 percent of the 1952 output. Other producing States, in order of output, were: Indiana, Minnesota, Iowa, Virginia, Illinois, and Nebraska.

The total value of the 1952 production of packaged fuel ($1,780,000) represents an 18-percent decrease from the 1951 value. Except for a slight drop in 1950 in the Eastern States, the average value per net ton (f. o. b. plant) of packaged fuel has increased consistently both in the Eastern and Central States from 1948 through 1952 (see table 9). Proceeds received by the manufacturers are equivalent to cost of coal at the mine, freight charge to factory, direct and indirect manufacturing costs, and profit. For this reason, the value may vary greatly from plant to plant, depending on the local conditions under which the product is manufactured. Production of packaged fuel, by States, for 1951–52 is shown in table 10.

[4] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

Number of Plants.—Of the 43 plants producing packaged fuel in 1952 (see footnote 2), 15 plants located in Michigan produced 40 percent of the total output, 4 plants in Wisconsin 19 percent, and 13 plants in Ohio 19 percent.

Capacity of Plants.—Table 11 gives comparative data on capacity and production for 1948 to 1952, inclusive. In 1952, 14 plants with a capacity of 5,000 tons or more operated at 26 percent of their combined capacity and produced 77,000 tons of packaged fuel, 80 percent of the total output. Twenty-nine plants, each with an annual capacity under 5,000 tons, produced 19,000 tons (20 percent of the total output) and utilized about 30 percent of their combined capacity.

TABLE 10.—Production of packaged fuel in the United States, 1951–52, by States

State	1951			1952		
	Active plants	Production (net tons)	Value	Active plants	Production (net tons)	Value
Indiana	3	14,561	$267,818	3	12,676	$251,640
Michigan	17	37,604	636,215	15	37,989	647,308
Minnesota	4	17,489	383,834	3	6,420	153,697
Ohio	14	18,494	338,272	13	17,872	341,694
Wisconsin	7	26,889	458,383	4	18,654	327,312
Other States	[1] 8	4,498	85,017	[2] 5	2,656	58,820
Total	53	119,535	2,169,539	43	96,267	1,780,471

[1] Comprises 2 plants each in Illinois and Virginia and 1 plant each in Iowa, Kentucky, Missouri, and Nebraska.
[2] Comprises 2 plants in Illinois, and 1 plant each in Iowa, Nebraska, and Virginia.

TABLE 11.—Annual capacity and production of packaged-fuel plants in the United States, 1948–52

	Active plants	Annual capacity (net tons)	Production	
			Net tons	Percent of annual capacity
1948	62	397,620	157,013	39.5
1949	57	331,300	125,948	38.0
1950	54	293,560	135,682	46.2
1951	53	277,010	119,535	43.2
1952:				
Plants with capacity of—				
Less than 5,000 tons	29	63,450	18,858	29.7
5,000 to less than 10,000 tons	9	57,408	17,380	30.3
10,000 to less than 15,000 tons	1	[1] 238,000	[1] 60,029	[1] 25.2
15,000 to less than 25,000 tons	1			
25,000 or more tons	3			
Total	43	358,858	96,267	26.8
Plants with production of—				
Less than 1,000 tons	25	170,550	9,388	5.5
1,000 to less than 3,000 tons	13	64,308	23,883	37.1
3,000 to less than 5,000 tons	1	[1] 124,000	[1] 62,996	[1] 50.8
5,000 to less than 10,000 tons	1			
10,000 to less than 30,000 tons	3			
Total	43	358,858	96,267	26.8

[1] Combined to avoid disclosure of individual operations.

Raw Fuels.—Bituminous low-volatile coal used at 37 plants, either alone or in combination with other fuels, comprised 91 percent of the total raw fuels used in making packaged fuel. Small quantities of bituminous high-volatile coal, semianthracite, and petroleum coke were used also in manufacturing packaged fuel in 1952.

Yard screenings were used at 23 plants to produce 21 percent of the total output; raw fuels other than yard screenings were used at 9 plants to manufacture 52 percent; and screenings and other raw fuels combined were used at 11 plants to produce 27 percent of the total 1952 production.

Binders.—Starch, totaling 516 tons, an average of about 11 pounds per ton of packaged fuel produced, was the principal binder employed at 40 plants; these plants produced about 82 percent of the total 1952 output. Asphalt and cement were used exclusively at a few of the plants. Table 13 gives details on binders employed in the manufacture of packaged fuel in 1949–52.

TABLE 12.—Raw fuels used in making packaged fuel in the United States, 1952

Type of raw fuel	Plants using raw fuels	Raw fuels used (net tons)	Source of raw fuel	Plants using raw fuels	Net tons		
					Yard screenings	Other raw fuels	Total
Bituminous low-volatile coal	37	86,061	Yard screenings	23	20,354	--------	20,354
Bituminous high-volatile coal	3	5,131	Raw fuels (other than yard screenings)	9	--------	48,654	48,654
Pennsylvania anthracite	--------	--------	Yard screenings and other raw fuels	11	6,131	19,343	25,474
Semianthracite	1	[1] 3,290					
Petroleum coke	4						
Total	[2] 43	94,482	Total	43	26,485	67,997	94,482

[1] Combined to avoid disclosure of individual operations.
[2] A number of plants used more than one kind of raw fuel; hence, the sum of the plants above is greater than the actual number of active plants (43) in 1952.

TABLE 13.—Classification of packaged-fuel plants in the United States, 1949–52, by type of binder used

Type of binder	1949		1950		1951		1952	
	Plants using binders	Percent of total production	Plants using binders	Percent of total production	Plants using binders	Percent of total production	Plants using binders	Percent of total production
Starch	52	78.3	48	74.6	48	71.3	39	81.7
Asphalt	3	20.6	2		2		1	
Starch and asphalt	1	[1] 1.1	1	[1] 25.4	--------	[1] 28.7	1	[1] 18.3
Cement	2		2		2		2	
Starch and cement	--------	--------	--------		1		--------	--------
Coal-tar pitch	--------	--------	1		--------	--------	--------	--------
Total	[2] 57	100.0	54	100.0	53	100.0	43	100.0

[1] Combined to avoid disclosure of individual operations.
[2] 1 plant making 2 types of packaged fuel used starch binder for 1 and asphalt and starch for the other; hence, the sum of the items shown exceeds the number of active plants.

SHIPMENTS

In 1952, 93,436 tons of packaged fuel was shipped. Of this total, 76,874 tons (82 percent) was local sales, by truck, and 16,562 tons (18 percent) was reported as other than local sales. Of the 16,562 tons shipped outside the local area, 9,698 tons (59 percent) went by truck and 6,864 tons (41 percent) by rail.

TABLE 14.—Shipments of packaged fuel in the United States, 1948–52, by method of transportation, in net tons

Year	Shipped by truck			Shipped by rail	Total
	Local sales [1]	Other than local sales	Total		
1948	128,661	17,753	146,414	10,272	156,686
1949	108,606	11,036	119,642	6,306	125,948
1950	112,962	13,774	126,736	7,814	134,550
1951	98,324	13,566	111,890	7,950	119,840
1952	76,874	9,698	86,572	6,864	93,436

[1] Includes sales both called for and delivered.

WORLD PRODUCTION

Although world production of fuel briquets and packaged fuel increased slightly in 1952, the United States showed a decline in output (see table 15). This decline in United States production can be attributed primarily to competition from other space-heating fuels, which were in ample supply. In 1952, as in former years, Germany was the world's largest producer of fuel briquets.

TABLE 15.—World production of fuel briquets (and packaged fuel), by countries, 1948–52, in thousands of metric tons [1]

[Compiled by Pauline Roberts]

Country	1948	1949	1950	1951	1952
Algeria	78	57	66	67	[2] 53
Australia [3]	554	568	598	520	[2] 520
Austria	[4]	28	46	80	[2] 57
Belgium	970	783	1,020	1,810	1,488
Bulgaria [2]	150	150	200	200	225
Canada	323	460	410	359	645
Czechoslovakia:					
Bituminous coal	336	388	388	395	[2] 400
Lignite	291	[2] 297	[2] 303	[2] 400	[2] 425
Denmark	17	39	20	[2] 40	[2] 40
Finland			80	80	[2] 80
France	5,828	6,270	6,307	8,049	7,941
French Morocco	32	15	35	25	16
Germany:					
East Germany, lignite [2]	30,000	30,000	38,000	39,500	39,500
West Germany:					
Bituminous coal	2,972	3,586	3,722	4,104	4,961
Lignite	12,898	14,250	14,912	15,924	16,403
Hungary [2]	90	100	125	150	160
Indochina	12	[2] 12	[2] 12	[2] 12	[2] 70
Indonesia	9	25	25	27	[2] 30
Ireland [4]	24	17	28	[2] 27	[2] 30
Italy:					
Anthracite	3	[2] 10	[2] 10	[2] 25	[2] 25
Lignite	2				
Japan [2]	800	1,000	1,500	1,800	[4] 2,100
Korea, South	77	168	67	5	[2] 5

For footnotes, see end of table.

TABLE 15.—World production of fuel briquets (and packaged fuel), by countries, 1948–52, in thousands of metric tons [1]—Continued

Country	1948	1949	1950	1951	1952
Netherlands:					
Bituminous coal	936	992	1,049	1,062	[2] 1,000
Lignite	63	61	57	73	[2] 72
New Zealand	13	14	11	11	[2] 12
Pakistan	5	9	[2] 7	[2] 8	[2] 10
Poland:					
Bituminous coal	718	695	631	[2] 622	[2] 650
Lignite	114	170	169	[2] 159	[2] 165
Portugal	74	72	80	91	94
Rumania [2]	200	200	250	250	260
Spain	1,005	1,136	1,130	1,161	[2] 1,130
Sweden	111	59	3	([5])	([5])
Switzerland [2]	100	100	100	100	100
Tunisia	46	44	42	38	[2] 30
Turkey	7	40	29	[2] 30	37
U. S. S. R. [2]	5,000	5,500	6,000	7,000	7,000
United Kingdom	1,490	1,536	1,419	1,775	[2] 1,850
United States:					
Briquets	2,838	2,181	2,513	2,166	2,068
Packaged fuel	142	114	123	108	87
Yugoslavia:					
Bituminous coal	[2] 150	[2] 175	[2] 200	22	16
Lignite				[2] 178	[2] 178
Total (estimate)	68,000	71,000	82,000	88,000	90,000

[1] This table incorporates a number of revisions of data published in previous chapters.
[2] Estimate.
[3] Fiscal year ended June 30 of year stated.
[4] Includes peat briquets.
[5] Negligible.

Peat

By J. A. Corgan and Golden V. Chiriaco

GENERAL SUMMARY

OUTPUT of the peat industry in the United States in 1952 increased 8 percent in quantity and 16 percent in value over 1951. Imports, which comprised 44 percent of the 378,000 net tons of peat consumed, increased 16 percent. No exports were reported.

TABLE 1.—Salient statistics of the peat industry in the United States, 1948–52

	1948	1949	1950	1951	1952
NET TONS					
Production	129,581	129,532	130,723	194,416	210,582
Imports	91,073	94,747	124,382	[1] 144,390	167,298
Available supply	220,654	224,279	255,105	[1] 338,806	377,880
World production	49,000,000	50,000,000	56,000,000	58,000,000	60,000,000
VALUE					
Production	$929,560	$1,020,014	$1,142,566	$1,489,225	$1,729,511
Average per ton	$7.17	$7.87	$8.74	$7.66	$8.21

[1] Revised figure.

RESERVES

Total reserves of peat were calculated in 1922 to be 13,827 million net tons in terms of air-dried peat.[1] Seventy-five percent of the reserves is in Minnesota, Wisconsin, and Michigan. Florida contains 14 percent of the country's total; the rest is distributed through the New England and Pacific Coast States. It is estimated that about 2,500,000 tons of peat have been recovered from these reserves since 1922.

PRODUCTION

In 1952 a total production of 211,000 net tons of peat was reported to the Bureau of Mines by 62 producers operating in 19 States. In 1951, 63 producers operating in 17 States produced 194,000 tons. The rise in production was due to the increased use of peat in the United States for soil improvement. Although the average value per ton in 1952—$8.21—increased only 7 percent, the total value—$1,730,000—increased 16 percent over the 1951 value.

Washington retained the position reached in 1951 as the largest peat-producing State. The output of Washington with that of the next three leading States—Michigan, Ohio, and Florida—was 57 percent of the United States total production. Other producing States, in order of output, were New Jersey, Iowa, California, Connecticut,

[1] Soper, E. K., and Osbon, C. C., The Occurrence and Uses of Peat in the United States: Geol. Survey Bull. 728, 1922, p. 92.

Indiana, Pennsylvania, Illinois, Colorado, Georgia, Maine, New York, Texas, Wisconsin, Massachusetts, and New Hampshire.

Peat humus, produced in 14 States in 1952, made up 63 percent of the total output; reed, or sedge peat, produced in 10 States, 30 percent; and moss peat and other, produced in 9 States, 7 percent.

TABLE 2.—Peat produced in the United States, 1950–52, by States

State	1950		1951		1952	
	Production (net tons)	Value	Production (net tons)	Value	Production (net tons)	Value
California	6,399	$37,192	6,432	$42,016	10,527	$76,706
Colorado	3,210	28,088	2,241	19,611	2,312	20,230
Connecticut	6,294	35,145	5,586	33,702	(1)	(1)
Florida	23,022	151,270	25,748	161,417	23,729	154,164
Georgia	1,750	41,000	2,250	41,000	2,150	38,000
Indiana	5,793	18,966	5,699	22,824	10,115	49,775
Iowa	3,000	19,500	13,545	107,909	14,500	110,334
Maine	2,912	61,600	1,805	36,870	1,695	57,541
Massachusetts	650	7,575	(1)	(1)	(1)	(1)
Michigan	12,750	174,000	20,180	320,100	29,304	419,856
Minnesota	400	13,100				
New Jersey	26,466	186,338	27,678	213,500	21,800	191,664
Ohio	22,145	245,379	21,378	261,891	24,828	290,664
Pennsylvania	(1)	(1)	8,591	46,568	7,898	43,874
Texas	977	10,566	1,238	10,750	1,200	12,000
Washington			45,304	98,955	42,580	111,386
Wisconsin	2,293	9,536	(1)	(1)	(1)	(1)
Other States [2]	12,662	103,311	6,741	72,112	17,944	153,317
Total	130,723	1,142,566	194,416	1,489,225	210,582	1,729,511

[1] Reported under "Other States" to avoid disclosure of individual company operations.
[2] Includes data for Illinois, New Hampshire (1952), New York (1952), and States indicated by footnote 1.

TABLE 3.—Peat produced in the United States, 1951–52, by kinds

Kind of peat	1951			1952		
	Production (net tons)	Value		Production (net tons)	Value	
		Total	Average per ton		Total	Average per ton
Moss [1]	24,001	$140,870	$5.87	15,053	$156,273	$10.38
Reed or sedge	46,643	463,131	9.93	63,312	627,739	9.92
Humus	123,772	885,224	7.15	132,217	945,499	7.15
Total	194,416	1,489,225	7.66	210,582	1,729,511	8.21

[1] Includes negligible quantity of "Other" types of peat, to avoid disclosure of individual company operations.

USES

As in former years, more peat was used for soil improvement than for any other purpose in the United States in 1952. Of the total sales reported for the year, 77 percent was so used, 19 percent was sold for mixed fertilizers, and 4 percent was consumed in other uses, such as a packing medium for nursery stock, house plants, fish bait, and highway and municipal use by contractors.

United States Government Specifications.—The Federal Government purchases a certain amount of peat primarily for horticultural purposes, provided the peat meets required specifications. These specifications may be obtained from General Services Administration, Business Service Center, Region 3, Seventh and D Streets, SW., Washington 25, D. C.

TABLE 4.—Peat sold in the United States, 1948–52, by uses

Year	Soil improvement		Mixed fertilizers		Other uses		Total	
	Sales (net tons)	Value	Sales (net tons)	Value	Sales (net tons)	Value	Sales (net tons)	Value
1948	86,991	$578,615	36,012	$309,259	6,000	$36,000	129,003	$923,874
1949	76,963	546,062	40,897	385,015	11,672	89,237	129,532	1,020,314
1950	87,090	704,200	36,433	391,174	7,198	47,345	130,721	1,142,719
1951	138,712	962,002	37,233	364,164	14,800	141,268	190,745	1,467,434
1952	159,203	1,189,195	37,957	401,180	9,159	80,060	206,319	1,670,435

IMPORTS [2]

Except for a small decrease in 1947, imports of peat have increased consistently since 1940, when a sharp decline occurred because of the war in Europe. In 1952 an alltime high of 167,000 net tons was reached. This represents an increase of 16 percent over the 144,000 tons imported in 1951 and 113 percent over the 1939 prewar figure of 79,000 tons. As in previous years, no exports of peat were reported; consequently, the quantity available for domestic consumption was 378,000 tons.

TABLE 5.—Peat moss imported for consumption in the United States, 1950–52, by kind and by country

[U. S. Department of Commerce]

Country	Poultry and stable grade					
	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
Canada	20,807	$828,966	17,963	$734,549	11,967	$664,467
Denmark	50	1,254				
Germany	8,252	219,766	11,539	343,769	[1] 9,815	341,015
Ireland	682	21,546	97	3,320	78	3,010
Netherlands	923	17,128	1,083	43,916	325	20,458
Sweden	63	2,221	65	2,008		
United Kingdom	34	812	18	790		
Total	30,811	1,091,693	30,765	1,128,352	22,185	1,028,950

Country	Fertilizer grade					
	1950		1951		1952	
	Net tons	Value	Net tons	Value	Net tons	Value
Canada	46,762	$1,610,988	56,101	$2,196,367	54,676	$2,504,359
Denmark	1,051	24,550	325	6,507	140	3,987
France					5	142
Germany						
East	30,902	780,265	[2] 47,559	1,230,544	85	1,680
West					81,520	2,653,443
Ireland	2,171	74,126	1,139	40,921	1,165	48,040
Netherlands	7,673	149,011	6,485	189,331	7,365	253,563
Poland-Danzig	3,823	106,325	1,846	53,815		
Sweden	432	12,482	22	556		
United Kingdom	757	17,487	148	4,143	157	4,659
Total	93,571	2,775,234	[2] 113,625	3,722,184	145,113	5,469,873

[1] West Germany.
[2] Revised figure.

[3] Figures on imports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 6.—World production of peat, 1947–52, by countries, in thousand metric tons [1]

[Compiled by Pauline Roberts]

Country	1947	1948	1949	1950	1951	1952
Austria [2]	50	50	50	50	50	50
Canada, agricultural use [3]	73	81	73	68	70	70
Denmark	5,168	3,617	1,416	902	2,014	[2] 1,627
Finland:						
Agricultural use	14	17	19	7	224	[2] 250
Fuel	153	198	179	197		
France	58	37	45	[2] 60	[2] 60	[2] 60
Germany:						
East Germany [2]	500	500	500	500	500	500
West Germany	1,800	2,038	1,203	[2] 1,200	[4] 423	[2] 450
Hungary	9	[2] 8	[2] 8	[2] 8	[2] 8	[2] 50
Iceland	3	3	[2] 3	[2] 3	[2] 2	[2] 3
Ireland	4,851	[2] 3,847	[2] 4,079	[2] 2,680	[2] 4,000	[2] 4,200
Italy	21	3	4	4	5	[2] 5
Japan	(5)	(5)	(5)	(5)	(5)	30
Netherlands	715	966	779	528	642	[2] 700
Norway:						
Agricultural use	[2] 20	[2] 20	[2] 20	25	25	[2] 20
Fuel	379	343	382	361	328	331
Portugal	3	2	(5)	(5)	4	(5)
Spain	3	1	1	5		[2] 5
Sweden:						
Agricultural use	88	109	106	99	[2] 100	[2] 150
Fuel	436	364	94	[2] 100	[2] 250	[2] 100
Switzerland	40	(5)				
U. S. S. R. [2]	32,000	32,000	36,000	44,000	44,000	45,000
United States	124	118	118	119	176	191
Total (estimate)	47,000	44,000	45,000	51,000	53,000	54,000

[1] This table incorporates a number of revisions of data published in previous chapters.
[2] Estimate.
[3] In addition, Canada produces less than 100 tons per year of peat for fuel.
[4] Including 280,959 tons for agricultural use.
[5] Less than 500 tons.

WORLD PRODUCTION

As indicated in table 6, the estimated world production of peat has been rising since 1948. The 54,000,000 metric tons estimated for 1952 represents a 2-percent increase over the 53,000,000 tons for 1951.

B. Petroleum and Related Products

Asphalt and Related Bitumens

By A. T. Coumbe

GENERAL SUMMARY

PRODUCTION of petroleum asphalt, which represented 88 percent of the available supply in 1952, increased 6 percent over 1951. Imports accounted for 3 percent of the supply, and the balance consisted of stocks on hand January 1. The breakdown of the supply differed only slightly from that of 1951. Domestic demand [1] increased 7 percent compared with a 13-percent gain in 1951. Exports doubled in volume but represented only 3 percent of the supply. The total demand (domestic and foreign) for petroleum asphalt increased 9 percent in 1952 compared with 1951 requirements.

Both production and domestic demand for native asphalt increased 14 percent in 1952; however, exports were a fifth lower in volume. These conditions brought about a 9-percent stock buildup during the year.

TABLE 1.—Supply and distribution of asphalt and related bitumens in the United States, 1951–52, in short tons

	1951	1952
SUPPLY		
Native asphalt and related bitumens:		
Production	[1] 1,436,173	1,637,862
Imports (chiefly lake asphalt)[2]	6,304	4,201
Stocks, Jan. 1	79,858	72,076
Petroleum asphalt (excluding road oil):		
Production	12,055,455	12,784,000
Imports	442,572	493,111
Stocks, Jan. 1	962,361	1,203,636
Total supply	[1] 14,982,723	16,194,886
DISTRIBUTION		
Native asphalt and related bitumens:		
Apparent domestic consumption [2]	1,419,037	1,611,512
Exports	24,918	19,926
Stocks, Dec. 31	72,076	78,500
Petroleum asphalt (excluding road oil):		
Apparent domestic consumption [2]	12,079,811	12,948,096
Exports	183,245	387,579
Stocks, Dec. 31	1,203,636	1,149,273
Total distribution	[1] 14,982,723	16,194,886

[1] Revised.
[2] Apparent consumption for native asphalt excludes, and that for petroleum asphalt includes, lake asphalt, since this has the same type of uses as the manufactured product.

[1] The term "domestic demand" as used in this chapter means apparent consumption, that is, production plus net imports and changes in refiners' stocks.

NATIVE ASPHALT AND BITUMENS

Sales of bituminous rock in the United States increased 14 percent to 1.6 million short tons in 1952. Of this quantity, 91 percent was limestone and the remaining 9 percent sandstone. Production of bituminous rock increased 16 percent during the year.

Sales of gilsonite in northeastern Utah continued to decline in 1952. There were 61,000 short tons, valued at $1.8 million, sold compared with 65,500, valued at $1.9 million, in 1951.

MANUFACTURED OR PETROLEUM ASPHALT

Production.—Production of asphalt at petroleum refineries increased 6 percent in 1952, with gains in all refinery districts except the Appalachian and Texas Inland, where output is relatively small. Production in the East Coast area, where a quarter of the asphalt is manufactured, was up 2 percent over 1951. The California and Indiana-Illinois-Kentucky districts, each credited with 17 percent of the production in 1952, gained 12 and 6 percent, respectively. The quantity of asphalt produced at petroleum refineries in the Oklahoma-Kansas-Missouri group of States was 13 percent greater in 1952; it represented a tenth of the national total production.

TABLE 2.—Supply and disposition of petroleum asphalt at refineries in the United States in 1952, by refinery district, in short tons

District	Production	Receipts [1]	Stocks		Consumption by producers, transfers,[2] losses, and exports	Sales to domestic consumers
			Jan. 1	Dec. 31		
East Coast	3,192,000	231,500	204,500	222,400	301,600	3,104,000
Appalachian	392,200	62,600	41,300	43,800	18,400	433,900
Indiana, Illinois, Kentucky, etc.	2,226,900	311,100	215,300	208,000	117,200	2,428,100
Oklahoma, Kansas, Missouri	1,294,200	79,000	209,500	196,700	139,800	1,246,200
Texas:						
Gulf Coast	870,600	----------	72,500	60,400	129,700	753,000
Inland	691,400	42,600	94,000	62,300	63,600	702,100
Total Texas	1,562,000	42,600	166,500	122,700	193,300	1,455,100
Louisiana-Arkansas:						
Louisiana Gulf Coast	694,200	36,700	66,500	61,600	79,700	656,100
Arkansas, Louisiana Inland	669,600	49,000	78,700	73,300	12,300	711,800
Total Louisiana-Arkansas	1,363,800	85,700	145,200	134,900	92,000	1,367,900
Rocky Mountain	616,400	146,600	92,900	91,500	54,900	709,500
California	2,136,500	----------	128,400	129,300	351,000	1,784,600
Total: 1952	12,784,000	959,100	1,203,600	1,149,300	1,268,200	12,529,300
1951	12,055,500	780,900	962,400	1,203,600	894,400	11,700,800

[1] Receipts from intraindustry refinery transfers, addition of other petroleum products blended to make cutback asphalts, imports, and transfers from stocks formerly not classified as asphalt.
[2] Transfers between refineries and transfers of asphalt to stocks not so classified.

Stocks.—Year-end stocks of petroleum asphalt at refineries declined 5 percent in 1952 in contrast with a 25-percent gain in 1951. The stock decline was evident in all refinery districts except the East Coast (where about 19 percent of the year-end quantity was reported), California (with 11 percent of the total stock), and the Appalachian (with 4 percent).

Sales.—Sales of petroleum asphalt to domestic consumers increased 7 percent in 1952, with an average sales price per short ton of $18.15 compared with $18.47 in 1951. All refinery districts reported increased sales except the East Coast, where the quantity marketed declined 11 percent. Refinery areas with large volume sales were the Indiana-Illinois-Kentucky district (with a 24-percent gain in 1952), Oklahoma-Kansas-Missouri (with an 11-percent gain), and California (with a 2-percent increase).

TABLE 3.—Domestic sales of asphalt from petroleum refineries in 1952, by uses

[Value f. o. b. refinery]

Form and use	From domestic petroleum		From foreign petroleum		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
Solid and semisolid products of 200 and less penetration:						
Asphalt for—						
Paving	3,902,861	$67,103,436	1,144,059	$22,587,768	5,046,920	$89,691,204
Roofing	1,214,966	21,442,025	575,920	11,437,580	1,790,886	32,879,605
Waterproofing	139,827	3,057,597	12,779	393,968	152,606	3,451,565
Blending with rubber	7,111	184,310	26,177	654,072	33,288	838,382
Briquetting	139,128	2,292,940	1,734	36,254	140,862	2,329,194
Mastic and mastic cake	445	15,509			445	15,509
Pipe coatings	28,461	752,656	397	13,895	28,858	766,551
Molding compounds	48,980	1,067,993	4,273	108,996	53,253	1,176,989
Miscellaneous uses	233,560	4,842,570	179,565	3,280,259	413,125	8,122,829
Total	5,715,339	100,759,036	1,944,904	38,512,792	7,660,243	139,271,828
Semisolid and liquid products of more than 200 penetration:						
Flux for—						
Paving	473,953	6,723,953	26,049	499,081	500,002	7,223,034
Roofing	799,546	11,807,529	9,308	176,942	808,854	11,984,471
Waterproofing	15,962	378,487			15,962	378,487
Mastic	9,367	363,980			9,367	363,980
Cutback asphalts:						
Rapid-curing	1,199,199	22,836,115	428,080	8,855,405	1,627,279	31,691,520
Medium-curing	1,403,256	25,726,038	230,765	4,703,005	1,634,021	30,429,043
Emulsified asphalts and fluxes	88,951	1,850,695	39,713	995,314	128,664	2,846,009
Paints, enamels, japans, and lacquers	42,428	1,112,686	22,823	464,927	65,251	1,577,613
Other liquid products	59,767	1,129,510	19,864	470,489	79,631	1,599,999
Total	4,092,429	71,928,993	776,602	16,165,163	4,869,031	88,094,156
Grand total: 1952	9,807,768	172,688,029	2,721,506	54,677,955	12,529,274	227,365,984
1951	8,573,762	152,806,455	3,127,040	63,298,541	11,700,802	216,104,996

TABLE 4.—Domestic sales of asphalt from petroleum refineries, 1951–52, by refinery district

District	1951		1952	
	Short tons	Value	Short tons	Value
East Coast	3,492,552	$70,569,180	3,104,021	$62,087,999
Appalachian	407,921	9,029,274	433,840	9,770,852
Indiana, Illinois, Kentucky, etc	1,954,961	37,806,652	2,428,070	48,615,337
Oklahoma, Kansas, Missouri	1,123,929	18,179,307	1,246,193	20,011,795
Texas:				
Gulf Coast	739,428	12,674,919	753,004	12,400,432
Inland	622,032	10,684,159	702,101	11,602,123
Total Texas	1,361,460	23,359,078	1,455,105	24,002,555
Louisiana-Arkansas:				
Louisiana Gulf Coast	477,429	8,048,326	656,133	10,863,408
Arkansas, Louisiana Inland	620,981	10,752,655	711,735	11,634,010
Total Louisiana-Arkansas	1,098,410	18,800,981	1,367,868	22,497,418
Rocky Mountain	517,290	7,664,247	709,527	10,486,869
California	1,744,279	30,696,277	1,784,650	29,893,159
Total United States	11,700,802	216,104,996	12,529,274	227,365,984

Asphalt manufactured from imported crude petroleum equaled 22 percent of domestic sales in 1952 compared with 27 percent in 1951. Although runs of foreign crude petroleum to refineries increased 13 percent, domestic sales of asphalt refined from imported crude petroleum declined 13 percent. The yield of asphalt from foreign crude petroleum was 7 percent in 1952 compared with 9 percent in 1951. The refineries in the East Coast area manufactured most of the asphalt from this source both years.

Over 70 percent of the petroleum asphalt and asphaltic material was sold for street, highway, and airport-runway surfacing in 1952. The quantity so used was 15 percent over 1951. Asphalt delivered for roofing material declined 12 percent to represent slightly more than a fifth of the total sales compared with a quarter of the sales in 1951.

Sales of asphalt emulsified with water at petroleum refineries declined to 129,000 short tons in 1952, a drop of about 40 percent; that sold by secondary producers increased 6 percent to 636,000 short tons. Total net sales of emulsified asphalt declined approximtely 7 percent.

TABLE 5.—Domestic sales of asphalt from petroleum refineries in 1952, by district and use, in short tons

	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Oklahoma, Kansas, Missouri	Texas	Louisiana-Arkansas	Rocky Mountain	California	Total	
									Production	Value
Solid and semisolid products of 200 and less penetration:										
Asphalt for—										
Paving	1,272,924	167,224	968,364	248,485	533,381	739,865	307,735	808,942	5,046,920	$89,691,204
Roofing	672,531	111,437	365,624	44,738	163,802	234,848	10,054	187,852	1,790,886	32,879,605
Waterproofing	12,784	2,081	53,007	37,162	12,261	12,954	2,918	19,439	152,606	3,451,565
Blending with rubber	26,688	1,541	756	2,544		727	700	332	33,288	838,382
Briquetting	6,843	2,050	62,094	56,416	1,321		8,215	3,923	140,862	2,329,194
Mastic and mastic cake	106	256	32					51	445	15,509
Pipe coatings	4,939	3,819	941	694	506	2,113	29	15,817	28,858	766,551
Moulding compounds	9,594	2,946	25,277	2,239	2,823	3,448	3,313	3,613	53,253	1,176,989
Miscellaneous uses	254,829	2,680	41,935	58,733	3,037	31,355	12,132	8,424	413,125	8,122,829
Total	2,261,238	294,034	1,518,030	451,011	717,131	1,025,310	345,096	1,048,393	7,660,243	139,271,828
Semisolid and liquid products of more than 200 penetration:										
Flux for—										
Paving	45,494	2,468	53,378	100,262	95,101	67,532	29,790	105,977	500,002	7,223,034
Roofing	9,090	21,858	352,272	140,160	14,302	36,933	973	233,266	808,854	11,984,471
Waterproofing			3,382					12,580	15,962	378,487
Mastic					7,837			1,530	9,367	363,980
Cutback asphalts:										
Rapid-curing	455,789	62,068	224,925	127,858	496,837	116,135	89,849	53,818	1,627,279	31,691,520
Medium-curing	252,639	19,986	240,047	412,485	104,739	102,134	220,317	281,674	1,634,021	30,429,043
Emulsified asphalts and fluxes	35,193	6,657	6,103	6,547	17,107	9,984	2,058	45,015	128,664	2,846,009
Paints, enamels, japans, and lacquers	22,882	26,769	14,672	76	113			739	65,251	1,577,613
Other liquid products	21,696		15,261	7,794	1,938	9,840	21,444	1,658	79,631	1,599,999
Total	842,783	139,806	910,040	795,182	737,974	342,558	364,431	736,257	4,869,031	88,094,156
Grand total:										
Production	3,104,021	433,840	2,428,070	1,246,193	1,455,105	1,367,868	709,527	1,784,650	12,529,274	
Value	$62,087,999	$9,770,852	$48,615,337	$20,011,795	$24,002,555	$22,497,418	$10,486,869	$29,893,159		227,365,984

FOREIGN TRADE [2]

Imports.—Imports of natural asphalt and bitumens, virtually all of which were received from Trinidad, declined a third in quantity and from $112,000 to $98,000 in value in 1952 compared with 1951. Solid petroleum-asphalt receipts—mostly from the Netherlands Antilles—increased from 423,000 short tons (value $5,014,000) in 1951 to 479,000 (value $5,617,000) in 1952. In addition, 14,000 short tons of liquid asphalt was imported compared with 20,000 short tons in 1951. Venezuela was the chief source of the liquid asphalt in both years.

Exports.—The quantity of unmanufactured natural asphalt exported declined 20 percent to 20,000 short tons valued at $955,000 in 1952. The exports went mainly to Canada, Mexico, Colombia, the United Kingdom, France, West Germany, Italy, and Japan. Exports of petroleum asphalt increased from 183,000 short tons valued at $6,391,000 in 1951 to 388,000 valued at $13,277,000 in 1952. The large gain in this foreign demand in 1952 was the result of greatly increased shipments to Asiatic countries, notably French Indochina, India, Indonesia, Iraq, Pakistan, the Philippines and Thailand.

TABLE 6.—Petroleum asphalt (unmanufactured) [1] exported from the United States, 1951–52, by country of destination

[U. S. Department of Commerce]

Country	1951		1952	
	Short tons	Value	Short tons	Value
North America:				
Bahamas	134	$9,848	431	$17,608
British Honduras	248	10,548		
Canada	3,861	210,410	3,177	178,336
Canal Zone	4,823	85,265	5,508	94,120
Costa Rica	623	21,641	5,318	201,000
Cuba	5,395	165,695	757	27,516
Dominican Republic	103	3,388	268	8,762
Guatemala	885	22,798	1	137
Haiti	26	1,473	701	20,477
Honduras	19	394	1	149
Mexico	26,252	588,125	29,234	709,677
Netherlands Antilles			222	9,398
Nicaragua	319	15,482	244	12,710
Panama	251	6,512	416	10,157
Other North America			13	713
Total North America	42,939	1,141,579	46,291	1,290,760
South America:				
Argentina	88	6,483	73	5,272
Bolivia	823	25,512	1,208	39,420
Brazil	54,132	2,505,738	2,960	134,761
Chile	1,024	35,454	2,455	94,804
Colombia	114	6,584	8,707	249,557
Ecuador	506	29,073	986	29,717
Uruguay	2,861	94,237	90	2,685
Venezuela	366	25,410	137	6,715
Other South America	59	7,815	60	3,074
Total South America	59,973	2,736,306	16,676	566,005

For footnote, see end of table.

[2] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 6.—Petroleum asphalt (unmanufactured) [1] exported from the United States, 1951–52, by country of destination—Continued

[U. S. Department of Commerce]

Country	1951		1952	
	Short tons	Value	Short tons	Value
Europe:				
Austria	1,464	$47,313	50	$1,532
Belgium-Luxembourg	2,450	84,881	1,628	50,280
France	10,371	304,518	30,983	912,653
Greece	10,518	410,925	4,407	147,544
Iceland			258	11,704
Italy	13	2,274	113	23,569
Netherlands	25	1,219	67	4,905
Norway	179	9,794	77	3,411
Spain	30	1,847	111	3,493
Sweden	102	7,277	22	420
Switzerland	1,397	63,678	836	43,839
Turkey	3,920	145,950	2,742	90,094
Other Europe	86	7,478		
Total Europe	30,555	1,087,154	41,294	1,293,444
Asia:				
British Malaya	938	27,108	2,752	81,075
Burma			1,151	39,673
Ceylon	133	2,951	14,869	484,234
French Indochina	12,283	326,733	51,043	1,692,225
Hong Kong	4,682	115,762	4,290	133,056
India	4,412	96,420	55,583	1,815,271
Indonesia	134	11,137	23,792	845,790
Iraq			19,241	980,463
Israel	4	325	72	3,542
Japan	434	24,060	459	26,174
Jordan			2,309	76,000
Kuwait			7,628	468,525
Pakistan	520	10,142	30,417	1,031,727
Philippines	8,742	290,037	15,327	605,297
Portuguese Asia n. e. c.			1,108	37,528
Saudi Arabia	8	502	2	168
Thailand	1,762	49,326	17,575	540,888
Other Asia	112	3,708	293	10,420
Total Asia	34,164	958,211	247,911	8,872,056
Africa:				
Belgian Congo	1,377	55,994	5,859	250,485
French Morocco	74	6,600	564	50,114
French West Africa	301	21,100	309	28,232
Liberia	356	14,528	11	355
Mozambique	582	15,264	1,039	34,333
Southern Rhodesia	550	15,586	413	12,785
Union of South Africa	10,258	266,544	19,189	601,169
Other Africa	54	3,418	481	22,740
Total Africa	13,552	399,034	27,865	1,000,213
Oceania:				
Australia	385	12,422	24	2,119
British West Pacific Islands			560	18,500
French Pacific Islands	219	8,247		
New Zealand	1,458	48,509	6,958	234,205
Total Oceania	2,062	69,178	7,542	254,824
Grand total	183,245	6,391,462	387,579	13,277,302

[1] In addition, exports of "petroleum asphalt manufactures" were valued as follows: 1951—$2,351,776; 1952 (data not strictly comparable with earlier years)—$4,567,595. Quantity not available.

LIQUID ASPHALTIC ROAD OIL

Sales of road oil by petroleum refineries increased 6 percent in 1952 in contrast with an 11-percent decline in 1951. It was mainly marketed in the Indiana-Illinois-Kentucky, Oklahoma-Kansas-Missouri, Rocky Mountain, and California refinery districts.

TABLE 7.—Supply and disposition of road oil in the United States in 1952, by refinery district, in thousands of barrels

District	Production	Receipts[1]	Stocks		Consumption by producers, transfers,[2] losses, and exports	Sales to domestic consumers
			Jan. 1	Dec. 31		
East Coast	101	23	16	2	80	58
Appalachian						
Indiana, Illinois, Kentucky, etc.	1,426	30	17	48	170	1,255
Oklahoma, Kansas, Missouri	891	622	26	46	314	1,179
Texas	8	97	1	3		103
Louisiana-Arkansas	8	9	2	2	8	9
Rocky Mountain	1,985	225	102	181	552	1,579
California	2,579	44	238	171		2,690
Total: 1952	6,998	1,050		453	1,124	6,873
1951	6,084	1,579	402		1,164	6,494

[1] Receipts from intraindustry refinery transfers, imports, and transfers from stocks formerly not classed as road oil.
[2] Transfers between refineries and transfers to stocks not classified as road oil.

TABLE 8.—Domestic sales of road oil by petroleum refineries, 1951–52, by refinery district

District	1951		1952	
	Thousand barrels	Thousand dollars	Thousand barrels	Thousand dollars
East Coast	71	245	58	238
Appalachian	3	56		
Indiana, Illinois, Kentucky, etc.	1,499	4,418	1,255	3,894
Oklahoma, Kansas, Missouri	604	1,225	1,179	2,500
Texas	91	276	103	212
Louisiana-Arkansas	6	21	9	32
Rocky Mountain	1,363	3,099	1,579	3,320
California	2,857	7,311	2,690	7,333
Total	6,494	16,651	6,873	17,529

Carbon Black

By D. S. Colby, H. J. Barton, and B. E. Oppegard

GENERAL SUMMARY

PRODUCTION of carbon black in the United States in 1952 totaled 1.6 billion pounds, 4 percent below 1951. Domestic sales increased 2 percent, while exports declined 32 percent. Producers' stocks increased 156 million pounds to 359 million pounds.

Production and shipments of furnace blacks in 1952 maintained approximately their 1951 levels, increasing 1 and 2 percent, respectively. Production and shipments of contact blacks, however, declined—production 13 and shipments 23 percent.

Stocks of contact blacks rose from an 88-day supply at the first of the year to a 204-day supply December 31, 1952. Stocks of furnace blacks rose from a 30- to a 39-day supply.

The value at plants of total production was $102 million. The average value was 6.36 cents per pound, down only slightly from the 1951 average.

Lower output in the Panhandle region of Texas accounted for most of the decrease in total production.

TABLE 1.—Salient statistics of carbon black produced from natural gas and liquid hydrocarbons in the United States, 1948–52

	1948	1949	1950	1951	1952
THOUSAND POUNDS					
Production:					
Contact process (chiefly channel)	677,133	627,650	616,765	645,881	563,597
Furnace processes	620,596	595,986	765,225	1,031,482	1,040,505
Total	1,297,729	1,223,636	1,381,990	1,677,363	1,604,102
Shipments:					
Domestic sales	932,433	822,166	1,109,071	1,129,645	1,154,274
Exports	321,915	303,244	399,568	433,493	292,908
Total	1,254,348	1,125,410	1,508,639	1,563,138	1,447,182
Losses	250	8	269	534	804
Stocks of producers Dec. 31	118,243	216,461	89,543	203,234	359,350
VALUE					
Production—thousand dollars	76,295	74,685	84,604	107,436	101,988
Average per pound—cents	5.88	6.10	6.12	6.41	6.36

The volume of natural gas used in the production of carbon black declined 14 percent. The average value of gas used was up 0.25 cent per 1,000 cubic feet from 1951. Liquid hydrocarbons consumed decreased 10 percent; but, because of improved yields, more carbon black was produced from liquid hydrocarbons than in 1951.

At the end of 1952, 59 plants were producing carbon black, 1 more than at the end of 1951. Daily capacity of operating plants at the end of 1952 was 9 percent above the previous year.

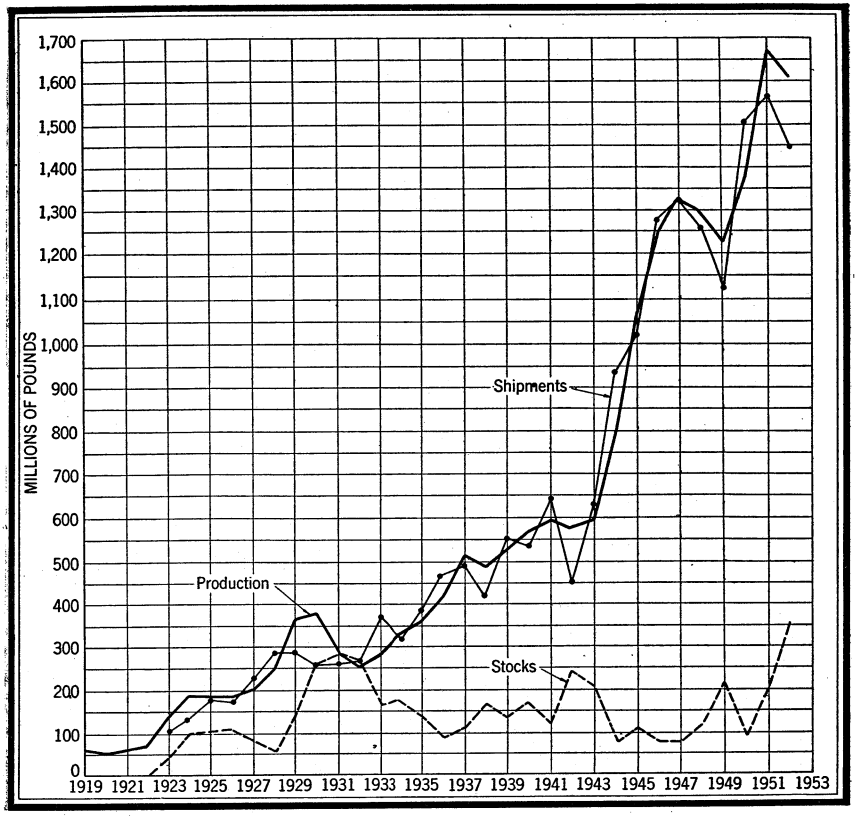

FIGURE 1.—Production, stocks, and shipments of carbon black, 1919–52.

PRODUCTION

By States.—The most significant change in production among the States was the large decline in contact-black production in the Panhandle region of Texas.

By Months.—Production of contact blacks declined steadily throughout the year. The rate of production in December was 81 percent of the January rate; however, it still had not declined to the level of shipments.

Furnace-black production declined during the first 8 months of the year, but increases in the HAF (high-abrasion furnace) production during the last 4 months had brought production back to the January rate.

TABLE 2.—Carbon black produced from natural gas and liquid hydrocarbons in the United States, 1948–52, by State and district, in thousands of pounds

State and district	1948	1949	1950	1951	1952
Louisiana	165,032	160,460	226,177	258,989	255,939
Texas:					
Panhandle district	653,480	625,760	638,159	700,659	613,298
Rest of State	249,904	249,083	310,705	449,287	460,462
Total Texas	903,384	874,843	948,864	1,149,946	1,073,760
Other States	229,313	188,333	206,949	268,428	274,403
Grand total	1,297,729	1,223,636	1,381,990	1,677,363	1,604,102

TABLE 3.—Carbon black produced in the United States in 1952, by State and district, and natural gas and liquid hydrocarbons used in its manufacture

State	Producers reporting [1]	Number of plants	Production					
			Furnace black			Contact black		
			Thousand pounds	Value at plant		Thousand pounds	Value at plant	
				Total (thousand dollars)	Cents per pound		Total (thousand dollars)	Cents per pound
Louisiana	7	10	254,144	13,118	5.16	1,794	334	18.62
Texas:								
Panhandle district	10	22	366,041	21,220	5.80	247,258	19,199	7.76
Rest of State	7	16	269,342	17,411	6.46	191,119	13,926	7.29
Total Texas	12	38	635,383	38,631	6.08	438,377	33,125	7.56
Arkansas	1	1						
California	1	1	150,978	7,189	4.76			
Oklahoma	1	1						
Kansas	3	3						
New Mexico	5	5				123,426	9,591	7.77
Grand total	18	59	1,040,505	58,938	5.66	563,597	43,050	7.64

State	Natural gas used					Liquid hydrocarbons used	
	Million cubic feet	Average yield [2] (pounds per M cubic feet)		Value		Thousand gallons	Average yield (pounds per gallon)
		Furnace	Contact	Total (thousand dollars)	Average (cents per M cu. ft.)		
Louisiana	21,069	8.51	0.64	1,225	5.81	27,608	3.57
Texas:							
Panhandle district	158,241	7.03	1.74	8,887	5.62	76,908	3.32
Rest of State	105,886	6.26	2.10	5,148	4.86	53,037	3.31
Total Texas	264,127	6.66	1.88	14,035	5.31	129,945	3.31
Arkansas							
California	[3] 83,203	7.52		[4] 4,848	[4] 5.83	5,839	3.04
Oklahoma							
Kansas							
New Mexico			1.88				
Grand total	368,399	7.39	1.87	20,108	5.46	163,392	3.35

[1] Detail will not add to totals, because some producers operate in more than one area.
[2] Partly estimated.
[3] Comprises 17,705 million cubic feet used by furnace-plant operations in Arkansas, California, Oklahoma, and Kansas and 65,498 million cubic feet used by contact-plant operations in Kansas and New Mexico.
[4] Comprises 1,613 thousand dollars (9.11 cents per M cu. ft.) of natural gas used in Arkansas, California, Oklahoma, and Kansas for manufacture of furnace black and 3,235 thousand dollars (4.94 cents per M cu. ft.) used in Kansas and New Mexico for manufacture of contact black.

TABLE 4.—Production and shipments of carbon black in the United States in 1952, by months and grades, in thousands of pounds

Month	Furnace						Contact	Total
	SRF [1]	HMF [2]	FEF [3]	HAF [4]	Other	Total		
PRODUCTION								
January	24,347	12,418	19,751	31,498	8,213	96,227	53,263	149,490
February	24,087	11,625	18,231	28,782	7,960	90,685	50,760	141,445
March	25,281	10,932	18,408	31,091	8,377	94,089	53,330	147,419
April	22,340	11,281	16,062	31,259	8,113	89,055	51,005	140,060
May	23,593	9,998	16,099	29,824	7,430	86,944	45,646	132,590
June	22,173	9,084	14,372	25,746	7,965	79,340	47,818	127,158
July	20,366	9,761	13,031	27,829	7,692	78,679	46,943	125,622
August	17,802	10,559	14,362	27,836	7,262	77,821	44,287	122,108
September	18,066	9,954	13,700	31,841	7,416	80,977	42,307	123,284
October	20,278	8,608	14,880	33,236	7,527	84,529	44,117	128,646
November	19,043	8,599	15,545	35,738	7,723	86,648	41,231	127,879
December	21,361	8,643	17,775	38,770	8,962	95,511	42,890	138,401
Total	258,737	121,462	192,216	373,450	94,640	1,040,505	563,597	1,604,102
SHIPMENTS (INCLUDING EXPORTS) [5]								
January	22,303	8,168	15,774	29,980	8,342	84,567	44,645	129,212
February	20,432	9,779	16,177	30,676	8,089	85,153	39,082	124,235
March	21,396	9,263	15,761	30,291	8,505	85,216	40,247	125,463
April	22,101	8,870	16,259	28,891	8,241	84,362	37,396	121,758
May	18,072	7,909	16,665	23,804	7,558	74,008	33,064	107,072
June	17,099	8,268	13,648	25,183	8,092	72,290	34,371	106,661
July	17,792	6,898	14,346	30,192	7,819	77,047	33,830	110,877
August	16,429	6,482	12,833	31,515	7,389	74,648	39,087	113,735
September	19,507	8,795	14,693	29,939	7,544	80,478	37,592	118,070
October	23,023	9,502	18,355	33,342	7,655	91,877	39,125	131,002
November	21,606	9,305	15,133	34,224	7,851	88,119	36,884	125,003
December	22,992	9,862	18,985	37,441	9,092	98,372	35,722	134,094
Total	242,752	103,101	188,629	365,478	96,177	996,137	451,045	1,447,182

[1] Semireinforcing furnace.
[2] High-modulus furnace.
[3] Fast-extrusion furnace.
[4] High-abrasion furnace.
[5] Compiled from reports of the National Gas Products Association and of producing companies not included in the association figures. Figures adjusted to agree with annual reports of individual producers.

By Grades.—Total production of furnace grades was slightly greater in 1952 than in 1951. The production of HAF increased 72 million pounds; production of all other furnace grades declined. Furnace grades represented 65 percent of the total production of carbon black compared with 61 percent in 1951. Contact-black production declined 13 percent in 1952.

Number and Capacity of Plants.—Two contact-type plants were shut down during 1952, reducing the number operating at the end of the year to 33. These two plants were operated by United Carbon Co. at Borger and Sanford, Hutchinson County, Tex. One other contact-type plant, the United Carbon plant at Sunray, Moore County, Tex., was scheduled to shut down early in 1953.

Three new furnace plants started operation in 1952, increasing the number operating at the end of the year to 26. New plants were constructed by Cabot Carbon Co. and United Carbon Co. at Franklin, St. Mary Parish, La., and by Phillips Chemical Co. at Borger, Hutchinson County, Texas.

The total daily capacity of operating plants at the end of 1952 was 5.6 million pounds, 480,000 pounds over 1951. Furnace-plant daily

capacity increased 551,000 pounds to 4.1 million pounds and contact-plant daily capacity declined 71,000 to 1.6 million pounds per day.

Producers.—Two producers—the General Atlas Carbon Co. and the Texas Elf Carbon Co.—merged with the Cabot Carbon Co. in 1952.

TABLE 5.—Natural gas and liquid hydrocarbons used in the manufacture of carbon black in the United States, and average yield, 1948–52

	1948	1949	1950	1951	1952
Natural gas used—million cubic feet	480,646	427,892	410,852	426,423	368,399
Average yield of carbon black per thousand cubic feet—pounds	2.41	2.38	2.57	2.67	2.87
Average value of natural gas used per thousand cubic feet—cents	4.73	4.76	4.79	5.21	5.46
Liquid hydrocarbons used—thousand gallons	44,551	72,387	107,707	182,343	163,392
Average yield of carbon black per gallon—pounds	3.11	2.86	3.02	2.96	3.35
Number of producers reporting	24	20	20	20	18
Number of plants	63	63	53	58	59

TABLE 6.—Number and capacity of carbon-black plants operated in the United States, 1951–52

State or district	County or parish	Number of plants				Total daily capacity (pounds)	
		1951		1952			
		Contact	Furnace	Contact	Furnace	1951	1952
Texas: Panhandle district	Carson	1		1		2,025,900	2,114,500
	Gray	6	1	6	1		
	Hutchinson	6	3	4	4		
	Moore	4	1	4	1		
	Wheeler		1		1		
Total Panhandle district		17	6	15	7	2,025,900	2,114,500
Rest of State	Aransas	1	2	1	2	1,436,300	1,494,700
	Brazoria	1		1			
	Brooks	1		1			
	Ector	1		1			
	Gaines	1		1			
	Harris		2		2		
	Howard		1		1		
	Montgomery		1		1		
	Nueces	1		1			
	Reagan	1		1			
	Terry		1		1		
	Ward	1		1			
	Winkler	1		1			
Total rest of State		9	7	9	7	1,436,300	1,494,700
Total Texas		26	13	24	14	3,462,200	3,609,200
Louisiana	Avoyelles		1		1	778,600	1,050,100
	Calcasieu		1		1		
	Evangeline		1		1		
	Ouachita	1	2	1	2		
	Richland	2		2			
	St. Mary				2		
Total Louisiana		3	5	3	7	778,600	1,050,100
Arkansas	Union		1		1	612,600	628,500
California	Contra Costa		1		1		
Kansas	Grant	1	2	1	2		
Oklahoma	Texas		1		1		
New Mexico	Lea	5		5		309,900	355,300
Total United States		35	23	33	26	5,163,300	5,643,100

Methods and Yields.—The average yield of contact black from natural gas continued to increase slowly, rising from 1.79 pounds per thousand cubic feet in 1951 to 1.87 pounds in 1952. The average yield of furnace blacks from natural gas declined in 1952, while the yield from liquid hydrocarbons increased. Furnace yields cannot be determined accurately, since both gas and oil are sometimes used as feed stock in a single plant.

The quantity of gas used in 1952 to produce furnace blacks totaled 67 billion cubic feet, slightly more than in 1951. The quantity of liquid hydrocarbon used decreased in 1952, but the larger yields resulted in a greater production of carbon black from this source than in 1951. Nineteen plants used liquid hydrocarbon fuel in 1952 compared with 15 in 1951.

CONSUMPTION AND USES

Domestic sales of carbon black in 1952, as in 1951, rose only slightly, increasing 25 million pounds to 1.2 billion pounds. The shift toward furnace blacks continued in 1952. Sales of furnace blacks, 75 percent of domestic deliveries, increased 47 million pounds; sales of contact blacks decreased 22 million pounds.

Sales of both contact and furnace blacks declined during the summer months of 1952. Furnace-black sales recovered in the last quarter and by the end of the year were at a new high. Contact-black sales recovered partly but ended the year near the summer low.

The consumption of new rubber in the United States in 1952 increased 4 percent to 1.3 million long tons. Sixty-four percent of this rubber was synthetic compared with 63 percent in 1951. Sales of carbon black for rubber production did not increase correspondingly, rising only 1 percent. Average loading of virgin rubber dropped from 843 pounds per ton in 1951 to 828 pounds per ton in 1952.

Sales of carbon black for ink and paint declined 3 and 7 percent, respectively. The quantity sold for miscellaneous uses was increased sharply by sales of carbon black for carburizing.

TABLE 7.—Sales of carbon black for domestic consumption in the United States, 1948–52, by uses, in thousands of pounds

Use	1948	1949	1950	1951	1952
Rubber	870,564	767,131	1,030,368	1,061,229	1,074,545
Ink	32,436	32,054	50,903	45,496	44,116
Paint	6,799	7,005	11,139	11,366	10,628
Miscellaneous	22,634	15,976	16,661	11,554	24,985
Total	932,433	822,166	1,109,071	1,129,645	1,154,274

STOCKS

At the end of 1952 producers' stocks of carbon black were at an all-time high of 359 million pounds, a 39-day supply of furnace blacks and 204-day supply of contact black. Stocks of contact blacks increased throughout the year but at a diminishing rate. Furnace-black stocks increased through August but declined the rest of the year.

TABLE 8.—Producers' stocks of contact- and furnace-type blacks in the United States, Dec. 31, 1948–52, in thousands of pounds

Year	Furnace						Contact	Total
	SRF [1]	HMF [1]	FEF [1]	HAF [1]	Other	Total		
1948	(2)	(2)	(2)	(2)	(2)	90,597	27,646	118,243
1949	(2)	(2)	(2)	(2)	(2)	96,862	119,599	216,461
1950	5,275	[3] 6,276	[3] 3,381	7,831	1,438	24,201	65,342	89,543
1951	15,340	15,119	19,729	23,642	6,105	79,935	123,299	203,234
1952	31,220	33,375	23,211	31,509	4,464	123,779	235,571	359,350

[1] For explanation, see table 4.
[2] Data not available.
[3] Adjusted figures (reclassification of grade).

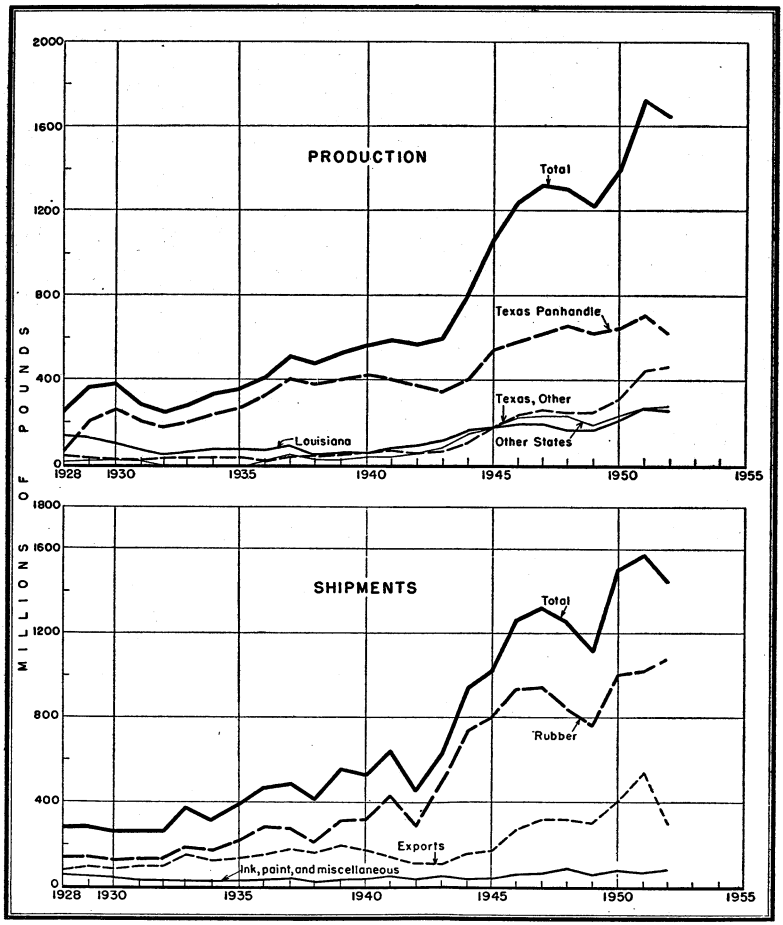

FIGURE 2.—Production and shipments of carbon black, 1928–52. (Production in "Texas, other" includes Oklahoma and Wyoming in 1932–35.)

VALUE

The reported average value at plants for furnace blacks increased 0.1 cent per pound to 5.66 cents in 1952 and for contact blacks decreased 0.1 cent per pound to 7.64 cents. The market prices as reported in the Oil, Paint and Drug Reporter remained unchanged throughout the year.

The average value of natural gas consumed in the production of carbon black was 5.46 cents per thousand cubic feet in 1952 compared with 5.21 cents in 1951. The increase would have been greater had not consumption decreased sharply in the Texas Panhandle region, where the value of gas was above average.

The average value of liquid hydrocarbons consumed was 8.15 cents per gallon.

TABLE 9.—Prices of carbon black in carlots, f. o. b. plant, 1948–52, in cents per pound

[Oil, Paint and Drug Reporter]

Date of change	Channel blacks		Furnace blacks			
	Ordinary rubber grades [1]		Semireinforcing grades (SRF)	High-Modulus grades (HMF)	Fine grades (FF)	High-Abrasion grades (HAF)
	Bags	Bulk	Bags	Bags	Bags	Bags
Jan. 1, 1948	6.82	6.50	3.50	5.00	6.50	[2]
Apr. 1, 1948	7.32	7.00	3.50	5.00	7.32	[2]
Jan. 7, 1949	7.40	7.00	3.50	5.00	7.40	[2]
July 1, 1949	6.90	6.50	3.50	5.00	7.40	[2]
Oct. 1, 1950	7.40	7.00	4.00	5.50	8.00	[2]
Jan. 5, 1951	7.40	7.00	4.00	5.50	[2]	7.90
Jan. 1, 1952	[3]	[3]	[3]	[3]	----------	[3]

[1] Chiefly Easy-Processing (EPC) and Medium-Processing (MPC) but also includes Hard-Processing (HPC) and Conductive (CC) channel blacks.
[2] No quotation.
[3] No change during 1952.

FOREIGN TRADE [1]

Imports.—Imports of acetylene black from Canada dropped from 9.4 million pounds in 1951 to 6.8 million pounds in 1952. Average value increased from 13.3 to 15.2 cents per pound. Forty-four pounds of acetylene black was imported from Switzerland.

Imports of other carbon blacks totaled 2,033,815 pounds, of which 2,025,630 pounds came from Canada and the remainder from the United Kingdom, West Germany, and Switzerland. In 1951 imports from Canada were only 123,000 pounds.

Exports.—Exports of carbon black declined 32 percent in 1952 to 293 million pounds. Exports of furnace blacks decreased much less than contact exports. The decline in exports was largely attributable to the loss of the United Kingdom market, which it now supplies from its own production. Exports to the United Kingdom dropped 90 million pounds to 11 million pounds in 1952. Exports to Australia, New Zealand, Mexico, Belgium, France, Italy, and the Union of South Africa also declined sharply. Canada and France are now the largest remaining export customers for carbon black. A plant to be built in Canada will no doubt sharply diminish the Canadian market.

[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 10.—Carbon black exported from the United States, 1950–52, by country of destination

[U. S. Department of Commerce]

Country	1950		1951		1952	
	Pounds	Value	Pounds	Value	Pounds	Value
Argentina	14, 253, 880	$1, 324, 106	10, 732, 454	$1, 086, 974	11, 023, 425	$1, 201, 677
Australia	24, 454, 785	2, 094, 740	27, 138, 625	2, 406, 309	16, 474, 688	1, 445, 274
Austria	4, 361, 092	376, 838	3, 618, 325	320, 827	1, 689, 050	159, 060
Belgium-Luxembourg	8, 283, 850	775, 845	10, 442, 505	987, 369	5, 881, 225	534, 211
Brazil	21, 978, 247	1, 868, 528	20, 571, 152	1, 840, 779	22, 272, 045	1, 920, 305
Canada	56, 206, 788	3, 560, 771	55, 542, 233	3, 970, 651	56, 943, 203	4, 228, 904
Chile	1, 249, 451	108, 847	1, 557, 450	146, 645	1, 960, 563	181, 871
China	224, 650	29. 650				
Colombia	3, 652, 435	314, 577	2, 339. 787	225, 886	2, 574, 573	252. 207
Cuba	1, 138, 950	89, 126	1, 494, 550	129, 828	815, 640	69, 247
Denmark	1, 190, 050	121, 700	1, 489, 500	147, 159	864, 438	82, 534
Finland	972, 225	82, 636	1, 823, 695	161, 690	832, 675	71, 881
France	52, 392, 925	4, 646, 839	73. 872, 100	6, 842, 454	54, 660, 731	4, 941, 352
Germany	778, 725	76, 616	2, 366, 424	289, 300	2, 259, 442	263, 504
Greece	177, 300	16, 677	120, 162	12, 695	264, 700	25, 926
Hong Kong	433, 151	53, 896				
India	11, 242, 092	966, 132	11, 959, 978	1, 050, 505	12, 143, 610	1, 130, 001
Indonesia	3, 463, 300	311, 076	2, 292, 550	211, 454	3, 714, 700	385, 701
Ireland	1, 250, 965	120, 918	1, 600, 800	165, 591	541, 900	57, 636
Israel	114, 525	12, 159	784, 825	69, 490	224, 393	19, 574
Italy	20, 233, 380	1, 860, 757	27, 477, 119	2, 575, 628	17, 979, 051	1, 658, 896
Japan	1, 812, 238	214, 623	7, 933, 391	814, 268	7, 497, 351	739, 143
Malaya	794, 023	72, 798	964, 300	97, 494	885, 200	87, 600
Mexico	10, 364, 674	708, 968	12, 904, 038	934, 746	8, 850, 544	623, 732
Netherlands	3, 457, 857	319, 416	3, 193, 613	371, 657	2, 509, 206	232, 025
New Zealand	4, 209. 025	358, 859	5, 224, 225	457, 426	704, 500	65, 018
Norway	1, 743, 425	148, 963	1, 907, 418	162, 654	1, 214, 450	111, 360
Pakistan	145, 750	14, 923	132, 650	15, 411	401, 350	41, 305
Peru	812, 160	71, 578	1, 555, 780	139. 895	1, 380, 500	123, 800
Portugal	1, 354, 650	126, 257	1, 724, 185	167, 433	899, 225	77, 685
Spain	1, 989, 600	173, 583	3, 235. 730	294, 788	4, 981, 995	445, 819
Sweden	11, 884, 949	1, 013, 592	9, 440, 615	896, 672	15, 733, 714	1, 422, 399
Switzerland	3, 033, 160	295, 868	4, 547, 166	434, 847	4, 685, 673	463, 673
Taiwan	30, 000	2, 906	189, 550	19, 316	312, 000	36, 846
Trieste	192, 500	15, 365	900	225	180, 000	10, 620
Turkey	925, 700	70, 873	493, 350	39, 787	1, 297, 200	98, 250
Union of South Africa	16, 723, 450	1, 455, 811	18, 203, 460	1, 646, 436	14, 130, 625	1, 310, 207
United Kingdom	107, 141, 888	9, 531, 569	100, 928, 382	9, 665, 076	11, 121, 664	1, 274, 392
Uruguay	961, 835	87, 679	1, 146, 325	119, 417	701, 600	74, 415
Venezuela	2, 007, 951	192, 330	654, 196	58, 306	1, 269, 650	115, 306
Yugoslavia	1, 499. 350	142, 377	1, 225, 200	115, 236	112, 275	12, 119
Other countries	430, 550	47, 859	664, 580	62, 392	919, 702	103, 657
Tota	399, 567, 501	33, 878, 631	433, 493, 288	39, 154, 716	292, 908, 476	26, 099, 632

TABLE 11.—Carbon black exported from the United States in 1952, by months, in thousands of pounds

[U. S. Department of Commerce]

Month	Contact	Furnace	Total	Month	Contact	Furnace	Total
January	19, 585	10, 706	30, 291	August	19, 652	12, 210	31, 862
February	12, 316	9, 993	22, 309	September	14, 476	8, 475	22, 951
March	19, 033	12, 655	31, 688	October	11, 046	12, 413	23, 459
April	13, 248	9, 909	23, 157	November	12, 024	10, 482	22, 506
May	13, 200	9, 111	22, 311	December	10, 158	13, 819	23, 977
June	9, 444	8, 323	17, 767				
July	13, 195	7, 435	20, 630	Total	167, 377	125, 531	292, 908

WORLD PRODUCTION

Production of carbon black in the United Kingdom in 1952 totaled 70 million pounds; by the end of the year the rate of production had increased to 90 million pounds per year. Japan produced 10 million pounds of carbon black in 1952, the same as in 1951. At the end of 1952, however, Japan was producing at the rate of 17 million pounds per year.

Natural Gas

By D. S. Colby, H. J. Barton, and B. E. Oppegard

GENERAL SUMMARY

MARKETED production [1] of natural gas in the United States increased 7 percent in 1952, a smaller gain than was recorded in each of the two preceding years. Total consumption of fuels, including natural gas, was diminished by strikes in the oil and steel industries in the first half of the year. The replacement of manufactured by natural gas as measured by the decline in manufactured-gas output, was more rapid in 1952 than in any previous year. The decline in manufactured-gas output was equivalent in heating value to approximately 40 billion cubic feet of natural gas. Additions to underground storage were higher than for any previous year, but here, too, the rate of growth had slackened.

Residential and commercial consumption of natural gas increased 10 and 11 percent, respectively. The use of gas for the production of carbon black declined, as the output of contact blacks was reduced; use of natural gas as fuel at petroleum refineries remained virtually unchanged, and other industrial use increased 12 percent.

Interstate shipments increased over 500 billion cubic feet, approximating the increase in marketed production.

Price rises were general throughout most States, both for gas at the wellhead and at point of consumption.

TABLE 1.—Salient statistics of natural gas in the United States, 1948–52

	1948	1949	1950	1951	1952
MILLION CUBIC FEET					
Supply:					
Marketed production [1]	5,148,020	5,419,736	6,282,060	7,457,359	8,013,457
Withdrawn from storage	79,035	106,368	175,260	209,428	221,909
Imports					7,807
Total supply	5,227,055	5,526,104	6,457,320	7,666,787	8,243,173
Disposition:					
Consumption	4,945,149	5,195,484	6,026,404	7,102,562	7,613,478
Exports	18,704	20,054	25,727	24,163	27,456
Stored	136,406	172,051	229,752	347,690	398,593
Lost in transmission, etc	126,796	138,515	175,437	192,372	203,646
Total disposition	5,227,055	5,526,104	6,457,320	7,666,787	8,243,173
VALUE					
Production (at wells)...thousand dollars	333,173	344,034	408,521	542,964	623,649
Average per M cubic feet...cents	6.5	6.3	6.5	7.3	7.8

GOVERNMENT REGULATIONS

Several gas-industry problems were under consideration by the United States courts at the end of 1952, and final decisions would not be reached on some until they had been heard by the United States Supreme Court. Two such cases were the determination of whether Phillips Petroleum Co.[2] was a natural-gas company and subject to

[1] Comprises gas sold or consumed by producers, including losses in transmission, amounts added to storage, and increases in gas in pipelines.

[2] Federal Power Commission Docket 1148, Opinion 217. See Minerals Yearbook 1951.

Federal Power Commission jurisdiction and determination of the constitutionality of the natural-gas-gathering tax [3] imposed by Texas.

The decision of the Federal Power Commission in 1950 to divide the New England market between Algonquin Gas Transmission Co. and Northeastern Gas Transmission Co. was still being contested by Northeastern. The controversy was referred back to the Federal Power Commission by refusal of the Supreme Court to review the litigation. The rising field prices of natural gas and higher transmission and distribution operating expenses kept pressure on regulatory bodies for rate adjustments. The Federal Power Commission handled more applications for rate increases in 1952 than in any year since its creation.

RESERVES

The American Gas Association Committee on Natural-Gas Reserves estimated proved recoverable reserves to be 199,716 billion cubic feet on December 31, 1952. The increase of 5,905 billion cubic feet over the previous year was smaller than the gain recorded for the five preceding years.

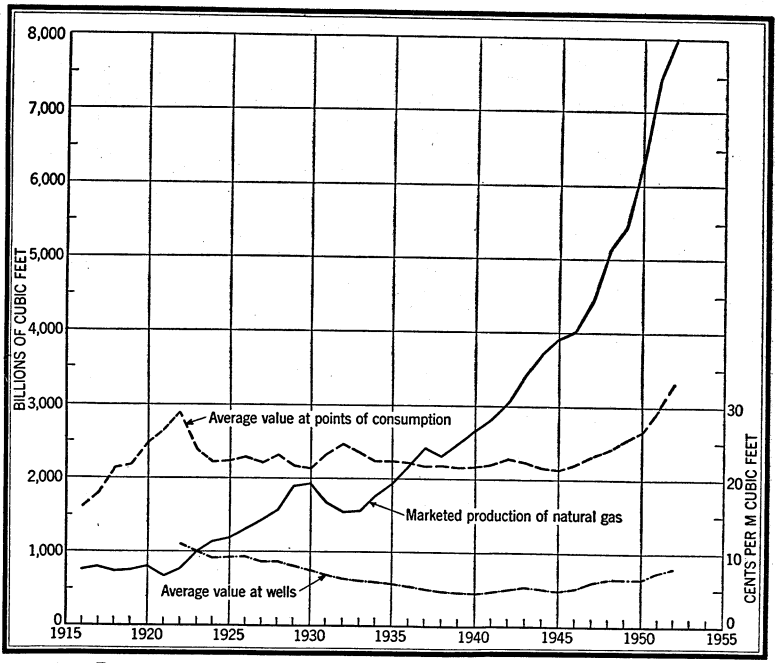

FIGURE 1.—Production and average value of natural gas in the United States, 1916–52.

Additions to reserves through extensions and revisions were small compared with previous years, totaling 8,934 billion cubic feet. The estimated ultimate recovery of oil and gas from the Spraberry region in Texas was revised downward. Additions made through discoveries of new fields and new pools totaled 5,411 billion cubic feet, the highest for any year since the committee was organized.

[3] General and Special Laws of Texas, 52d Legislative Regular Session, 1951, House Bill 285, sec. 23. See Minerals Yearbook 1951.

TABLE 2.—Estimated proved recoverable reserves of natural gas in the United States, 1951–52, in million cubic feet [1]

[Committee on Natural-Gas Reserves, American Gas Association]

State	Reserves [2] as of Dec. 31, 1951	Changes in reserves during 1952			
		Extensions and revisions [2]	Discoveries of new fields and new pools in old fields [2]	Net change in underground storage [3]	Net production [4]
Arkansas	931,314	91,070	3,020	630	41,452
California [5]	9,482,445	269,427	65,938	−1,925	475,863
Colorado	1,138,451	31,851	42,181	----------	48,234
Illinois	227,133	14,750	1,768	----------	32,000
Indiana	30,807	9,990	1,472	1,790	7,345
Kansas	13,457,498	1,167,567	21,912	1,110	454,522
Kentucky	1,325,588	46,696	11,360	2,379	72,500
Louisiana [5]	29,005,031	2,176,296	1,549,159	----------	1,269,872
Michigan	213,025	3,296	18,612	40,498	10,888
Mississippi	2,439,969	21,771	118,224	417	216,321
Montana	828,107	12,885	17,236	2,051	32,676
Nebraska	95,810	1,264	3,964	----------	7,080
New Mexico	11,589,979	2,669,335	217,160	4,458	442,043
New York	66,793	200	----------	5,047	3,400
Ohio	689,135	32,607	8,275	33,966	32,500
Oklahoma	11,894,337	547,606	199,997	13,781	899,892
Pennsylvania	619,455	36,595	91,950	56,385	94,800
Texas [5]	105,653,229	1,459,565	2,950,264	13	4,330,308
Utah	95,845	188,045	2,802	----------	3,280
West Virginia	1,671,499	108,315	23,400	26,256	169,400
Wyoming	2,340,298	35,660	21,379	11,994	88,207
Other States [6]	115,752	9,679	49,970	----------	6,055
Total	193,811,500	8,934,470	5,411,043	198,850	8,639,638

State	Reserves as of Dec. 31, 1952 [2]				
	Nonassociated [7]	Associated [8]	Dissolved [9]	Underground storage [10]	Total
Arkansas	528,029	138,462	315,465	2,626	984,582
California [5]	2,516,241	2,156,918	4,653,946	12,917	9,340,022
Colorado	524,113	39,286	600,850	----------	1,164,249
Illinois	4,251	5,000	202,400	----------	211,651
Indiana	3,552	3,100	27,225	2,837	36,714
Kansas	13,707,255	132,627	320,946	32,737	14,193,565
Kentucky	1,240,879	----------	59,080	13,564	1,313,523
Louisiana [5]	25,000,197	4,185,548	2,265,869	----------	31,451,614
Michigan	132,752	----------	38,645	83,146	254,543
Mississippi	1,700,671	401,453	261,479	457	2,364,060
Montana	697,705	36,593	83,691	9,614	827,603
Nebraksa	64,895	7,701	21,362	----------	93,958
New Mexico	10,653,682	2,155,593	1,209,904	19,710	14,038,889
New York	47,502	----------	468	20,670	68,640
Ohio	561,537	----------	31,470	138,476	731,483
Oklahoma	7,273,114	951,250	3,491,935	48,530	11,764,829
Pennsylvania	515,866	----------	36,470	157,249	709,585
Texas [5]	69,209,845	20,462,637	16,058,448	1,833	105,732,763
Utah	265,105	----------	18,307	----------	283,412
West Virginia	1,470,546	----------	73,285	116,239	1,660,070
Wyoming	1,455,746	350,249	502,443	12,686	2,321,124
Other States [6]	66,682	----------	102,664	----------	169,346
Total	137,640,165	31,026,417	30,376,352	673,291	199,716,225

[1] Volumes are reported at a pressure base of 14.65 pounds per square inch absolute and at a standard temperature of 60° F.

[2] Excludes gas loss due to recovery of natural-gas liquids.

[3] The net difference between gas stored in and gas withdrawn from underground storage reservoirs inclusive of adjustments.

[4] Net production equals gross withdrawals less gas injected into underground reservoirs; changes in underground storage and gas loss due to recovery of natural-gas liquids are excluded. December production partly estimated.

[5] Includes offshore reserves.

[6] Includes Alabama, Florida, Maryland, Missouri, North Dakota, and Virginia.

[7] Nonassociated gas is free gas not in contact with crude oil in the reservoir.

[8] Associated gas is free gas in contact with crude oil in the reservoir.

[9] Dissolved gas is gas in solution with crude oil in the reservoir.

[10] Net gas placed in underground reservoirs for storage purposes only.

TABLE 3.—Gross withdrawals and disposition of natural gas in the United States, 1951–52, by States, in million cubic feet

State	Gross withdrawals [1]			Disposition		
	From gas wells	From oil wells	Total	Marketed production [2]	Repressuring	Vented and wasted [3]
1951						
Arkansas	37,060	30,050	67,110	44,656	18,911	3,543
California	200,200	611,800	812,000	566,751	239,955	5,294
Colorado	10,400	16,600	27,000	14,128	1,866	11,006
Illinois	500	43,300	43,800	11,425	1,394	30,981
Indiana	200	6,400	6,600	845	70	5,685
Kansas	379,500	80,700	460,200	417,538	1,401	41,261
Kentucky	73,100	5,000	78,100	76,097		2,003
Louisiana	1,088,900	302,700	1,391,600	1,054,199	202,383	135,018
Maryland	3,422		3,422	3,422		
Michigan	10,000	5,300	15,300	11,194	672	3,434
Mississippi	175,500	83,400	258,900	158,845	41,718	58,337
Montana	34,000	3,100	37,100	36,424	384	292
Nebraska	3,100	900	4,000	3,895		105
New Mexico	120,600	208,500	329,100	300,169	5,105	23,826
New York	3,100	150	3,250	3,214		36
Ohio	40,000	1,500	41,500	38,879	12	2,609
Oklahoma	420,000	338,000	758,000	538,756	57,119	162,125
Pennsylvania	126,000	3,100	129,100	128,715	260	125
Texas	3,518,500	1,411,600	4,930,100	3,781,136	856,930	292,034
Utah	3,690	160	3,850	3,733		117
West Virginia	188,000	5,000	193,000	191,146	373	1,481
Wyoming	45,000	50,600	95,600	71,508	10,274	13,818
Other States [4]	680	60	740	684		56
Total	6,481,452	3,207,920	9,689,372	7,457,359	1,438,827	793,186
1952						
Arkansas	40,400	27,200	67,600	42,325	22,070	3,205
California	170,000	600,300	770,300	517,450	244,450	8,400
Colorado	29,200	22,100	51,300	34,260	2,225	14,815
Illinois	900	35,000	35,900	10,183	2,369	23,348
Indiana	150	7,200	7,350	836	48	6,466
Kansas	382,000	80,300	462,300	412,544	1,197	48,559
Kentucky	70,000	4,800	74,800	73,427		1,373
Louisiana	1,185,900	339,000	1,524,900	1,237,143	201,405	86,352
Maryland	2,372		2,372	2,372		
Michigan	6,600	5,000	11,600	9,052	708	1,840
Mississippi	184,200	81,500	265,700	174,100	47,605	43,995
Montana	25,900	3,400	29,300	28,714	376	210
Nebraska	4,400	1,600	6,000	5,568	48	384
New Mexico	170,700	242,000	412,700	359,377	9,005	44,318
New York	3,300	370	3,670	3,627		43
North Dakota	320	1,450	1,770	369		1,401
Ohio	30,900	1,700	32,600	30,993	33	1,574
Oklahoma	420,000	404,100	824,100	554,033	80,109	189,958
Pennsylvania	106,400	3,000	109,400	108,684	234	482
Texas	3,779,100	1,507,700	5,286,800	4,147,805	784,892	354,103
Utah	2,870	420	3,290	3,006		284
Virginia	1,133		1,133	1,133		
West Virginia	178,500	4,700	183,200	180,995	724	1,481
Wyoming	43,800	60,500	104,300	75,313	13,003	15,984
Other States [5]	132	49	181	148		33
Total	6,839,177	3,433,389	10,272,566	8,013,457	1,410,501	848,608

[1] Marketed production plus quantities used in repressuring, vented, and wasted.
[2] Gas sold or consumed by producers (*see* table 1, footnote 1).
[3] Includes gas (mostly residue) blown to the air, but does not include direct waste on producing properties, except where data are available.
[4] Alabama, Florida, Missouri, North Dakota, South Dakota, Tennessee, and Virginia.
[5] Alabama, Florida, Missouri, South Dakota, and Tennessee.

PRODUCTION

GROSS WITHDRAWAL

The gross withdrawal of natural gas increased 6 percent in 1952 to 10,273 billion cubic feet, with gas from gas wells accounting for 67 percent of the total.

The quantity of gas repressured in Texas declined for the second successive year and was enough to cause a decline in the United States

total. The quantity repressured in Oklahoma increased again in 1952 as cycling-plant operations were expanded.

The estimated quantity of gas vented in Texas increased mainly because production of oil-well gas in west Texas expanded more rapidly than treating and transmission facilities. In Louisiana the quantity vented declined sharply.

STORAGE

Underground storage of natural gas continued to increase but at a slower rate than in past years because construction of new underground storage projects had been curtailed in 1951 owing to shortage of pipe for new facilities. By December 31, 1952, however, 17 underground storage projects were under construction, compared with 8 on December 31, 1951.

Of the States with large storage capacity, West Virginia, Kansas, and New York had substantially no changes in additions to or withdrawals from storage, whereas in Pennsylvania, Ohio, New Mexico, Oklahoma, and Wyoming increased quantities of gas were put into underground storage.

The Committee on Underground Storage of the American Gas Association reported that 151 storage pools were in operation in 1952, compared with 142 in 1951.

TABLE 4.—Natural gas stored underground in and withdrawn from storage fields, 1951–52, by State of location, in million cubic feet

State	1951			1952		
	Total stored	Total withdrawn	Net stored	Total stored	Total withdrawn	Net stored
Arkansas	817	644	173	711	462	249
California	12,571	17,524	−4,953	16,286	16,949	−663
Illinois	1,606	445	1,161	588	749	−161
Indiana	796	508	288	2,339	333	2,006
Kansas	15,481	15,528	−47	16,182	15,449	733
Kentucky	6,659	6,324	335	8,894	6,091	2,803
Michigan	54,409	34,755	19,654	59,971	32,960	27,011
Mississippi	40		40	148	7	141
Montana	3,479	538	2,941	2,563	578	1,985
New Mexico	2,668	4,823	−2,155	7,751	2,155	5,596
New York	10,311	5,577	4,734	10,696	5,525	5,171
Ohio	63,117	34,663	28,454	68,585	34,694	33,891
Oklahoma	17,836	7,308	10,528	22,822	9,061	13,761
Pennsylvania	72,620	29,797	42,823	91,290	37,264	54,026
Texas	2,544	1,548	996	1,733	2,291	−558
West Virginia	81,312	47,726	33,586	82,755	56,407	26,348
Wyoming	1,424	1,720	−296	5,279	934	4,345
Total	347,690	209,428	138,262	398,593	221,909	176,684

MARKETED PRODUCTION [4]

The marketed production of natural gas in 1952 was 8,013 billion cubic feet, a 7-percent increase over 1951, but a smaller increase than that reported for either of the 2 previous years. Natural gas represented 22 percent of the total supply of mineral fuels and water power in 1952, an increase over the previous year. The strikes in the oil and steel industries, which did not affect consumption of gas as severely as that of coal and oil, were largely responsible for the relative increase in use of gas.

[4] See footnote 1, table 5.

Texas, Louisiana, and New Mexico continued to expand production as they had steadily for a number of years, and these States also recorded the largest gains for the year.

Virginia production increased as a result of construction of a pipeline connection to wells in Buchanan County, and Colorado production increased as a result of completion of pipeline outlets for gas from the San Juan Basin. Production in Kansas declined for the first time since 1945, and in Michigan and Ohio continued the downward trend of recent years.

TABLE 5.—Marketed production of natural gas in the United States, 1948–52, by States [1]

State	Quantity (million cubic feet)					Estimated value at wells (thousand dollars)	
	1948	1949	1950	1951	1952	1951	1952
Alabama			2	1	4	(2)	(2)
Arkansas	53, 946	47, 788	48, 047	44, 656	42, 325	1, 786	1, 735
California	570, 954	550, 903	558, 398	566, 751	517, 450	82, 745	86, 414
Colorado	8, 967	8, 490	11, 168	14, 128	34, 260	608	1, 884
Florida	27	39	8	10	15	1	1
Illinois	14, 062	12, 391	13, 285	11, 425	10, 183	1, 748	1, 650
Indiana	553	334	956	845	836	83	79
Kansas	245, 189	294, 078	364, 024	417, 538	412, 544	33, 821	34, 241
Kentucky	70, 095	51, 851	73, 316	76, 097	73, 427	16, 513	15, 934
Louisiana	686, 061	732, 845	831, 771	1, 054, 199	1, 237, 143	61, 143	82, 889
Maryland			373	3, 422	2, 372	684	460
Michigan	14, 981	14, 753	11, 250	11, 194	9, 052	1, 657	1, 322
Mississippi	59, 899	68, 062	114, 153	158, 845	174, 100	10, 007	10, 620
Missouri	27	24	21	14	16	2	3
Montana	36, 551	35, 291	39, 186	36, 424	28, 714	2, 003	1, 752
Nebraska			17	3, 895	5, 568	499	740
New Mexico	194, 749	204, 961	212, 909	300, 169	359, 377	11, 406	16, 414
New York	4, 705	3, 693	3, 336	3, 214	3, 627	807	1, 059
North Dakota	643	533	608	456	369	24	23
Ohio	65, 619	46, 512	43, 163	38, 879	30, 993	7, 854	6, 725
Oklahoma	480, 573	435, 262	482, 360	538, 756	554, 033	28, 554	29, 918
Pennsylvania	87, 578	84, 739	91, 137	128, 715	108, 684	35, 654	30, 758
South Dakota	2	1		7	6	(2)	(2)
Tennessee	127	83	132	132	107	12	11
Texas	2, 289, 923	2, 588, 921	3, 126, 402	3, 781, 136	4, 147, 805	204, 181	257, 164
Utah	6, 610	6, 126	3, 950	3, 733	3, 006	246	225
Virginia	74	65	46	64	1, 133	10	279
West Virginia	203, 681	181, 176	189, 980	191. 146	180, 995	35, 553	35, 475
Wyoming	52, 424	50, 815	62, 062	71, 508	75, 313	5, 363	5, 874
Total	5, 148, 020	5, 419, 736	6, 282, 060	7, 457, 359	8, 013, 457	542, 964	623, 649

[1] Comprises gas either sold or consumed by producers, including losses in transmission, amounts added to storage, and increases in gas in pipelines.
[2] Less than $500.

NUMBER OF WELLS

The number of gas wells drilled increased again in 1952, totaling 3,255. Substantial increases were reported for Kentucky, Louisiana, Oklahoma, and Texas. The number drilled in New Mexico continued to increase sharply as development of the San Juan Basin proceeded. Drilling in Kansas and Ohio again declined slowly. Producing wells in the Appalachian States continued to decline as abandonments exceeded the number of new wells drilled. At the end of 1952, the number of producing gas wells in the United States totaled 65,450, an increase of 350 for the year.

TABLE 6.—Gas wells in the United States, 1951–52, by States

State	Producing Dec. 31, 1951	Drilled during 1951 [1]	Producing Dec. 31, 1952	Drilled during 1952 [1]
Arkansas	190	10	200	7
California	360	40	380	43
Colorado	35	12	40	29
Illinois	50	10	40	18
Indiana	650	18	600	18
Kansas	4,000	376	4,270	316
Kentucky	3,570	155	3,800	227
Louisiana	2,690	176	2,900	206
Michigan	400	20	380	30
Mississippi	190	9	220	4
Missouri	[2] 30	2	[2] 20	6
Nebraska		13		10
Montana	830	8	920	18
New Mexico	570	254	920	319
New York	1,380	----	1,360	----
Ohio	6,300	226	6,000	219
Oklahoma	3,600	265	3,700	295
Pennsylvania	17,700	239	16,700	220
Tennessee	20	2	20	----
Texas	8,300	726	9,200	778
West Virginia	14,000	419	13,500	443
Wyoming	165	21	180	16
Alabama, Maryland, North Dakota, South Dakota, Utah and Virginia	70	29	100	33
Total	65,100	3,030	65,450	3,255

[1] From Oil and Gas Jour.
[2] Combined to avoid disclosure of individual company operations.

DEVELOPMENT AND PRODUCTION BY STATES [5]

Arkansas.—J. W. Sanders, chief engineer, Arkansas Oil and Gas Commission, reported that gas produced from the dry-gas fields in northwest Arkansas totaled 10.4 billion cubic feet in 1952 and 8.2 billion in 1951. Gas production from the oil and condensate wells in south Arkansas declined slightly in 1952. Marketed production of all natural gas in 1952 was 42.3 billion cubic feet, compared with 44.7 billion in 1951.

Nine wildcat wells drilled in northwest Arkansas resulted in the discovery of two new gasfields, the Linville field in Johnson County, producing from the Atoka formation, and the Ozan field, producing from the Hale formation. Fifteen development wells were drilled, of which 10 were productive gas wells. Both wildcat and development drilling in this region increased to almost twice the 1951 rate.

California.—R. D. Bush, State oil and gas supervisor, reported that no new gasfields of major importance were discovered in 1952. A possible new gasfield was discovered in San Benito County, 2 miles northwest of Hollister. A new gas-producing area was discovered 10 miles south of the city of Sacramento, but subsequent drilling indicated the producing area to be comparatively small.

The limits of the Eureka gasfield were extended 1 mile to the east by the addition of 3 new wells. Minor extensions of field limits were also made in the Maine Prairie, Marysville Buttes, Rio Vista, and Willows fields, all in the central and northern areas of the State.

The quantity of out-of-State gas distributed by gas companies in California continued to increase, rising from 41 percent of the total distributed in 1951 to 50 percent in 1952.

[5] Based on latest available trade publications and reports from Federal and State agencies.

Colorado.—J. R. Schwabrow, Federal Geological Survey, reported that about 22 gas wells were completed in 1952 with a total initial open flow of 106 million cubic feet per day. New field discoveries were made at Akron, Washington County; Chappel, Sedgwick County; Dale, Frenchman Creek, and northwest Peetz, Logan County; a noncommercial discovery at McClave, Kiowa County; and at south Redmesa, La Plata County. South Redmesa field may be found to tie into the Blanco field of New Mexico.

Asbury Creek field in Mesa County was the only field to obtain a pipeline connection in 1952.

The State Oil and Gas Conservation Commission issued an order, effective in June 1952, designed to reduce gas waste in the Rangely field. At the end of the year producers, fearing curtailed oil production, were still contesting this ruling in the courts.

Illinois.—A. H. Bell and L. L. Whiting, Illinois State Geological Survey, reported that 17 new tests and 1 reworked oil well were completed in the State in 1952, with a combined daily open-flow capacity of 30.1 million cubic feet. Ten of them, 6 in the Louden and 3 in the Herald fields, and the discovery well of the Harrisburg gas pool in Saline County, were utilized, and the others were shut in or abandoned for lack of market.

Production of dry gas from 8 wells in the Cottonwood, Harrisburg, and Herald pools, amounting to slightly over 210 million cubic feet, was marketed for use outside the producing areas.

Kansas.—Edwin D. Goebel, geologist, Kansas State Geological Survey, reported that 9 new gas pools were discovered in Kansas during 1952, including the Hawks pool, producing from Morrowan rocks in Seward County, which, although discovered in 1951, was not officially named until 1952. Most of these new pools were located in the southwestern counties of Kansas, and all new production in that area was reported from Morrowan strata. Meade County had 2 discoveries, the Fringer and Stevens pools; Clark County had 1 new gas pool, the Snake Creek; and Seward County added the Liberal-White pool.

The other new gas pools were the Heizer Southwest, producing from the Pennsylvania basal conglomerate in Barton County; the Barnes, producing from the Simpson group; and the Blowout, producing from the Lansing-Kansas City group, in Pratt County; the Farmington West, producing from Pennsylvanian sand; and the Hill, producing from the Lansing-Kansas City group in Stafford County.

The addition of 272 new Permian gas wells in the Hugoton Gas Area increased its estimated size to 2.4 million acres. Production of gas from 2,874 wells in this area represented almost 92 percent of the State's total production.

The most significant development in Kansas during 1952 was the expansion of the Greenwood pool in Morton County, where commercial quantities of gas were found in an offset well in the Shawnee group of rocks. The discovery well of the Greenwood pool produced from Morrowan rocks.

Kentucky.—C. D. Hunter, chief geologist, Kentucky-West Virginia Gas Co., reported that 223 gas wells were drilled in Kentucky in 1952. In the Big Sandy gasfield 166 gas wells and 25 dry holes were drilled, resulting in a total open flow of 167.6 million cubic feet. In the Knox-Bell County gasfield, 11 gas wells and 3 dry holes were drilled, with a total open flow of 10.2 million cubic feet. Discovery

wells were drilled in Bell, Daviess, Hancock, Letcher, Muhlenberg, and Perry Counties.

The Big Sandy gasfield in southeastern Kentucky produced 67.7 billion cubic feet of gas in 1952. This field, in Floyd, Martin, Pike, Knott, Johnson, and Magoffin Counties, was extended into northern Letcher and northern Perry Counties during the year. The only other gas-producing area in Kentucky of notable importance is in the southeast-central fields of Clay, Knox, and Bell Counties, which produced nearly 2 billion cubic feet in 1952. A small amount was produced in Breathitt and Jackson Counties and in western Kentucky.

Louisiana.—The Louisiana Department of Conservation reported that 259 development gas wells were completed in 1952. Twenty-six new gasfields were discovered by exploratory activity, 20 in south and 6 in north Louisiana. Both exploratory and development activity exceeded that of 1951.

Most of the increase in natural gas production was in south Louisiana, which produced about 56 percent of the State's output in 1952.

Maryland.—Joseph T. Singewald, Jr., Director of the Maryland Department of Geology, Mines and Water Resources, reported that the Mountain Lake Park field in Garrett County was the only producing gasfield in Maryland. On December 31, 1952, there were 31 producing wells; 18 new wells produced during the year and 10 wells were abandoned. By the end of 1952, 90 wells had been drilled in the field, of which 49 were dry holes and 41 were producers. Only 14 were expected to be productive enough to repay drilling costs. Marketed production in 1952 dropped to 2.4 billion cubic feet from 3.4 billion in 1951.

In the Avilton area, northeast of the Mountain Lake Park field, additional drilling on the Deer Park anticline produced only salt water. Another well was being drilled on the Accident dome, an area in which 4 unsuccessful wells were drilled some years ago.

Michigan.—William L. Daoust, Geological Survey Division, Michigan Department of Conservation, reported that there were five significant dry natural-gas discoveries in the State during 1952. Three of the discoveries were completed in the Michigan Stray, 1 in the Marshall, and 1 in the Niagara-Salina formations. The discoveries were made in Clare, Newaygo, Osceola, St. Clair, and Mecosta Counties. The depth of 4 of the discoveries was less than 1,500 feet, whereas the depth of the Niagara-Salina well was about 2,500 feet. The initial potential flow reported ranged from 600,000 to 20 million cubic feet, the total for the 5 wells being 48.3 million cubic feet.

The operations in Clare County resulted in greater activity than the other discoveries. Fourteen wells had been completed there by the end of the year with a total initial potential flow capacity of 88.7 million cubic feet per day.

A total of 81 gas wells were completed in the State during the year, of which 51 were service wells drilled in gas-storage reservoirs. The other 30 were strictly new dry-gas wells. At the end of 1952 there were 1,111 productive dry-gas wells in the State, of which 728 were gas-storage reservoir wells and 383 were dry-gas wells.

Mississippi.—Eleven successful development and 3 wildcat gas wells were completed in Mississippi in 1952, according to the annual report of the Mississippi State Oil and Gas Board. New gasfields discovered included the Maxie field in Forrest County, the Muldon

field in Monroe County, and the East Angie field in Pearl River County.

Missouri.—Frank C. Greene, district geologist, Missouri Division of Geological Survey and Water Resources, reported that a new gasfield near Turney in Clinton County was the only discovery in 1952. An area about 3 miles long was proved with 6 wells having a combined open flow of 2.5 million cubic feet per day.

Montana.—J. R. Schwabrow, Federal Geological Survey, reported that no important gas discoveries were made in Montana in 1952. Wells completed had a total daily open flow of 75 million cubic feet compared with 82 million in 1951. Eleven shallow gas wells were drilled at Bowdoin, extending the productive area about 5,700 acres to the southeast.

The small Bears Den, Keith, and East Keith fields in the Sweetgrass Hills were placed in production in October 1952 by a line connecting with the Whitlash–Great Falls line. Importation of gas from Canada began in February 1952 from fields north of the Sweetgrass Hills. Marketed production from the Cut Bank field declined about 7.9 billion cubic feet, and the operations of the Rural Electrification Administration in the Cut Bank and Kevin-Sunburst fields reduced the use of field gas.

Nebraska.—Three gasfields were discovered in Nebraska in 1952, all in Cheyenne County. Five wildcat and 4 development gas wells were drilled in Deuel County.

New Mexico.—John A. Anderson, Federal Geological Survey, reported that 24 gas wells were completed in southeastern New Mexico in Lea County. Also 2 new gas pools of undetermined importance were discovered there. In northwestern New Mexico 158 gas wells were completed and 3 new pools were discovered, 2 in Rio Arriba County and 1 in San Juan County.

New York.—W. L. Kreidler, senior geologist, New York State Geological Survey, reported that an estimated 25 wells were drilled in the Medina gas horizon, of which 17 were dry holes and 8 producing gas wells. Eleven wells were drilled in the Lower Devonian Oriskany sand; of these, 6 were storage wells, and 5 were dry wildcat wells. By November 1952, a well in Van Etter Township, Chemung County, was being drilled at a cable-tool world record depth of 10,893 feet, and it was anticipated that the drilling would continue to the Pre-Cambrian.

North Dakota.—Wilson M. Laird, State geologist, North Dakota Geological Survey, reported that 144 million cubic feet of gas were produced from the Baker-Glendive gasfield in Bowman County, compared with 456 million produced in 1951. Much larger quantities of gas were produced with oil production in the Beaver Lodge and Tioga fields in Williams and Mountrail Counties, but this gas was not utilized during 1952 because of lack of processing facilities.

Ohio.—Robert L. Alkire, chief of the Oil and Gas Section, Ohio Geological Survey, reported that for the seventh year there were no significant gas discoveries in Ohio. Most successful Clinton sand operations were in Lorain and Muskingum Counties. The principal area of Berea gas discovery was in Tuscarawas County.

Approximately 2,500 acres were proved as the result of 4 gas-pool discoveries, and 13,000 acres were proved by extensions to known pools. New wells had a combined initial daily open flow of 151 million cubic feet. The new pools were discovered in La Grange and Cass

Townships, Muskingum County; and Goshen Township, Tuscarawas County.

Oklahoma.—In the most active of recent years, 295 gas wells were completed in Oklahoma in 1952. Of these, 13 were successful wildcat wells in Beaver, Beckham, and Lincoln Counties.

Additions to proved reserves, however, were less than in 1951, especially those made by extensions of known fields; total reserves were also less than in the previous year.

Pennsylvania.—J. G. Montgomery, Jr., vice president, United Natural Gas Co., reported that 240 productive shallow-sand gas wells were drilled in 1952, with a total initial daily open flow of 34.8 million cubic feet. One small, new, shallow-sand gasfield was discovered in Wharton Township, Fayette County, and was of interest because no prior commercial gas production had been discovered southwest of the Chestnut Ridge anticline in the Upper Devonian or higher strata. The significance of this discovery will be determined by further exploratory drilling. Three other minor shallow pools were discovered in 1952.

Development of the Leidy gasfield continued in 1952, but activity slowed considerably toward the end of the year. Thirty-four producing wells, with an average daily open flow of 4.8 million cubic feet of gas, and 14 dry holes were completed in and adjacent to the main pool, resulting in a developed area of approximately 11,000 acres. The daily production had dropped from approximately 150 million cubic feet to 30 million. The pool had produced about 87.2 billion cubic feet of gas by the end of 1952. A subsidiary pool, known as the Tamarack, located on a fault block on the southeast flank of the Leidy Dome, was opened early in 1952 and underwent intensive development. Sixteen producing wells and 10 dry holes were completed. The 1952 production from the pool amounted to approximately 8 billion cubic feet of gas.

The Driftwood pool in Cameron County underwent intensive development in 1952. Fifteen producing wells, with an average initial daily open flow of 3 million cubic feet and 20 dry holes were completed. Production was confined to the west of a fault that intersects the main anticlinal axis at an oblique angle.

The drilling of an exploratory well in Benezett Township, Elk County, approximately 7 miles from the Driftwood pool, resulted in the discovery of gas in commercial quantity in the Oriskany sand. This discovery was expected to result in intensive development.

Texas.—Gas-well completions increased again in 1952 to 778 wells from 726 in 1951. Proved reserves of natural gas gained only slightly during the year, partly because of a downward revision in the estimated recovery of gas from the Spraberry regions.

In west Texas a gas well in Pecos County, producing from 14,500 feet, was the deepest producing well in the State and had a calculated daily open flow of 50 million cubic feet. Located in the western part of the Val Verde Basin, it appeared to have opened a large gas reserve. In Culberson County in the Delaware Basin, the Grisham Fee No. 1 was completed as a gas well from dolomite thought to be of Devonian age. This is rated as an important discovery because of the Pre-Permian source of the gas.

In south Texas numerous new gas strikes were made. Full evaluation of new reserves, such as those discovered in the Pharr and McAllen areas of Hidalgo County, will require several years.

Utah.—J. R. Schwabrow, Federal Geological Survey, reported that 7 gas wells were completed with a total open flow of 136 million cubic feet. One of these was a small hydrocarbon gas well in the Ferron sandstone of the Mancos shale at Gordan Creek, which had deep CO_2 gas shut-in. One was in the Red Wash oil field, and 5 in the Clear Creek field, which was discovered in 1951.

The development of Clear Creek indicated that wells with initial productions of 10 to 35 million cubic feet per well can be drilled in the Ferron sand, and a conservative estimate of 8,000 acres were proved productive. At the end of the year considerably more drilling was planned for the Wasatch Plateau area and a pipeline was planned to Provo, Utah, and perhaps on to Salt Lake City.

The Clay Basin gasfield still was the only one where production was marketed away from the field. The only carbon dioxide field in operation was Farnham, which produced 84.5 million cubic feet. Some gas was produced from oil wells in the new Uinta Basin fields; most of this gas was used there.

Virginia.—W. T. Harnsberger, fuels geologist of the Virginia Geological Survey, reported that drilling for natural gas and petroleum continued in the southwestern part of the State throughout 1952. Tests for natural gas were drilled in Buchanan, Dickenson, and Wise Counties, in the Appalachian Plateaus section, and in Rockingham County in the Ridges and Valley province.

A total of 36 wells was drilled or in process of drilling in search of natural gas, 5 less than reported for 1951. The number of gas tests being drilled in 1952 was as follows: Buchanan County, 14; Dickenson County, 17; Rockingham County, 3; Smyth County, 1; and Wise County, 1. Of these, 12 were completed as potential producers and 15 were still being drilled at the end of the year.

The productive and potentially productive gas wells average around 5,000 feet in depth. The gas was encountered mainly in sandstone horizons of lower Mississippian age, but was also found in overlying beds of Pennsylvanian and in deeper shales of Devonian age. The reported initial open-flow tests of individual wells ranged from several hundred thousand to 23 million cubic feet. Indications are that a potential daily production of 75 to 100 million cubic feet of gas can be obtained from the completed wells in Buchanan and Dickenson Counties. During 1952 leasing was in progress in Alleghany, Bath, Highland, and Rockingham Counties. From available reports, it was estimated that over 90 percent of the gas was produced in Buchanan County in 1952. Commercial production was obtained from the Early Grove field in Scott and Washington Counties.

West Virginia.—R. C. Tucker, assistant State geologist, West Virginia Geological and Economic Survey, reported that 455 gas wells were drilled in West Virginia, in 1952, 8 less than in 1951. The total initial daily open flow of wells drilled was 411 million cubic feet, an increase of 55 million over 1951. Nine counties—Kanawha, Mingo, Logan, Putnam, Lincoln, McDowell, Preston, Wyoming, and Wayne—had approximately 83 percent of the total initial open flow.

Two wells being drilled in Harrison County were to be storage wells. A new Oriskany-sand gas field was being developed in northwestern Wood County; and Randolph County entered the productive list with completion of gas wells in the western part of the county on the Hiram anticline.

Wyoming.—J. R. Schwabrow, Federal Geological Survey, reported that gas wells completed in 1952 had an initial daily open flow of 82 million cubic feet. In the Powder River Basin new gas areas were discovered at Castle Creek and west of Salt Creek.

In western Wyoming, in the broad area of the Green River Basin, 1 gas well was completed at Big Piney and 3 at Hiawatha (Wyoming side). At Tip Top, south of Big Piney, in an offset well to a shallow oil producer, gas was unexpectedly encountered. The well, after completion, produced 1 million cubic feet of gas daily. One small gas well was completed in the Wind River Basin, and 10 wells were completed in the Big Horn Basin, making the latter the location of half of the State's gas drilling activities. There were new field discoveries at Five Mile, Fourteen Mile, west Greybull, North Shoshoni, and Whistle Creek.

INTERSTATE SHIPMENTS

Interstate shipments and exports in 1952 increased 17 percent to 3,787 billion cubic feet. The increase of 544 billion cubic feet from 1951 nearly equaled the 556 billion cubic foot increase in marketed production in the same period. Interstate shipments were 47 percent of marketed production, compared to 43 percent in 1951. The major changes from producing States were reduced shipments of Pennsylvania and West Virginia gas and increased shipments from Texas, Louisiana, New Mexico, Colorado, Mississippi, and Kansas. The West South Central region was the source of 77 percent of the gas moving across State lines.

Illinois had the largest increase in the consumption of interstate gas, 90 billion cubic feet more than in 1951. Ohio remained the largest consumer of gas brought from outside the State.

Imports and Exports.—Natural gas was imported into the United States in 1952 for the first time since 1939. Imports from Canada were exclusively for the use of a smelter in Montana expanded as part of the defense program. A small quantity of gas was also received in Texas from Mexico. Exports to both Canada and Mexico increased.

TABLE 7.—Interstate shipments, imports, and exports of natural gas in 1952, by source and final destination, in million cubic feet [1]

Producing region and State or country	Quantity shipped	Consuming State or country	Quantity received [2]
Middle Atlantic:			
New Jersey		Canada	84
New York	417	District of Columbia	70
Pennsylvania	24,263	Maryland	98
		New Jersey	18
		New York	23,159
		Ohio	1,010
		Pennsylvania	198
		Virginia	5
		West Virginia	38
Total	24,680	Total	24,680
South Atlantic:			
Delaware		Canada	4
District of Columbia		District of Columbia	2,955
Florida		Kentucky	534
Georgia		Maryland	5,064
Maryland	1,485	New Jersey	3
North Carolina		New York	4,618
South Carolina		Ohio	53,049
Virginia	1,076	Pennsylvania	33,356
West Virginia	102,090	Tennessee	12
		Virginia	4,124
		West Virginia	932
Total	104,651	Total	104,651
East North Central:			
Illinois		Canada	165
Indiana	493	Illinois	493
Michigan	165		
Ohio			
Wisconsin			
Total	658	Total	658
East South Central:			
Alabama		Alabama	46,842
Kentucky	47,424	Arkansas	76
Mississippi	129,971	Canada	11
Tennessee		Delaware	101
		District of Columbia	2,111
		Florida	6,920
		Georgia	46,167
		Indiana	220
		Kentucky	520
		Louisiana	4,153
		Maryland	3,729
		Mississippi	116
		New Jersey	810
		New York	5,140
		Ohio	30,120
		Pennsylvania	25,418
		Tennessee	307
		Virginia	3,021
		West Virginia	1,613
Total	177,395	Total	177,395
West North Central:			
Iowa		Canada	1,540
Kansas	286,614	Colorado	24,709
Minnesota		Illinois	12,301
Missouri		Indiana	13,764
Nebraska		Iowa	32,494
North Dakota	325	Michigan	32,515
South Dakota		Minnesota	50,982
		Missouri	46,338
		Montana	325
		Nebraska	43,072
		Ohio	22,537
		Oklahoma	1,350
		South Dakota	4,427
		Wisconsin	54
		Wyoming	531
Total	286,939	Total	286,939

See footnote at end of table.

TABLE 7.—Interstate shipments, imports, and exports of natural gas in 1952, by source and final destination, in million cubic feet [1]—Continued

Producing region and State or country	Quantity shipped	Consuming State or country	Quantity received [2]
West South Central:			
Arkansas	1,513	Alabama	82,144
Louisiana	694,288	Arizona	33,566
Oklahoma	227,709	Arkansas	128,329
Texas	1,997,633	California	128,175
		Canada	4,096
		Colorado	72,670
		Connecticut	1,217
		Delaware	2,439
		District of Columbia	8,299
		Florida	9,174
		Georgia	64,285
		Illinois	330,064
		Indiana	88,463
		Iowa	64,573
		Kansas	162,722
		Kentucky	67,534
		Louisiana	68,222
		Maryland	18,226
		Massachusetts	12,642
		Mexico	19,941
		Michigan	154,212
		Minnesota	47,060
		Mississippi	71,905
		Missouri	126,040
		Nebraska	29,448
		New Hampshire	387
		New Jersey	43,159
		New Mexico	37,715
		New York	157,566
		North Carolina	3,415
		Ohio	303,932
		Oklahoma	21,626
		Pennsylvania	243,060
		South Carolina	3,057
		South Dakota	4,088
		Tennessee	102,431
		Texas	58,111
		Virginia	12,991
		West Virginia	95,816
		Wisconsin	36,661
		Wyoming	1,682
Total	2,921,143	Total	2,921,143
Mountain:			
Arizona		Arizona	31,311
Colorado	29,178	California	169,499
Idaho		Colorado	1,069
Montana	4,059	Mexico	1,615
Nevada		Montana	9,656
New Mexico	202,839	Nebraska	1,180
Utah	37	New Mexico	12,343
Wyoming	35,156	North Dakota	3,404
		South Dakota	3,431
		Texas	8,211
		Utah	28,760
		Wyoming	790
Total	271,269	Total	271,269
Foreign:			
Canada	7,803	Montana	7,803
Mexico	4	Texas	4
Total	7,807	Total	7,807
Grand total	3,794,542	Grand Total	3,794,542

[1] Includes exports as follows: 5,900 million cubic feet to Canada and 21,556 million cubic feet to Mexico.
[2] Includes amounts consumed, stored, and lost in transmission.

PIPELINES

In 1952 the Federal Power Commission issued certificates of necessity totaling $344 million to the natural gas industry for construction of facilities, including 4,147 miles of pipeline. The corresponding 1951 figures were $471 million and 5,791 miles of pipeline. Applications pending before the Commission, at the end of 1952, totaled $797 million, slightly more than the previous year. In 1952 the Petroleum Administration for Defense allocated to the gas industry 1,322,931 tons of line pipe; however, a strike in the steel industry reduced the quantity of available pipe below expectations. The Petroleum Administration for Defense recommended natural-gas transmission lines for certificates of necessity for accelerated amortization on 25 percent of their cost. Few companies applied for this, however, because it was thought that it offered no advantage to companies operating under utility-type regulation.

Several factors were operating to reduce the attractiveness of further pipeline expansion, including rising field price of natural gas and higher interest rates on borrowed money. These factors had not yet become dominant in influencing new construction, however, because of the expanding demand for gas.

The largest projects, authorized by certificates of necessity issued by the Federal Power Commission during 1952, were construction of 895 miles of line by the Tennessee Gas Transmission Co. and 438 miles by El Paso Natural Gas Co. Large projects completed during 1952 included the 1 billion cubic feet per day expansion of the United Gas Pipeline Co. system and the Texas Eastern Transmission Corp. line from Kosciusko, Miss., to Connellsville, Pa.

Importation of natural gas into Montana from Alberta, Canada, was authorized by both the Canadian and United States Governments. This gas was to be delivered only to Anaconda Copper Mining Co. through facilities of the Montana Power Co.

CONSUMPTION

Total consumption of natural gas in the United States increased 7 percent to 7,613 billion cubic feet. Only in Colorado, North Dakota, and Wyoming did consumption decrease. Consumption increased more in Illinois than in any other State as the result of completion of an additional transmission pipeline to that State in 1951.

Residential and Commercial.—The residential consumption of natural gas increased 10 percent in 1952. Although the gain in residential use was retarded by the milder than normal winter weather at both the beginning and end of the year, residential use increased from 20.8 percent of total consumption in 1951 to 21.3 percent in 1952. Increased residential consumption was the result of customers added because of home construction and conversion to natural gas from other fuels. The average consumption of straight natural gas per residential consumer dropped from 86,700 cubic feet in 1951 to 82,000 in 1952, chiefly because a large number of small consumers in the New York City area converted from mixed to straight natural gas. The total number of residential consumers in New York State declined in 1952 because 112,100 consumers, using 6.9 billion cubic feet of gas classified as residential in 1951, were reclassified as commercial in 1952.

California led all States in increase in quantity of gas for residential use and again led in amount consumed for this use after having dropped behind Ohio in 1951. Massachusetts had a large increase in both the number of residential consumers and amount of natural gas consumed as pipeline there completed the first full year of operation.

Commercial consumption increased 11 percent to 516 billion cubic feet. In 1952 it represented 6.8 percent of total consumption, compared with 6.5 percent in 1951. The reclassification of consumers in New York from residential to commercial accounted for the seemingly abnormal increase there.

Field.—Field use increased 3 percent in 1952 compared with a 7-percent increase in marketed production. Thus it continued to represent a declining proportion of marketed production, a trend evident since 1938. The large indicated rise in field use in Kentucky was mainly the result of extraction loss and fuel consumption at the natural-gas-liquids recovery plant constructed in that State on the line of Tennessee Gas Transmission Co.

TABLE 8.—Consumption of natural gas in the United States, 1948–52, by States [1]

State	Quantity (million cubic feet)					Estimated value at points of consumption (thousand dollars)	
	1948	1949	1950	1951	1952	1951	1952
Alabama	61,113	71,072	92,466	111,030	125,874	32,357	39,711
Arizona	34,983	44,489	53,419	62,046	63,111	18,555	21,467
Arkansas	112,675	113,922	135,609	155,524	165,603	24,342	28,094
California	617,615	619,323	683,924	787,848	792,520	276,745	313,248
Colorado	60,585	73,664	88,692	102,769	101,835	30,473	32,437
Connecticut					1,039		2,119
Delaware		708	1,022	1,679	2,276	2,923	4,440
District of Columbia	9,361	9,305	10,694	11,904	12,782	14,638	16,328
Florida	8,973	10,185	12,348	13,044	16,001	2,728	3,272
Georgia	47,552	58,824	67,894	94,596	108,329	29,010	33,014
Illinois	168,796	202,546	235,211	250,812	344,705	120,770	159,478
Indiana	50,774	55,263	58,620	69,177	96,124	44,489	62,171
Iowa	50,350	57,620	66,233	79,640	94,951	33,226	39,781
Kansas	199,893	206,593	242,603	278,892	279,632	59,463	63,399
Kentucky	41,357	45,504	61,323	74,386	87,006	31,553	35,818
Louisiana	426,837	450,712	475,500	549,305	599,312	66,253	75,693
Maryland	4,280	4,821	13,813	22,286	26,468	27,813	32,496
Massachusetts				1,783	11,386	4,675	26,441
Michigan	75,978	84,315	127,180	154,283	163,991	114,878	121,826
Minnesota	52,376	59,040	67,861	84,205	97,591	36,072	44,680
Mississippi	65,245	60,987	76,918	97,786	119,638	21,142	25,526
Missouri	90,883	99,667	140,384	156,922	168,992	67,417	73,407
Montana	32,919	34,361	38,544	37,481	40,771	11,732	12,958
Nebraska	47,647	51,911	61,742	72,386	78,544	27,943	31,537
New Hampshire				3	316	9	623
New Jersey		3,172	3,209	30,887	40,409	55,236	58,185
New Mexico	110,132	127,423	147,509	174,808	194,748	19,151	22,580
New York	44,200	51,064	65,157	144,920	180,747	153,255	258,599
North Carolina				1,631	2,945	294	1,942
North Dakota	2,712	2,686	3,279	3,408	3,342	1,950	1,925
Ohio	236,137	246,212	324,594	375,820	393,250	199,153	213,461
Oklahoma	277,955	258,579	286,793	307,887	319,908	46,616	50,730
Pennsylvania	191,631	209,749	263,199	311,937	324,187	182,103	202,985
South Carolina				853	2,896	120	1,182
South Dakota	8,540	8,212	10,001	11,447	11,701	5,201	5,495
Tennessee	37,766	41,609	67,813	88,078	99,817	26,499	31,502
Texas	1,605,955	1,658,379	1,824,553	2,130,377	2,175,100	220,866	254,607
Utah	21,627	24,338	26,368	29,014	30,929	10,111	12,100
Virginia	3,877	4,324	7,639	14,853	18,630	14,799	19,465
West Virginia	112,702	111,802	132,273	139,608	146,153	44,805	47,419
Wisconsin	323	1,696	15,380	28,382	33,632	31,924	37,233
Wyoming	31,400	31,407	36,637	38,865	36,287	7,386	7,945
Total United States	4,945,149	5,195,484	6,026,404	7,102,562	7,613,478	2,118,675	2,527,319

[1] Includes natural gas mixed with manufactured gas.

TABLE 9.—Residential and commercial consumption of natural gas in the United States in 1952, by States [1]

State	Residential				Commercial				Total			
	Number of consumers	Quantity (million cubic feet)	Value at point of consumption		Number of consumers	Quantity (million cubic feet)	Value at point of consumption		Number of consumers	Quantity (million cubic feet)	Value at point of consumption	
			Total (thousand dollars)	Average (cents per M cubic feet)			Total (thousand dollars)	Average (cents per M cubic feet)			Total (thousand dollars)	Average (cents per M cubic feet)
Alabama	232,053	17,799	15,357	86.3	22,214	6,168	3,764	61.0	254,267	23,967	19,121	79.8
Arizona	143,370	9,111	7,813	85.8	16,880	6,244	2,751	44.1	160,250	15,355	10,564	68.8
Arkansas	174,284	18,216	9,329	51.2	26,649	9,261	3,455	37.3	200,933	27,477	12,784	46.5
California	3,007,954	228,390	159,730	69.9	235,128	79,757	40,341	50.6	3,243,082	308,147	200,071	64.9
Colorado	211,983	29,096	16,410	56.4	28,147	15,463	7,230	46.8	240,130	44,559	23,640	53.1
Connecticut	131,819	636	1,482	233.0	6,465	140	277	197.9	138,284	776	1,759	226.7
Delaware, District of Columbia, and Maryland	608,181	28,754	40,310	140.2	46,118	6,046	7,847	129.8	654,299	34,800	48,157	138.4
Florida	16,256	1,249	1,009	80.8	36	269	69	25.7	16,292	1,518	1,078	71.0
Georgia	223,854	22,043	14,446	65.5	21,788	9,250	3,501	37.8	245,642	31,293	17,947	57.4
Illinois	1,715,753	88,113	82,305	93.4	96,596	20,725	14,292	69.0	1,812,349	108,838	96,597	88.8
Indiana	589,715	29,942	33,091	110.5	39,754	7,623	7,178	94.2	629,469	37,565	40,269	107.2
Iowa	244,765	23,726	18,656	78.6	24,225	12,212	6,042	49.5	268,990	35,938	24,698	68.7
Kansas	392,076	50,127	24,299	48.5	42,103	28,404	8,807	31.0	434,179	78,531	33,106	42.2
Kentucky	276,500	32,839	19,262	58.7	29,802	9,497	4,793	50.5	306,302	42,336	24,055	56.8
Louisiana	450,032	29,938	18,035	60.2	41,339	12,975	4,173	32.2	491,371	42,913	22,208	51.8
Massachusetts	492,627	7,876	20,051	254.6	20,549	1,590	3,532	222.1	513,176	9,466	23,583	249.1
Michigan	1,117,120	103,039	87,541	85.0	63,888	13,870	10,743	77.5	1,181,008	116,909	98,284	84.1
Minnesota	304,065	33,728	25,574	75.8	16,425	7,324	3,663	50.0	320,490	41,052	29,237	71.2
Mississippi	172,545	14,269	9,838	68.9	23,038	7,863	3,100	39.4	195,583	22,132	12,938	58.5
Missouri	575,421	63,514	43,858	69.1	50,384	18,714	8,993	48.1	625,805	82,228	52,851	64.3
Montana	75,067	12,330	6,250	50.7	8,676	7,837	2,758	35.2	83,743	20,167	9,008	44.7
Nebraska	191,611	23,578	16,279	69.0	19,936	9,498	4,438	46.7	211,547	33,076	20,717	62.6
New Hampshire	25,502	208	450	216.3	1,393	83	133	160.2	26,895	291	583	200.3
New Jersey	1,162,104	20,492	44,917	219.2	77,958	4,032	7,053	174.9	1,240,062	24,524	51,970	211.9
New Mexico	99,129	11,605	8,032	69.2	10,346	8,078	2,968	36.7	109,475	19,683	11,000	55.9
New York	3,347,945	112,030	197,154	176.0	293,084	23,651	36,480	154.2	3,641,029	135,681	233,634	172.2
North Carolina	28,016	521	1,045	200.6	4,325	452	690	152.7	32,341	973	1,735	178.3
North Dakota and South Dakota	40,728	5,305	3,859	72.7	5,355	3,940	1,924	48.8	46,083	9,245	5,783	62.6
Ohio	1,630,066	213,278	129,357	60.7	128,002	48,040	27,267	56.8	1,758,068	261,318	156,624	59.9
Oklahoma	445,796	44,409	22,579	50.8	49,988	21,754	6,605	30.4	495,784	66,163	29,184	44.1
Pennsylvania	1,738,332	141,262	122,027	86.4	117,425	27,342	18,209	66.6	1,855,757	168,604	140,236	83.2
South Carolina	9,498	203	380	187.2	1,646	118	197	166.9	11,144	321	577	179.8
Tennessee	178,006	16,754	12,645	75.5	30,226	12,243	5,300	43.3	208,232	28,997	17,945	61.9
Texas	1,488,541	101,276	65,980	65.1	171,090	48,756	19,605	40.2	1,659,631	150,032	85,585	57.0
Utah	79,922	8,418	5,242	62.3	11,085	4,146	2,057	49.6	91,007	12,564	7,299	58.1
Virginia	234,133	9,637	14,028	145.6	17,956	3,683	3,786	102.8	252,089	13,320	17,814	133.7
West Virginia	287,205	40,443	17,430	43.1	28,034	11,161	4,412	39.5	315,239	51,604	21,842	42.3
Wisconsin	384,417	20,974	27,411	130.7	20,963	3,655	4,237	115.9	405,380	24,629	31,648	128.5
Wyoming	42,879	6,838	3,710	54.3	5,915	3,805	1,517	39.9	48,794	10,643	5,227	49.1
Total: 1952	22,569,270	1,621,966	1,347,171	83.1	1,854,931	515,669	294,187	57.0	24,424,201	2,137,635	1,641,358	76.8
1951	21,443,950	1,474,725	1,120,819	76.0	1,613,708	464,309	245,609	52.9	23,057,658	1,939,034	1,366,428	70.5

[1] Includes natural gas mixed with manufactured gas.

Treated for Natural-Gas Liquids.[6]—The volume of gas treated for the extraction of natural-gas liquids increased 3 percent in 1952 compared with 16 percent in 1951. A large part of the increase in 1952 was the result of the operation of an extraction plant on a gas-transmission line in Kentucky. Most of the gas processed at this plant had already been treated at conventional natural-gasoline plants before entering the transmission line.

The overall yield of natural-gas liquids in the United States was 1.46 gallons per 1,000 cubic feet.

TABLE 10.—Natural gas treated at natural-gasoline and cycle plants in the United States, 1948–52, by States, in million cubic feet

State	1948	1949	1950	1951	1952
Arkansas	60,265	59,037	64,237	71,145	77,317
California	474,607	495,843	509,796	553,821	523,115
Colorado	364	5,521	7,785	11,739	(1)
Illinois	19,545	14,918	13,333	11,856	[2] 12,317
Kansas	230,119	252,864	361,744	397,294	403,376
Kentucky	44,748	43,472	47,660	86,950	268,096
Louisiana	405,101	463,138	534,550	598,420	607,564
Michigan	1,586	1,487	1,173	382	(2)
Mississippi	32,325	38,365	45,145	46,468	53,050
Montana	13,615	13,876	15,017	17,000	(1)
Nebraska				2,662	(1)
New Mexico	177,191	174,818	185,138	242,759	279,286
New York	12	22	13	20	
Ohio	24,366	18,351	20,764	23,837	9,011
Oklahoma	266,479	307,014	332,764	419,868	444,425
Pennsylvania	37,289	37,367	41,406	37,386	32,235
Texas	2,382,804	2,526,885	2,938,158	3,406,670	3,420,398
Utah					(1)
West Virginia	193,086	170,831	183,957	229,654	215,485
Wyoming	29,998	32,333	39,164	45,139	46,848
Other States					26,074
Total	4,393,500	4,656,142	5,341,804	6,203,070	6,418,597

[1] Colorado, Montana, Nebraska, and Utah combined under "Other States" to avoid disclosure of individual State data.
[2] Michigan included with Illinois.

Carbon Black.—The use of natural gas as a raw material for manufacturing carbon black declined 14 percent in 1952, whereas the production of carbon black from all materials declined only 4 percent. The largest decline occurred in the Panhandle region of Texas. In New Mexico the use of gas for producing carbon black increased.

Gas consumption by the carbon black industry declined because the industry was using a larger proportion of furnace black than contact black in their compounding formulas. Less gas is required to produce furnace black than an equivalent quantity of contact black. Oil also was being used to produce some grades of carbon blacks.

Petroleum Refineries.—The use of natural gas as fuel at petroleum refineries in the United States remained substantially unchanged both in volume and relative to the total fuel consumed. Gas for this use declined in most States. These declines were offset in the total by increases in a few States, namely, Illinois, Indiana, Louisiana, and Pennsylvania. Thus, it appears that the States with declining refinery usage are those that have found more profitable sales for their gas production, and States with increasing refinery usage are those receiving out-of-State gas and using off-peak receipts at refineries.

[6] Includes liquefied petroleum gases, natural gasoline, and condensate.

TABLE 11.—Industrial consumption of natural gas in the United States in 1952, by States and uses

State	Field (drilling, pumping, and operating gasoline-recovery plants)		Carbon-black manufacture			Fuel							Total industrial			Fuel at electric utility plants [1] (million cubic feet)
				Value at point of consumption		Million cubic feet					Value at point of consumption			Value at point of consumption		
	Million cubic feet (estimated)	Value at point of consumption (thousand dollars)	Million cubic feet	Total (thousand dollars)	Average (cents per M cubic feet)	Petroleum refineries	Portland cement plants	Natural-gas pipelines	Other industrial	Total	Total (thousand dollars)	Average (cents per M cubic feet)	Million cubic feet	Total (thousand dollars)	Average (cents per M cubic feet)	
Alabama	4	(2)				(3)	13,736	6,556	[3] 81,611	101,903	20,590	20.2	101,907	20,590	20.2	21,383
Arizona							(3)	4,716	[3] 43,040	47,756	10,903	22.8	47,756	10,903	22.8	11,199
Arkansas	25,671	2,010	(4)	(4)	(4)	9,786	(3)	6,429	[3] [4] 96,240	[4] 112,455	[4] 13,300	[4] 11.8	138,126	15,310	11.1	32,115
California	154,654	25,187	(4)	(4)	(4)	75,696	18,708	4,431	[4] 230,884	[4] 329,719	[4] 87,990	[4] 26.7	484,373	113,177	23.4	74,287
Colorado	3,823	225				1,344	(3)	1,580	[3] 50,529	53,453	8,572	16.0	57,276	8,797	15.4	23,322
Connecticut									263	263	360	136.9	263	360	136.9	
Delaware, District of Columbia, and Maryland	29	16						801	5,896	6,697	5,091	76.0	6,726	5,107	75.9	3
Florida	15	1							14,468	14,468	2,193	15.2	14,483	2,194	15.1	6,799
Georgia							(3)		[3] 77,036	77,036	15,067	19.6	77,036	15,067	19.6	46,149
Illinois	12,081	1,447				9,561		4,203	210,022	223,786	61,434	27.5	235,867	62,881	26.7	82,873
Indiana	143	11				2,158		2,992	53,266	58,416	21,891	37.5	58,559	21,902	37.4	10,560
Iowa							6,411	6,900	45,702	59,013	15,083	25.6	59,013	15,083	25.6	28,891
Kansas	22,396	2,043	(4)	(4)	(4)	11,772	10,903	25,399	[4] 130,631	[4] 178,705	[4] 28,250	[4] 15.8	201,101	30,293	15.1	51,374
Kentucky	10,362	2,240				(3)		9,412	[3] 24,896	34,308	9,523	27.8	44,670	11,763	26.3	3,763
Louisiana	180,869	12,370	21,069	1,225	5.8	95,850	(3)	19,940	[3] 238,671	354,461	39,890	11.3	556,399	53,485	9.6	70,990
Massachusetts								10	1,910	1,920	2,858	148.9	1,920	2,858	148.9	127
Michigan	1,571	311				199		1,925	43,387	45,511	23,231	51.0	47,082	23,542	50.0	286
Minnesota									56,539	56,539	15,443	27.3	56,539	15,443	27.3	29,278
Mississippi	11,013	1,028				(3)	(3)	18,414	[3] 68,079	86,493	11,560	13.4	97,506	12,588	12.9	30,728
Missouri	37	7				(3)	7,624	4,667	[3] 74,436	86,727	20,549	23.7	86,764	20,556	23.7	20,944
Montana	1,793	149				2,580	(3)	290	[3] 15,941	18,811	3,801	20.2	20,604	3,950	19.2	1,603
Nebraska	667	86				(3)	(3)	4,522	[3] 40,279	44,801	10,734	24.0	45,468	10,820	23.8	17,651
New Hampshire									25	25	40	160.0	25	40	160.0	
New Jersey								176	15,709	15,885	6,215	39.1	15,885	6,215	39.1	7,631
New Mexico	79,328	3,140	(4)	(4)	(4)	927		3,084	[4] 91,726	[4] 95,737	[4] 8,440	[4] 8.8	175,065	11,580	6.6	17,109
New York	247	90				19		428	44,372	44,819	24,875	55.5	45,066	24,965	55.4	25,264
North Carolina								1,899	73	1,972	207	10.5	1,972	207	10.5	
North Dakota and South Dakota	309	23					(3)	3	[3] 5,486	5,489	1,614	29.4	5,798	1,637	28.2	3,444

Ohio	853	225				250		4,413	126,416	131,079	56,612	43.2	131,932	56,837	43.1	3,095
Oklahoma	136,920	7,039	(4)	(4)	(4)	33,601	(3)	8,425	[3] [4] 74,799	[4] 116,825	[4] 14,507	[4] 12.4	253,745	21,546	8.5	47,856
Pennsylvania	3,744	1,189				13,004		6,115	132,720	151,839	61,560	40.5	155,583	62,749	40.3	8,398
South Carolina								956	1,619	2,575	605	23.5	2,575	605	23.5	801
Tennessee	500	53				(3)		8,748	[3] 61,572	70,320	13,504	19.2	70,820	13,557	19.1	7,398
Texas	793,366	49,671	264,127	14,035	5.3	268,317	27,740	42,067	629,451	967,575	105,316	10.9	2,025,068	169,022	8.3	223,507
Utah	170	11				287	(3)	8	[3] 17,900	18,195	4,790	26.3	18,365	4,801	26.1	[5] 59
Virginia	50	13						1,946	3,314	5,260	1,638	31.1	5,310	1,651	31.1	408
West Virginia	26,893	5,511				1,428		4,427	61,801	67,656	20,066	29.7	94,549	25,577	27.1	112
Wisconsin								676	8,327	9,003	5,585	62.0	9,003	5,585	62.0	136
Wyoming	16,246	1,275				3,366		649	5,383	9,398	1,443	15.4	25,644	2,718	10.6	574
Unclassified by States			[4] 83,203	[4] 4,848	[4] 5.8	[3] 6,257	[3] 26,357									
Total: 1952	1,483,754	115,371	368,399	20,108	5.5	536,402	111,479	207,207	[6] 2,768,602	[6] 3,623,690	[6] 750,482	[6] 20.7	5,475,843	885,961	16.2	910,117
1951	1,441,870	97,470	426,423	22,213	5.2	537,774	102,508	192,496	2,462,457	3,295,235	632,564	19.2	5,163,528	752,247	14.6	763,898

[1] Federal Power Commission. These figures include some manufactured gas and are therefore shown separately. The natural-gas component in these figures is included with "Other industrial."

[2] Less than $500.

[3] Gas used in petroleum refineries and/or portland-cement plants included under "Unclassified by States" for United States total and under "Other industrial" for State totals to avoid disclosing figures of individual operators.

[4] Gas used in carbon-black manufacture included under "Unclassified by States" for United States total and under "Other industrial" for State totals to avoid disclosing figures of individual operators.

[5] Includes 1 million cubic feet of manufactured gas used in Nevada and Washington.

[6] Total does not include undisclosed figures.

Electric Utility Plants.—The use of natural gas as fuel at electric power plants increased 19 percent in 1952 to 910 billion cubic feet. The increases were general throughout most of the consuming States. In Illinois the use of natural gas for electric generation increased more than two and one-half times as the result of completion of a transmission line. Massachusetts and South Carolina used natural gas to generate electricity for the first time in 1952. Gas can usually be disposed of for this use when more profitable sales cannot be made; therefore new lines sell gas to the power companies while more diversified loads are being developed and connected.

Portland-Cement Plants.—The use of natural gas as fuel at portland cement plants increased 9 percent, whereas the production of portland cement increased only 1 percent. The rise in gas usage was at the displacement of coal, which declined 5 percent. California's use of gas for this purpose declined. Oil usage increased 2 percent.

Natural-Gas Pipelines.—Natural gas used as fuel at compressor stations on natural-gas pipelines increased 8 percent, which was slightly higher than the rate of increase in marketed production. This use amounted to 2.6 percent of marketed production.

Other Industrial.—In 1952 "Other Industrial" use increased 12 per cent, compared with a 14-percent increase in 1951. Although there was a decline in the rate of growth from the previous year, it was not as sharp as that experienced for residential and commercial use. Most States recorded gains, Illinois showing the largest. The largest decline in industrial consumption took place in California.

Mixed Gas.—The consumption of natural gas as a component of mixed gas increased again in 1952, mainly in Illinois and Indiana where additional supplies of gas became available with the completion in 1951 of the line of Texas-Illinois Natural Gas Pipeline Co. The conversion of consumers in the New York City area from mixed to straight natural gas reduced the number of consumers of mixed gas there.

PRICES

The average value of natural gas at the wellhead in the United States was 7.8 cents per 1,000 cubic feet in 1952, or 0.5 cent higher than in 1951. In the 5 largest producing States the increases in average values were, 0.8 cent in Texas and New Mexico, 0.9 cent in Louisiana, 2.1 cents in California, and 0.1 cent in Oklahoma, the only below average increase of the 5 States. The sharp rise in average value of Virginia gas from 15.6 cents per 1,000 cubic feet to 24.6 cents was caused by completion of a pipeline outlet in that State permitting a higher proportion of its production to be sold for more profitable uses.

The average value of natural gas for residential use increased in most States. Increases up to 5 cents per 1,000 cubic feet were general. The rise of 7.1 cents in the total United States average value was caused in part by the larger proportion of gas being consumed in the high value areas long distances from the producing fields. The value of gas for commercial consumption followed the pattern of residential gas, with increases in most States.

The average value of gas for industrial use also increased in most States. The rise in the total United States average was 1.5 cents per 1,000 cubic feet.

TABLE 12.—Consumption of natural gas used with manufactured gas in the United States in 1952, by States [1]

State	Residential		Commercial		Industrial (million cubic feet)	Total	
	Number of consumers	Million cubic feet	Number of consumers	Million cubic feet		Million cubic feet	Value at point of consumption (thousand dollars)
Connecticut	10,194	43	636	10	10	63	171
Delaware and Maryland	48,600	1,737	2,561	243	325	2,305	4,507
Illinois	913,463	33,803	42,447	10,341	18,049	62,193	41,341
Indiana	315,886	10,489	19,709	2,686	29,598	42,773	28,495
New Jersey	915,142	15,580	62,418	2,589	3,905	22,074	38,223
New York	1,434,428	46,792	161,662	9,100	4,995	60,887	119,062
Pennsylvania	877,771	32,457	53,124	3,710	7,548	43,715	68,948
Tennessee	1,240	6	90	6		12	18
Virginia	650	2	196	4		6	9
Total: 1952	4,517,374	140,909	342,843	28,689	64,430	234,028	300,774
1951	5,900,336	127,316	298,070	26,980	47,086	201,382	243,726

[1] Included in tables for the consumption of natural gas (tables 8–11).

TABLE 13.—Average value of natural gas in the United States, 1951–52, by States, in cents per thousand cubic feet

State	At wells (estimated)		At point of consumption		State	At wells (estimated)		At point of consumption	
	1951	1952	1951	1952		1951	1952	1951	1952
Alabama	5.0	4.0	29.1	31.5	Montana	5.5	6.1	31.3	31.8
Arizona			29.9	34.0	Nebraska	12.8	13.3	38.6	40.2
Arkansas	4.0	4.1	15.7	17.0	New Hampshire			300.0	197.2
California	14.6	16.7	35.1	39.5	New Jersey			178.8	144.0
Colorado	4.3	5.5	29.7	31.9	New Mexico	3.8	4.6	11.0	11.6
Connecticut				203.9	New York	25.1	29.2	105.8	143.1
Delaware			174.1	195.1	North Carolina			18.0	65.9
District of Columbia			123.0	127.7	North Dakota	5.2	6.1	57.2	57.6
Florida	7.3	6.7	20.9	20.4	Ohio	20.2	21.7	53.0	54.3
Georgia			30.7	30.5	Oklahoma	5.3	5.4	15.1	15.9
Illinois	15.3	16.2	48.2	46.3	Pennsylvania	27.7	28.3	58.4	62.6
Indiana	9.8	9.5	64.3	64.7	South Carolina			14.1	40.8
Iowa			41.7	41.9	South Dakota	5.0	5.0	45.4	47.0
Kansas	8.1	8.3	21.3	22.7	Tennessee	9.4	10.3	30.1	31.6
Kentucky	21.7	21.7	42.4	41.2	Texas	5.4	6.2	10.4	11.7
Louisiana	5.8	6.7	12.1	12.6	Utah	6.6	7.5	34.8	39.1
Maryland	20.0	19.4	124.8	122.8	Virginia	15.6	24.6	99.6	104.5
Massachusetts			262.2	232.2	West Virginia	18.6	19.6	32.1	32.4
Michigan	14.8	14.6	74.5	74.3	Wisconsin			112.5	110.7
Minnesota			42.8	45.8	Wyoming	7.5	7.8	19.0	21.9
Mississippi	6.3	6.1	21.6	21.3	Total	7.3	7.8	29.8	33.2
Missouri	14.3	18.8	43.0	43.4					

TECHNOLOGY

Gas turbines were installed for the first time to drive compressors on a gas pipeline in 1952. Mississippi River Fuel Corp. was the first company to install one, and other companies installed units before the end of the year.

Because of the small amount of experience with these units, no definite conclusions as to their performance were available. It was claimed that for applications where the low compression ratio of centrifugal compressors was not a handicap, the use of gas turbines would allow savings on installed cost and operating expense compared with compressor stations powered by internal-combustion engines.

WORLD REVIEW

Canada.—Gross production of natural gas in the Province of Alberta in 1952 was 95.7 billion cubic feet, compared with 85.4 billion in 1951.

The Alberta Legislature approved the export of gas from the Peace River area and the Canadian Board of Transport Commissioners granted Westcoast Transmission Co. a permit to build a line from the Peace River area to Vancouver, British Columbia.

Gas was exported to the United States by special permit for use by a smelter in Montana.

Italy.—The production of natural gas in Italy increased nearly 50 percent in 1952 to 50.7 billion cubic feet. A pipeline from the northern Italy gasfields was completed to Turin and work was in progress on lines to Venice, Genoa, and Bologna. A new gasfield was discovered in the Po Valley, bringing to 7 the number of fields owned by the State-controlled company.

TABLE 14.—Consumption of natural gas, 1946–51, by countries, in million cubic meters

[United Nations Statistical Yearbook]

Country	1946	1947	1948	1949	1950	1951 [1]
Western Hemisphere:						
Argentina	562	(2)	(2)	(2)	641	(2)
Canada	1,356	1,491	1,660	1,712	1,921	2,091
Ecuador	66	87	[3] 106	109	132	152
Mexico	768	997	[3] 1,248	[3] 1,362	1,677	2,378
United States	117,594	129,753	145,776	153,471	177,860	211,170
Venezuela	9,381	11,402	13,319	14,066	15,776	19,113
Europe:						
Austria	(2)	(2)	(2)	(2)	(2)	(2)
Czechoslovakia	3	(2)	(2)	(2)	(2)	(2)
Denmark	3	3	(2)	(2)	(2)	(2)
France	110	147	174	228	246	285
Germany [4]	109	78	67	54	68	77
Hungary	91	101	(2)	(2)	(2)	(2)
Italy	64	94	117	[3] 249	510	957
Poland	149	148	[5] 81	(2)	(2)	(2)
Rumania	1,332	[1] 1,176	(2)	(2)	(2)	(2)
Yugoslavia	6	12	9	8	15	17
Asia:						
Brunei	[1] 28	25	562	580	754	(2)
China [6]	61	55	(2)	(2)	(2)	(2)
Indonesia	(2)	24	369	591	621	785
Japan	36	35	51	58	69	83
Total [7]	132,000	147,000	[3] 166,000	176,000	203,000	240,000

[1] Preliminary or estimated figures.
[2] Data not available.
[3] Revised.
[4] American and British zones.
[5] January–June.
[6] Beginning 1945, industries under control of the National Resources Commission.
[7] Excluding U. S. S. R. where natural-gas consumption was last reported as 1,400 million cubic meters in 1936.

Mexico.—Gross production of natural gas in Mexico in 1952 was approximately 94 billion cubic feet, compared with 80 billion in 1951.

Venezuela.—Gross production of natural gas was 737 billion cubic feet in 1952, of which 840 million was sold away from the field.

Other Countries.—Gas was discovered in Balchistan Province of Pakistan. The quantity was thought to be considerable although only one well had been completed.

A gas well was discovered in northwest Germany near the town of Rehden.

Natural-Gas Liquids

By D. S. Colby, L. V. Harvey, A. T. Coumbe, and I. F. Avery

GENERAL SUMMARY

THE PRODUCTION of natural-gas liquids in 1952 increased 9 percent, a smaller rise than in the 2 previous years. Of the several types of natural-gas liquids, production of LP-(liquefied-petroleum) gases was growing most rapidly and constituted 46 percent of total production. The yield of LP-gases from gas treated improved, while the yield of heavier products changed only slightly from 1951. Texas continued to produce an increasing percentage of the United States output of natural-gas liquids.

Additions to proved reserves of natural-gas liquids were less than those in 1950 and 1951; total proved reserves again increased.

Stocks of LP-gases at plants and terminals were nearly 1 million barrels higher at the year's end than on December 31, 1951; stocks of natural gasoline were lower at plants and terminals and at refineries.

Domestic sales of liquefied gases for all uses other than gasoline production increased 6 percent in 1952 compared with 21 percent in 1951.

Exports of both natural gasoline and LP-gases were higher in 1952 but natural-gasoline exports were still less than quantities shipped in the late 1940's.

RESERVES

The American Gas Association reserves committee estimated proved recoverable reserves of natural-gas liquids in the United States on December 31, 1952, to be nearly 5 billion barrels. The increase was considerably below that reported for each of the 2 previous years. Additions to reserves through discovery of new pools and fields were greater in 1952, but additions made through extensions of known fields and revisions of previous estimates declined. Reserves contained in dissolved gases again represented the major portion of the increase and were 36 percent of the total reserves at the end of the year.

Reserves declined in 11 of the 20 States reported individually. Of the 6 States having the largest reserves, only California and Oklahoma reported decreases.

TABLE 1.—Salient statistics of the natural-gas liquids industry in the United States, 1948–52, in thousands of barrels

	1948	1949	1950	1951	1952
Production:					
Natural gasoline and natural-gasoline mixtures	70,938	71,640	76,873	83,880	87,280
LP-gases:					
Isobutane	4,675	4,181	4,667	5,509	6,568
Other LP-gases	47,922	53,688	67,615	80,868	95,465
Finished gasoline and naphtha	12,594	16,681	20,981	23,048	21,436
Other products	10,592	10,896	11,825	11,449	12,766
Total	146,721	157,086	181,961	204,754	223,515
Receipts from outside sources (refineries)	4,103	4,316	1,727	1,600	1,998
Total new supply	150,824	161,402	183,688	206,354	225,513
Additions to stocks at plants and terminals	1,188	850	190	457	180
For motor fuel:					
Shipments to refineries:					
Natural gasoline and natural-gasoline mixtures	65,659	65,941	72,246	77,943	82,394
LP-gases	10,284	12,226	13,188	15,430	18,374
Finished gasoline and naphtha	3,462	3,392	4,401	5,304	5,248
Other products	8,229	7,760	8,597	7,731	8,353
Shipments to jobbers:					
Natural gasoline	4,109	4,370	3,897	5,368	7,509
LP-gases	[1]	[1]	[1]	[1]	3,028
Finished gasoline and naphtha	8,841	12,904	17,602	17,599	16,363
Other products	200	211	113	182	246
Exports	3,649	4,142	1,217	2,029	[2]
Losses	890	1,488	1,483	1,099	[2]
Transfers to non-motor-fuel uses:					
LP-gases for fuel	35,609	38,855	49,228	57,571	65,699
LP-gases for chemical manufacture	6,790	6,793	8,599	12,230	[3] 14,009
Other products	1,914	2,470	2,927	3,411	4,110
Total demand at plants and terminals	149,636	160,552	183,498	205,897	225,333
Stocks at plants, terminals, and refineries:					
Natural gasoline	3,609	4,100	4,187	4,909	3,664
LP-gases	1,051	1,172	1,661	1,547	2,551
Other products	919	1,559	1,507	1,730	1,592
Total	5,579	6,831	7,355	8,186	7,807
Value at plants:					
Natural gasoline, thousands of dollars	257,125	211,487	213,810	254,319	259,088
LP-gases, do	117,823	99,054	97,773	138,443	161,692
Finished gasoline and naphtha, do	52,414	60,551	75,044	83,062	76,343
Other products, do	31,615	31,098	32,978	32,337	36,037
Average value per gallon, cents	7.4	6.1	5.5	5.9	5.7
Natural gas treated, millions of cubic feet	4,393,500	4,656,142	5,341,804	6,203,070	6,418,597
Average yield, light products except LP-gases, gallons per M cubic feet	.90	.89	.86	.80	.79
Average yield, all light products, do	1.40	1.42	1.43	1.39	1.46
Sales to consumers for fuel and chemical uses:					
LP-gases	42,048	45,649	57,643	69,152	76,552
LR-gases [4]	23,114	21,889	25,275	31,497	30,052
Total	65,162	67,538	82,918	100,649	106,604
Exports of natural gasoline, LP-gases, and LR-gases	5,150	5,635	2,612	3,718	4,227

[1] Included in "Shipments to refineries" and "Losses".
[2] Included in "Shipments to jobbers."
[3] Includes ethane. Ethane is excluded from "Sales to consumers for fuel and chemical uses."
[4] Liquefied-refinery gases.

TABLE 2.—Estimated proved recoverable reserves of natural-gas liquids [1] in the United States, 1951–52, in thousands of barrels

[Committee on Natural Gas Reserves, American Gas Association]

State	Reserves as of Dec. 31, 1951	Changes in reserves during 1952			Reserves as of Dec. 31, 1952			
		Extensions and revisions	Discoveries of new fields and new pools in old fields	Net production	Nonassociated with oil	Associated with oil	Dissolved in oil	Total
Arkansas	51,050	1,013	91	1,283	29,914	6,762	14,195	50,871
California	329,316	21,229	1,475	29,513		108,720	213,787	322,507
Colorado	11,910	−14		557	299		11,040	11,339
Illinois	24,572	−907	9	3,428	21	25	20,200	20,246
Indiana	149	50	7	37	18	15	136	169
Kansas	159,569	14,666	260	6,268	163,505	1,513	3,209	168,227
Kentucky	10,478	311	156	1,787	[2] 9,158			9,158
Louisiana	684,773	48,322	17,991	37,420	567,311	98,413	47,942	713,666
Michigan	1,009	−439	94	81	196		387	583
Mississippi	52,290	998	2,056	4,413	22,445	23,779	4,707	50,931
Montana	3,341			212	3,129			3,129
Nebraska	2,586	221	85	176	2,194	415	107	2,716
New Mexico	130,619	29,689	1,347	10,112	59,636	31,127	60,780	151,543
Ohio	1,710	94	11	37	[2] 1,778			1,778
Oklahoma	311,125	−4,717	4,970	26,472	100,438	22,224	162,244	284,906
Pennsylvania	2,563	214	107	244	2,640			2,640
Texas	2,877,341	350,683	52,437	155,370	1,390,472	459,347	1,275,272	3,125,091
Utah	61			4	57			57
West Virginia	23,921	658	220	5,271	19,528			19,528
Wyoming	45,886	12,948	350	2,094	38,757	18,333		57,090
Alabama, Florida, and North Dakota	333	151	2	10			476	476
Total	4,724,602	475,170	81,668	284,789	2,411,496	770,673	1,814,482	4,996,651

[1] Comprises natural gasoline, LP-gases, and condensate.
[2] Not allocated by types, but occurring principally in column shown.

PRODUCTION

The production of natural-gas liquids in 1952 rose 9 percent to 223.5 million barrels. Both the percentage and quantity increase in production have been tapering off since 1950. Of the several types of natural-gas liquids, LP-gases again had the largest growth, increasing 18 percent over 1951. Although the quantity gain in LP-gas production in 1952 was over 1 million barrels higher than the gain in each of the 2 preceding years, the annual percentage gain declined from a peak of 25 percent in 1950. Natural-gasoline production increased 4 percent in 1952, a sharp drop from its previous rate of growth. The combined production of finished gasoline and naphtha and of other products remained virtually unchanged.

The total value of natural-gas-liquid production was 533 million dollars in 1952 compared with 508 million in 1951. The average value of any one of the products did not change more than 0.1 cent per gallon from 1951, however, the average value of total production dropped 0.2 cent because of the relatively greater output of the less valuable LP-gases in 1952.

TABLE 3.—Natural-gas liquids produced and natural gas treated in the United States, 1952, by States

State	Number of operators [2]	Production										Natural gas treated		
		Natural gasoline		LP-gases		Finished gasoline and naphtha		Other products [1]		Total				
		Thousand barrels	Thousand dollars	Thousand barrels	Thousand dollars	Thousand barrels	Thousand dollars	Thousand barrels	Thousand dollars	Thousand barrels	Thousand dollars	Million cubic feet	Average yield (gallons per M cubic feet)	
													Natural gas liquids except LP-gases	All natural gas liquids
Arkansas	9	1,348	4,155	1,169	2,079	65	262	58	163	2,640	6,659	77,317	0.80	1.43
California	28	18,822	58,986	9,376	16,700			1,916	5,959	30,114	81,645	523,115	1.67	2.42
Illinois [3]	9	847	2,460	1,972	4,626			7	19	2,826	7,105	12,317	2.91	9.64
Kansas	13	2,742	7,286	1,843	3,116			1	(4)	4,586	10,402	403,376	.29	.48
Kentucky	4	730	2,191	3,719	3,963					4,449	6,154	268,096	.11	.70
Louisiana	26	4,694	14,062	7,082	14,890	7,130	22,886	4,177	11,631	23,083	63,469	607,564	1.11	1.60
Mississippi	2	732	2,410	467	777			71	196	1,270	3,383	53,050	.64	1.01
New Mexico	9	3,901	11,652	2,724	3,600			2	8	6,627	15,260	279,286	.59	1.00
Ohio	2	38	114							38	114	9,011	.18	.18
Oklahoma	32	8,958	27,345	8,953	14,090	248	1,231	454	883	18,613	43,549	444,425	.91	1.76
Pennsylvania	7	171	548	19	75					190	623	32,235	.22	.25
Texas	100	41,759	119,943	58,497	88,635	13,982	51,910	5,916	16,647	120,154	277,135	3,420,398	.76	1.48
West Virginia	9	979	2,828	4,757	6,187	11	54	41	187	5,788	9,256	215,485	.20	1.13
Wyoming	5	1,103	3,672	928	1,881			123	344	2,154	5,897	46,848	1.10	1.93
Undistributed [5]	3	456	1,436	527	1,073					983	2,509	26,074	.73	1.58
Total	188	87,280	259,088	102,033	161,692	21,436	76,343	12,766	36,037	223,515	533,160	6,418,597	.79	1.46

[1] Includes condensate, kerosine, distillate fuel, etc.
[2] A producer operating in more than 1 State is counted but once in arriving at total for United States.
[3] Michigan with 3 operators, included with Illinois.
[4] Less than $500.
[5] Colorado, Montana, Nebraska, with 1 operator each, and Utah, with production of a small amount of drip gasoline, combined under "Undistributed" to avoid disclosure of individual company operations.

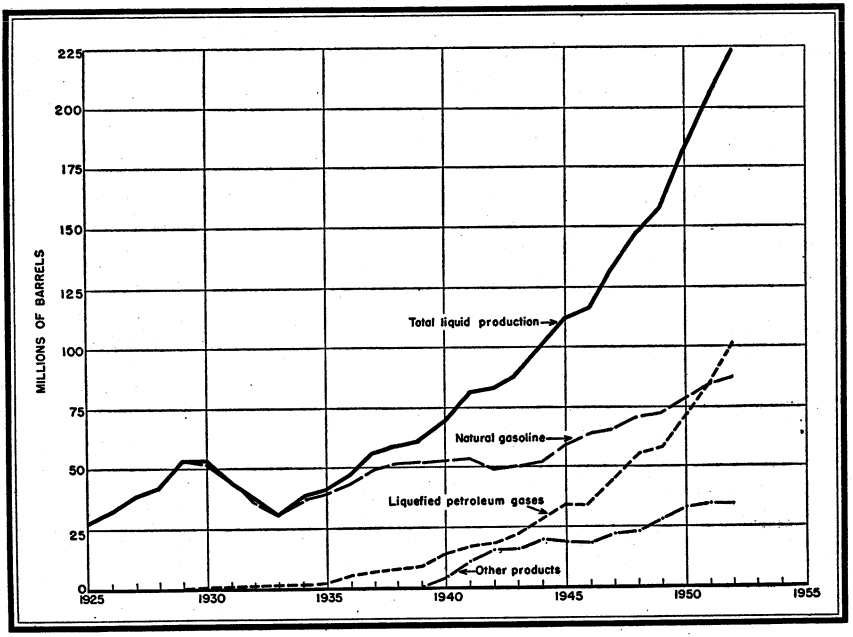

FIGURE 1.—Production of the natural-gas-liquids industry in the United States, 1925–52.

REVIEW BY STATES

California.—The production of all natural-gas liquids in California in 1952 increased 2 percent compared with 4 percent in each of the 2 previous years. A 12-percent increase in LP-gas production accounted for most of the gain.

Louisiana.—The production of natural-gas liquids increased 3 percent in Louisiana in 1952. The overall increase was held down by the decreased production in the Inland area of the State. Production in the Gulf Coast area increased 9 percent largely because of increased field condensate production and production at the new plant of Acadia Corp. at Egan, Acadia Parish.

Oklahoma.—The annual rate of growth of natural-gas-liquid production in Oklahoma dropped sharply from nearly 20 percent in 1950 and 1951 to 6 percent in 1952. The increase during the year was mainly in the production of LP-gases, which rose 11 percent. Shutting-down of a number of small plants in 1951 and 1952 and the temporary disruption of production by a strike in the industry in May 1952 contributed to the slower expansion in 1952.

Texas.—Texas produced 54 percent of the total natural-gas-liquids output in 1952 compared with 53 percent in 1951. The 11-percent increase in output was higher than the national increase of 9 percent; in fact, Texas has set the pattern for the national trend, with the annual rate of increase tapering off since 1950. Although all districts produced more, West Texas was outstanding with an 18-percent gain from 1951.

TABLE 4.—Monthly production of natural-gas liquids in the United States, 1952, by State and district,[1] in thousands of barrels

State and district	January	February	March	April	May	June	July
West Pennsylvania	17	16	16	12	33	30	10
West Virginia	523	472	481	485	483	450	451
Ohio	4	4	4	5	5	2	2
Illinois and Michigan	252	230	230	239	230	229	226
Kentucky	391	377	389	367	359	336	339
Kansas	456	435	415	367	233	255	296
Oklahoma	1,638	1,522	1,541	1,497	1,300	1,445	1,505
Texas:							
Gulf	2,417	2,265	2,285	2,220	2,135	2,113	2,184
East Texas	1,020	964	1,013	994	911	1,023	1,049
Panhandle	1,707	1,662	1,650	1,516	1,537	1,281	1,344
West Texas	2,025	2,012	2,243	2,206	1,635	2,275	2,252
Rest of State	2,952	2,820	2,915	2,733	2,697	2,644	2,750
Total Texas	10,121	9,723	10,106	9,669	8,915	9,336	9,579
Arkansas	225	209	224	214	217	216	221
Louisiana:							
Gulf	766	761	744	733	724	779	743
Inland	1,218	1,139	1,191	1,121	1,090	1,050	1,060
Total Louisiana	1,984	1,900	1,935	1,854	1,814	1,829	1,803
Mississippi	105	94	105	96	105	98	102
New Mexico	511	487	534	522	480	559	575
Colorado, Montana, Nebraska, Utah, and Wyoming	269	252	267	248	232	242	257
California	2,719	2,495	2,636	2,461	2,515	2,395	2,417
Total United States	19,215	18,216	18,883	18,036	16,921	17,422	17,783
Daily average	620	628	609	601	546	581	574

State and district	August	September	October	November	December	Total
West Pennsylvania	10	9	10	13	14	190
West Virginia	459	457	503	512	512	5,788
Ohio	2	4	2	2	2	38
Illinois and Michigan	238	241	244	229	238	2,826
Kentucky	352	334	399	386	420	4,449
Kansas	286	333	425	510	575	4,586
Oklahoma	1,521	1,523	1,686	1,666	1,769	18,613
Texas:						
Gulf	2,233	2,267	2,455	2,383	2,474	27,431
East Texas	1,094	1,075	1,022	956	979	12,100
Panhandle	1,498	1,519	1,687	1,687	1,860	18,948
West Texas	2,423	2,426	2,541	2,309	2,772	27,119
Rest of State	2,870	2,837	3,065	3,049	3,224	34,556
Total Texas	10,118	10,124	10,770	10,384	11,309	120,154
Arkansas	220	217	224	224	229	2,640
Louisiana:						
Gulf	840	842	839	898	889	9,558
Inland	1,088	1,083	1,177	1,146	1,162	13,525
Total Louisiana	1,928	1,925	2,016	2,044	2,051	23,083
Mississippi	96	94	127	121	127	1,270
New Mexico	587	575	596	584	617	6,627
Colorado, Montana, Nebraska, Utah, and Wyoming	256	268	285	269	292	3,137
California	2,323	2,272	2,458	2,604	2,819	30,114
Total United States	18,396	18,376	19,745	19,548	20,974	223,515
Daily average	593	613	637	652	677	611

[1] West Pennsylvania separated from east part of State to allow grouping either in a Bureau of Mines refinery district or Petroleum Administration for War district. Districts shown for Texas and Louisiana are Bureau of Mines production districts.

Other States.—In 1952 New York dropped from the list of States producing natural gasoline. Production in Illinois and Michigan again declined; Pennsylvania, Ohio, and Montana also produced less. Production in Kentucky increased as a result of the operations of the Tennessee Gas Transmission Co. plant, completed in 1951. In New Mexico production of natural-gas liquids increased 19 percent.

YIELDS, PROCESSES, AND NUMBER OF PLANTS

Cycling Plants.—In 1952, 48.2 million barrels of natural-gas liquids was produced at cycling plants. These plants treated 1,336 billion cubic feet of gas for an average yield of 1.52 gallons per 1,000 cubic feet.

Yields.—The average yield of total natural-gas liquids more than recovered from the decline in 1951 to 1.46 gallons per 1,000 cubic feet for 1952. The increased yield was due entirely to higher recoveries of LP-gases. The yield of heavier products changed slightly to 0.79 gallon per 1,000 cubic feet. The recovery of more propane from the gas stream and the recovery of ethane in some instances resulted in the high LP-gas yield. Propane production increased 21 percent in 1952, while total natural-gas liquids increased 9 percent.

The average value of products recovered per 1,000 cubic feet of gas treated rose from 8.2 cents in 1951 to 8.3 cents in 1952, an increase of 1 percent. The average yield increased 5 percent.

Production by Processes.—There was an increase of four operating plants in 1952 over 1951. Both the number of operating absorption plants and cycling plants increased. The number of compression plants continued to decrease, particularly in Pennsylvania. Only one charcoal-type plant in West Virginia remained operating.

TABLE 5.—Natural-gas liquids produced in the United States in 1952, by States and by methods of manufacture

State	Number of plants operating				Production (thousands of barrels)			
	Compression [1]	Absorption [2]	Cycling [3]	Total	Compression	Absorption	Cycling	Total
Arkansas		8	1	9		2,173	467	2,640
California		72	2	74		25,997	4,117	30,114
Illinois	4	5		9	[4] 38	2,788		[4] 2,826
Kansas	3	16		19	52	4,534		4,586
Kentucky	2	3		5	2,837	1,612		4,449
Louisiana	2	36	6	44	77	12,900	10,106	23,083
Michigan	3			3	[4]			[4]
Mississippi		2	1	3		382	888	1,270
New Mexico		13		13		6,627		6,627
Ohio		3		3		38		38
Oklahoma	8	63	2	73	328	15,946	2,339	18,613
Pennsylvania	5	6		11	11	179		190
Texas	14	159	33	206	2,219	87,645	30,290	120,154
West Virginia	28	15		43	3,602	2,186		5,788
Wyoming	1	6		7	78	2,076		2,154
Undistributed [5]		3		3		983		983
Total: 1952	70	410	45	525	9,242	166,066	48,207	223,515
1951	78	402	41	521	6,324	154,519	43,911	204,754

[1] Includes 13 plants manufacturing LP-gases; and 1 refrigeration-type plant in Kentucky.
[2] Includes combination of absorption with compression process. Includes 290 plants manufacturing LP-gases; and 1 charcoal-type plant in West Virginia.
[3] Includes 39 plants manufacturing LP-gases.
[4] Michigan included with Illinois.
[5] Colorado, Montana, Nebraska, with 1 absorption process plant each, and Utah with production of a small amount of drip gasoline, included under "Undistributed" to avoid disclosure of individual company operations.

MARKET DEMAND—SHIPMENTS

Total demand at plants and terminals for natural-gas liquids was 225.3 million barrels in 1952, 9 percent greater than in 1951. Demand for natural gasoline in 1952 rose 5 percent and for LP-gases 17 percent.

For Motor-Fuel Use.—Shipments of natural-gas liquids to refineries for use in the production of gasoline motor fuel totaled 114.4 million barrels in 1952. The 1952 figure includes 1.1 million barrels of propane delivered to refineries. In previous years the quantity of propane delivered to refineries had been small and was included in "Other LP-gases." The utilization of natural-gas liquids at refineries increased in all districts except the East Coast and Appalachian districts.

Shipments (and losses) to jobbers and exports of natural-gas liquids, for use in gasoline-motor-fuel production totaled 27.1 million barrels. In 1952 all isobutane not delivered to refineries was shown as delivered to jobbers. In previous years this, if so reported, was shown as LP-gas for fuel.

TABLE 6.—Supply and distribution at plants and terminals[1] of natural-gas liquids in the United States, 1952, by months, in thousands of barrels

	January	February	March	April	May	June	July
Production:							
Natural gasoline and natural-gasoline mixtures	7,003	6,715	7,135	7,109	6,707	7,252	7,473
LP-gases:							
Propane	4,037	3,879	3,955	3,461	3,169	3,102	3,109
Butane, normal	1,778	1,752	1,687	1,447	1,443	1,585	1,593
Isobutane	531	542	568	509	478	518	530
Isopentane	186	186	201	150	194	195	207
Butane-propane mixture	1,619	1,597	1,642	1,779	1,411	1,375	1,412
Other LP-gas mixtures	1,061	776	837	868	826	789	777
Finished gasoline and naphtha	1,883	1,732	1,786	1,727	1,668	1,674	1,734
Condensate, raw	775	714	742	668	698	617	620
Other products	342	323	330	318	327	315	328
Total	19,215	18,216	18,883	18,036	16,921	17,422	17,783
Receipts from outside sources[2]	168	180	192	157	209	127	214
Total new supply	19,383	18,396	19,075	18,193	17,130	17,549	17,997
Stock change at plants and terminals	−269	540	826	−337	32	496	46
For motor fuel:							
Shipments to refineries:							
Natural gasoline and natural-gasoline mixtures	6,594	6,192	6,518	6,388	6,514	6,856	7,156
Propane	125	111	109	62	55	44	46
Butane, normal	704	650	575	638	376	533	605
Isobutane	383	383	393	368	327	365	368
Isopentane	158	159	161	147	179	197	196
Other LP-gas mixtures	363	334	331	271	197	229	210
Finished gasoline and naphtha	467	444	442	408	401	481	427
Condensate	787	691	709	696	573	623	571
Shipments to jobbers, exports, and losses:[3]							
Natural gasoline	710	493	605	764	488	528	740
LP-gases	186	212	224	243	294	294	299
Finished gasoline and naphtha	1,396	1,209	1,462	1,330	1,590	1,247	1,252
Condensate	16	16	16	11	17	17	30
Transfers to non-motor-fuel uses:							
LP-gases:							
For fuel[3]	6,023	5,584	5,242	5,752	4,577	4,319	4,640
For chemical manufacture	1,372	1,023	1,118	1,161	1,201	1,048	1,118
Other products	368	355	344	291	309	272	293
Total demand at plants and terminals	19,652	17,856	18,249	18,530	17,098	17,053	17,951

TABLE 6.—Supply and distribution at plants and terminals [1] of natural-gas liquids in the United States, 1952, by months, in thousands of barrels—Continued

	August	September	October	November	December	Total
Production:						
Natural gasoline and natural-gasoline mixtures	7,686	7,464	7,737	7,460	7,539	87,280
LP-gases:						
Propane	3,236	3,520	4,021	4,065	4,634	44,188
Butane, normal	1,566	1,689	1,835	1,753	1,963	20,091
Isobutane	527	535	599	603	628	6,568
Isopentane	186	180	223	191	196	2,295
Butane-propane mixture	1,659	1,465	1,473	1,500	1,832	18,764
Other LP-gas mixtures	747	794	864	882	906	10,127
Finished gasoline and naphtha	1,799	1,721	1,888	1,848	1,976	21,436
Condensate, raw	649	664	746	888	933	8,714
Other products	341	344	359	358	367	4,052
Total	18,396	18,376	19,745	19,548	20,974	223,515
Receipts from outside sources [2]	126	108	170	170	177	1,998
Total new supply	18,522	18,484	19,915	19,718	21,151	225,513
Stock change at plants and terminals	208	−427	80	−281	−734	180
For motor fuel:						
Shipments to refineries:						
Natural gasoline and natural-gasoline mixtures	6,973	7,265	7,492	7,255	7,191	82,394
Propane	70	96	111	130	200	1,159
Butane, normal	495	601	614	629	659	7,079
Isobutane	364	370	416	413	425	4,575
Isopentane	182	193	196	173	173	2,114
Other LP-gas mixtures	203	247	297	331	434	3,447
Finished gasoline and naphtha	424	419	442	436	457	5,248
Condensate	624	609	756	834	880	8,353
Shipments to jobbers, exports, and losses: [3]						
Natural gasoline	718	577	602	639	645	7,509
LP-gases	274	263	248	229	262	3,028
Finished gasoline and naphtha	1,376	1,326	1,361	1,293	1,521	16,363
Condensate	23	22	23	23	32	246
Transfers to non-motor-fuel uses:						
LP-gases:						
For fuel [3]	5,147	5,401	5,671	6,019	7,324	65,699
For chemical manufacture	1,128	1,156	1,231	1,218	1,235	14,009
Other products	313	366	375	377	447	4,110
Total demand at plants and terminals	18,314	18,911	19,835	19,999	21,885	225,333

[1] Terminals owned by producers.
[2] Mainly straight-run gasoline from refineries.
[3] Of the total exports from plants and terminals, an estimated 1,418,000 barrels are included with shipments of LP-gases for fuel and are excluded from shipments to jobbers, exports, and losses. This portion of the exports is not separable by months.

For Non-Motor-Fuel Uses.—Domestic sale of LP-gases for fuel increased 12 percent above 1951, whereas total sales of LP-gases and LR-gases for fuel use increased only 8 percent. Sales of LP-gases for chemical manufacture increased 15 percent from 1951. From 1950 to 1951 the increase had been 42 percent.

Mode of Transport.—In 1952, pipelines carried 48 percent of the shipments of natural-gas liquids from plants. Fifty-one percent had been handled by pipeline in 1951. Tank trucks again carried 24 percent, tank cars 22 percent, a 1-percent increase, and barges 1 percent, a 1-percent decrease in 1952. Retail sales directly from the plant were up 3 percent in 1952, to represent 5 percent of total sales.

TABLE 7.—Natural-gas liquids utilized at refineries in the United States, 1952, by Bureau of Mines refinery districts and by months, in thousands of barrels

District	January	February	March	April	May	June	July
East Coast	211	219	177	150	219	347	310
Appalachian	41	46	43	13	8	7	6
Indiana, Illinois, Kentucky, etc.	1,017	932	1,078	1,023	564	920	1,026
Oklahoma, Kansas, Missouri	905	757	673	588	520	673	785
Texas:							
Gulf Coast	2,396	2,265	2,231	2,290	1,531	2,515	2,309
Inland	1,265	1,312	1,292	1,122	1,386	1,150	1,426
Total Texas	3,661	3,577	3,523	3,412	2,917	3,665	3,735
Louisiana-Arkansas:							
Louisiana Gulf Coast	417	413	374	408	416	359	354
Arkansas, Louisiana Inland	114	156	156	128	112	121	117
Total Louisiana-Arkansas	531	569	530	536	528	480	471
Rocky Mountain	138	128	139	157	141	140	151
California	1,955	1,885	1,875	2,162	2,501	2,205	2,277
Total United States	8,459	8,113	8,038	8,041	7,398	8,437	8,761

District	August	September	October	November	December	Total
East Coast	278	259	302	320	460	3,252
Appalachian	7	7	11	14	12	215
Indiana, Illinois, Kentucky, etc.	964	1,058	1,229	1,320	1,182	12,313
Oklahoma, Kansas, Missouri	766	917	1,000	939	899	9,422
Texas:						
Gulf Coast	2,658	2,684	2,828	2,678	2,785	29,170
Inland	1,316	1,455	1,388	1,295	1,170	15,577
Total Texas	3,974	4,139	4,216	3,973	3,955	44,747
Louisiana-Arkansas:						
Louisiana Gulf Coast	355	362	454	400	437	4,749
Arkansas, Louisiana Inland	103	145	118	81	103	1,454
Total Louisiana-Arkansas	458	507	572	481	540	6,203
Rocky Mountain	174	193	201	213	208	1,983
California	2,317	2,106	2,228	2,057	2,195	25,763
Total United States	8,938	9,186	9,759	9,317	9,451	103,898

TABLE 8.—Percentage of natural-gas liquids in refinery gasoline in the United States, 1948–52, by Bureau of Mines refinery districts

Year	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Oklahoma, Kansas, Missouri	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas, Louisiana Inland	Rocky Mountain	California	Total
1948	0.8	2.4	5.0	8.9	25.0	8.3	4.8	7.1	3.8	17.2	8.5
1949	1.5	2.0	5.3	9.5	27.6	8.5	6.0	7.5	4.5	18.4	9.1
1950	3.5	1.7	5.0	8.3	26.0	10.7	5.9	13.8	4.1	19.0	9.5
1951	2.6	1.7	5.1	8.9	23.1	11.1	5.3	12.4	4.3	16.1	9.0
1952	2.2	.7	5.2	8.4	24.3	11.1	5.3	12.2	4.7	16.8	9.0

SALES OF LP-GASES [1]

Sales of LP-gases in 1952 for all uses other than gasoline production were up 6 percent compared with a 21-percent increase in 1951 and 23 percent in 1950 over 1949. Quantities reported sold for industrial fuel and for use in internal-combustion engines were greater by 24 and 28 percent, respectively. Only nominal gains were indicated for domestic and commercial uses and for chemical raw material. Deliveries of LP-gases to synthetic rubber plants and to manufactured-gas companies were 1 and 8 percent lower, respectively, in 1952. The Bureau of the Census, United States Department of Commerce, reported a 14-percent increase in exports of LP-gases during the year, a gain about half of that realized in 1950 and 1951. Exports have more than doubled since 1948.

TABLE 9.—Sales of LP-gases [1] in the United States, 1948–52, in thousands of gallons

Year	Butane	Percent of total	Propane	Percent of total	Butane-propane mixture	Percent of total	Total LP-gas	Percent increase over previous year
1948	512,615	18.7	1,279,744	46.8	944,442	34.5	2,736,801	23.8
1949	488,801	17.2	1,403,359	49.5	944,439	33.3	2,836,599	3.6
1950	568,038	16.3	1,938,301	55.7	976,228	28.0	3,482,567	22.8
1951	708,989	16.8	2,418,790	57.2	1,099,496	26.0	4,227,275	21.4
1952	639,282	14.3	2,513,595	56.1	1,324,502	29.6	4,477,379	5.9

[1] Data include LR-gases.

TABLE 10.—Sales of LP-gases [1] in the United States, 1948–52, by uses, in thousands of gallons

Year	Domestic and commercial	Chemical	Synthetic rubber	Internal combustion	Industrial	Gas manufacturing	All other	Total
1948	1,473,289	524,350	225,641	92,941	180,518	237,638	2,424	2,736,801
1949	1,627,550	544,886	177,850	77,981	162,197	239,210	6,925	2,836,599
1950	2,022,464	624,468	228,485	129,818	217,078	251,694	8,560	3,482,567
1951	2,166,813	844,507	374,864	289,991	262,102	281,692	7,306	4,227,275
1952	2,266,178	870,990	370,997	370,558	324,967	259,697	13,992	4,477,379

[1] Data include LR-gases.

The increased sales of LP-gases in 1952 varied somewhat in the different marketing areas. In district 3, where about 41 percent of the total sales is reported, the demand was up 2 percent over 1951, largely because of the requirements for synthetic rubber and chemical raw material. Over a quarter of the LP-gases were sold in district 2, where demand was up 5 percent in 1952. Increases of 8 percent in domestic sales, 10 percent for industrial fuel and 32 percent in deliveries for internal-combustion-engine use, were partly offset by lower requirements of chemical plants and manufactured-gas companies. The wider distribution of natural gas in the area during the year

[1] LP-gases, as used in this section, include LR- (liquid refinery) gases as well. The survey covering sales of LP-gases in the Pacific Coast marketing area (district 5) was made by E. T. Knudsen, Chief, Petroleum Statistics Branch, Bureau of Mines, San Francisco, Calif.

TABLE 11.—Sales of LP-gases [1] in the United States, 1951–52, by State and use, in thousands of gallons

PAW district and State	Domestic and commercial		Gas manufacturing		Industrial		Synthetic rubber		Chemical		Internal combustion		All other		Total		Percent of total	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
District 1:																		
Connecticut	16,612	17,285	6,056	14,128	13,527	12,619	11	126			620	671	232	1,682	37,058	46,511	4.7	5.3
Delaware	5,031	6,372	2,176	1,256	352	3,173			933	932	25	14		3	8,517	11,750	1.1	1.4
Florida	59,333	65,893	6,658	10,611	1,059	1,098					341	1,010	4	65	67,395	78,677	8.6	9.0
Georgia	51,775	62,094	9,900	11,284	3,116	3,346		20	175	152	1,215	1,338	209	155	66,390	78,389	8.4	9.0
Maine	11,349	11,655	461	1,011	491	616					76	81		54	12,377	13,417	1.6	1.5
Maryland and D. C.	20,239	21,038	3,059	3,542	1,458	2,554						20	125	70	24,881	27,224	3.2	3.1
Massachusetts	22,854	23,822	10,947	14,208	2,126	3,789		1		10			39	269	35,966	42,099	4.6	4.8
New Hampshire	9,529	10,101	1,165	1,472	109	1,118								25	10,803	12,716	1.4	1.5
New Jersey	30,691	24,202	7,926	4,871	26,263	23,498	31	21	3,179	4,084	19	27	281	342	68,390	57,045	8.7	6.5
New York	52,866	52,694	6,178	5,260	3,022	5,616			1,231	2,366	9	76	13	10	63,319	66,022	8.0	7.5
North Carolina	44,614	47,867	16,702	15,703	1,950	4,249			21		1,047	872	197	261	64,531	68,952	8.2	7.9
Pennsylvania	38,403	37,820	17,633	21,739	20,502	21,363	134	345	10,542	7,945	278	156	38	67	87,530	89,435	11.1	10.2
Rhode Island	5,150	4,227	4	158	556	670									5,710	5,055	.7	.6
South Carolina	29,817	31,200	6,650	4,653	3,231	4,304					64	179	110	49	39,872	40,385	5.1	4.6
Vermont	6,098	7,122	2,009	2,799	374	541									8,481	10,462	1.1	1.2
Virginia	25,069	25,289	4,482	3,782	1,938	3,317			62	113	32	107			31,583	32,608	4.0	3.7
West Virginia	6,299	6,207	1,560	654	4,077	3,606			140,562	183,436	620	637			153,118	194,540	19.5	22.2
Total	435,729	454,888	103,566	117,131	84,151	95,477	176	513	156,705	199,038	4,346	5,188	1,248	3,052	785,921	875,287	100.0	100.0
District 2:																		
Illinois	96,800	93,368	17,388	9,904	22,342	22,231	11	2,196	1,318	2,164	17,072	18,320	379	409	155,310	148,592	13.3	12.1
Indiana	45,283	50,817	20,445	12,712	7,028	10,267	105	418	36,295	26,027	2,688	7,453	688	690	112,532	108,384	9.7	8.8
Iowa	49,781	58,293	9,741	13,527	5,358	8,086					581	1,636	9	313	65,470	81,855	5.6	6.7
Kansas	79,567	93,337	92	109	6,272	8,622			911		12,730	12,300	122	162	99,694	114,530	8.6	9.3
Kentucky	26,489	29,269	1,508	1,375	1,364	1,055	1,443	1,446	50,062	52,839	1,064	1,355	62	20	81,992	87,359	7.1	7.1
Michigan	42,892	41,622	27,814	14,058	23,302	19,881	189	134	2,456	3,106	2,011	2,543	15	3	98,679	81,347	8.5	6.6
Minnesota	55,279	65,416	7,812	9,173	5,072	4,810				40	4,144	5,080	44	4	72,351	84,523	6.2	6.9
Missouri	68,501	81,463	4,466	3,218	4,270	4,904					1,434	4,057	22	167	78,693	93,809	6.7	7.7
Nebraska	42,375	48,808	2,225	2,328	1,484	1,470					1,591	3,162	220	71	47,895	55,839	4.1	4.6
North Dakota	20,516	20,458	2,156	1,753	528	162					1,486	8,536	130	135	24,816	31,044	2.1	2.5
Ohio	31,447	33,422	6,012	3,034	4,909	6,298	1,098	825	34	96	1,372	1,841	38	21	44,910	45,537	3.8	3.7
Oklahoma	105,131	108,227	2,239	1,552	5,672	7,336	76	339	299	572	19,105	19,911	207		132,729	137,937	11.4	11.2
South Dakota	32,158	33,572	3,839	3,139	1,216	1,024				16	2,006	2,326	240	292	39,459	40,369	3.4	3.3
Tennessee	22,554	21,738	4,102	3,312	543	2,338	29		15	2,289	224	415	85	125	27,552	30,217	2.4	2.5
Wisconsin	41,853	40,000	9,481	10,154	30,122	33,135				1	1,599	2,164	49	233	83,104	85,687	7.1	7.0
Total	760,626	819,810	119,320	89,348	119,482	131,619	2,951	5,358	91,390	87,150	69,107	91,099	2,310	2,645	1,165,186	1,227,029	100.0	100.0

District 3:																		
Alabama	41,892	43,771	2,934	2,475	3,864	4,354					1,007	1,226	11	47	49,708	51,873	2.8	2.8
Arkansas	73,946	86,449	489	388	2,856	2,984					4,338	6,543	745	772	82,374	97,136	4.6	5.3
Louisiana	128,913	85,496	688	574	4,794	2,735	66,264	89,770	104,617	110,048	15,907	18,594	62	20	321,245	307,237	18.0	16.9
Mississippi	53,903	74,930	73	115	1,282	1,200					8,009	8,607	9	1,256	63,276	86,108	3.5	4.7
New Mexico	44,698	36,741	5,444	4,607	332	3,576					7,091	19,105	1,295	861	58,860	64,890	3.3	3.6
Texas	347,269	338,442	3,665	5,853	28,752	58,551	273,987	243,405	438,303	423,863	120,382	142,837	242	2,269	1,212,600	1,215,220	67.8	66.7
Total	690,621	665,829	13,293	14,012	41,880	73,400	340,251	333,175	542,920	533,911	156,734	196,912	2,364	5,225	1,788,063	1,822,464	100.0	100.0
District 4:																		
Colorado	37,322	43,028	1,538	1,051	706	941					1,640	4,325	132	155	41,338	49,500	44.8	46.5
Idaho	5,540	6,891	4,930	2,370	427	521					43	65		48	10,940	9,895	11.8	9.3
Montana	9,681	10,015	508	527	620	383					719	2,680	20		11,548	13,605	12.5	12.8
Utah	3,030	6,129	200	220	200	638				27	582	1,551	39	103	4,051	8,668	4.4	8.2
Wyoming	19,536	20,998			1,565	1,073	2				3,388	2,613			24,491	24,684	26.5	23.2
Total	75,109	87,061	7,176	4,168	3,518	3,556	2			27	6,372	11,234	191	306	92,368	106,352	100.0	100.0
District 5:																		
Arizona	19,137	22,942	510	155	149	209					3,527	6,150			23,323	29,456	5.9	6.6
California	142,998	164,574	12,708	6,619	7,367	14,794	31,484	31,951	53,492	50,817	49,592	58,671	1,001	2,587	298,642	330,013	75.5	74.0
Nevada	4,475	6,324	5,039	6,203	484	1,058				47	108	128		20	10,106	13,780	2.5	3.1
Oregon	26,52	28,594	11,081	14,816	2,389	2,052					187	1,015	178	93	40,087	46,600	10.1	10.4
Washington	11,866	16,156	8,999	7,215	2,682	2,802					18	161	14	64	23,579	26,398	6.0	5.9
Total	204,728	238,590	38,337	35,038	13,071	20,915	31,484	31,951	53,492	50,864	53,432	66,125	1,193	2,764	395,737	446,247	100.0	100.0
Total U. S.	2,166,813	2,266,178	281,692	259,697	262,102	324,967	374,864	370,997	844,507	870,990	289,991	370,558	7,306	13,992	4,227,275	4,477,379	------	------

[1] Data include LR-gases.

TABLE 12.—Sales of LP-gases[1] in the United States, 1951–52, in thousands of gallons

PAW district and State	Butane		Propane		Butane and propane mixture		Total LP-gases		Percent change, 1951–52
	1951	1952	1951	1952	1951	1952	1951	1952	
District 1:									
Connecticut	1,349	4,268	35,436	42,122	273	121	37,058	46,511	25.5
Delaware	7	11	8,510	11,739			8,517	11,750	38.0
Florida	5,772	4,445	34,068	45,861	27,555	28,371	67,395	78,677	16.7
Georgia	4,294	7,396	43,047	43,822	19,049	27,171	66,390	78,389	18.1
Maine			12,367	13,417	10		12,377	13,417	8.4
Maryland and D. C.	581	1,397	24,300	25,827			24,881	27,224	9.4
Massachusetts	5,245	7,818	28,082	34,281	2,639		35,966	42,099	17.1
New Hampshire		90	10,732	12,626	71		10,803	12,716	17.7
New Jersey	9,282	6,477	59,094	48,922	14	1,646	68,390	57,045	−16.6
New York	2,180	1,347	60,283	61,858	856	2,817	63,319	66,022	4.3
North Carolina	2,755	630	56,175	63,136	5,601	5,186	64,531	68,952	6.9
Pennsylvania	2,090	3,454	80,352	75,247	5,088	10,734	87,530	89,435	2.2
Rhode Island			5,710	5,055			5,710	5,055	−11.5
South Carolina	1,768	2,131	27,951	28,661	10,153	9,593	39,872	40,385	1.3
Vermont		27	8,481	10,435			8,481	10,462	23.4
Virginia	1,112	871	30,410	31,737	61		31,583	32,608	3.2
West Virginia	1,917	4,181	18,316	18,816	132,885	171,543	153,118	194,540	27.1
Total	38,352	44,543	543,314	573,562	204,255	257,182	785,921	875,287	11.4
District 2:									
Illinois	16,009	10,122	122,655	129,971	16,646	8,499	155,310	148,592	−4.3
Indiana	6,773	6,746	71,094	74,190	34,665	27,448	112,532	108,384	−3.7
Iowa	2,654	5,524	61,779	75,657	1,037	674	65,470	81,855	25.0
Kansas	12,215	14,692	57,853	73,385	29,626	26,453	99,694	114,530	14.9
Kentucky	2,362	1,775	26,205	30,054	53,425	55,530	81,992	87,359	6.5
Michigan	9,979	8,969	87,659	71,508	1,041	870	98,679	81,347	−17.6
Minnesota	2,440	3,156	67,503	77,776	2,408	3,591	72,351	84,523	16.8
Missouri	2,991	3,130	64,961	80,644	10,741	10,035	78,693	93,809	19.2
Nebraska	1,072	1,888	43,085	49,862	3,738	4,089	47,895	55,839	16.6
North Dakota	666	1,446	22,813	25,279	1,337	4,319	24,816	31,044	25.1
Ohio	1,779	1,656	43,059	43,881	72		44,910	45,537	1.4
Oklahoma	14,049	13,779	60,957	70,934	57,723	53,224	132,729	137,937	3.9
South Dakota	792	232	37,857	39,297	810	840	39,459	40,369	2.3
Tennessee	1,134	872	21,439	24,383	4,979	4,962	27,552	30,217	9.7
Wisconsin	17,742	20,219	63,122	62,047	2,240	3,421	83,104	85,687	3.1
Total	92,657	94,206	852,041	928,868	220,488	203,955	1,165,186	1,227,029	5.3
District 3:									
Alabama	5,604	2,082	19,671	23,282	24,433	26,509	49,708	51,873	4.4
Arkansas	3,770	10,004	23,888	33,680	54,716	53,452	82,374	97,136	17.9
Louisiana	86,287	98,629	141,427	140,133	93,531	68,475	321,245	307,237	−4.4
Mississippi	4,937	4,100	19,312	25,798	39,027	56,210	63,276	86,108	36.1
New Mexico	5,972	8,341	35,400	39,399	17,488	17,150	58,860	64,890	10.2
Texas	409,469	325,794	467,867	383,053	335,264	506,373	1,212,600	1,215,220	.2
Total	516,039	448,950	707,565	645,345	564,459	728,169	1,788,063	1,822,464	1.9
District 4:									
Colorado	2,557	1,165	36,289	44,176	2,492	4,159	41,338	49,500	19.7
Idaho	595	249	10,203	9,446	142	200	10,940	9,895	−9.6
Montana	3,205	1,191	8,343	10,739		1,675	11,548	13,605	17.8
Utah	46	283	3,793	8,354	212	31	4,051	8,668	114.0
Wyoming	6,068	3,326	17,082	18,501	1,341	2,857	24,491	24,684	.8
Total	12,471	6,214	75,710	91,216	4,187	8,922	92,368	106,352	15.1
District 5:									
Arizona	16	44	13,483	9,164	9,824	20,248	23,323	29,456	26.3
California	44,953	41,729	166,521	191,352	87,168	96,932	298,642	330,013	10.5
Nevada		47	8,606	11,145	1,500	2,588	10,106	13,780	36.4
Oregon		11	36,081	44,676	4,006	1,913	40,087	46,600	16.2
Washington	4,501	3,538	15,469	18,267	3,609	4,593	23,579	26,398	12.0
Total	49,470	45,369	240,160	274,604	106,107	126,274	395,737	446,247	12.8
Total U. S.	708,989	639,282	2,418,790	2,513,595	1,099,496	1,324,502	4,227,275	4,477,379	5.9
Exports[2]							87,244	99,296	13.8
Grand total[2]							4,314,519	4,576,675	6.1

[1] Data include LR-gases.
[2] Not available by the different gases.

evidently resulted in a smaller demand of LP-gases by manufactured-gas companies. Distributors in district 1 reported deliveries up 11 percent in 1952 over 1951. Sales for all principal uses increased, especially for gas manufacturing, industrial fuel, and chemical raw material and solvents. Relatively smaller amounts of LP-gases were sold in district 4, where there was a gain of 15 percent in volume, and district 5, where dealers reported a 13-percent increase in market requirements in 1952.

Sales of butane were 10 percent lower in 1952. It is believed that the decline in butane deliveries was partly the result of a shift in demand for butane-propane mixtures, which were up 20 percent, and to the greater demand for butane for blending into motor fuel not included in these sales figures. The propane sold in 1952 increased 4 percent over the 1951 quantity.

STOCKS

Stocks of natural-gas liquids at plants and terminals increased 180,000 barrels in 1952; at refineries they declined 559,000.

Natural-gasoline stocks declined at both plants and terminals and at refineries. For the first time, stocks of LP-gases, which increased nearly 1 million barrels at plants and terminals, were higher than natural-gasoline stocks at the end of the year. Only small changes took place in LP-gas stocks at refineries and in stocks of other products.

TABLE 13.—Stocks of natural-gas liquids in the United States, 1948–51, and 1952 by months, in thousands of barrels

Date	Natural gasoline		LP-gases		Other products		Total		
	At plants and terminals	At refineries	At plants and terminals	At refineries	At plants and terminals	At refineries	At plants and terminals	At refineries	Grand total
Dec. 31:									
1948	2,538	1,071	748	303	760	159	4,046	1,533	5,579
1949	2,919	1,181	803	369	1,175	384	4,897	1,934	6,831
1950	2,461	1,726	1,229	432	1,397	110	5,087	2,268	7,355
1951	2,653	2,256	1,268	279	1,623	107	5,544	2,642	8,186
1952									
Jan. 31	2,518	2,209	1,166	274	1,591	138	5,275	2,621	7,896
Feb. 29	2,727	2,306	1,442	297	1,646	167	5,815	2,770	8,585
Mar. 31	2,930	2,396	2,179	337	1,532	153	6,641	2,886	9,527
Apr. 30	3,043	2,515	1,751	334	1,510	213	6,304	3,062	9,366
May 31	2,955	2,351	2,066	301	1,315	258	6,336	2,910	9,246
June 30	2,949	2,763	2,601	311	1,282	129	6,832	3,203	10,035
July 31	2,738	2,721	2,747	286	1,393	210	6,878	3,217	10,095
Aug. 31	2,858	2,181	2,505	356	1,423	99	7,086	2,636	9,722
Sept. 30	2,587	1,732	2,661	357	1,411	177	6,659	2,266	8,925
Oct. 31	2,399	1,698	2,892	316	1,448	137	6,739	2,151	8,890
Nov. 30	2,133	1,681	2,744	356	1,581	89	6,458	2,126	8,584
Dec. 31	2,011	1,653	2,191	360	1,522	70	5,724	2,083	7,807

PRICES

The average price of grade 26–70 natural gasoline to blenders f. o. b. group 3 was 6.22 cents per gallon in 1952, virtually unchanged from 1951. The price both at the beginning and at the end of the year was 6.875 cents per gallon. Following the normal seasonal

pattern, the price dropped to 5.5 cents during the summer. This seasonal decline took place early in March 1952, a month ahead of 1951, and the upturn at the end of the summer also occurred earlier.

The average refinery price of regular grade (82 octane) gasoline, f. o. b. Oklahoma (group 3), in 1952 was 10.59 cents per gallon, a slight increase from 10.56 cents average in 1951. The price in January was 10.5 cents per gallon and after weakening in March and April held steady at 10.69 cents during the latter half of the year.

The price of commercial propane, f. o. b. refineries New York harbor, was quoted at 7.0 to 7.5 cents per gallon in January 1952. By June the price had risen to 8.0 cents and remained constant during the rest of the year. The average value for the year was 7.71 cents per gallon compared with 7.07 cents for 1951.

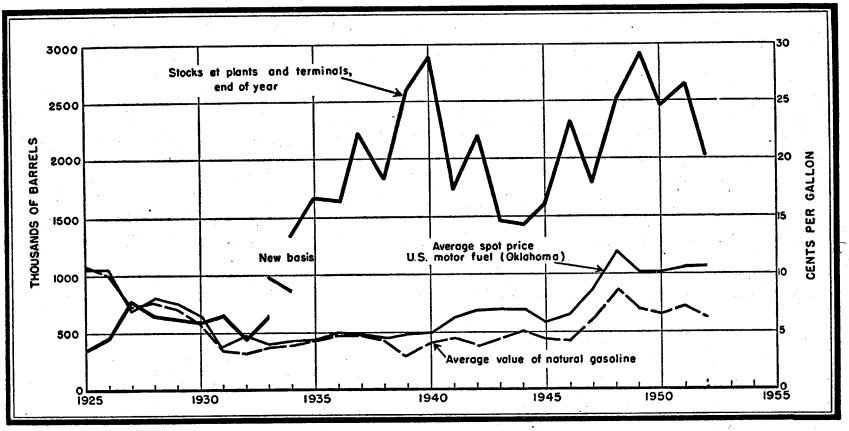

FIGURE 2.—Average value of natural gasoline, spot price of gasoline, and stocks of natural gasoline, 1925–52.

FOREIGN TRADE [2]

Export of natural gasoline in 1952 increased somewhat over the previous year owing to larger shipments to the Netherlands Antilles, but continued low compared to quantities exported in the late 1940's. Aside from the three major markets—Australia, Canada, and the Netherlands Antilles—small quantities were shipped to New Zealand and Italy.

Exports of LP-gases increased in 1952, but at a lesser rate than in the previous 3 years. Canada and Mexico remained the large markets. Shipments to Mexico continued to increase, while shipments to Canada were virtually the same as in 1951. Shipments to Brazil and Cuba, although relatively small in quantity, rose at a rapid rate.

[2] Figures on exports compiled by Mae B. Price and Elsie D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 14.—Natural gasoline exported from the United States, 1948–52, by countries, in thousands of barrels

[U. S. Department of Commerce]

	1948	1949	1950	1951	1952
Australia	268	408		711	368
Canada	1,356	1,412	846	715	719
Netherlands Antilles	591	882	92	102	706
Trinidad		324			
United Kingdom	1,815	1,065	61		
Sweden	33				
Other countries	3	273	(1)	113	70
Total	4,066	4,364	999	1,641	1,863

[1] Less than 500 barrels.

TABLE 15.—LP-gases [1] exported from the United States, 1948–52, by countries, in thousands of barrels [2]

[U. S. Department of Commerce]

Country	1948	1949	1950	1951	1952
Argentina	7	13	1		
Bermuda	6	7	8	10	10
Brazil	41	81	112	152	263
Canada	635	743	810	1,031	1,023
Cuba	6	11	30	53	81
France	(3)	(3)	15	30	(3)
Mexico	369	384	605	761	952
Philippines, Republic of	14	21	18	19	13
Other countries	6	11	14	21	22
Total	1,084	1,271	1,613	2,077	2,364

[1] Data include LR-gases.
[2] Converted from pounds to barrels at 189 pounds per barrel.
[3] Less than 500 barrels.

Petroleum and Petroleum Products

By A. G. White, A. T. Coumbe, D. S. Colby, and E. M. Seeley

GENERAL SUMMARY

DEMAND [1] for petroleum and petroleum products, in contrast to the previous year's high increase, was only 3.4 percent greater in 1952 than in 1951. Production was characterized by abnormal seasonal operations caused by refinery strikes during May, which affected a major part of the industry.

The increase in total demand comprised gains of 3.4 percent in domestic demand and 3.3 percent in total exports. However, from May through August, domestic demand, compared with that during the same period in 1951, increased slightly (1 million barrels), while exports declined 4 million. This relatively static demand was related to temporary shortages of gasoline caused by the refinery strike, deferred restocking of fuel oils by dealers, and reduced industrial demand during and after the long steel strikes in June and July.

The major results of the refinery strike were: Reduction of total crude runs to stills to 4.9 million barrels daily in May (a loss of at least 40 million barrels in normal runs), a gain of 20 million barrels in stocks of crude oil, and a decline of 26 million barrels in stocks of refined products during the month, with most of the abnormal reduction in gasoline stocks. Therefore, the usual seasonal rise in gasoline demand in the third quarter had to be supplied from current production. The major refinery shutdowns were in the Texas Gulf, Indiana-Illinois, and Oklahoma-Kansas districts. In June, crude runs to stills were back to or exceeded normal runs in all districts. A considerable movement of products, particularly gasoline, occurred between districts.

The shutdown of the Iranian refinery of over 500,000-barrel daily capacity in the middle of 1951 and through 1952 had a major effect on the foreign trade of the United States in oil products. Further expansion of refinery capacity in Western Europe, however, progressively modified the extent of the temporary world shortage. Furthermore, a much smaller increase in demand in 1952 in the United States and the rest of the world contributed to providing an ample supply of oil products.

The new supply of all oils [2] in the United States was 3.5 percent greater in 1952 than in 1951. The relative gains in production were 1.7 percent in crude and 7.8 percent in light oils (primarily natural-gas liquids); the import gains were 16.9 percent in crude and 8.5 percent

[1] Certain terms used in this chapter are more or less unique to the petroleum industry. Principal terms, and their meaning, are as follows:

Total demand.—A derived figure representing total new supply plus decreases or minus increases in reported stocks. Because there are substantial secondary and consumers' stocks that are not reported to the Bureau of Mines, this figure varies considerably from consumption.

Domestic demand.—Total demand less exports.

New supply of all oils.—The sum of crude oil production, plus production of natural-gas liquids, plus benzol (coke-oven) used for motor fuel, plus imports of crude oil and other petroleum products.

Transfers.—Crude oil conveyed to fuel oil stocks without processing or reclassification of products from one product category to another.

All oils.—Crude petroleum, natural-gas liquids, and their derivatives.

Principal products.—Gasoline, kerosine, distillate fuel oil, and residual fuel oil.

Exports.—Total shipments from continental United States, including shipments to United States Territories and possessions.

[2] For definition, see footnote 1 at beginning of this chapter.

in petroleum products. Stock increases, including gains of 16 million in crude and 24 million in products, were sufficient for all requirements.

TABLE 1.—Salient statistics of crude petroleum, refined products, and natural-gas liquids in the United States, 1948–52

	1948	1949	1950	1951	1952 [1]
Crude petroleum:					
Domestic production, thousands of barrels [2]	2,020,185	1,841,940	1,973,574	2,247,711	2,291,997
World production, do	3,433,234	3,404,025	3,802,843	4,286,443	4,498,057
United States proportion of world production, percent	59	54	52	52	51
Imports [3], thousands of barrels [2]	129,093	153,686	177,714	179,073	209,591
Exports [4], do	39,736	33,069	34,823	28,604	26,727
Stocks, end of year:					
Gasoline-bearing crude, do	246,572	} 253,356	248,463	255,783	271,928
California heavy crude, do	10,055				
Runs to stills, do	[5] 2,048,349	1,944,221	2,094,867	2,370,404	2,441,259
Total value of domestic production at wells, thousands of dollars	5,245,080	4,674,770	4,963,380	5,690,410	5,790,280
Average price per barrel at wells	$2.60	$2.54	$2.51	$2.53	$2.53
Total producing oil wells in the United States Dec. 31	437,880	448,680	465,870	474,990	488,520
Total oil wells completed in the United States during year (successful wells)	22,585	22,042	24,430	23,453	23,466
Refined products:					
Imports [4], thousands of barrels [2]	59,051	81,873	132,547	129,121	140,716
Exports [4], do	94,938	86,307	76,483	125,448	132,811
Stocks, end of year [6], do	343,537	342,932	326,892	370,140	394,019
Output of motor fuel, do	921,923	962,417	1,024,462	1,140,843	1,189,781
Yield of gasoline, percent	40.3	43.7	43.0	42.4	42.9
Completed refineries, end of year	375	367	357	350	343
Daily crude oil capacity of refineries, thousands of barrels [2]	6,439	6,696	6,964	7,333	7,639
Average dealers' net price (excluding tax) of gasoline in 50 United States cities, cents per gallon [7]	14.55	15.05	15.10	15.33	15.27
Natural-gas liquids:					
Production, thousands of barrels [2]	146,721	157,086	181,961	204,754	221,474
Stocks, end of year, do	5,579	6,831	7,355	8,186	7,807

[1] Preliminary except stock figures.
[2] 42 gallons per barrel.
[3] Bureau of Mines data.
[4] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data, 1948–52. Exports include shipments to the Territories.
[5] Figure on new basis and comparable with succeeding years. Figure for 1948 on old basis and comparable with preceding years—2,031,041,000 barrels.
[6] Stocks as shown are comparable with the unrevised stocks of the succeeding year. Comparable stocks for each succeeding year are shown on the same line below:

1948	*1949*	*1950*	*1951*	*1952*
343,537	342,704			
	342,932	326,892	351,146	
			370,140	394,019

At the end of 1951, bulk terminals were defined for reporting purposes as follows:
1. All bulk installations which receive their supplies by tankers, barges, or pipelines.
2. Any other storage point with a combined capacity of 50,000 barrels or more, regardless of the transportation means of products.

[7] American Petroleum Institute.

TABLE 2.—Supply of and demand for all oils [1] in continental United States, 1950 (total) and 1951–52, by months

[Thousands of barrels]

	1951—old basis [2]													1950 (total)
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
New supply:														
Domestic production:														
Crude petroleum	183,437	166,163	187,774	183,860	191,601	184,064	190,626	193,537	188,016	198,163	188,499	191,971	2,247,711	1,973,574
Natural-gas liquids	17,247	15,570	17,716	16,646	16,581	15,864	16,298	16,910	16,973	18,040	18,066	18,843	204,754	181,961
Benzol, etc	9	9	6	6	6	12	10	8	40	44	45	16	211	158
Total production	200,693	181,742	205,496	200,512	208,188	199,940	206,934	210,455	205,029	216,247	206,610	210,830	2,452,676	2,155,693
Imports:														
Crude petroleum [3]	15,472	13,096	14,971	15,319	16,051	16,889	16,940	16,404	15,000	13,054	12,760	13,117	179,073	177,714
Refined products [4]	14,958	13,163	12,094	11,179	11,001	9,462	7,501	7,783	7,318	10,801	11,198	12,663	129,121	132,547
Total new supply	231,123	208,001	232,561	227,010	235,240	226,291	231,375	234,642	227,347	240,102	230,568	236,610	2,760,870	2,465,954
Increase (+) or decrease (−) in stocks, end of period	−12,793	−11,174	−1,523	+13,433	+16,556	+15,260	+12,146	+8,109	+12,952	+7,040	−11,902	−15,699	+32,405	−20,409
Demand:														
Total demand	243,916	219,175	234,084	213,577	218,684	211,031	219,229	226,533	214,395	233,062	242,470	252,309	2,728,465	2,486,363
Exports: [4]														
Crude petroleum	2,913	2,471	2,640	3,615	1,791	2,342	2,320	2,361	2,199	1,947	1,858	2,147	28,604	34,823
Refined products	5,414	5,291	7,299	7,951	11,208	10,092	13,529	15,091	14,929	12,184	11,640	10,820	125,448	76,483
Domestic demand:														
Motor fuel	80,670	72,864	86,962	87,573	100,266	96,364	100,567	101,453	91,891	100,209	88,581	84,551	1,091,951	994,290
Kerosine	15,633	14,789	11,788	8,646	5,852	5,559	6,429	6,494	6,637	10,190	14,902	16,775	123,694	117,844
Distillate fuel oil	57,331	50,074	45,046	32,182	25,361	24,134	24,280	27,288	27,285	31,713	47,157	57,251	449,102	394,885
Residual fuel oil	56,223	51,088	53,974	47,042	44,104	42,230	39,459	40,454	39,547	44,995	50,883	54,322	564,321	553,793
Lubricants	3,540	3,115	3,691	3,544	3,858	3,631	3,348	3,591	3,313	4,085	3,420	3,156	42,292	38,853
Miscellaneous	22,192	19,483	22,684	23,024	26,244	26,679	29,297	29,801	28,594	27,739	24,029	23,287	303,053	275,392
Total domestic demand	235,589	211,413	224,145	202,011	205,685	198,597	203,380	209,081	197,267	218,931	228,972	239,342	2,574,413	2,375,057
Stocks, end of period:														
Crude petroleum	243,107	235,247	233,824	243,180	248,418	248,170	250,847	254,276	254,900	262,266	261,100	255,783	255,783	248,463
Natural-gas liquids	7,474	7,842	8,109	8,522	9,079	10,043	10,065	9,883	9,578	9,003	8,379	8,186	8,186	7,355
Refined products	319,336	315,654	315,287	318,951	329,712	344,256	353,703	358,565	371,198	371,447	361,335	351,146	351,146	326,892
Total stocks	569,917	558,743	557,220	570,653	587,209	602,469	614,615	622,724	635,676	642,716	630,814	615,115	615,115	582,710

TABLE 2.—Supply of and demand for all oils [1] in continental United States, 1950 (total) and 1951–52, by months—Continued

[Thousands of barrels]

	1951—new basis [2]													1950 [5]
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Total new supply (no change)	231,123	208,001	232,561	227,010	235,240	226,291	231,375	234,642	227,347	240,102	230,568	236,610	2,760,870	
Increase (+) or decrease (−) in stocks, end of period	−12,901	−10,839	−1,841	+13,200	+18,073	+16,241	+13,417	+10,217	+15,278	+5,335	−11,759	−17,430	+36,991	
Demand:														
Total demand	244,024	218,840	234,402	213,810	217,167	210,050	217,958	224,425	212,069	234,767	242,327	254,040	2,723,879	
Exports:														
Crude petroleum	2,913	2,471	2,640	3,615	1,791	2,342	2,320	2,361	2,199	1,947	1,858	2,147	28,604	
Refined products	5,414	5,291	7,299	7,951	11,208	10,092	13,529	15,091	14,929	12,184	11,640	10,820	125,448	
Domestic demand:														
Motor fuel	80,682	72,589	86,680	87,305	99,360	96,347	100,532	101,146	91,264	100,528	87,950	85,183	1,089,566	
Kerosine	15,379	15,124	11,936	8,747	5,586	5,167	6,062	6,409	6,457	10,480	15,111	16,783	123,241	
Distillate	57,665	50,052	45,041	32,445	24,865	23,832	23,736	25,537	26,040	32,571	47,391	58,103	447,278	
Residual fuel oil	56,239	50,715	54,431	47,179	44,255	41,960	39,134	40,489	39,273	45,233	50,928	54,561	564,397	
Lubricants	3,540	3,115	3,691	3,544	3,858	3,631	3,348	3,591	3,313	4,085	3,420	3,156	42,292	
Miscellaneous	22,192	19,483	22,684	23,024	26,244	26,679	29,297	29,801	28,594	27,739	24,029	23,287	303,053	
Total domestic demand	235,697	211,078	224,463	202,244	204,168	197,616	202,109	206,973	194,941	220,636	228,829	241,073	2,569,827	
Stocks, end of period:														
Crude petroleum	243,107	235,247	233,824	243,180	248,418	248,170	250,847	254,276	254,900	262,266	261,100	255,783	255,783	248,463
Natural-gas liquids	7,474	7,842	8,109	8,522	9,079	10,043	10,065	9,883	9,578	9,003	8,379	8,186	8,186	7,355
Refined products	333,636	330,289	329,604	333,035	345,313	360,838	371,556	378,526	393,485	392,029	382,060	370,140	370,140	[5] 341,300
Gasoline	128,139	137,478	141,688	138,992	133,227	129,183	123,183	116,460	116,930	111,901	115,812	127,120	127,120	116,347
Kerosine	18,634	17,776	15,135	17,639	21,974	26,204	29,679	32,728	35,773	35,759	32,116	27,088	27,088	21,430
Distillate fuel oil	62,163	51,348	46,744	48,239	59,272	72,140	84,282	94,028	104,082	109,544	101,666	86,619	86,619	76,021
Residual fuel oil	41,251	40,716	38,366	37,623	39,879	42,398	46,320	48,365	49,608	49,573	46,491	42,853	42,853	41,700
Total stocks	584,217	573,378	571,537	584,737	602,810	619,051	632,468	642,685	657,963	663,298	651,539	634,109	634,109	597,118

See footnotes at end of table.

	1952 [6]												1951 [2] (total)
New supply:													
Domestic production:													
Crude petroleum	192,712	184,654	198,028	192,882	158,310	185,917	188,868	192,798	195,528	202,044	194,611	205,645	2,291,997	2,247,711
Natural-gas liquids	19,035	18,049	18,709	17,878	16,770	17,271	17,628	18,232	18,211	19,562	19,360	20,769	221,474	204,754
Benzol, etc.	23	21	15	39	26	39	41	27	37	43	36	35	382	211
Total production	211,770	202,724	216,752	210,799	175,106	203,227	206,537	211,057	213,776	221,649	214,007	226,449	2,513,853	2,452,676
Imports:														
Crude petroleum [3]	15,123	14,228	15,817	16,170	16,903	17,434	18,519	19,596	18,459	19,948	18,709	18,685	209,591	179,073
Refined products [4]	14,343	13,032	13,534	11,498	12,586	9,917	9,122	7,639	8,608	12,212	10,802	17,423	140,716	129,121
Total new supply	241,236	229,984	246,103	238,467	204,595	230,578	234,178	238,292	240,843	253,809	243,518	262,557	2,864,160	2,760,870
Increase (+) or decrease (−) in stocks, end of period	−20,729	−7,014	+7,694	+9,583	−6,140	+17,739	+15,033	+14,488	+17,408	+3,123	+3,641	−15,181	+39,645	+36,991
Demand:														
Total demand	261,965	236,998	238,409	228,884	210,735	212,839	219,145	223,804	223,435	250,686	239,877	277,738	2,824,515	2,723,879
Exports: [4]														
Crude petroleum	2,303	2,211	2,939	3,340	1,718	2,388	1,876	1,966	1,664	1,526	1,805	2,991	26,727	28,604
Refined products	10,124	9,452	9,728	12,056	10,906	12,449	12,523	10,790	10,619	10,517	11,109	12,538	132,811	125,448
Domestic demand:														
Motor fuel	86,863	82,043	87,065	98,653	101,137	99,305	105,307	102,954	100,095	103,689	91,326	95,817	1,154,254	1,089,566
Kerosine	16,633	14,608	12,853	8,150	5,504	5,268	5,883	6,014	7,156	12,230	12,455	17,829	124,583	123,241
Distillate fuel oil	63,185	54,489	49,081	33,921	27,867	25,815	23,291	26,221	28,836	39,347	47,176	60,535	479,764	447,278
Residual fuel oil	56,246	49,796	50,721	45,119	38,500	36,285	37,027	42,094	41,267	50,395	48,304	60,109	555,863	564,397
Lubricants	3,381	2,827	2,990	3,509	2,525	3,414	3,224	3,343	3,433	3,711	2,800	2,993	38,150	42,292
Miscellaneous	23,230	21,572	23,032	24,136	22,578	27,915	30,014	30,422	30,365	29,271	24,902	24,926	312,363	303,053
Total domestic demand	249,538	225,335	225,742	213,488	198,111	198,002	204,746	211,048	211,152	238,643	226,963	262,209	2,664,977	2,569,827
Stocks, end of period:														
Crude petroleum	254,007	255,900	259,126	270,679	290,813	285,964	275,951	264,368	264,723	269,776	267,852	271,928	271,928	255,783
Natural-gas liquids	7,896	8,585	9,527	9,366	9,246	10,035	10,095	9,722	8,925	8,890	8,584	7,807	7,807	8,186
Refined products	351,477	341,881	345,407	343,598	317,444	339,243	364,229	390,673	408,523	406,628	412,499	394,019	394,019	370,140
Total stocks	613,380	606,366	614,060	623,643	617,503	635,242	650,275	664,763	682,171	685,294	688,935	673,754	673,754	634,109

[1] For definition of this and other terms used in the petroleum industry, see text footnote 1 at the beginning of this chapter.
[2] For definition of new basis, see table 1, footnote 6.
[3] Bureau of Mines data.
[4] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data.
[5] Comparable with new basis for 1951.
[6] Preliminary, except stock figures.

TABLE 3.—Demand for all oils [1] in continental United States, 1943–52

[Millions of barrels]

Year	Domestic demand	Exports	Total demand	Year	Domestic demand	Exports	Total demand
1943	1,521.4	150.0	1,671.4	1948	2,113.7	134.7	2,248.4
1944	1,671.3	207.6	1,878.9	1949	2,118.2	119.4	2,237.6
1945	1,772.7	183.0	1,955.7	1950	2,375.1	111.3	2,486.4
1946	1,792.8	153.1	1,945.9	1951	2,569.8	154.1	2,723.9
1947	1,989.8	164.5	2,154.3	1952 [2]	2,665.0	159.5	2,824.5

[1] See text footnote 1 at beginning of this chapter.
[2] Preliminary figures.

DEMAND

A change in the definition of bulk terminals (see table 1, footnote 6), effective at the beginning of 1952, increased substantially stocks of the four major products (gasoline, kerosine, and distillate and residual fuel oils) but made relatively small changes in total and domestic demand for these products. To permit comparison of monthly stock and demand data for corresponding periods in 1951 and 1952, stock data on the 1952 basis were collected for 1951. Consequently, table 2 is composed of a set of 1951 figures for comparison with 1950 and a second set with stocks on a basis comparable with 1952. All comparisons of data for these products in 1952 are with the new basis for 1951.

Total demand for all oils in 1952 averaged 7.7 million barrels daily, including exports of 436,000 barrels daily. Crude exports averaged a 6.8-percent daily decline, whereas product exports averaged a 5.5-percent increase. The sharp decline in crude exports after 1950 was related to expansion of the domestic crude supply in central Canada, a market that received 88 percent of our crude exports in 1950 and only 76 percent in 1952. Exports of oil products increased in the first half of 1952 but declined in the latter half, indicating an improved supply of products outside the United States.

The domestic demand for all oils was 7.3 million barrels daily in 1952, a 3.4-percent gain. The small increase in domestic demand reflected a static situation in the volume of industrial operations, moderate weather, and increasing competition from natural gas. A brief discussion of demand by products follows.

Motor Fuel.—Motor fuel includes gasoline and naphtha produced from crude oil and blended with other light oils. Aviation gasolines and low-grade gasoline blended in jet fuel are included, while diesel oil and liquefied gases used in internal-combustion engines are excluded. The total demand for motor fuel was 1.2 billion barrels in 1952, an increase of 5.1 percent, and was over 42 percent of the total demand for all oils. The increase of about 65 million in domestic demand included gains of 55 million for automotive highway use, 9 million for military and civilian aviation, and 1 million barrels for other uses, including naphthas, jet-fuel blends, military motor gasoline, and all other uses and losses. Motor fuel for highway use was 82 percent of the domestic demand for total motor fuels in 1952.

Residual Fuel Oil.—Demand for residual fuel oil declined 1.9 percent to 584 million barrels in 1952, almost 21 percent of the total demand for all oils. Domestic demand dropped 1.7 percent; the principal causes were the continued shift from use of residual to diesel

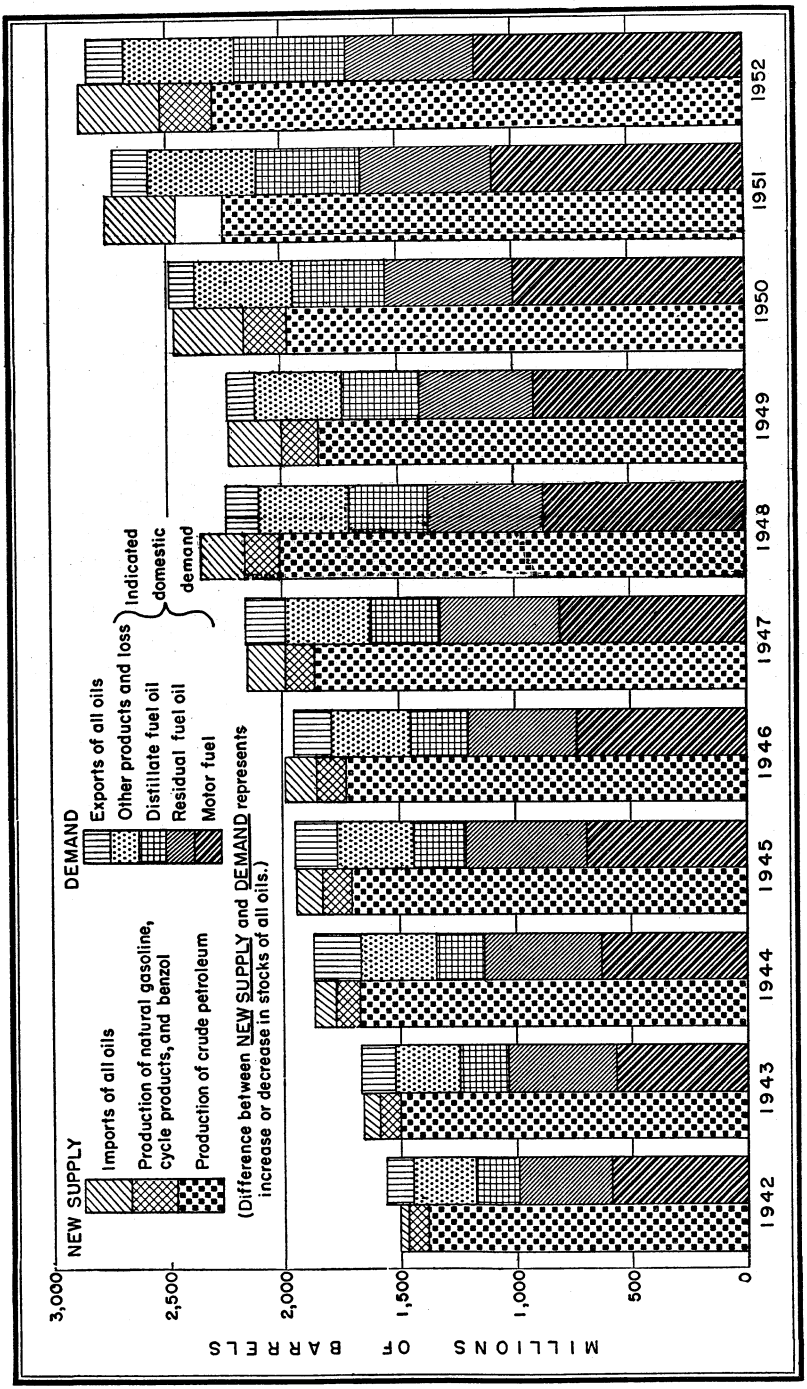

FIGURE 1.—Supply and demand of all oils in the United States, 1942–52.

fuel in railroad locomotives and increasing competition of natural gas. Exports of residual fuel oil declined 3.8 percent in 1952, while imports, representing 91 percent of total oil-product imports, increased 8 percent. Refinery production decreased almost 15 million barrels.

Distillate Fuel Oil.—Demand for distillate fuel oil was 514 million barrels in 1952, a 9-percent gain, and represented about 18 percent of the total demand for all oils. Exports rose 50 percent and comprised increased shipments of 5 million barrels to the Netherlands Antilles, 3 million to Canada, and 2 million barrels to Europe. A greater domestic demand included gains of about 14 million barrels in demand for heating oils, 8 million for railroad use, 3 million for vessel use, 1 million in military deliveries, and 6 million for miscellaneous uses. The heating-oil demand represented 55 percent of the total domestic demand for distillate fuel oil in 1952. Moderate weather and competition with natural gas kept the increase in heating-oil demand low. Much of the increase for miscellaneous uses was due to use of diesel oil by trucks.

Kerosine.—Kerosine demand represented less than 5 percent of the total demand for all oils and increased only slightly in 1952. Exports, however, gained 16 percent, largely because of greater shipments to India and Egypt; the increase was offset, in part, by declining exports to Europe. The small gain (0.6 percent) in domestic demand for kerosine was due to increased use as range oil and for small-space heating. Substitution of light distillate oil, natural gas, and liquefied gases has slowed the demand for kerosine.

Other Products.—The relatively small gain of less than 1 percent in total demand for "other" products in 1952 was the result of a 1-million-barrel decline in exports, chiefly lubricants, and only a slight gain in domestic demand. Domestic demand for asphalt (computed on a daily average) increased 8 percent and demand for liquefied gases 7 percent, whereas demand for lubricants declined 10 percent and petroleum coke 5 percent.

Shipments to United States Territories and Possessions.—Shipments from the United States to its Territories and possessions are considered United States exports, and any imports from foreign countries to these areas are deleted from United States total imports. The major part of continental United States exports to Territories and possessions is shipped to Hawaii, Alaska, and Puerto Rico. Puerto Rico is the chief importer of foreign oils. Table 4 shows the total shipments of oil into these areas from the United States and foreign countries.

Total shipments of petroleum to the Territories and possessions rose from 20.2 million barrels in 1951 to 22.0 million in 1952. The indicated demand, after reexports are deducted, was 21.6 million barrels in 1952.

TABLE 4.—Imports of crude petroleum and petroleum products into United States Territories and possessions, 1951–52 [1]

[Thousands of barrels]

Product	1951			1952 [2]		
	From continental United States	Foreign	Total	From continental United States	Foreign	Total
Gasoline	7,040	18	7,058	7,476	263	7,739
Kerosine	857		857	851	29	880
Distillate fuel oil	2,846	1,140	3,986	2,905	907	3,812
Residual fuel oil	4,919	2,803	7,722	5,466	3,614	9,080
Lubricants: Grease	5		5			
Oil	220		220	195		195
Wax						
Coke	46		46	42		42
Asphalt	248	7	255	149	39	188
Liquefied gases	56		56	49		49
Total	16,237	3,968	20,205	17,133	4,852	21,985

[1] Source: U. S. Department of Commerce, except for imports to Alaska and Hawaii from continental United States, which are Bureau of Mines data.
[2] Preliminary figures.

WORLD OIL SUPPLY

World production of crude petroleum increased 4.6 percent on a daily average basis in 1952. The total increase of 212 million barrels included a 44-million gain for the United States and a 168-million gain for the rest of the world. The largest increases in production outside the United States were: Iraq, 76 million barrels; Kuwait, 69 million; Venezuela, 38 million; U. S. S. R., 37 million (estimated); Saudi Arabia, 24 million; and Canada, 14 million. The principal decline was 118 million barrels for Iran. The United States produced 51 percent of the world supply in 1952.

Crude oil refined for the entire world averaged 12.1 million barrels daily, which included increases of 2.7 percent for the United States and 6.4 percent for other countries. The increase in crude refined in Western Europe from 793,000 barrels daily in 1950 to 1,435,000 barrels daily in 1952 was a major factor in replacing the loss of petroleum products caused by the shutdown of the Iranian refinery. Easing of the supply shortage outside the United States is evidenced by the gain of 31,000 barrels daily in product imports and only 19,000 barrels in product exports for continental United States in 1952.

RESERVES

The Committee on Petroleum Reserves of the American Petroleum Institute estimated proved reserves of crude petroleum in the United States on December 31, 1952, at 28 billion barrels. These estimates include only oil recoverable under existing economic and operating conditions.

The increase in net crude reserves in 1952 was 493 million barrels. New reserves were estimated to be 2,749 million barrels in 1952, of which 744 million represented upward revisions of previous estimates, 1,509 million extensions of old pools, and 496 million new reserves discovered in new fields and in new pools in old fields. Deduction of an estimated production of 2,257 million barrels of crude during 1952 (exclusive of condensate) resulted in the indicated net gain.

As of December 31, 1952, Texas had 53.3 percent of total estimated reserves, California 13.8 percent, Louisiana 9.1 percent, and Oklahoma 5.6 percent—81.8 percent for the four States combined.

TABLE 5.—Estimates of proved oil reserves [1] in the United States on Dec. 31, 1945–52, by States [2]

[Millions of barrels]

State	1945	1946	1947	1948	1949	1950	1951	1952
Eastern States:								
Illinois	350	351	355	393	468	564	646	619
Indiana	41	44	46	49	50	57	51	56
Kentucky	57	59	65	59	56	56	59	56
Michigan	64	69	70	69	66	79	64	57
New York	81	76	71	67	63	59	57	53
Ohio	30	29	29	29	28	27	26	27
Pennsylvania	110	98	123	110	103	106	95	122
West Virginia	39	36	36	37	38	39	39	37
Total	772	762	795	813	872	987	1,037	1,027
Central and Southern States:								
Arkansas	288	267	297	300	297	342	337	352
Kansas	542	545	563	674	738	732	792	917
Louisiana	1,559	1,652	1,791	1,869	1,910	2,185	2,285	2,558
Mississippi	257	270	304	365	403	386	385	359
New Mexico	512	544	530	552	592	592	612	733
Oklahoma	889	898	953	1,250	1,330	1,397	1,476	1,558
Texas	10,835	11,647	11,777	12,484	13,510	13,582	15,315	14,916
Total	14,882	15,823	16,215	17,494	18,780	19,216	21,202	21,393
Mountain States:								
Colorado	260	300	382	366	345	339	325	306
Montana	108	104	115	119	112	111	108	156
Utah				1	16	22	30	42
Wyoming	600	589	679	716	692	841	973	1,065
Total	968	993	1,176	1,202	1,165	1,313	1,436	1,569
Pacific Coast States: California	3,318	3,294	3,295	3,764	3,823	3,734	3,761	3,854
Other States	2	2	7	7	9	18	32	118
Total, United States	19,942	20,874	21,488	23,280	24,649	25,268	27,468	27,961

[1] Excludes condensate.

[2] From reports of Committee on Petroleum Reserves, American Petroleum Institute, of the amount of crude oil that may be extracted by present methods from fields completely developed or sufficiently explored to permit reasonably accurate calculations. The change in reserves during any year represents total new discoveries, extensions, and revisions, minus production.

CRUDE PETROLEUM

SUPPLY AND DEMAND

The new supply of crude petroleum in the United States averaged 6.8 million barrels daily in 1952, a 2.8-percent gain over 1951. Domestic production increased 1.7 and imports 16.9 percent. The supply of crude oil proved to be more than was required in 1952 as measured by an increase during the year of 16.1 million barrels in total crude stocks and 23.9 million in product stocks.

Total demand for crude (new supply plus or minus changes in crude stocks) was 2.5 billion barrels in 1952, a 2.4-percent gain in daily average. Crude runs to stills at refineries were up 2.7 percent in daily average. Exports decreased 1.9 million barrels, and the amount used as fuel and the losses decreased 3 million.

TABLE 6.—Supply of and demand [1] for crude petroleum in continental United States, 1948–52

[Thousands of barrels]

	1948	1948 [2]	1949	1950	1951	1952 [3]
Production	2,020,185	2,020,185	1,841,940	1,973,574	2,247,711	2,291,997
Imports [4]	129,093	129,093	153,686	177,714	179,073	209,591
Total new supply	2,149,278	2,149,278	1,995,626	2,151,288	2,426,784	2,501,588
Increase (+) or decreases (−) in stocks, end of year [5]	+25,973	+25,973	−3,271	−4,893	+7,320	+16,145
Demand: [1]						
Domestic crude	1,998,357	1,998,357	1,844,173	1,979,764	2,237,305	2,278,852
Foreign crude	124,948	124,948	154,724	176,417	182,159	206,591
Total demand	2,123,305	2,123,305	1,998,897	2,156,181	2,419,464	2,485,443
Runs to stills:						
Domestic	1,907,027	1,924,335	1,789,756	1,918,854	2,188,677	2,235,198
Foreign	124,014	124,014	154,465	176,013	181,727	206,061
Exports [6]	39,736	39,736	33,069	34,823	28,604	26,727
Transfers to fuel oil: [1]						
Distillate	3,543	3,403	2,701	2,537	2,863	2,705
Residual	23,847	6,699	4,750	5,325	6,006	6,343
Other fuel uses and losses	25,138	25,118	14,156	18,629	11,587	8,409
Total demand	2,123,305	2,123,305	1,998,897	2,156,181	2,419,464	2,485,443

[1] For definition, see text footnote 1 at the beginning of this chapter.
[2] Includes California data on a new basis to compare with subsequent years.
[3] Preliminary figures except stocks.
[4] Bureau of Mines data.
[5] Inclusive of heavy crude in California, separately reported in 1948; separation discontinued in 1949.
[6] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data.

TABLE 7.—Supply of and demand for crude petroleum in continental United States, 1951–52, by months

[Thousands of barrels]

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Supply: Production	183,437	166,163	187,774	183,860	191,601	184,064	190,626	193,537	188,016	198,163	188,499	191,971	2,247,711
Imports [1]	15,472	13,096	14,971	15,319	16,051	16,889	16,940	16,404	15,000	13,054	12,760	13,117	179,073
Total new supply	198,909	179,259	202,745	199,179	207,652	200,953	207,566	209,941	203,016	211,217	201,259	205,088	2,426,784
Change in stocks, end of period: Domestic	−3,832	−7,225	−1,705	+7,801	+5,799	−989	+2,926	+3,259	+1,411	+8,064	−115	−4,988	+10,406
Foreign	−1,524	−635	+282	+1,555	−561	+741	−249	+170	−787	−698	−1,051	−329	−3,086
Demand: [2] Domestic	187,269	173,388	189,479	176,059	185,802	185,053	187,700	190,278	186,605	190,099	188,614	196,959	2,237,305
Foreign	16,996	13,731	14,689	13,764	16,612	16,148	17,189	16,234	15,787	13,752	13,811	13,446	182,159
Runs to stills: Domestic	183,032	170,040	185,981	171,747	182,937	181,105	183,156	186,516	180,979	186,093	184,470	192,621	2,188,677
Foreign	16,926	13,705	14,554	13,741	16,584	16,141	17,166	16,205	15,773	13,733	13,788	13,411	181,727
Exports [3]	2,913	2,471	2,640	3,615	1,791	2,342	2,320	2,361	2,199	1,947	1,858	2,147	28,604
Transfers: Distillate	229	211	253	232	243	241	235	248	234	233	248	256	2,863
Residual	497	431	437	397	468	396	480	630	595	562	555	558	6,006
Losses	668	261	303	91	391	976	1,532	552	2,612	1,283	1,506	1,412	11,587
1952 [4]													
Supply: Production	192,712	184,654	198,028	192,882	158,310	185,917	188,868	192,798	195,528	202,044	194,611	205,645	2,291,997
Imports [1]	15,123	14,228	15,817	16,170	16,903	17,434	18,519	19,596	18,459	19,948	18,709	18,685	209,591
Total new supply	207,835	198,882	213,845	209,052	175,213	203,351	207,387	212,394	213,987	221,992	213,320	224,330	2,501,588
Change in stocks, end of period: Domestic	−2,949	+2,131	+2,766	+10,667	+18,859	−4,251	−10,246	−11,585	+1,685	+4,004	−1,743	+3,807	+13,145
Foreign	+1,173	−238	+460	+886	+1,275	−598	+233	+2	−1,330	+1,049	−181	+269	+3,000
Demand: [2] Domestic	195,661	182,523	195,262	182,215	139,451	190,168	199,114	204,383	193,843	198,040	196,354	201,838	2,278,852
Foreign	13,950	14,466	15,357	15,284	15,628	18,032	18,286	19,594	19,789	18,899	18,890	18,416	206,591
Runs to stills: Domestic	191,881	179,210	190,508	177,814	136,482	186,775	196,480	201,100	190,725	194,504	192,597	197,122	2,235,198
Foreign	13,948	14,314	15,317	15,225	15,580	17,987	18,249	19,561	19,785	18,854	18,859	18,382	206,061
Exports [3]	2,303	2,211	2,939	3,340	1,718	2,388	1,876	1,966	1,664	1,526	1,805	2,991	26,727
Transfers: Distillate	259	236	257	236	185	222	229	226	218	228	225	234	2,705
Residual	633	575	573	498	538	535	389	577	489	521	523	492	6,343
Losses	587	443	1,025	386	626	293	177	547	751	1,306	1,235	1,033	8,409

[1] Bureau of Mines data.
[2] For definition, see text footnote 1 at beginning of this chapter.
[3] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data.
[4] Preliminary figures except stocks.

303707—54——22

TABLE 8.—Petroleum produced in the United States, 1948–52, and total, 1859–1952, by States [1]

[Thousands of barrels]

	1948	1949	1950	1951	1952 [2]	1859–1952 (total)
Production:						
Alabama	466	462	735	1,020	1,019	4,702
Arkansas	31,682	29,986	31,108	29,798	29,551	855,451
California	340,074	332,942	327,607	354,561	359,415	9,333,574
Colorado	17,862	23,587	23,303	27,823	29,153	203,970
Florida	290	441	487	596	591	2,767
Illinois	64,808	64,501	62,028	60,243	58,748	1,625,307
Indiana	6,974	9,696	10,699	11,100	12,067	223,890
Kansas	110,908	101,868	107,586	114,522	114,758	[3] 2,355,158
Kentucky	8,801	8,803	10,381	11,622	12,043	[4] 275,911
Louisiana	181,458	190,826	208,965	232,281	241,936	3,035,233
Michigan	16,871	16,517	15,826	13,927	13,250	[5] 349,424
Mississippi	45,761	37,966	38,236	37,039	36,239	357,337
Montana	9,382	9,118	8,109	8,958	9,576	186,785
Nebraska	215	330	1,547	2,558	2,502	12,444
New Mexico	47,969	47,645	47,367	52,719	59,137	[6] 794,251
New York	4,621	4,425	4,143	4,254	4,262	[7] 175,117
North Dakota				25	1,549	1,574
Ohio	3,600	3,483	3,383	3,140	3,214	627,353
Oklahoma	154,455	151,660	164,599	186,869	192,671	6,614,649
Pennsylvania	12,667	11,374	11,859	11,345	11,158	1,158,076
Texas	903,498	744,834	829,874	1,010,270	1,026,371	15,759,500
Utah	16	637	1,228	1,305	1,737	[8] 4,923
West Virginia	2,692	2,839	2,808	2,757	2,582	446,299
Wyoming	55,032	47,890	61,631	68,929	68,427	1,053,154
Other States [9]	83	110	65	50	41	1,947
Total	2,020,185	1,841,940	1,973,574	2,247,711	2,291,997	45,458,796
Value at wells:						
Total (thousands of dollars)	5,245,080	4,674,770	4,963,380	5,690,410	5,790,280	69,771,548
Average per barrel	$2.60	$2.54	$2.51	$2.53	$2.53	$1.53

[1] For detailed figures by States, 1859–1935, see Minerals Yearbook, 1937, p. 1008.
[2] Preliminary figures.
[3] Oklahoma included with Kansas in 1905 and 1906.
[4] Includes Tennessee, 1883–1907.
[5] Figures represent 1925–52 production only; earlier years included under "Other States."
[6] Figures represent 1924–52 production only; earlier years included under "Other States."
[7] Early production in New York included with Pennsylvania.
[8] Figures represent 1948–52 production only; earlier years included under "Other States."
[9] Includes Alaska, 1912–33; Arkansas, 1920; Michigan, 1900–19; Mississippi, 1933–35; Missouri, 1899–1911, 1913–16, 1919–23, 1932–52; New Mexico, 1913, 1919–23; Tennessee, 1916–52; Utah, 1907–11, 1920, 1924–41; Virginia, 1943–1952.

TABLE 9.—Production of crude petroleum in the United States, 1951–52, by State and month

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Alabama	84	69	82	92	90	95	92	85	83	84	77	87	1,020
Arkansas	2,520	2,317	2,525	2,426	2,546	2,461	2,541	2,516	2,459	2,568	2,413	2,506	29,798
California [1]	29,737	26,928	29,818	28,887	29,971	29,297	30,084	30,247	29,430	30,380	29,487	30,295	354,561
Colorado	2,399	2,178	2,459	2,361	2,335	2,158	2,202	2,375	2,279	2,396	2,300	2,381	27,823
Florida	47	44	49	49	50	50	54	50	50	52	50	51	596
Illinois	5,261	4,425	5,117	5,019	5,348	4,921	5,141	5,124	4,842	5,225	4,937	4,883	60,243
Indiana	848	669	872	860	927	895	982	1,040	1,013	1,051	974	969	11,100
Kansas	9,308	8,592	9,734	9,439	9,706	9,214	9,538	9,944	9,620	10,072	9,677	9,678	114,522
Kentucky	913	739	873	864	940	925	993	1,037	1,084	1,148	1,060	1,046	11,622
Louisiana	19,577	17,491	19,692	19,070	19,779	18,934	19,550	19,689	19,115	20,178	19,307	19,899	232,281
Michigan [2]	1,241	1,100	1,215	1,176	1,210	1,164	1,174	1,175	1,110	1,174	1,097	1,091	13,927
Mississippi	3,237	2,905	3,146	3,042	3,165	3,035	3,120	3,113	3,005	3,159	3,012	3,100	37,039
Montana [3]	745	696	720	704	790	770	783	776	760	763	734	717	8,958
Nebraska	289	229	250	203	210	196	202	207	190	197	189	196	2,558
New Mexico	4,187	3,829	4,362	4,287	4,446	4,278	4,433	4,459	4,432	4,693	4,660	4,653	52,719
New York	363	316	356	341	368	355	365	376	336	386	350	342	4,254
Ohio	273	216	278	260	295	267	279	282	241	285	247	217	3,140
Oklahoma	15,275	13,909	15,703	15,254	15,833	15,287	15,809	15,962	15,404	16,297	15,938	16,198	186,869
Pennsylvania	990	876	986	949	997	965	978	983	916	999	897	809	11,345
Texas	79,729	72,991	83,231	82,670	86,354	82,867	86,096	87,858	85,573	90,876	85,182	86,843	1,010,270
Utah	105	98	108	98	109	110	112	113	105	111	115	121	1,305
West Virginia	238	204	229	227	235	222	243	244	227	244	223	221	2,757
Wyoming	6,067	5,338	5,964	5,575	5,891	5,593	5,850	5,871	5,734	5,817	5,567	5,662	68,929
Other States	4	4	5	7	6	5	5	11	8	8	6	6	[4] 75
Total: 1951	183,437	166,163	187,774	183,860	191,601	184,064	190,626	193,537	188,016	198,163	188,499	191,971	2,247,711
1950	152,935	139,127	151,301	149,147	159,558	161,305	170,058	176,192	176,698	183,011	176,782	177,460	1,973,574
Daily average, 1951	5,917	5,934	6,057	6,129	6,181	6,135	6,149	6,243	6,267	6,392	6,283	6,193	6,158
Pennsylvania Grade (included above)	1,733	1,508	1,717	1,650	1,749	1,673	1,722	1,739	1,591	1,774	1,581	1,472	19,909
1952 [5]													
Alabama	88	71	79	77	75	70	72	72	68	98	118	131	1,019
Arkansas	2,497	2,339	2,529	2,540	2,432	2,360	2,462	2,461	2,424	2,508	2,450	2,549	29,551
California [1]	30,129	28,299	30,284	29,426	30,652	29,592	30,388	30,376	29,478	30,485	29,568	30,738	359,415
Colorado	2,438	2,236	2,455	2,488	2,060	2,349	2,485	2,540	2,464	2,516	2,497	2,625	29,153
Florida	52	50	52	52	54	50	51	45	46	47	47	45	591
Illinois	4,918	4,583	4,720	4,942	4,673	4,787	4,984	4,866	5,054	5,172	4,876	5,173	58,748
Indiana	953	872	926	962	977	1,060	1,091	1,056	1,043	1,061	988	1,078	12,067
Kansas	10,038	9,620	10,028	10,019	4,975	9,218	10,094	10,006	10,166	10,622	9,497	10,475	114,758

For footnotes, see end of table.

TABLE 9.—Production of crude Petroleum in the United States, 1951–52, by State and month—Continued

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
1952													
Kentucky	1,096	1,040	1,072	1,061	1,040	1,000	1,015	957	941	954	902	965	12,043
Louisiana	19,996	18,778	20,267	19,899	17,967	19,926	20,489	20,614	20,384	21,178	20,700	21,738	241,936
Michigan [2]	1,161	1,092	1,126	1,140	1,119	1,121	1,128	1,111	1,017	1,099	1,010	1,126	13,250
Mississippi	3,119	2,880	3,062	2,996	3,143	2,962	2,981	3,009	2,980	3,043	2,965	3,099	36,239
Montana [3]	731	761	723	727	702	654	791	879	877	902	867	962	9,576
Nebraska	171	159	175	174	101	180	212	211	234	262	236	387	2,502
New Mexico	4,834	4,683	5,182	5,032	2,744	5,188	5,149	5,119	5,135	5,353	5,194	5,524	59,137
New York	357	348	347	364	368	355	375	355	357	364	314	358	4,262
Ohio	259	251	259	268	258	272	284	260	278	284	252	289	3,214
Oklahoma	16,381	15,670	16,646	16,242	12,367	16,129	16,789	16,501	16,213	16,597	15,948	17,188	192,671
Pennsylvania	934	871	950	976	979	941	962	925	914	931	842	933	11,158
Texas	86,404	84,146	91,100	87,602	67,055	81,778	80,675	84,766	88,890	92,070	88,790	93,095	1,026,371
Utah	120	128	139	119	129	151	165	156	151	163	155	161	1,737
West Virginia	231	222	214	221	196	208	223	200	211	233	198	225	2,582
Wyoming	5,795	5,546	5,670	5,515	4,189	5,476	5,888	6,096	6,023	5,907	5,885	6,437	68,427
Other States	10	9	23	40	55	90	115	217	180	195	312	344	[6] 1,590
Total: 1952	192,712	184,654	198,028	192,882	158,310	185,917	188,868	192,798	195,528	202,044	194,611	205,645	2,291,997
1951	183,437	166,163	187,774	183,860	191,601	184,064	190,626	193,537	188,016	198,163	188,499	191,971	2,247,711
Daily average, 1952	6,217	6,367	6,388	6,429	5,107	6,197	6,093	6,219	6,518	6,518	6,487	6,634	6,262
Pennsylvania Grade (included above)	1,639	1,557	1,629	1,682	1,654	1,619	1,680	1,590	1,595	1,640	1,457	1,628	19,370

[1] American Petroleum Institute.
[2] Department of Conservation, Michigan
[3] Montana Oil Conservation Board.
[4] 1951: Missouri (24), North Dakota (25), Tennessee (14), and Virginia (12).
[5] Preliminary figures.
[6] 1952: Missouri (21), North Dakota (1,549), Tennessee (10), and Virginia (10).

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PRODUCTION

General

Production of crude oil reached a record peak of 2.3 billion barrels in 1952. Five States (Texas, California, Louisiana, Oklahoma, and Kansas) produced over 100 million barrels each and supplied 84.4 percent of the output. There has been no change in the order of importance of these States since 1946. Texas produced 44.8 percent of the national total production in 1952.

The output of 6 other States, which supplied 12.3 percent of the total production in 1952, ranged from over 20 to less than 100 million barrels each. Wyoming replaced Illinois as the sixth State in importance in 1951, and New Mexico was seventh in 1952, with Illinois, Mississippi, Arkansas, and Colorado following in the order named.

The 11 States in the above groups furnished 96.7 percent of the total output in 1952. Six of these States—Texas, Louisiana, Oklahoma, Kansas, New Mexico, and Arkansas—issue monthly proration orders under State conservation laws to adjust production to market demand. These States produced 72.4 percent of the total crude oil in 1951 and 72.6 percent in 1952.

TABLE 10.—Percentage of total crude petroleum produced in the United States, 1943–52, by States

State	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952 [1]
Texas	39.5	44.5	44.0	43.8	44.2	44.7	40.4	42.1	45.0	44.8
California	18.9	18.6	19.1	18.2	17.9	16.8	18.1	16.6	15.8	15.7
Louisiana	8.2	7.7	7.7	8.3	8.6	9.0	10.4	10.6	10.3	10.5
Oklahoma	8.2	7.4	8.1	7.8	7.6	7.7	8.2	8.3	8.3	8.4
Kansas	7.0	5.9	5.6	5.6	5.7	5.5	5.5	5.5	5.1	5.0
Illinois	5.5	4.6	4.4	4.3	3.6	3.2	3.5	3.1	2.7	2.5
Wyoming	2.3	2.0	2.1	2.2	2.4	2.7	2.6	3.1	3.1	3.0
New Mexico	2.6	2.4	2.2	2.1	2.2	2.4	2.6	2.4	2.3	2.6
Mississippi	1.2	1.0	1.1	1.4	1.9	2.3	2.1	1.9	1.7	1.6
Arkansas	1.8	1.8	1.7	1.6	1.6	1.6	1.6	1.6	1.3	1.3
Colorado	.2	.2	.3	.7	.8	.9	1.3	1.2	1.2	1.3
Michigan	1.4	1.1	1.0	1.0	.9	.8	.9	.8	.6	.6
Pennsylvania	1.0	.8	.7	.8	.7	.6	.6	.6	.5	.5
Kentucky	.5	.5	.6	.6	.5	.4	.5	.5	.5	.5
Other States	1.7	1.5	1.4	1.6	1.4	1.4	1.7	1.7	1.6	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Preliminary figures.

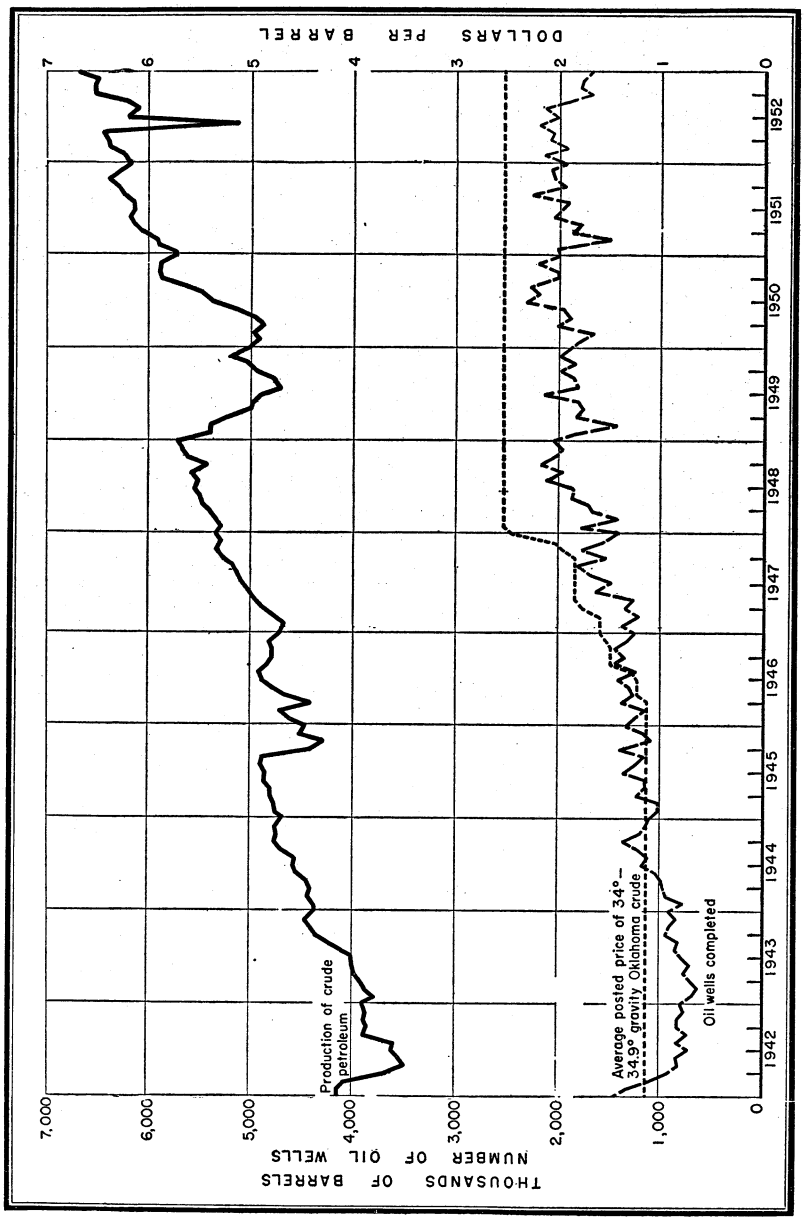

FIGURE 2.—Daily average production of crude petroleum, total number of oil wells completed, and average posted price per barrel of a selected grade of Oklahoma crude petroleum in the United States, 1942–52, by months.

TABLE 11.—Production of crude petroleum in leading fields in the United States, 1951–52, and total production since discovery, in thousands of barrels [1]

[Oil and Gas Journal]

Field	State	1951	1952	Total since discovery [2]
East Texas	Texas	99,646	96,539	2,983,152
Wilmington	California	51,057	48,073	605,952
Ventura Avenue	do	23,302	27,217	448,110
Coalinga	do	25,417	25,513	693,031
Rangely	Colorado	22,071	22,346	119,986
Huntington Beach	California	22,511	21,815	502,746
Wasson	Texas	22,465	19,941	256,198
Goldsmith	do	21,221	18,699	152,676
Velma	Oklahoma	16,089	18,634	84,848
Hawkins	Texas	13,333	16,044	147,871
Hastings	do	16,789	14,750	226,863
Cuyama-South	California	14,106	13,989	37,748
Webster	Texas	15,179	13,686	189,262
Slaughter	do	15,197	13,669	185,309
Diamond M	do	9,175	13,398	29,832
Seeligson	do	14,511	13,382	109,410
Bradford-Allegany [3]	Pennsylvania-New York	13,503	13,202	626,350
Yates	Texas	14,162	12,883	399,547
Conroe	do	14,270	12,857	319,218
Midway-Sunset	California	12,563	12,277	773,036
Sholem-Alechem	Oklahoma	10,557	12,239	89,874
TXL	Texas	14,673	12,075	101,116
Thompson	do	13,020	11,880	174,603
Levelland	do	12,683	11,783	60,450
Van	do	9,792	11,398	232,377
Keystone	do	13,031	11,220	111,234
Weeks Island	Louisiana	8,112	10,705	29,327
Cowden	Texas	10,542	9,844	130,019
Elk Basin	Wyoming-Montana	8,505	9,799	76,110
Buena Vista	California	11,174	9,747	422,861
Fullerton	Texas	10,855	8,748	90,828
Katy	do	7,936	8,589	53,715
San Ardo	California	2,718	8,275	11,781
Cogdell	Texas	7,629	8,118	18,657
Kettleman-North Dome	California	9,100	7,992	389,465
Long Beach	do	8,511	7,959	766,343
Coles Levee	do	8,344	7,955	91,364
Kern	do	8,000	7,801	400,729
Ward, South	Texas	3,715	7,673	43,929
Midland Farms	do	6,210	7,467	21,077
McElroy	do	8,447	7,431	227,076
Dollarhide	do	8,316	7,311	30,684
Elk City	Oklahoma	7,426	7,248	20,608
Caillou Island	Louisiana	6,509	7,137	70,838
Anahuac	Texas	7,816	7,032	114,837
Clay City	Illinois	7,031	6,993	147,453
Brea-Olinda	California	5,389	6,926	220,042
West Ranch	Texas	7,635	6,852	79,193
Delta Farms	Louisiana	7,194	6,751	53,164
Cat Canyon-West	California	6,140	6,609	58,698
Trapp	Kansas	7,686	6,469	137,286
Talco	Texas	6,738	6,429	136,136
Baxterville	Mississippi	6,381	6,242	33,860
Old Ocean	Texas	6,322	6,241	75,635
Coyote	California	5,899	6,073	240,940
Lake St. John	Louisiana	6,800	5,938	49,987
Venice	do	5,756	5,933	45,443
Russell Ranch	California	7,118	5,867	28,663
Seminole	Texas	7,213	5,610	70,057
Louden	Illinois	6,127	5,587	168,689
Oklahoma City	Oklahoma	6,303	5,513	687,065
Santa Fe Springs	California	5,146	5,198	543,844
Erath	Louisiana	5,245	5,192	51,814
Bayou Sale	do	5,088	5,173	42,192
Caddo	do	4,976	5,142	199,879
Vealmoor and East	Texas	4,242	5,015	11,064
Tinsley	Mississippi	5,117	4,961	127,763
Chocolate Bayou	Texas	5,107	4,946	39,787
LaGloria	do	5,355	4,930	47,042
Foster	do	5,457	4,758	73,681
Drinkard	New Mexico	5,037	4,007	31,835

[1] The classification of fields and data may differ from other sources used in the State summaries.
[2] Includes revisions.
[3] Bureau of Mines data.

Crude Production by States [3]

Alabama.—By the end of 1952 production in Alabama was exceeding the 1951 rate by 50 percent. This increase and the increase in drilling activity—72 completions in 1952 compared with 50 in 1951—resulted from discovery of the Pollard field in southern Escambia County in January 1952. The discovery well was completed in the lower Tuscaloosa and flowed 318 barrels per day. It was 40 miles southeast of the nearest producing well. Two additional pay zones were discovered and 25 additional producing wells completed in the field during the year.

The discovery of gas in the Warrior Basin of Mississippi sparked interest in its extension across northwestern Alabama. Five wildcats were drilled in this area in 1952, with showings of oil and gas.

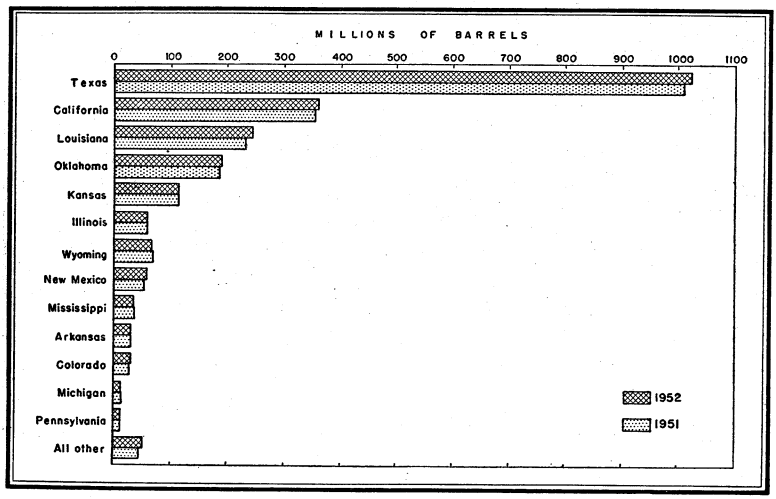

FIGURE 3.—Production of crude petroleum in the United States, 1951–52, by States.

Arkansas.—Daily production declined less than 1,000 barrels to 29.6 million for the year. Output of the Schuler and Village fields continued a steady decline but output in the McKamie field increased 23 percent to 1.4 million barrels after remaining in the neighborhood of 1.1 million since 1944.

Total drilling activity remained at the 1951 level, with 426 completions that included 206 development wells and 11 exploratory wells. The number of dry holes, however, increased from 184 in 1951 to 202 in 1952.

Twelve new-oilfield discoveries were made, none of which showed indications of developing into important fields.

[3] Based partly on trade publications and reports of Federal and State agencies. Some figures therefore differ from Bureau of Mines figures.

TABLE 12.—Production of crude petroleum in Arkansas, 1948–52, by fields

[Thousands of barrels]

Field	1948	1949	1950	1951	1952 [1]
Atlanta	1,383	1,080	999	841	810
Buckner	861	778	798	719	722
Dorcheat-Macedonia	1,263	930	983	875	877
Fouke	1,037	945	894	929	1,053
McKamie	1,084	1,156	1,179	1,175	1,446
Magnolia	4,622	4,292	4,547	4,407	4,223
Midway	2,851	2,685	2,786	2,684	2,674
Schuler	3,820	3,140	2,854	2,626	2,377
Smackover	3,901	3,900	3,991	3,910	3,814
Stephens	1,278	1,611	1,774	1,476	1,308
Village	2,086	1,850	1,677	1,247	1,018
Wesson	3,084	3,053	3,452	3,647	3,510
Other fields [2]	4,412	4,566	5,174	5,262	5,719
Total Arkansas	31,682	29,986	31,108	29,798	29,551

[1] Preliminary figures.
[2] Includes oil consumed on leases and net change in stocks held on leases for entire State.

California.—Production of crude oil decreased slightly in both the San Joaquin Valley and the Los Angeles Basin districts in 1952, but the increase in the Coastal district was enough to lift total production for the State 5 million barrels above that in 1951. Coastal district production was expanded mainly in the Ventura Avenue and in San Ardo fields. The San Ardo field produced 3 million barrels in 1951 and 8 million in 1952. It was the eighth most productive field in California in 1952 and, with 184 development wells drilled, led the State in development activity for the year.

There was a slight gain in overall drilling activity in 1952; 2,423 wells were completed compared with 2,355 in 1951. Both development and exploratory drilling exceeded that in 1951. Nine oilfields, 21 oil pools, 3 gasfields, and 3 gas pools were discovered. Oakridge, a new-field discovery in Ventura County, promised to have considerable reserves. Important new pool discoveries included the Antelope Shale in Buena Vista Hills, the Vaqueros in Coalinga Nose, the Lane in Seal Beach, the Lower Sespe in Torrey Canyon, and the Eocene in Wheeler Ridge.

TABLE 13.—Production of crude petroleum in California, 1948–52, by district and field, in thousands of barrels

[Conservation Committee of California]

District and field	1948	1949	1950	1951	1952 [1]
San Joaquin Valley:					
Belridge	4,019	2,920	2,931	3,516	3,237
Buena Vista	16,596	13,907	12,032	11,168	9,753
Coalinga	35,818	33,266	31,210	31,957	30,344
Coles Levee [2]	6,591	7,239	7,207	7,224	7,007
Cuyama-Russell Ranch	842	8,066	16,504	21,230	20,140
Edison	4,107	4,126	3,914	4,867	5,489
Elk Hills	2,118	3,057	2,700	2,459	2,836
Fruitvale	2,383	2,720	2,827	3,312	3,372
Gosford East	4	382	680	831	802
Greeley	5,100	4,750	4,061	4,615	4,739
Helm	1,264	979	819	728	545
Kern River-Kern Front	8,240	6,934	6,461	7,984	7,790
Kettleman North Dome	12,832	11,739	10,467	9,090	7,984
Lost Hills	2,750	2,383	2,019	2,084	2,161
McKittrick	10,606	6,509	5,774	6,309	7,148
Midway-Sunset	15,165	12,758	11,431	12,619	12,309
Mountain View	1,307	1,199	1,240	1,173	1,303
Mount Poso	4,567	4,216	3,809	3,451	3,276
Poso Creek	1,286	785	830	1,196	1,405
Raisin City	1,093	1,356	1,613	1,749	1,790
Rio Bravo	4,430	4,229	3,748	4,089	4,334
Riverdale	1,155	966	780	781	789
Round Mountain	2,700	2,438	2,167	2,056	2,015
Tejon Ranch	1,133	861	[3] 795	[3] 2,078	2,363
Ten Section	2,379	2,351	2,076	1,877	1,621
Other San Joaquin Valley	8,360	8,692	8,002	8,093	7,671
Total San Joaquin Valley	156,845	148,828	146,097	156,536	152,223
Coastal district:					
Aliso Canyon	1,226	1,275	1,455	1,986	2,428
Cat Canyon	5,897	5,175	4,632	6,324	6,700
Del Valle	3,516	3,283	1,261	1,677	1,229
Elwood	2,681	2,681	2,313	1,920	1,785
Gato Ridge	1,279	1,150	933	1,030	1,076
Lompoc	2,320	203	988	2,482	1,917
Newhall Potrero	2,726	3,185	2,995	2,865	2,851
Orcutt	1,667	1,717	1,362	1,476	1,421
Padre Canyon	2,092	2,655	2,462	2,242	1,549
Rincon	1,158	1,264	1,304	1,319	1,499
San Ardo	120	481	188	2,745	8,281
San Miguelito	1,832	2,350	2,895	4,464	4,250
Santa Maria	7,269	5,667	4,509	4,479	4,029
South Mountain	2,072	2,463	2,382	2,207	2,858
Ventura Avenue	17,738	21,040	20,985	23,301	27,241
Zaca Creek	612	658	556	1,648	1,537
Other Coastal	5,195	9,830	11,609	10,440	13,133
Total Coastal	59,400	65,077	62,829	72,605	83,784
Los Angeles Basin:					
Brea Olinda	5,286	5,213	4,533	5,402	6,928
Coyote	7,381	6,450	5,717	5,895	6,075
Dominguez	4,818	4,743	4,602	4,286	3,887
Huntington Beach	20,821	21,035	20,568	22,465	21,789
Inglewood	4,420	5,064	4,879	4,951	4,984
Long Beach	8,159	8,349	8,432	8,498	7,963
Montebello	2,467	2,346	2,185	2,014	1,916
Newport	2,412	2,242	1,785	1,575	1,494
Richfield	2,272	2,347	2,364	2,425	2,412
Rosecrans	1,695	[4] 2,247	[4] 1,991	[4] 1,640	[4] 1,684
Sansinena	19	125	531	1,037	1,928
Santa Fe Springs	5,512	5,327	5,288	5,131	5,164
Seal Beach	4,150	4,381	4,286	4,118	4,083
Torrance	2,862	2,762	2,615	2,522	2,511
Wilmington	48,317	43,509	46,234	50,806	48,121
Other Los Angeles Basin	3,238	2,897	2,671	2,655	2,504
Total Los Angeles Basin	123,829	119,037	118,681	125,420	123,443
Total California	340,074	332,942	327,607	354,561	359,450

[1] Preliminary figures.
[2] Includes Tupman.
[3] Includes Willow Springs.
[4] Includes Athens.

Colorado.—Production increased 5 percent in 1952; most of the increase was from fields in the Denver-Julesburg Basin.

Both exploratory and development drilling contributed to about a 70-percent increase in completions of wells. There were 143 successful development oil-well completions and 19 successful oil-well wildcats. Seventeen of the oil and 7 of the gas discoveries were in the Denver-Julesburg Basin in the eastern part of the State.

Discoveries of oil and gas in Adams and Washington Counties extended the productive area of this basin southward. Attempts were made to establish the presence of oil below the Cretaceous by several Paleozoic tests. Oil was obtained for the first time from the "O" sand in the West Padroni field of the basin, and development drilling extended the Yenter, Mount Hope, and Little Beaver Creek fields.

In the North Park Basin of northwestern Colorado a wildcat on the Coalmont anticline showed oil; in the same basin a new pay—the Morrison sand—was discovered in the North McCallum field.

TABLE 14.—Production of crude petroleum in Colorado, 1948–52, by fields

[Thousands of barrels]

Year	Fort Collins-Wellington	Hiawatha	Iles	Maudlin Gulch	Moffat	Price	Powder Wash	Rangely	Walden	Wilson Creek	Other fields [1]	Total
1948	127	62	534	1	112	164	35	13,881	129	2,602	215	17,862
1949	99	63	531	51	85	164	63	19,632	120	2,586	193	23,587
1950	115	64	503	174	81	181	91	18,956	115	2,796	227	23,303
1951	100	119	447	223	76	189	123	22,091	106	2,795	1,554	27,823
1952 [2]	89	147	378	139	60	163	257	22,443	117	2,851	2,509	29,153

[1] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.
[2] Preliminary figures.

Florida.—Production, entirely from the Sunniland field in Collier County, declined slightly to 591,000 barrels. Discovery of the Pollard field in Alabama, just across from the Florida line, spurred drilling activity in the Panhandle region of Florida.

Illinois.—Crude-oil production declined 1.5 million barrels in 1952 to 58.7 million. Drilling activity also decreased, with 2,142 completions in 1952 compared with 2,412 in 1951. Most of the decline was in exploratory drilling, with 873 completions in 1951 and 656 in 1952. Wildcat wells led to the discovery of 24 new pools and 55 extensions to pools, none, however, of major importance. The largest pool was Ruark West in Lawrence County. Also, 27 new producing zones in established areas were discovered. Most of the drilling was in the structural basin of southern Illinois, and half of the wells were drilled in the following 6 counties: Wayne, 307 completions; White, 305; Lawrence, 136; Hamilton, 126; Edwards, 106; Wabash, 93.

TABLE 15.—Production of crude petroleum in Illinois, 1948–52, by fields, in thousands of barrels

[Oil and Gas Journal]

Field	1948	1949	1950	1951	1952
Albion	595	979	1,187	1,231	1,134
Benton	664	532	436	2,205	3,056
Boyd	1,210	1,062	887	687	557
Bridgeport	1,905	1,943	2,012	1,936	1,996
Centralia	1,251	1,712	1,250	946	836
Clay City-Noble	8,585	8,347	8,142	[1] 7,031	[1] 6,993
Dale-Hoodville	1,323	1,300	1,187	2,215	[2] 2,249
East Inman	1,102	1,905	1,050	837	630
Johnsonville	1,173	941	829	664	678
Louden	6,715	6,077	7,436	6,127	5,587
Marine	1,080	988	872	787	674
New Harmony-Keensburg	2,918	2,783	2,376	[3] 3,504	[3] 3,215
Phillipstown	1,032	861	829	1,092	1,084
Robinson	1,236	1,381	1,532	1,530	1,572
Sailor Springs	1,320	2,371	1,833	1,445	1,204
Salem	4,706	4,106	3,726	3,404	3,080
Other fields	27,217	26,798	26,519	24,186	25,019
Total Illinois	64,032	64,086	62,103	59,827	59,564

[1] Clay City only. [2] Dale only. [3] New Harmony only.

Indiana.—Crude production increased 9 percent to 12.1 million barrels in 1952. Development-drilling activity increased slightly, with 845 completions, whereas exploratory activity declined from 559 in 1951 to 424 completions in 1952. Discoveries included 18 new oil and 4 gas pools and 28 new pays in established pools. Most of the drilling was done in the southwest part of the State, with over half of the total completions in four counties—Posey, Gibson, Knox and Pike. The most important discovery during 1952 was the Riley South pool in Vigo County, which produced from the Devonian limestone. It was estimated to have a reserve of 750,000 barrels.

TABLE 16.—Production of crude petroleum in Indiana, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	504	476	528	520	447	550	570	577	635	679	663	725	6,974
1949	667	620	735	734	855	792	804	864	845	941	915	924	9,696
1950	813	775	930	905	929	879	935	948	882	959	858	886	10,699
1951	848	669	872	860	927	895	982	1,040	1,013	1,051	974	969	11,100
1952 [1]	953	872	926	962	977	1,060	1,091	1,056	1,043	1,061	988	1,078	12,067

[1] Preliminary figures.

Kansas.—Production of crude remained substantially unchanged from 1951 and increased only 236,000 barrels. Overall drilling activity increased slightly; there were 4,525 completions in 1952 compared with 4,439 in 1951. Development completions increased, whereas wildcat completions declined. Barton County was the most active in drilling, with 567 completions. During 1952 there were 147 new fields and new-pool oil discoveries, 10 gas discoveries, and 68 new oil-pay and 5 new gas-pay discoveries in existing pools. Only 3 of the new-field discoveries were estimated to have reserves exceeding 1 million barrels compared with 5 such fields in 1951. The three were Great Bend Airport pool in Barton County, the Bergkamp pool in Cowley County, and the Ruggles pool in Osborne

County. The most significant discoveries were those in the west-central counties—Decatur, Sheridan, Gove, Lane, Finney, Meade, and Seward. Extensive development followed discovery of several pools in Cowley County in eastern Kansas.

TABLE 17.—Production of crude petroleum in Kansas, 1948–52, by fields, in thousands of barrels

[Oil & Gas Journal]

Field	1948	1949	1950	1951	1952
Bemis-Shutts	5,748	4,560	4,681	4,287	3,741
Bloomer	3,161	2,492	2,716	2,782	2,344
Burnett	4,996	3,497	2,747	3,044	2,709
Burrton-Haury	1,024	1,211	1,127	1,026	909
Chase	2,583	3,258	3,078	2,786	[1] 7,152
El Dorado	3,026	3,084	3,019	3,202	3,454
Fairport	801	908	1,243	1,135	879
Genesco-Edwards	3,519	2,803	2,960	3,001	3,304
Gorham	1,667	1,445	1,406	2,452	1,990
Hall-Gurney	3,485	3,433	3,159	3,637	3,954
Kraft-Prusa	6,871	5,463	5,870	6,326	5,449
Morel	1,717	1,399	1,337	2,301	2,092
Ray	1,390	1,246	1,484	1,822	1,624
Silica-Raymond	4,824	4,597	5,147	4,950	(1)
Stoltenberg	2,483	2,098	1,962	1,760	1,471
Trapp	10,404	8,905	8,645	7,686	6,469
Other fields	50,114	49,733	56,639	61,921	67,304
Total Kansas	107,813	100,132	107,220	114,118	114,845

[1] Silica included with Chase.

Kentucky.—Output increased about 4 percent in 1952 to 12.0 million barrels, 10 million of which was produced in the western part of the State. Successful oil-well completions declined and gas-well completions increased. Most of the gas wells were development wells in the Big Sandy field of eastern Kentucky. In western Kentucky 11 new fields, 13 new pools, 13 new pays, and 25 extensions of old pools were discovered, most of them in Henderson County. In south-central Kentucky the main activity was development of the Trenton pools in Monroe County.

TABLE 18.—Production of crude petroleum in Kentucky, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	748	706	801	663	736	732	738	728	726	746	730	747	8,801
1949	711	628	743	699	739	688	722	723	755	806	799	790	8,803
1950	708	668	840	803	914	857	887	925	919	1,021	916	923	10,381
1951	913	739	873	864	940	925	993	1,037	1,084	1,148	1,060	1,046	11,622
1952 [1]	1,096	1,040	1,072	1,061	1,040	1,000	1,015	957	941	954	902	965	12,043

[1] Preliminary figures.

Louisiana.—Production in Louisiana followed the trend of the last several years of increasing in the Gulf Coast region and decreasing in the Northern. The decrease was small in the Northern region—about 2 percent—and was due to declines in most of the larger fields. The declines in the majority of the larger fields in the Gulf Coast region were offset by increases in Cox Bay, Duck Lake, Romre Pass, Weeks Island and in fields included in the "Other Gulf Coast" category.

TABLE 10.—Production of crude petroleum in Louisiana, 1948–52, by district and field

[Thousands of barrels]

District and field	1949	1950	1951	1952 [1]
Gulf Coast:				
Anse la Butte		2,194	2,442	2,373
Avery Island		2,649	3,018	3,090
Barataria		[illegible]	3,294	2,876
Bay de Chene		[illegible]	1,259	1,288
Bay Marchand		[illegible]	2,428	2,004
Bay St. Elaine		[illegible]	2,672	2,733
Bayou Blue		[illegible]71	1,122	1,156
Bayou Mallett	500	[illegible]874	1,253	1,604
Bayou Sale	5,221	[illegible]737	5,139	5,199
Caillou Island	3,549	4,135	5,335	6,499	7,136
Charenton	1,514	1,512	1,361	1,136	1,176
Cox Bay			29	1,123	2,102
David Haas	662	1,084	1,170	1,128	1,117
Delta Farms	6,818	7,581	7,648	7,190	6,751
Dog Lake	604	556	901	1,320	1,276
Duck Lake		103	414	1,123	2,269
East White Lake	1,333	1,217	1,321	1,443	1,427
Egan	2,441	2,381	2,136	2,083	1,906
Erath	1,233	1,246	1,214	1,178	1,179
Garden Island	1,353	1,509	1,614	1,583	1,590
Gibson	2,089	1,717	1,539	1,460	1,498
Golden Meadows	3,493	4,156	5,020	4,864	4,546
Good Hope	2,351	2,177	2,240	2,434	2,288
Grand Bay	3,729	3,590	3,766	3,853	3,638
Gueydan	2,072	2,115	2,217	2,325	1,970
Hackberry	4,264	3,626	3,519	3,621	3,780
Horseshoe Bayou	878	1,178	1,246	1,346	1,303
Iowa	2,478	2,212	1,947	2,282	2,513
Jeanerette	587	867	947	1,067	1,084
Jennings	1,492	1,207	1,104	893	861
Lafitte	4,107	4,017	4,332	4,489	4,467
Lake Chicot	1,201	1,083	1,031	1,105	1,104
Lake Pelto	1,558	1,584	1,625	2,173	2,456
Lake Salvador	1,665	1,842	1,972	2,086	1,843
Leeville	1,811	1,910	2,112	2,205	2,417
Main Pass	16	306	1,331	2,057	2,445
New Iberia	1,548	1,577	1,462	1,470	1,275
North Crowley	1,696	1,753	1,767	1,659	1,390
Paradis	3,936	3,698	3,649	3,626	3,411
Pine Prairie	1,409	1,416	1,168	1,048	984
Point a-La-Hache	3	304	1,603	2,484	2,746
Port Barre	1,636	1,456	1,470	1,438	1,285
Quarantine Bay	3,745	3,445	3,725	3,960	3,480
Romre Pass			606	2,315	3,641
St. Gabriel	1,709	1,629	1,577	1,793	2,095
Section 28	518	1,103	1,296	1,117	1,343
Sunshine	2	152	771	1,257	979
Tepetate	3,935	3,977	3,788	3,321	2,647
University	2,097	2,844	2,840	2,203	1,811
Venice	4,174	4,614	5,001	5,742	5,965
Ville Platte	2,106	1,969	1,888	1,462	1,424
Vinton	3,578	3,740	3,872	3,960	3,786
Weeks Island	1,642	2,922	5,183	8,199	10,680
West Bay	2,108	2,281	2,404	2,936	3,123
West Cote Blanche	1,280	1,827	1,704	2,392	2,830
West Lake Verrett	1,379	1,393	1,472	1,782	1,966
White Castle	1,597	1,594	1,692	1,672	1,563
Other Gulf Coast [2]	28,648	30,511	36,720	46,239	52,510
Total Gulf Coast	137,990	146,433	164,755	188,768	199,399
Northern:					
Big Creek	1,963	1,664	1,443	1,468	1,432
Caddo	3,392	4,969	5,689	4,995	5,111
Delhi	8,576	7,545	6,733	6,679	6,436
Haynesville	4,405	5,339	5,444	5,480	5,008
Lake St. John	7,357	7,300	6,695	5,871	4,870
Lisbon	978	1,703	2,216	1,481	889
Nebo [3]	2,623	2,438	2,328	2,302	2,272
Olla [4]	2,794	2,625	2,490	2,294	2,203
Ora	2,997	1,896	1,085	656	480
Rodessa	1,509	1,302	1,186	1,043	934
Other Northern [2]	6,874	7,612	8,901	11,244	12,902
Total Northern	43,468	44,393	44,210	43,513	42,537
Total Louisiana	181,458	190,826	208,965	232,281	241,936

[1] Preliminary figures.
[2] Includes crude oil consumed on leases and net change in stocks held on leases for entire district.
[3] Includes Hemphill, Trout Creek, and Jena.
[4] Includes Little Creek and Summerville.

Exploratory drilling activity declined 7 percent in the Northern region. Development drilling in the Northern region and exploratory and development drilling in the Gulf Coast region increased in 1952 compared with 1951. In northern Louisiana, most of the development drilling again was done in the Caddo-Pine Island field. Of the 22 new-field discoveries, 7 produced from the Wilcox group in central Louisiana.

In the Gulf Coast region 38 fields were discovered, 21 were completed in beds of Miocene age, 10 in the Oligocene, and 7 in the Eocene. The five most promising fields, from the standpoint of reserves, were: East Lake Verret, Assumption Parish; Deep Lake, Cameron Parish; East Black Bay, Plaquemines Parish; Bourg, Terrebonne Parish; and Lobdell, West Baton Rouge Parish. The southeast corner of the State was the most productive of the discoveries; Plaquemines, Jefferson, and Lafourche Parishes provided over one-third of the discoveries of the Louisiana Gulf Coast region.

Michigan.—Both production and drilling activity declined in 1952 but at a lesser rate than in 1951. Production dropped about 700,000 barrels to 13.3 million barrels; the declines were distributed among most of the fields. Development completions declined from 368 in 1951 to 362 in 1952 and exploratory completions from 332 to 277. Successful exploratory completions increased, however, from 7 percent in 1951 to 11 percent in 1952. Nine new oilfields, 2 new gasfields, and 10 new producing zones in established pools were discovered, and 12 successful outpost wells were drilled. The average production per well continued to increase, as in previous years. The new-field discoveries were not important from the standpoint of proved reserves, but several had interesting geological significance. The Dow-Brazos Unit I in Hamlin field, Mason County, established Niagaran formation production (Silurian age) in an area far removed from similar production. The Boyd-field discovery in St. Clair County, with production from the Salina-Niagaran (Silurian age), extends this group from southwestern Ontario, Canada, and opens part of eastern and southeastern Michigan to exploration.

TABLE 20.—Production of crude petroleum in Michigan, 1948–52, by fields, in thousands of barrels

[Michigan Department of Conservation]

Year	Beaver Creek	Cold-water	Deep River	East Nor-wich	Kaw-kaw-lin	Kim-ball Lake	Pent-water	Reed City	St. Helen	Stony Lake	Other fields	Total
1948	370	2,212	2,885	336	804	1,614	392	1,282	59	849	6,068	16,871
1949	904	1,673	2,396	322	755	1,119	1,333	944	157	861	6,053	16,517
1950	794	1,635	2,080	331	722	847	1,410	752	354	998	5,903	15,826
1951	641	1,488	2,029	384	631	569	718	646	388	881	5,552	13,927
1952 [1]	510	1,388	1,847	470	559	411	660	594	410	733	5,668	13,250

[1] Preliminary figures.

Mississippi.—Production continued to decline from the high point reached in 1948. Drilling activity, while below 1951, exceeded that of 1949 and 1950. Exploratory drilling increased 5 percent, whereas development drilling declined 17 percent. Eighteen new fields were discovered, 3 more than the previous high set in 1951; 13 of these produced from the Wilcox group in southwest Mississippi, but none

is expected to be important. Discovery of Wilcox gas in the Pistol Ridge field, Forrest County, in 1951 extended the producing possibilities of this sand eastward.

Discovery of the Muldon gasfield in Monroe County, producing from Paleozoic era rock, started widespread leasing in the Warrior Basin in Mississippi and Alabama. The discovery well was a reworked wildcat abandoned in 1951.

TABLE 21.—Production of crude petroleum in Mississippi, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	3,526	3,419	3,702	3,652	3,817	3,760	4,027	4,021	3,856	4,069	3,956	3,956	45,761
1949	3,580	3,028	3,383	3,286	3,376	2,990	3,073	3,124	2,990	3,069	3,017	3,050	37,966
1950	3,031	2,755	3,091	2,929	3,193	3,284	3,405	3,411	3,305	3,364	3,220	3,248	38,236
1951	3,237	2,905	3,146	3,042	3,165	3,035	3,120	3,113	3,005	3,159	3,012	3,100	37,039
1952 [1]	3,119	2,880	3,062	2,996	3,143	2,962	2,981	3,009	2,980	3,043	2,965	3,099	36,239

[1] Preliminary figures.

Montana.—Production increased 618,000 barrels to 9.6 million in 1952 and exceeded the previous high reached in 1948. Production from the larger established fields—Cut Bank, Elk Basin, and Kelvin-Sunburst—declined in 1952. The increased output was mainly from the Bowes field in north-central Montana and from the East Poplar, the Glendive, and the Richey fields, all in the Williston Basin.

With a total of 345 completions in 1952, wildcat drilling almost doubled, and development drilling increased 17 percent. Of the 10 new fields discovered, 7 were in the Williston Basin, especially along the Cedar Creek–Baker–Glendive anticline where oil was discovered in 1951. It was estimated that 75 million barrels of reserves was added during the year in the eastern part of the State.

TABLE 22.—Production of crude petroleum in Montana, 1948–52, by fields, in thousands of barrels

[Montana Oil Conservation Board]

Year	Big Wall	Bowes	Cat Creek	Cut Bank	Elk Basin	Kevin-Sunburst	Melstone	Pondera	Reagan	Other fields [1]	Total
1948	2	-------	510	4,074	2,415	1,623	14	361	61	322	9,382
1949	225	-------	459	3,437	2,331	1,559	70	515	226	296	9,118
1950	460	61	398	2,931	1,569	1,486	164	544	182	314	8,109
1951	716	427	325	2,724	1,821	1,449	179	792	215	310	8,958
1952 [2]	316	1,025	271	2,633	1,819	1,343	133	697	227	1,112	9,576

[1] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.
[2] Preliminary figures.

Nebraska.—Production in 1952 was 2 percent less than in 1951. The outlet for crude oil provided by the completion in 1952 of the Platte pipeline across the northern part of the Denver-Julesburg Basin, however, allowed production to increase in the latter half of the year.

Total well completions increased to 291 in 1952 from 241 in 1951, with both wildcat and development completions higher. Most of the drilling in Nebraska was done in the Denver–Julesburg Basin in Cheyenne and Kimball Counties. Development drilling extended the

limits of the West Sidney gasfield and of the Long, Southwest Potter, and Kimball oilfields. The area of production was extended north by the discovery of oil in Morrill County.

TABLE 23.—Production of crude petroleum in Nebraska, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	17	14	18	17	18	20	21	20	16	18	17	19	215
1949	21	18	20	20	17	18	28	23	25	49	41	50	330
1950	56	54	64	72	84	96	124	135	171	227	215	249	1,547
1951	289	229	250	203	210	196	202	207	190	197	189	196	2,558
1952 [1]	171	159	175	174	101	180	212	211	234	262	236	387	2,502

[1] Preliminary figures.

New Mexico.—Production of crude oil in 1952 increased 12 percent over 1951. Although there were declines in the larger fields of the southeast part of the State, development of other fields, especially the Denton field in Lea County, provided an overall increase. Oil production in northwest New Mexico was enhanced by development of the Doswell field in Rio Arriba County.

Drilling activity also exceeded that in 1951, both in the Northwest and Southeast. Completions rose approximately 30 and 40 percent, respectively, in the 2 regions. Most discoveries in the Southeast continued to be in Lea County, from the Permian horizon. In 1952 increasing interest was being shown in the northern portion of Lea County, in the deeper formations—the Devonian and Ellenburger.

In the northwest portion of the State the major activity was development and extension of known fields in the San Juan Basin. The Blanco gas pool was extended to a length of 50 miles and a width of 35 miles. A new pay discovery in Hogback field, San Jaun County, produced oil from the Mississippian horizon, deep production for that area.

TABLE 24.—Production of crude petroleum in New Mexico, 1948–52, by district and field, in thousands of barrels

[Oil and Gas Journal]

District and field	1948	1949	1950	1951	1952
Southeast:					
Arrowhead	1,460	1,289	1,059	988	809
Brunson	2,660	3,015	2,143	2,515	3,511
Drinkard	6,236	6,742	5,538	5,037	4,007
Eunice	5,360	4,414	3,898	[1] 10,590	[1] 9,588
Grayburg-Jackson	1,869	1,763	1,750	1,545	1,353
Hobbs	3,841	3,732	3,924	4,380	3,902
Langlie-Mattix	1,075	1,126	1,546	1,700	1,635
Maljamar	2,033	2,042	2,011	1,829	1,813
Monument	6,902	6,488	6,168	([1])	([1])
Paddock	1,584	1,568	1,378	1,178	887
Vacuum	4,504	4,449	4,546	4,865	4,496
Other	9,708	10,714	13,023	17,775	26,365
Northwest [2]	375	335	331	327	359
Total New Mexico	47,607	47,677	47,315	52,729	58,725

[1] Monument included with Eunice.
[2] Bureau of Mines data.

New York.—Crude-oil production continued at the 1951 level and totaled 4.3 million barrels in 1952. All drilling of oil wells was in conjunction with secondary-recovery operations.

TABLE 25.—Production of crude petroleum in New York, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	375	351	410	387	386	397	396	390	389	368	386	386	4,621
1949	371	362	392	371	363	373	362	388	366	361	350	366	4,425
1950	365	305	362	320	372	351	338	362	341	354	331	342	4,143
1951	363	316	356	341	368	355	365	376	336	386	350	342	4,254
1952 [1]	357	348	347	364	368	355	375	355	357	364	314	358	4,262

[1] Preliminary figures.

North Dakota.—Activity surged following discovery of the Beaver Lodge field, Williams County, in the Williston Basin in 1951. At the end of 1952 there were 86 producing oil wells compared with 1 at the end of 1951. Production totaled 1.5 million barrels and at the end of the year was approximately 11,000 barrels per day. In 1952 Amerada Petroleum Corp. discovered four new fields along the Nesson anticline on which Beaver Lodge is located. These fields—the Charlson, Croff, Hoflund, and Tioga—all produced from the Madison formation.

Ohio.—Oil production increased slightly in 1952 to 3.2 million barrels. Total development drilling increased 7 percent without a corresponding increase in dry holes or gas-well completions. Development oil-well completions thus rose 21 percent. The active areas for oil-well development drilling were Jackson Township, Knox County, and Newcastle Township, Coshocton County. The one important new pool found in 1952 was in Newcastle Township.

TABLE 26.—Production of crude petroleum in Ohio, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	259	251	309	302	303	312	317	324	309	305	298	311	3,600
1949	263	267	304	287	288	321	281	315	293	293	288	283	3,483
1950	282	250	292	274	290	305	298	310	282	303	238	259	3,383
1951	273	216	278	260	295	267	279	282	241	285	247	217	3,140
1952 [1]	259	251	259	268	258	272	284	260	278	284	252	289	3,214

[1] Preliminary figures.

Oklahoma.—Crude production in 1952 increased less than in the previous 2 years. Substantial increases were reported by only a small number of fields, mainly the Fox-Graham, Sholem Alechem, and the Velma.[4]

Exploratory-drilling activity dropped in 1952, while development drilling increased slightly.

No major fields were discovered during the year, there was active exploration, however, in the Ardmore Basin, the Hugoton Embayment, and Washita uplift east and west of the Elk city field in Beckham County.

[4] Approximately 5 percent of the crude production was from secondary-recovery projects.

TABLE 27.—Production of crude petroleum in Oklahoma, 1948–52, by fields, in thousands of barrels

[Oil and Gas Journal]

Field	1948	1949	1950	1951	1952
Allen	1,129	1,317	1,359	1,447	1,336
Apache	2,181	1,749	1,337	1,470	1,331
Beebe	601	740	1,272	1,073	1,244
Brock-west	536	858	1,114	982	679
Burbank	2,432	2,338	2,124	2,318	3,157
Cache Creek	1,945	1,780	1,511	1,289	1,042
Cement	4,552	4,207	4,091	4,127	3,964
Coon Creek	1,731	1,539	1,363	1,432	1,113
Cumberland	3,955	3,275	3,628	3,475	3,102
Cushing	2,862	2,726	2,759	2,816	2,889
Edmond	470	434	392	359	383
Elk City	63	788	5,066	7,426	7,248
Eola		370	595	891	1,178
Fitts	1,141	1,076	1,026	938	909
Fox-Graham	(1)	414	923	3,196	5,532
Glenn	2,610	2,587	2,551	2,502	2,252
Healdton	2,629	2,527	2,382	2,267	2,183
Hewitt	1,633	[2] 2,716	4,320	3,694	3,173
Hoover-northwest	434	766	1,034	887	693
Knox	1,758	2,250	1,886	1,725	1,627
Lone Grove	1,199	1,023	834	934	709
Lucien	625	589	670	978	1,222
Oklahoma City	8,543	7,703	6,785	6,303	5,513
Pauls Valley	2,162	1,488	1,091	957	817
Ramsey	689	712	767	728	615
Ringwood	87	260	1,927	2,288	1,338
Seminole district:					
Bowlegs	1,262	1,176	1,201	1,178	1,003
Little River	1,416	1,194	1,016	945	852
St. Louis	1,330	1,283	1,405	1,560	1,440
Seminole City	1,086	1,441	1,164	1,207	1,077
Sholem Alechem	5,196	6,497	8,545	10,557	12,239
South Burbank	1,076	901	860	776	617
Tatums	1,119	3,795	3,456	3,378	3,466
Velma	13,225	10,134	10,227	16,089	18,634
West Edmond	9,322	5,478	3,914	3,482	4,471
Witcher	1,497	2,094	1,942	1,655	1,120
Yale-Quay	828	796	825	1,352	1,891
Other fields	71,356	68,982	76,481	88,185	89,464
Total Oklahoma	154,680	150,003	163,843	186,866	191,523

[1] Included with "Other fields."
[2] Includes Bayou.

Pennsylvania. Crude-oil output declined approximately 2 percent in 1952. The Bradford field produced 78 percent of the crude oil in Pennsylvania. All but 24 of the oil wells drilled were in connection with secondary-recovery projects, most of them in the Bradford field. No new oilfields or pools were discovered in the State during the year.

TABLE 28.—Production of crude petroleum in Pennsylvania, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	1,021	961	1,115	1,089	1,071	1,093	1,083	1,073	1,048	1,047	1,046	1,020	12,667
1949	983	916	1,029	970	956	959	919	980	922	940	884	916	11,374
1950	949	846	971	953	1,034	1,010	1,022	1,041	1,011	1,041	980	1,001	11,859
1951	990	876	986	949	997	965	978	983	916	999	897	809	11,345
1952 [1]	934	871	950	976	979	941	962	925	914	931	842	933	11,158

[1] Preliminary figures.

Texas.—Overall production in Texas increased 1.6 percent and the total number of completions 1.1 percent in 1952.

Gulf Coast.—Production of crude declined slightly from 1951. Drilling activity increased 12 percent to 2,581 completions in 1952; successful oil and gas completions, however, increased only 3 percent. The numerous discoveries were collectively important, but none was a major contribution to reserves. Development was greatest on salt domes in the Frio and Yegua formations.

East Texas.—Crude-oil production continued close to that in 1951 in 1952. Exploratory drilling remained slightly over 250 completions, but development completions dropped from 918 in 1951 to 530 in 1952. Twenty discoveries were made in 1952, 10 less than in 1951; the new fields did not yield important oil reserves but continued the trend toward expansion of gas condensate.

Central Texas.—Production of crude oil increased 4 percent in the Central district. Completions gained considerably from 1951, however, the number of productive wells was only slightly greater. Successful exploratory drilling dropped from 14 percent in 1951 to 7 in 1952.

North Texas.—Production of crude increased in 1952, as it had for several years. Drilling activity also increased; with 5,517 tests drilled, 2,846 successfully, compared with 4,990 of which 2,474 were successful in 1951. The main interests in Railroad Commission District 9 (Montague, Jack, Young, and Archer Counties) were searchings for Strawn sand and Caddo conglomerate reserves. Nearly half of the discoveries in District 7B were made in the Strawn sand. Coleman, Stevens, Throckmorton, and Jones Counties led in number of discoveries.

Panhandle.—Both production and drilling declined again in the Panhandle region. Total completions dropped from 727 in 1951 to 631 in 1952, partly because of lack of casing. Six new pools—3 oil and 3 gas—5 of which were in the Anadarko Basin, were discovered; the most important was the Quinduno in Roberts County.

South Texas.—Crude production dropped about 1 percent in 1952 compared with a 26-percent rise in 1951. Total completions declined, mainly because of the reduction in the number of development oil wells. Gasfield development wells exceeded the number completed in 1951.

San Patricio County led the district in number of discoveries and extensions, Nueces County ranked second. None of the new fields was classified as a major discovery. Throughout South Texas emphasis was on exploiting new pay levels in areas of previous production. Discoveries in Hidalgo County were expected to develop into sizable additions to that area's already large gas reserves.

West Texas.—Drilling activity, especially development drilling, declined in 1952. The tempo of drilling in the Spraberry subsided as methods were sought to improve the recovery from this tight formation. Production from the Spraberry trend and from Scurry County, which contributed much to the rise in output in the district in 1951, remained virtually static in 1952. The greatest number of new field discoveries were in the Central Basin platform, the Midland Basin and the Eastern shelf.

TABLE 29.—Production of crude petroleum in Texas, 1948–52, by district and field

[Thousands of barrels]

District and field [1]	1948	1949	1950	1951	1952 [2]
Gulf Coast:					
Amelia	1,581	1,080	715	1,073	1,004
Anahuac	10,832	7,103	6,801	7,727	7,032
Barbers Hill	1,944	1,964	2,110	2,038	2,132
Bay City	1,903	1,044	1,510	1,737	1,161
Bloomington	1,337	1,794	1,775	1,934	1,756
Bonnie View	1,299	856	832	965	890
Chocolate Bayou	2,863	3,529	4,272	5,166	5,028
Conroe	20,519	11,638	11,943	14,081	12,913
Dickinson-Gillock	2,287	2,368	3,493	4,090	4,105
Dyersdale	1,171	1,393	1,550	1,449	1,340
Esperson	1,029	1,220	1,508	1,496	1,474
Fairbanks	2,272	1,905	1,696	1,403	1,455
Falls City	1,571	1,048	1,101	1,341	1,232
Fannette	2,484	1,529	1,425	1,737	1,830
Fig Ridge	1,236	860	783	937	989
Friendswood	20,745	13,178	11,386	14,989	13,729
Goose Creek	913	1,766	2,451	2,873	3,148
Greta	4,338	3,053	2,858	3,512	3,269
Hastings	21,643	14,317	13,247	16,536	14,767
Heyser	1,891	1,109	1,288	1,671	1,491
High Island	1,315	1,893	2,380	2,384	2,291
Hull	1,520	1,781	3,534	4,612	[3] 3,388
Humble	1,138	1,272	1,257	1,246	1,036
La Rosa	1,052	812	716	827	704
Livingston	1,898	1,353	1,373	1,395	1,208
Lolita	2,193	1,482	1,502	1,803	1,589
Lovells Lake	1,595	1,113	1,220	1,418	1,217
McFaddin	1,955	1,254	1,126	1,339	1,368
Manvel	2,913	2,108	2,011	2,393	2,166
Markham	1,468	1,047	1,139	1,333	1,685
Old Ocean	5,983	5,096	5,521	6,247	6,268
Oyster Bayou	4,218	2,913	2,418	3,519	3,368
Pierce Junction	840	1,285	1,444	1,782	1,591
Placedo	2,281	1,675	1,944	2,291	1,997
Raccoon Bend	2,492	1,785	1,657	1,874	1,966
Refugio	3,119	2,355	2,442	2,708	2,655
Segno	1,161	850	772	817	642
Silsbee	1,114	1,176	1,223	1,364	1,465
Sour Lake	1,180	1,400	1,883	2,009	1,804
South Houston	1,641	1,417	1,193	1,192	1,255
South Liberty	442	1,339	2,064	1,665	1,626
Stowell	3,762	2,645	2,288	2,336	2,360
Sugarland	1,859	1,186	1,059	1,380	1,294
Sugar Valley	2,421	2,079	2,056	1,943	1,468
Swan Lake			331	1,052	926
Thompson	16,927	11,763	10,187	12,840	11,846
Tomball	3,518	2,394	2,212	2,444	2,204
Village Mills	77	366	2,291	3,300	3,216
West Columbia	2,591	2,654	2,619	2,331	2,297
West Ranch	7,031	5,066	5,456	7,525	6,844
Withers-Magnet	5,850	4,160	3,718	4,345	4,018
Other Gulf Coast [4]	60,221	49,119	55,483	68,938	73,835
Total Gulf Coast	249,633	189,592	199,263	239,407	232,342
East Texas:					
East Texas proper	112,284	93,951	97,825	100,695	97,394
Cayuga	2,098	1,991	1,808	1,568	1,413
Hawkins	17,609	11,464	10,439	13,638	16,261
Long Lake	2,223	1,491	1,415	1,619	1,476
Merigale	1,614	1,036	1,088	992	700
Mexia-Powell	1,038	977	829	698	718
New Hope	1,617	1,894	1,836	2,355	2,309
Quitman	3,715	2,886	2,740	3,078	2,848
Rodessa	1,204	1,005	848	802	694
Sulphur Bluff	1,167	735	708	769	685
Talco	8,804	6,188	5,891	6,692	6,440
Van	12,110	8,313	7,358	9,698	11,349
Other East Texas	8,899	9,686	11,406	19,642	19,584
Total East Texas	174,382	141,617	144,191	162,246	161,871
Central Texas:					
Charlotte	1,879	2,045	2,223	2,434	1,778
Darst Creek	2,574	2,508	2,534	2,830	2,943
Luling	1,401	1,387	1,608	1,951	2,385
Other Central Texas	3,345	2,952	3,404	4,302	4,921
Total Central Texas	9,199	8,892	9,769	11,517	12,027

For footnotes, see end of table.

TABLE 29.—Production of crude petroleum in Texas, 1948–52, by district and field—Continued

District and field [1]	1948	1949	1950	1951	1952 [2]
North Texas [3] [6]	70,257	69,543	79,998	87,985	96,513
Panhandle [7]	31,725	33,076	33,131	31,287	29,272
South Texas:					
Agua Dulce	4,097	2,082	2,094	2,232	1,955
Fulton Beach	361	743	1,202	1,819	1,993
Garcia	1,393	1,009	1,064	1,321	1,282
Hoffman	1,052	1,049	1,069	2,154	1,983
Kelsey	2,629	2,056	2,284	3,017	3,083
London Gin		52	974	1,330	1,192
Midway	1,663	1,449	1,652	1,582	1,469
Saxet-Saxet Frio	2,519	1,794	1,499	1,176	1,018
Stratton	4,625	3,233	3,150	3,680	3,344
Sun	1,861	1,231	1,260	1,293	1,405
Taft	1,381	1,148	1,096	1,491	1,210
White Point	4,496	2,684	2,674	3,391	3,337
Willamar and West Willamar	4,029	2,397	2,092	2,205	3,106
Other South Texas	64,165	52,627	54,716	69,858	69,158
Total South Texas	94,271	73,554	76,826	96,549	95,535
West Texas:					
Andrews	31,417	28,043	31,860	37,308	38,225
Borden			2,978	8,981	9,614
Coke	1,056	1,971	3,852	4,790	5,817
Crane-Upton	21,875	19,345	22,973	31,557	42,500
Crockett	8,496	6,931	7,078	8,574	8,725
Dawson	1,550	1,112	1,534	2,305	2,300
Ector [8]	67,518	53,814	57,096	69,576	69,516
Gaines-Yoakum	41,417	29,098	28,703	35,742	34,854
Garza	2,586	2,605	3,364	4,199	3,802
Glasscock-Howard-Mitchell-Scurry	[9] 9,002	[9] 12,455	8,977	11,598	9,597
Hockley [10]	29,697	26,503	27,597	31,338	30,263
Kent	16	10	3,525	7,121	6,980
King	1,088	759	863	1,090	978
Midland	3	20	873	9,598	14,885
Pecos	22,771	17,036	17,862	22,305	22,004
Reagan	2,669	2,389	2,372	2,031	3,007
Reeves	461	784	1,090	1,295	1,609
Runnels	90	860	1,063	7,703	6,052
Scurry	(9)	(9)	36,529	48,478	48,077
Terry	150	303	1,172	3,391	5,102
Tom Green		262	1,152	1,911	1,618
Ward	6,739	4,833	5,380	8,281	11,521
Winkler	24,325	18,506	17,961	19,228	16,653
Other West Texas [4]	1,105	921	842	2,879	5,112
Total West Texas	274,031	228,560	286,696	381,279	398,811
Total Texas	903,498	744,834	829,874	1,010,270	1,026,371

[1] The breakdown of Texas districts, 1946–52, was changed to agree with the Texas Railroad Commission divisions.
[2] Preliminary figures.
[3] A new field was created out of a portion of Hull and included in "Other Gulf Coast."
[4] Includes crude oil consumed on leases and net change in stocks held on leases for entire district.
[5] Includes the fields in and between Hardeman, Wilbarger, Wichita, Clay, Montague, and Cooke Counties on the north and San Saba, Lampasas, and Coryell on the south.
[6] Includes crude oil consumed on leases and net change in stocks held on leases for East (exclusive of East Texas proper), Central, North, and South Texas.
[7] Carson, Gray, Hutchinson, Moore, Sherman, and Wheeler Counties.
[8] Includes the part of Jordan pool in Crane County.
[9] Scurry County included with Glasscock-Howard-Mitchell before 1950.
[10] Includes Slaughter and Levelland fields.

Utah.—Production of crude rose from 1.3 million barrels in 1951 to 1.7 million in 1952; the increase was mainly from the Red Wash field, Uintah County. Development drilling increased from 7 wells in 1951 to 29 in 1952. Exploratory drilling continued to gain slowly. Important extensions were made to the Roosevelt and Red Wash oilfields of the Uinta Basin. A new field, Flat Mesa, was discovered in Duchesne County in the western part of the basin. In the eastern part of the basin production was obtained from the Mesaverde, the first from this zone within the Tertiary limits of the basin.

West Virginia.—Crude-oil production and development drilling decreased in 1952, crude production 6 percent to 2.6 million barrels. The average daily production of active oil wells in the State was 10.7 barrels. During the year 453 oil wells and 59 oil and gas wells were abandoned.

TABLE 30.—Production of crude petroleum in West Virginia, 1948–52, by months

[Thousands of barrels]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1948	210	199	234	230	222	224	230	231	225	230	232	225	2,692
1949	212	209	233	226	235	238	236	254	247	260	247	242	2,839
1950	240	220	246	234	245	238	230	249	232	248	209	217	2,808
1951	238	204	229	227	235	222	243	244	227	244	223	221	2,757
1952[1]	231	222	214	221	196	208	223	200	211	233	198	225	2,582

[1] Preliminary figures.

Wyoming.—Production of crude oil in Wyoming declined 1 percent in 1952. Completion of the Platte pipeline in November 1952, providing an outlet to the Midwest, should allow production to rise in 1953. Construction of this pipeline stimulated drilling activity in the Big Horn and Powder River Basins. Exploratory drilling in the State increased 23 percent, whereas development completions dropped 13 percent.

Increasing interest was being shown in deeper basin drilling, and 5 of the new fields discovered in 1952 were in the deeper parts of the basins. The deepest production in Wyoming was established in the Morrison at West Poison Spider, Natrona County, at a depth of 16,102 feet. The most important new field discoveries of the year were Five Mile, Fourteen Mile, Ash Creek, and Middle Mountain. Middle Mountain was the first field producing from the Mesaverde in southwest Wyoming.

TABLE 31.—Production of crude petroleum in Wyoming, 1948–52, by fields

[Thousands of barrels]

Year	Big Sand Draw	Byron-Garland	Cole Creek	Elk Basin	Fiddler Creek	Frannie	Grass Creek	Hamilton Dome	Lance Creek	Little Buffalo
1948	2,590	4,546	570	6,039	12	1,746	1,137	3,138	3,290	1,264
1949	2,250	2,628	515	5,325	1,246	1,305	899	1,493	2,862	598
1950	2,077	4,849	837	5,583	3,696	2,968	1,317	3,531	2,669	1,285
1951	2,185	5,186	1,317	7,292	2,126	3,703	1,816	3,870	2,385	1,001
1952[1]	2,387	4,343	1,820	8,041	1,321	3,709	2,395	3,075	1,895	951

Year	Lost Soldier-Wertz, etc.	Mush Creek	Oregon Basin	Salt Creek	Steamboat Butte	Sussex-Meadow Creek	Winkleman	Worland	Other fields[2]	Total
1948	5,466	1,020	3,491	4,655	3,822	25	796	1,577	9,848	55,032
1949	5,322	1,085	1,604	3,937	2,247	262	471	3,076	10,765	47,890
1950	5,362	934	2,839	4,165	2,410	2,010	828	2,173	12,098	61,631
1951	5,225	747	3,717	4,063	3,018	3,043	817	1,643	15,775	68,929
1952[1]	5,299	773	2,688	4,159	1,999	2,960	811	1,421	18,380	68,427

[1] Preliminary figures.
[2] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.

WELLS

The number of wells drilled in the United States, including oil and gas wells and dry holes, set a new record of 44,339 in 1952. The increase of 1,203 wells included 13 producing oil wells, 225 gas wells, and 965 dry holes. The number of dry holes represented 39.7 percent of the total wells drilled during the year.

There was a 280-well gain in the total number drilled in New Mexico, 197 gains each in Texas and Colorado, 179 in Oklahoma, and 141 in Louisiana and 270 declines in Illinois, 95 in Indiana, and 61 in Michigan.

Producing oil wells in the United States rose from 474,990 at the end of 1951 to 488,520 at the end of 1952; the average production per well declined from 13.1 to 13.0 barrels per day.

TABLE 32.—Wells drilled for oil and gas in the United States, 1951–52, by months

[Oil and Gas Journal]

Wells	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
													Number	Percent
1951														
Oil	2,021	1,499	1,883	1,775	2,058	1,979	1,914	2,286	1,940	2,062	2,089	1,947	23,453	54.4
Gas	239	217	239	169	258	251	258	320	231	276	294	278	3,030	7.0
Dry	1,307	933	1,240	1,224	1,486	1,373	1,477	1,667	1,440	1,455	1,632	1,419	16,653	38.6
Total	3,567	2,649	3,362	3,168	3,802	3,603	3,649	4,273	3,611	3,793	4,015	3,644	43,136	100.0
1952														
Oil	2,159	1,929	2,096	2,062	2,199	2,017	2,139	1,935	1,677	1,790	1,773	1,690	23,466	52.9
Gas	283	249	259	237	282	241	287	314	271	272	285	275	3,255	7.4
Dry	1,573	1,233	1,302	1,411	1,559	1,376	1,575	1,547	1,430	1,594	1,531	1,487	17,618	39.7
Total	4,015	3,411	3,657	3,710	4,040	3,634	4,001	3,796	3,378	3,656	3,589	3,452	44,339	100.0

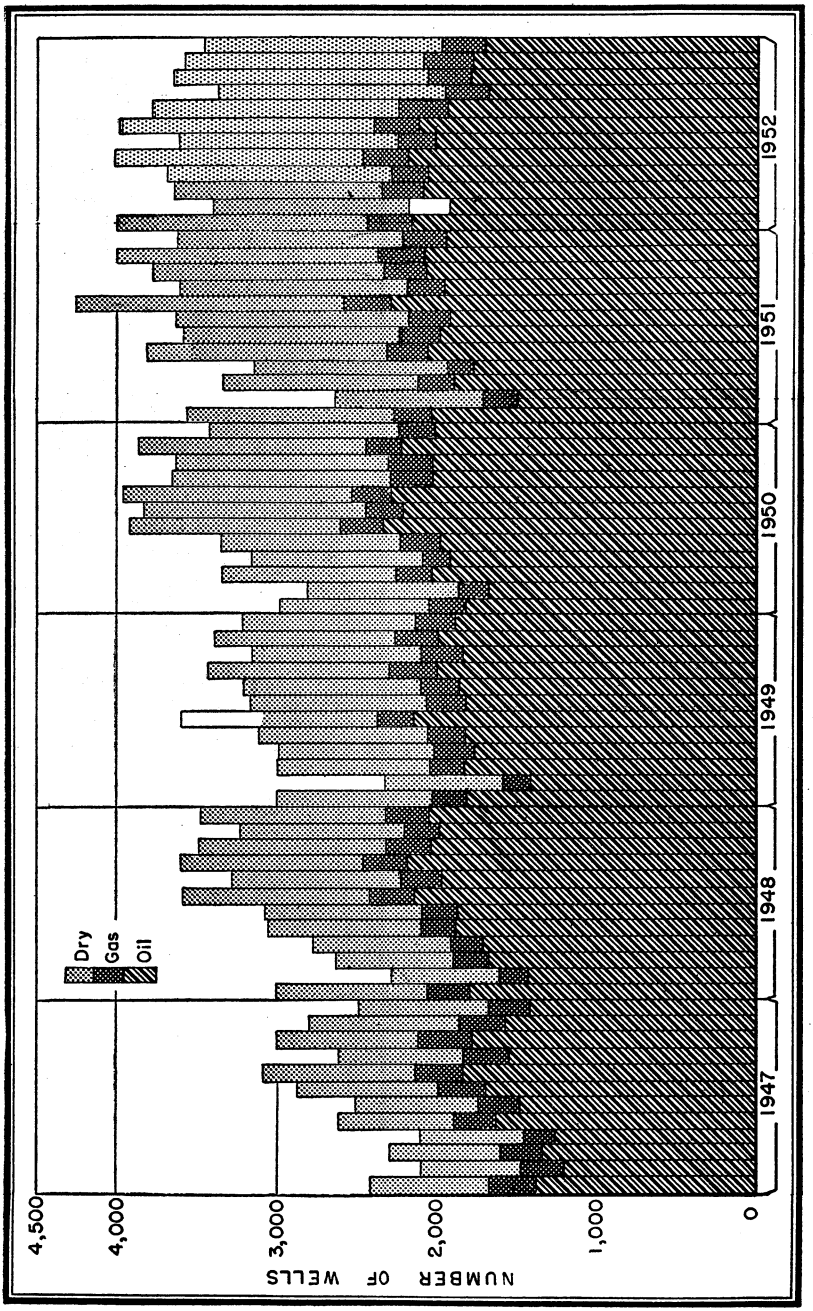

FIGURE 4.—Wells drilled in the United States, 1947-52, by months.

TABLE 33.—Wells drilled for oil and gas in the United States, 1951–52, by State and district

[Oil and Gas Journal]

State and district	1951				1952			
	Oil	Gas	Dry	Total	Oil	Gas	Dry	Total
Alabama	17	-------	33	50	30	1	41	72
Arkansas	235	10	184	429	217	7	202	426
California	1,735	40	580	2,355	1,790	43	590	2,423
Colorado	103	12	174	289	162	29	295	486
Illinois	918	10	1,484	2,412	825	18	1,299	2,142
Indiana	434	18	912	1,364	408	18	843	1,269
Kansas	2,177	376	1,886	4,439	2,194	316	2,015	4,525
Kentucky	524	155	629	1,308	406	227	661	1,294
Louisiana:								
Gulf Coast	583	36	370	989	603	67	410	1,080
Northern	635	140	473	1,248	683	139	476	1,298
Total Louisiana	1,218	176	843	2,237	1,286	206	886	2,378
Michigan	223	20	457	700	253	30	356	639
Mississippi	137	9	228	374	111	4	233	348
Montana	144	8	110	262	163	18	164	345
Nebraska, Missouri	77	15	167	259	100	16	193	309
New Mexico	350	254	169	773	525	319	209	1,053
Oklahoma	3,109	265	2,075	5,449	3,086	295	2,247	5,628
Pennsylvania, New York, Ohio, West Virginia	1,509	884	538	2,931	1,721	882	563	3,166
Texas:								
Gulf Coast	1,267	209	836	2,312	1,286	234	1,061	2,581
West Texas	4,053	25	1,034	5,112	3,823	28	1,093	4,944
East Texas	739	30	404	1,173	386	60	336	782
Other districts	4,027	462	3,529	8,018	4,187	456	3,862	8,505
Total Texas	10,086	726	5,803	16,615	9,682	778	6,352	16,812
Wyoming	442	21	282	745	403	16	281	700
Other States	15	31	99	145	104	32	188	324
Total United States	23,453	3,030	16,653	43,136	23,466	3,255	17,618	44,339

CONSUMPTION AND DISTRIBUTION

The indicated total demand for crude petroleum set a new record of 2.5 billion barrels in 1952, a 2.4-percent increase over the previous year. The demand for domestic crude oil (production plus or minus change in domestic stocks) increased 1.6 percent to 2.3 billion barrels, and demand for foreign crude (imports plus or minus change in foreign stocks) increased 13.2 percent to 206.6 million barrels. The demand for foreign crude oil was 8.3 percent of that for total crude in 1952 compared with 7.5 percent in 1951.

The total demand for crude oil in 1952 included 2,441.3 million barrels of crude run to stills, 98.2 percent of the total demand. Other demands for crude oil totaled 44.2 million barrels, including 26.7 million exported, 9.1 million used as fuel oil, and 8.4 million for other fuel and losses. Exports of crude oil continued to decline, with expansion of Canadian production and completion of a crude pipeline to Lake Superior in 1951 to connect with Lake tankers to Ontario ports. Canada has long been the chief market for our crude exports, but a further rapid decline in exports is anticipated.

TABLE 34.—Producing oil wells in the United States and average production per day, 1951–52, by State and district

State and district	Producing oil wells			
	1951		1952 [1]	
	Approximate number, Dec. 31	Average production per well per day (barrels)	Approximate number, Dec. 31	Average production per well per day (barrels)
Arkansas	3,800	21.8	3,930	20.9
California	29,630	33.7	30,900	32.4
Colorado	840	94.7	1,000	86.6
Illinois	27,420	6.0	27,460	5.8
Indiana	3,600	8.7	3,840	8.9
Kansas	32,460	9.9	33,620	9.5
Kentucky	16,900	2.0	16,950	1.9
Louisiana:				
Gulf Coast	5,420	98.7	5,860	96.6
Northern	7,070	17.2	7,430	16.0
Total Louisiana	12,490	52.3	13,290	51.3
Michigan	3,800	9.8	3,980	9.3
Mississippi	1,760	59.2	1,870	54.6
Montana	3,380	7.3	3,510	7.6
Nebraska	260	35.0	300	24.4
New Mexico	6,350	23.4	6,790	24.6
New York	23,200	.5	22,950	.5
Ohio	17,650	.5	17,600	.5
Oklahoma	57,600	9.0	60,320	8.9
Pennsylvania	78,800	.4	80,600	.4
Texas:[2]				
Gulf Coast	18,260	37.1	19,220	33.9
West Texas	34,600	32.1	37,730	30.1
East Texas proper	22,950	12.0	23,170	11.5
Other districts	58,860	13.6	59,410	13.8
Total Texas	134,670	21.0	139,530	20.5
West Virginia	14,500	.5	13,900	.5
Wyoming	5,610	34.6	5,800	32.8
Other States [3]	270	32.8	380	41.5
Total United States	474,990	13.1	488,520	13.0

[1] Preliminary figures.
[2] The breakdown of Texas districts was changed to agree with the Texas Railroad Commission divisions.
[3] Alabama, Florida, Missouri, North Dakota, Tennessee, Utah, and Virginia.

Runs to Stills.—Total runs of crude to stills increased from 6.5 million barrels daily in 1951 to 6.7 million in 1952, a 2.7-percent gain. The increase in runs (70.8 million barrels) included gains of 46.5 million of domestic crude and 24.3 million foreign. Runs of foreign crude were 8.4 percent of total runs in 1952 compared with 7.7 percent in 1951. In the East Coast district, runs of foreign crude dropped from 95.9 percent of total foreign crude to 91.8 percent in 1952, whereas runs in the California district rose from 1.9 to 5.5 percent.

Distribution.—The Bureau of Mines collects data relating to receipts of domestic and foreign crude petroleum at refineries in the United States. These receipts provide the crude runs to stills, a small amount used as refinery fuel, and any increase in crude stocks at refineries. Classification of receipts, by States of origin, shows the amount received from local production (intrastate), from other States (interstate), and receipts of imported crude. Classification by methods of transportation indicates the final receipts by boat, pipeline, and tank cars and trucks. Receipts of domestic crude by boat were, in most instances, moved by pipeline from point of production to point of shipment by boat.

TABLE 35.—Runs to stills of crude petroleum in the United States in 1952, by district and month [1]

[Thousands of barrels]

District [2]	January	February	March	April	May	June	July	August	September	October	November	December	Total
East Coast:													
Domestic	16,973	14,555	14,511	14,352	15,960	17,092	16,223	15,712	15,209	15,820	15,061	16,071	187,539
Foreign	12,958	13,678	14,639	14,624	15,204	16,676	16,530	17,223	17,171	16,581	17,208	16,738	189,230
Total East Coast	29,931	28,233	29,150	28,976	31,164	33,768	32,753	32,935	32,380	32,401	32,269	32,809	376,769
Appalachian	6,002	5,540	5,599	4,646	4,497	5,614	5,754	5,622	5,774	5,707	5,889	6,236	66,880
Indiana, Illinois, Kentucky, etc.:													
Domestic	39,321	36,211	38,784	35,961	22,848	37,143	40,270	41,731	38,383	38,434	39,108	39,859	448,053
Foreign	93	108	68	82	117	50	41	107	111	121	110	110	1,118
Total Indiana, Illinois, Kentucky, etc.	39,414	36,319	38,852	36,043	22,965	37,193	40,311	41,838	38,494	38,555	39,218	39,969	449,171
Oklahoma, Kansas, etc.	16,390	16,126	16,579	14,608	11,553	16,188	18,901	18,906	17,275	17,498	17,575	17,542	199,141
Texas Inland	7,468	7,278	7,300	7,546	8,338	8,136	8,447	7,988	7,693	8,229	7,565	7,900	93,888
Texas Gulf Coast:													
Domestic	50,669	47,442	52,610	48,772	19,481	47,846	50,749	53,485	51,507	53,779	52,542	52,851	581,733
Foreign	506	254	243	71	10	240	337	401	368	338	397	360	3,525
Total Texas Gulf Coast	51,175	47,696	52,853	48,843	19,491	48,086	51,086	53,886	51,875	54,117	52,939	53,211	585,258
Louisiana Gulf Coast:													
Domestic	15,929	15,304	15,405	14,975	15,627	16,074	16,360	16,179	15,165	16,209	15,821	17,111	190,159
Foreign	34	60	64	140	81	78	114	156	65	59	21	41	913
Total Louisiana Gulf Coast	15,963	15,364	15,469	15,115	15,708	16,152	16,474	16,335	15,230	16,268	15,842	17,152	191,072
Arkansas, Louisiana Inland, etc.	2,427	2,289	2,184	2,424	2,042	2,551	2,377	2,679	2,616	2,634	2,251	2,648	29,122
Rocky Mountain	7,726	6,786	7,275	5,775	6,418	7,595	8,086	8,121	7,854	6,916	7,610	7,868	88,030
California:													
Domestic	28,976	27,679	30,261	28,755	29,718	28,536	29,313	30,677	29,249	29,278	29,175	29,036	350,653
Foreign	357	214	303	308	168	943	1,227	1,674	2,070	1,755	1,123	1,133	11,275
Total California	29,333	27,893	30,564	29,063	29,886	29,479	30,540	32,351	31,319	31,033	30,298	30,169	361,928
Total United States: Domestic	191,881	179,210	190,508	177,814	136,482	186,775	196,480	201,100	190,725	194,504	192,597	197,122	2,235,198
Foreign	13,948	14,314	15,317	15,225	15,580	17,987	18,249	19,561	19,785	18,854	18,859	18,382	206,061
Grand total: 1952	205,829	193,524	205,825	193,039	152,062	204,762	214,729	220,661	210,510	213,358	211,456	215,504	2,441,259
1951	199,958	183,745	200,535	185,488	199,521	197,246	200,322	202,721	196,752	199,826	198,258	206,032	2,370,404
Daily average 1952	6,640	6,673	6,640	6,435	4,905	6,825	6,927	7,118	7,017	6,883	7,049	6,952	6,670

[1] Preliminary figures. [2] Where no breakdown is shown, runs were all of domestic crude.

Receipts of domestic and foreign crude petroleum at refineries totaled 2,447.4 million barrels in 1952 and provided an increase of 4 million barrels in crude stocks at refineries, total crude runs of 2,441.3 million, and 2.1 million barrels for fuel or losses. Receipts of foreign crude represented 8.6 percent of total receipts, interstate receipts of domestic crude 38.1, and intrastate receipts 53.3 percent of total receipts.

Refinery receipts of crude petroleum in 1952, by methods of transportation, indicated that 73.3 percent was delivered by pipeline, 25.4 percent by boat, and 1.3 percent by tank cars and trucks.

TABLE 36.—Receipts of domestic and foreign crude petroleum at refineries in the United States, 1948–52, by method of transportation

[Millions of barrels]

Method of transportation	1948	1949	1950	1951	1952 [1]
By boat:					
Intrastate	120.9	112.2	128.6	145.9	170.0
Interstate	265.1	211.8	221.2	256.9	243.1
Foreign	129.1	154.9	177.7	178.7	208.5
Total	515.1	478.9	527.5	581.5	621.6
By pipeline:					
Intrastate	984.7	938.1	998.7	1,127.0	1,113.7
Interstate	490.0	495.7	542.6	629.4	680.3
Foreign				.4	1.1
Total	1,474.7	1,433.8	1,541.3	1,756.8	1,795.1
By tank car and truck:					
Intrastate	24.0	17.4	16.2	18.3	20.6
Interstate	32.8	15.4	15.4	15.4	10.1
Total	56.8	32.8	31.6	33.7	30.7
Grand total	2,046.6	1,945.5	2,100.4	2,372.0	2,447.4

[1] Preliminary figures.

Deliveries of crude oil to refineries by boat amounted to 621.6 million barrels in 1952. Foreign crude oil delivered by boat totaled 208.5 million, including 192.4 million to the East Coast, 4.4 to the Gulf Coast, and 11.7 million to the California district. The interstate movement of domestic crude oil by boat was 243.1 million barrels, including 174.7 million from the Gulf Coast to the East Coast district, 54.6 million exchange between the Texas Gulf and Louisiana Gulf districts, 12.0 million of river shipments to Kentucky refineries, 1.0 million to Illinois, Minnesota, and Wisconsin refineries, and 0.8 million to the California district. Intrastate deliveries by boat amounted to 169.9 million barrels, including 65 million in California, 50.3 million in Texas, 45 million in the Louisiana Gulf Coast district, and 9.6 million barrels in Kentucky.

The relatively small quantity of crude oil moved by tank cars and trucks equaled 30.7 million barrels, about two-thirds of which was intrastate. The total movement included deliveries of 8.4 million barrels in the California district, 7.4 in Texas, 5.4 in the Indiana-Illinois refining district, and 4.6 in the Rocky Mountain refining district.

The East Coast refinery district is a major market for crude oil from outside sources. Total receipts rose from 369.3 million barrels in 1951 to 378.9 million in 1952. Receipts of foreign crude oil increased from 171.9 million barrels to 192.4, whereas total receipts of domestic crude declined from 197.4 to 186.5 million barrels. Receipts of Texas crude declined from 159.9 million barrels in 1951 to 145.6 million in 1952, receipts of Louisiana crude rose from 24.5 million to 26.8 million, and receipts of Mississippi crude increased from 7.1 million to 9.4 million.

Demand by States of Origin.—The demand for domestic crude oil (production plus or minus change in domestic stocks) increased 42 million barrels in 1952 to 2,279 million barrels. The eight States that had a demand of over 50 million barrels a year supplied 92.6 percent of the total demand in both 1951 and 1952. There was no change in the order of importance of these States in 1952 from 1951.

Texas supplied 44.6 percent of the demand for domestic crude oil during the year. Its output was 1,026.3 million barrels of crude oil, resulting in an increase of 10.5 million barrels in stocks and an indicated demand of 1,015.8 million. Total deliveries of Texas crude oil to refineries comprised 566.2 million barrels to refineries within the State and 450.3 million to refineries in other States, mainly of the East Coast and Indiana-Illinois districts.

The demand for California crude oil was 15.7 percent of the total for domestic crude in 1952 compared with 15.9 percent in 1951. Production amounted to 359.4 million barrels, 2. 0 million was added to stocks, and the indicated demand was 357.4 million. About 6.7 million barrels of California crude was exported in 1952, mostly to western Canada, and the balance was used within the State. The static demand for California crude was primarily related to the increase of 8.1 million barrels in imports of foreign crude into California in 1952.

Louisiana ranks third as a source of domestic crude, supplying 10.5 percent of the total in 1952. Production totaled 241.9 million barrels, stocks increased 1.8 million, and indicated demand was 240.1 million barrels, a 3.5-percent gain over 1951. In 1952, 123.7 million barrels was delivered to refineries within the State, and 116.9 million was delivered to outside refineries, mainly those in Texas, the East Coast, Kentucky, and western Ohio.

Oklahoma was the fourth State in importance as a source of domestic crude oil, supplying 8.5 percent of the total demand in 1952. Production amounted to 192.7 million barrels in 1952 and was supplemented by 1.5 million barrels in stocks. The principal deliveries of Oklahoma crude were 72.8 million barrels to refineries within the State and 66.7 million to the Indiana-Illinois district.

Kansas supplied 5.1 percent of the total demand for domestic crude oil in both 1951 and 1952. Production amounted to 114.8 million barrels in 1952. Other high-ranking States were Wyoming, Illinois, and New Mexico.

TABLE 37.—Receipts of domestic crude oil at refineries in the United States in 1952, by State and district

[Thousands of barrels]

Receiving State and district	Total domestic receipts	Intrastate receipts	Interstate receipts from—															
			Ark.	Colo.	Fla. and N. Y.	Ill.	Ind.	Kans., Nebr., and N. Dak.	Ky. and Ohio	La.	Ala. and Miss.	New Mexico	Okla.	Pa.	Texas	West Va.	Mont. and Wyo.	Total
Ga.; S. C.	174										174							174
Maryland	15,861									2,607	492				12,762			15,861
Mass.; R. I.	4,360				113					2,837	647				763			4,360
N. J.; Fla.	67,754				417			64		14,049	3,794	1,271	636	1,710	45,813			67,754
New York: East	4,819									104	4,715							4,819
West	18,211	2,644				5,650		1,003						521	8,393			15,567
Pennsylvania: East	93,533									7,242		20			86,271			93,533
West	16,517	10,465			53	610			815				1,797		2,527	250		6,052
West Virginia	4,285	1,781				191			411				1,902					2,504
District 1	225,514	14,890			583	6,451		1,067	1,226	26,839	9,822	1,291	4,335	2,231	156,529	250		210,624
Ill., Minn., Wis.	157,363	23,728		505		112	1,181	19,361	15	371		12,434	27,365		63,937		8,354	133,635
Indiana	132,165	932		2,266		5,175		14,765		22		2,272	18,128		80,414		8,191	131,233
Kans., Nebr., S. Dak.	82,746	61,965						4					9,721		10,255		801	20,781
Ky., Tenn.	30,055	11,506	421			615	1,883		118	11,076	3,857				579			18,549
Michigan	40,926	13,605				5,195		117					5,191		13,887		2,931	27,321
Missouri	13,917							963					1,368		9,871		1,715	13,917
Ohio: East	28,216	1,671				17,182		868	1,301	103			4,503		2,588			26,545
West	86,713	187	1,649			9,278		2,301	2,226	9,170	542		15,987		45,373			86,526
Oklahoma	102,029	72,789						11,400				504			17,336			29,240
District 2	674,130	186,383	2,070	2,771		37,557	3,064	49,779	3,660	20,742	4,399	15,210	82,263		244,240		21,992	487,747
Arkansas	21,299	20,324								975								975
La., Ala., Miss.	198,767	123,739	8,379			134					18,031	127	157		48,200			75,028
New Mexico	6,623	5,532													1,091			1,091
Texas	677,185	566,160	33							67,716	280	33,689	9,307					111,025
District 3	903,874	715,755	8,412			134				68,691	18,311	33,816	9,464		49,291			188,119
Colorado	7,217	1,891															5,326	5,326
Montana	18,988	6,486															12,502	12,502
Utah	23,179	1,653		20,502													1,024	21,526
Wyo., Idaho	31,560	27,273		3,199				455									633	4,287
District 4	80,944	37,303		23,701				455									19,485	43,641
Calif., Wash.: Dist. 5	353,300	349,960		519				503		601		268			234		1,215	3,340
U. S. total	2,237,762	1,304,291	10,482	26,991	583	44,142	3,064	51,804	4,886	116,873	32,532	50,585	96,062	2,231	450,294	250	42,692	933,471
Daily average	6,114	3,564	29	74	2	121	8	141	13	319	89	138	262	6	1,230	1	117	2,550

TABLE 38.—Runs to stills and refinery receipts of crude oil in the United States in 1952, by methods of transportation and by receiving State and district

[Thousands of barrels]

Receiving State and district	Crude runs to stils	Fuel and losses	Change in refinery stocks	Origin of domestic crude receipts	Total receipts by method of transportation						
					Intrastate			Interstate			Foreign
					Pipe lines	Tank cars and trucks	Boats	Pipeline	Tank cars and trucks	Boats	
Ga., S. C.	3,799		−60							174	3,565
Maryland	24,958	−45	354							15,861	9,406
Mass., R. I.	11,483	−2	−116							4,360	7,005
N. J., Fla.	152,080	178	874	530				6,797		60,957	85,378
New York: East	13,668	43	159							4,819	9,051
West	18,021	2	188	2,697	2,644			15,262	305		
Pennsylvania: East	170,781	198	498					5,037		88,496	77,944
West	16,443	2	72	12,696	10,391	74		5,965	87		
West Virginia	4,268	−1	18	2,031	1,735	46		2,504			
District 1	415,501	375	1,987	17,954	14,770	120		35,565	392	174,667	192,349
Ill., Minn., Wis.	159,272	−47	−746	67,870	23,728			130,342	2,313	980	[1] 1,116
Indiana	132,162	−1	4	3,996	631	301		130,772	461		
Kans., Nebr., N. Dak., S. Dak.	83,421	123	−798	113,769	60,576	1,270	119	20,507	274		
Ky., Tenn.	30,069	−3	−11	15,135	1,593	333	9,580	5,748	751	12,050	
Michigan	40,676	502	−252	13,605	12,904	701		26,822	499		
Missouri	13,836	1	80					13,917			
Ohio: East	28,148		38	3,115	1,652	19		26,545			
West	86,992	5	−254		173	14		86,526			
Oklahoma	101,884	150	−4	168,851	72,271	518		29,230	10		
District 2	676,460	730	−1,943	386,341	173,528	3,156	9,699	470,409	4,308	13,030	1,116
Arkansas	21,253	1	45	30,806	20,101	223		746	226	3	
La., Ala., Miss.	198,941	353	432	273,144	77,224	1,512	45,003	59,040	321	15,667	959
New Mexico	6,617	4	2	56,117	5,404	128		1,091			
Texas	679,146	131	1,372	1,016,454	508,511	7,355	50,294	72,118	28	38,879	3,464
District 3	905,957	489	1,851	1,376,521	611,240	9,218	95,297	132,995	575	54,549	4,423
Colorado	7,291	13	−87	28,882	1,704	187		5,142	184		
Montana	19,116	−2	−126	8,109	5,566	920		12,145	357		
Utah	23,386	11	−218	1,653	1,363	290		21,451	75		
Wyo., Idaho	31,620	42	−102	68,342	26,465	808		2,604	1,683		
District 4	81,413	64	−533	106,986	35,098	2,205		41,342	2,299		
Calif., Wash.: Dist. 5	361,928	473	2,602	349,960	279,087	5,916	64,957		2,505	835	11,703
U. S. total	2,441,259	2,131	3,964	2,237,762	1,113,723	20,615	169,953	680,311	10,079	243,081	209,591
Daily average	6,670	6	11	6,114	3,043	56	465	1,859	27	664	573

[1] Pipeline.

TABLE 39.—Daily average demand for total crude petroleum in the United States in 1951–52, by State of origin and month

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1951													
Alabama	2.9	2.9	2.5	3.9	2.7	2.5	2.1	3.2	2.8	3.0	2.6	2.6	2.8
Arkansas	74.6	98.7	69.8	82.7	82.2	74.7	86.9	81.1	82.4	77.7	87.5	72.1	80.7
California	950.4	1,011.4	972.2	961.4	957.3	965.2	971.0	995.7	1,002.1	984.0	1,000.7	943.1	975.9
Colorado	70.2	82.6	80.0	69.5	71.4	80.8	70.7	76.5	72.8	68.0	84.7	75.9	75.2
Florida	2.5	1.2	1.0	2.6	.1	3.5	.2	2.8	.8	3.5	.2	3.4	1.8
Illinois	160.6	204.7	154.8	133.6	131.7	155.8	171.2	155.6	159.4	154.4	155.3	175.9	159.1
Indiana	29.4	21.8	27.2	29.1	30.9	28.8	31.1	33.3	31.3	33.2	33.4	30.2	30.0
Kansas	315.7	312.3	329.5	295.3	294.3	308.4	290.7	286.0	331.6	338.0	316.4	332.5	312.6
Kentucky	39.3	20.1	28.6	21.2	29.0	37.6	30.3	26.4	32.0	35.1	45.4	26.4	31.0
Louisiana	617.8	626.8	628.2	644.0	630.8	645.2	601.6	630.6	623.0	664.8	671.2	631.6	634.6
Michigan	34.0	42.2	40.3	35.1	38.0	35.7	40.1	37.7	38.2	37.5	37.7	37.4	37.8
Mississippi	86.8	121.4	102.5	90.9	100.6	104.8	105.0	100.6	85.5	98.8	106.1	94.1	99.6
Missouri, North Dakota, Tennessee, Virginia	.1	.1	.2	.2	.2	.2	.2	.3	.3	.2	.2	.2	.2
Montana	24.9	25.1	22.8	20.6	24.5	28.1	29.5	25.0	28.8	22.2	26.9	26.7	25.4
Nebraska	8.8	8.9	8.6	5.5	6.8	6.2	6.6	6.2	5.8	1.6	4.8	7.6	6.5
New Mexico	152.0	124.6	128.6	158.7	139.2	150.2	146.8	138.0	142.6	136.2	170.2	129.2	143.0
New York	12.0	11.4	11.4	11.3	10.8	11.7	12.0	12.0	11.0	14.6	11.9	12.2	11.8
Ohio	8.7	11.1	12.6	7.8	7.2	9.4	8.0	7.1	9.2	9.0	8.1	9.3	9.0
Oklahoma	510.1	488.9	535.5	500.3	520.5	526.7	510.8	513.8	495.5	478.6	512.6	525.5	510.1
Pennsylvania	32.6	32.1	32.2	33.2	32.2	30.9	29.0	29.1	35.5	31.6	32.1	27.4	31.5
Texas	2,721.2	2,755.8	2,742.0	2,594.4	2,694.5	2,755.7	2,699.7	2,765.3	2,826.2	2,754.0	2,790.4	2,993.8	2,757.9
Utah	2.9	3.5	3.7	3.1	3.5	3.7	3.6	3.6	3.3	3.7	3.7	3.8	3.5
West Virginia	6.7	6.5	7.1	7.2	8.8	6.2	8.1	8.4	8.6	7.9	6.2	8.5	7.5
Wyoming	176.7	178.3	170.9	157.0	176.9	196.4	199.6	199.7	191.5	174.6	178.8	184.1	182.1
Total, domestic crude	6,040.9	6,192.4	6,112.2	5,868.6	5,993.6	6,168.4	6,054.8	6,138.0	6,220.2	6,132.2	6,287.1	6,353.5	6,129.6
Foreign crude	548.3	490.4	473.9	458.8	535.9	538.3	554.5	523.7	526.2	443.6	460.4	433.8	499.1
Grand total 1951	6,589.2	6,682.8	6,586.1	6,327.4	6,529.5	6,706.7	6,609.3	6,661.7	6,746.4	6,575.8	6,747.5	6,787.3	6,628.7
Pennsylvania Grade (included above)	57.1	55.4	57.3	48.9	62.2	53.4	56.7	56.0	58.9	59.3	52.9	51.4	55.3
1952 [1]													
Alabama	2.7	3.1	2.9	2.7	2.7	1.4	1.4	2.0	2.8	3.9	3.3	4.4	2.8
Arkansas	81.0	82.0	70.1	87.4	79.9	77.3	77.5	78.6	83.7	83.1	74.9	79.9	79.6
California	947.5	970.7	991.8	974.3	982.5	960.6	963.5	1,006.9	998.0	965.0	997.9	958.4	976.4
Colorado	80.5	77.8	81.6	73.0	60.4	87.9	82.7	86.2	81.2	75.1	95.8	85.6	80.6
Florida	.1	1.2	2.5	----------	3.7	1.0	1.8	.6	2.4	1.5	.2	2.6	1.5
Illinois	173.7	154.6	154.7	129.3	135.5	155.6	158.1	181.4	185.3	157.7	182.7	181.7	162.6
Indiana	31.0	29.9	30.8	31.2	32.9	32.8	34.0	37.3	37.8	33.8	33.0	33.4	33.2
Kansas	342.9	319.3	317.2	303.7	180.0	335.1	344.5	346.6	314.9	311.8	369.1	338.4	318.5
Kentucky	27.7	37.9	32.1	42.3	27.6	33.7	30.1	33.2	29.6	34.7	37.1	34.3	33.3
Louisiana	659.3	643.1	640.6	633.4	534.7	686.7	666.8	680.6	659.3	659.2	702.7	707.3	656.1

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TABLE 39.—Daily average demand for total crude petroleum iu the United States in 1951–52, by State of origin and month—Continued

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
Michigan	37.5	39.1	36.0	35.9	33.2	35.4	32.2	36.7	33.4	37.2	37.8	35.2	35.8
Mississippi	101.1	103.4	96.1	90.5	100.9	108.5	95.3	88.2	100.1	120.0	99.8	92.4	99.7
Missouri, North Dakota, Tennessee, Virginia	.2	.3	.6	1.2	1.5	2.6	3.8	6.0	4.7	6.5	10.5	9.5	4.0
Montana	24.7	29.2	26.4	15.5	27.5	19.5	26.8	27.4	28.2	25.0	30.9	30.6	26.0
Nebraska	5.3	5.2	5.3	6.0	2.5	8.6	7.4	6.3	3.1	2.8	3.5	4.3	5.0
New Mexico	138.5	165.4	162.6	162.6	107.6	142.2	189.8	175.4	163.0	178.1	190.3	166.1	161.8
New York	11.9	12.3	10.4	10.3	9.7	14.8	12.8	11.1	12.8	10.9	11.8	10.9	11.6
Ohio	9.9	8.5	7.8	5.1	9.9	8.6	10.5	10.7	11.2	7.4	8.0	6.9	8.7
Oklahoma	527.2	577.5	510.1	489.4	365.4	502.8	590.7	592.1	575.1	550.3	537.6	552.0	530.6
Pennsylvania	24.6	25.0	26.3	27.5	35.3	33.5	31.2	29.7	32.6	28.8	29.6	28.8	29.4
Texas	2,880.0	2,816.3	2,906.6	2,790.9	1,619.9	2,889.0	2,842.1	2,946.0	2,900.5	2,907.0	2,897.5	2,925.1	2,775.5
Utah	4.2	4.0	3.6	4.7	4.1	5.3	5.3	5.1	5.1	5.0	5.3	5.1	4.7
West Virginia	6.2	8.3	7.0	6.9	6.0	6.0	6.7	7.0	8.3	9.1	5.8	7.3	7.0
Wyoming	194.0	179.8	175.7	150.0	135.0	190.0	208.0	197.9	188.3	174.5	180.0	210.7	182.0
Total, domestic crude	6,311.7	6,293.9	6,298.8	6,073.8	4,498.4	6,338.9	6,423.0	6,593.0	6,461.4	6,388.4	6,545.1	6,510.9	6,226.4
Foreign crude	450.0	498.8	495.4	509.5	504.1	601.1	589.9	632.1	659.7	609.6	629.7	594.1	564.4
Grand total, 1952	6,761.7	6,792.7	6,794.2	6,583.3	5,002.5	6,940.0	7,012.9	7,225.1	7,121.1	6,998.0	7,174.8	7,105.0	6,790.8
Pennsylvania Grade (included above)	48.2	49.7	47.1	47.0	50.6	58.4	55.4	55.8	58.4	51.3	51.3	52.9	52.2

[1] Preliminary figures.

TABLE 40.—Demand for total crude petroleum in the United States, 1951–52, by State of origin and by month

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1951													
Alabama	90	81	76	118	85	73	65	99	84	93	78	82	1,024
Arkansas	2,313	2,764	2,163	2,481	2,550	2,241	2,695	2,513	2,471	2,409	2,626	2,235	29,461
California	29,463	28,318	30,139	28,844	29,676	28,957	30,101	30,865	30,063	30,503	30,020	29,236	356,185
Colorado	2,177	2,314	2,479	2,084	2,213	2,424	2,192	2,371	2,185	2,107	2,542	2,352	27,440
Florida	76	34	32	77	2	106	6	87	24	109	6	107	666
Illinois	4,979	5,731	4,800	4,007	4,082	4,673	5,306	4,823	4,784	4,787	4,658	5,454	58,084
Indiana	912	610	844	873	957	865	965	1,033	939	1,029	1,001	936	10,964
Kansas	9,788	8,744	10,215	8,860	9,122	9,251	9,011	8,866	9,948	10,479	9,493	10,309	114,086
Kentucky	1,217	564	886	635	899	1,129	940	818	960	1,087	1,362	817	11,314
Louisiana	19,153	17,551	19,475	19,321	19,556	19,355	18,648	19,547	18,689	20,609	20,136	19,580	231,620
Michigan	1,054	1,181	1,250	1,053	1,177	1,072	1,242	1,170	1,145	1,163	1,132	1,161	13,800
Mississippi	2,692	3,400	3,177	2,727	3,118	3,145	3,256	3,120	2,567	3,063	3,184	2,916	36,365
Missouri, North Dakota, Tennessee, and Virginia	4	4	5	6	6	5	5	10	9	7	7	5	[1] 73
Montana	771	702	707	619	759	842	916	776	865	688	806	828	9,279
Nebraska	273	248	268	164	211	187	206	193	173	49	144	236	2,352
New Mexico	4,711	3,489	3,985	4,761	4,316	4,506	4,550	4,277	4,278	4,223	5,106	4,005	52,207
New York	372	320	352	339	321	351	373	373	329	454	356	378	4,318
Ohio	271	311	392	233	222	283	247	219	276	279	243	287	3,263
Oklahoma	15,812	13,689	16,601	15,010	16,137	15,802	15,836	15,929	14,865	14,835	15,376	16,290	186,182
Pennsylvania	1,009	898	997	997	999	926	900	903	1,064	980	963	849	11,485
Texas	84,358	77,162	85,001	77,832	83,529	82,672	83,691	85,723	84,785	85,373	83,711	92,807	1,006,644
Utah	89	99	114	93	108	110	113	112	100	116	112	117	1,283
West Virginia	206	182	223	215	273	187	250	259	257	244	187	264	2,747
Wyoming	5,479	4,992	5,298	4,710	5,484	5,891	6,186	6,192	5,745	5,413	5,365	5,708	66,463
Total domestic crude	187,269	173,388	189,479	176,059	185,802	185,053	187,700	190,278	186,605	190,099	188,614	196,959	2,237,305
Foreign crude	16,996	13,731	14,689	13,764	16,612	16,148	17,189	16,234	15,787	13,752	13,811	13,446	182,159
Grand total 1951	204,265	187,119	204,168	189,823	202,414	201,201	204,889	206,512	202,392	203,851	202,425	210,405	2,419,464
Daily average:													
Domestic crude	6,041	6,192	6,112	5,869	5,994	6,168	6,055	6,138	6,220	6,132	6,287	6,354	6,130
Domestic and foreign crude	6,589	6,683	6,586	6,327	6,529	6,707	6,609	6,662	6,746	6,576	6,748	6,787	6,629
1952 [2]													
Alabama	84	90	91	81	84	41	45	63	83	120	100	136	1,018
Arkansas	2,512	2,377	2,174	2,621	2,477	2,318	2,403	2,436	2,511	2,575	2,247	2,478	29,129
California	29,373	28,151	30,745	29,229	30,456	28,818	29,869	31,214	29,941	29,915	29,936	29,712	357,359
Colorado	2,494	2,255	2,528	2,191	1,872	2,636	2,563	2,673	2,435	2,329	2,875	2,653	29,504
Florida	4	34	76	1	114	30	57	18	71	46	6	80	537
Illinois	5,385	4,484	4,797	3,880	4,201	4,670	4,901	5,624	5,559	4,889	5,481	5,632	59,503
Indiana	962	866	955	937	1,019	984	1,054	1,167	1,135	1,048	989	1,036	12,142

TABLE 40.—Demand for total crude petroleum in the United States, 1951–52, by State of origin and by month—Continued

[Thousands of barrels]

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1952													
Kansas	10,631	9,259	9,834	9,111	5,580	10,052	10,681	10,746	9,446	9,667	11,072	10,491	116,570
Kentucky	859	1,099	995	1,270	856	1,011	932	1,029	889	1,075	1,113	1,064	12,192
Louisiana	20,437	18,650	19,858	19,003	16,577	20,601	20,670	21,098	19,780	20,434	21,082	21,927	240,117
Michigan	1,163	1,135	1,115	1,076	1,030	1,062	997	1,137	1,003	1,154	1,133	1,092	13,097
Mississippi	3,134	3,000	2,980	2,715	3,128	3,254	2,953	2,734	3,003	3,720	2,995	2,863	36,479
Missouri, North Dakota, Tennessee, and Virginia	5	8	18	37	47	77	119	185	141	202	315	293	[3] 1,447
Montana	766	846	819	464	853	585	832	850	847	776	926	949	9,513
Nebraska	165	150	165	179	79	259	230	195	94	85	104	133	1,838
New Mexico	4,293	4,798	5,041	4,877	3,335	4,266	5,883	5,438	4,891	5,522	5,710	5,149	59,203
New York	368	357	322	310	301	445	396	343	385	338	353	337	4,255
Ohio	306	246	242	153	307	259	325	331	336	228	240	214	3,187
Oklahoma	16,343	16,749	15,814	14,682	11,327	15,085	18,313	18,354	17,252	17,060	16,128	17,112	194,219
Pennsylvania	761	726	815	824	1,093	1,006	967	922	977	894	889	892	10,766
Texas	89,281	81,673	90,105	83,727	50,217	86,672	88,105	91,325	87,015	90,117	86,925	90,679	1,015,841
Utah	129	116	112	141	127	158	163	158	152	155	160	159	1,730
West Virginia	192	240	216	207	187	179	209	217	249	283	174	226	2,579
Wyoming	6,014	5,214	5,445	4,499	4,184	5,700	6,447	6,136	5,648	5,408	5,401	6,531	66,627
Total domestic crude	195,661	182,523	195,262	182,215	139,451	190,168	199,114	204,383	193,843	198,040	196,354	201,838	2,278,852
Foreign crude	13,950	14,466	15,357	15,284	15,628	18,032	18,286	19,594	19,789	18,899	18,890	18,416	206,591
Grand total 1952	209,611	196,989	210,619	197,499	155,079	208,200	217,400	223,977	213,632	216,939	215,244	220,254	2,485,443
Daily average:													
Domestic crude	6,312	6,294	6,299	6,074	4,498	6,339	6,423	6,593	6,461	6,388	6,545	6,511	6,226
Domestic and foreign crude	6,762	6,793	6,794	6,583	5,003	6,940	7,013	7,225	7,121	6,998	7,175	7,105	6,791

[1] Missouri (24), North Dakota (23), Tennessee (14), and Virginia (12). [2] Preliminary figures. [3] Missouri (21), North Dakota (1,406), Tennessee (10), and Virginia (10).

STOCKS

Stocks of all oils rose from 634 million barrels on the first of the year to 674 million at the end of the year. This increase included gains of 16 million barrels in crude oil and 24 million in refined products.

The principal changes in domestic crude-oil stocks by origin were gains of 10.5 million barrels for Texas, 2.1 million for California and 1.8 million each for Louisiana and Wyoming. The chief declines were 1.8 million barrels for Kansas and 1.6 million for Oklahoma.

The increase in refined stocks indicated that crude production and refinery runs substantially exceeded demand. The increase of 24 million barrels in product stocks included a gain of 13 million barrels in districts east of California and 11 million in the California district.

TABLE 41.—Stocks of crude petroleum, natural-gas liquids, and refined products in continental United States at end of year, 1948–52 [1]

[Thousands of barrels]

Product	1948	1949 [2]	1950	1951	1952
Crude petroleum (refinable):					
At refineries	60,969	60,405	63,328	62,311	66,275
Pipeline and tank-farm	169,508	177,049	167,941	175,481	187,852
Producers	16,095	15,902	17,194	17,991	17,801
Total refinable	246,572	253,356	248,463	255,783	271,928
California heavy crude	10,055				
Total crude petroleum	256,627	253,356	248,463	255,783	271,928
Natural-gas liquids	5,579	6,831	7,355	8,186	7,807
Refined products	[3] 343,537	[3] 342,932	326,892	[3] 370,140	394,019
Grand total	[3] 605,743	[3] 603,119	582,710	[3] 634,109	673,754

[1] Final figures.
[2] Separation between "gasoline-bearing" and "heavy" in California discontinued in 1949.
[3] New basis, for comparison with subsequent years; see table 1, footnote 6.

TABLE 42.—Stocks of crude petroleum in continental United States in 1952, by State of origin and month [1]

[Thousands of barrels]

State of origin	Jan. 1	Jan. 31	Feb. 29	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Alabama	88	92	73	61	57	48	77	104	113	98	76	94	89
Arkansas	2,605	2,590	2,552	2,907	2,826	2,781	2,823	2,882	2,907	2,820	2,753	2,956	3,027
California	29,616	30,372	30,520	30,059	30,256	30,452	31,226	31,745	30,907	30,444	31,014	30,646	31,672
Colorado	1,938	1,882	1,863	1,790	2,087	2,275	1,988	1,910	1,777	1,806	1,993	1,615	1,587
Florida	51	99	115	91	142	82	102	96	123	98	99	140	105
Illinois	11,356	10,889	10,988	10,911	11,973	12,445	12,562	12,645	11,887	11,382	11,665	11,060	10,601
Indiana	419	410	416	387	412	370	446	483	382	290	303	302	344
Kansas	10,568	9,975	10,336	10,530	11,438	10,833	9,999	9,412	8,672	9,392	10,347	8,772	8,756
Kentucky	1,667	1,904	1,845	1,922	1,713	1,897	1,886	1,969	1,897	1,949	1,828	1,617	1,518
Louisiana	14,890	14,449	14,577	14,986	15,882	17,272	16,597	16,416	15,932	16,536	17,280	16,898	16,709
Michigan	770	768	725	736	800	889	948	1,079	1,053	1,067	1,012	889	923
Mississippi	3,342	3,327	3,207	3,289	3,570	3,585	3,293	3,321	3,596	3,573	2,896	2,866	3,102
Missouri, Nebraska, North Dakota	268	279	289	304	302	332	266	244	292	471	641	770	1,075
Montana	949	914	829	733	996	845	914	873	902	932	1,058	999	1,012
New Mexico	6,961	7,502	7,387	7,528	7,683	7,092	8,014	7,280	6,961	7,205	7,036	6,520	6,895
New York	133	122	113	138	192	259	169	148	160	132	158	119	140
Ohio	640	593	598	615	730	681	694	653	582	524	580	592	667
Oklahoma	29,236	29,274	28,195	29,027	30,587	31,627	32,671	31,147	29,294	28,255	27,792	27,612	27,688
Pennsylvania	1,036	1,209	1,354	1,489	1,641	1,527	1,462	1,457	1,460	1,397	1,434	1,387	1,428
Texas	122,015	119,138	121,611	122,606	126,481	143,319	138,425	130,995	124,436	126,311	128,264	130,129	132,545
Utah	36	27	39	66	44	46	39	41	39	38	46	41	43
West Virginia	435	474	456	454	468	477	506	520	503	465	415	439	438
Wyoming	11,461	11,242	11,574	11,799	12,815	12,820	12,596	12,037	11,997	12,372	12,871	13,355	13,261
Total domestic	250,480	247,531	249,662	252,428	263,095	281,954	277,703	267,457	255,872	257,557	261,561	259,818	263,625
Foreign	5,303	6,476	6,238	6,698	7,584	8,859	8,261	8,494	8,496	7,166	8,215	8,034	8,303
Grand total	255,783	254,007	255,900	259,126	270,679	290,813	285,964	275,951	264,368	264,723	269,776	267,852	271,928
Pennsylvania Grade (included above)	1,857	2,002	2,117	2,287	2,560	2,645	2,511	2,473	2,333	2,177	2,227	2,146	2,133

[1] Final figures.

TABLE 43.—Stocks of crude petroleum in continental United States in 1952, by location and month [1]

[Thousands of barrels]

State	Jan. 1	Jan. 31	Feb. 29	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Arkansas	2,299	2,273	2,291	2,413	2,362	2,451	2,375	2,513	2,394	2,366	2,371	2,611	2,626
California, Washington	29,723	30,627	30,700	30,359	30,401	30,993	31,619	32,084	31,802	30,740	31,571	30,916	32,202
Colorado	775	655	667	665	914	876	853	762	727	701	843	793	740
Georgia, Delaware, Florida, South Carolina, Virginia	263	423	363	480	421	444	186	395	404	404	404	264	261
Illinois, Minnesota, Wisconsin	20,250	19,911	19,371	19,477	19,212	19,092	19,073	19,679	18,947	18,715	19,016	18,446	18,186
Indiana	4,008	4,106	4,095	4,505	4,618	4,734	4,413	4,419	4,188	4,192	4,227	3,948	4,058
Kansas, Nebraska	11,820	11,734	11,859	11,668	13,023	13,092	12,645	11,627	10,476	10,645	11,621	11,140	11,430
Kentucky, Tennessee	3,185	3,513	3,404	3,346	3,583	3,295	3,452	3,529	3,517	3,261	3,320	2,860	3,311
Louisiana, Alabama	13,785	14,267	13,942	14,136	13,829	14,130	13,474	14,445	14,214	14,550	14,590	14,801	14,421
Maryland	1,077	1,380	1,322	1,416	1,195	1,152	1,225	1,384	1,279	1,286	1,199	1,217	1,431
Massachusetts, Rhode Island	840	896	876	801	801	730	792	812	790	595	530	452	724
Michigan	1,632	1,327	1,261	1,249	1,463	1,493	1,598	1,718	1,731	1,724	1,620	1,560	1,638
Mississippi	1,878	1,779	1,707	1,751	1,693	1,702	1,767	1,733	1,756	1,677	1,664	1,675	1,700
Missouri, Iowa	6,339	6,708	6,972	7,040	7,452	7,061	6,960	6,648	6,532	6,746	6,984	6,853	7,402
Montana	1,352	1,133	1,205	1,175	1,627	1,390	1,362	1,243	1,173	1,225	1,424	1,472	1,369
New Jersey	5,761	5,441	5,966	6,652	7,952	7,706	7,779	6,556	6,557	5,696	6,409	6,611	6,719
New Mexico	1,718	1,676	1,983	2,172	2,203	2,009	1,884	1,627	1,721	1,919	1,805	1,846	1,891
New York	845	1,026	1,010	857	1,210	1,326	1,089	1,243	1,317	1,338	1,168	1,240	1,172
Ohio	8,118	7,409	6,654	6,988	7,639	8,232	8,342	7,843	7,675	8,091	7,685	7,595	7,406
Oklahoma	29,957	28,994	29,543	29,602	31,301	33,539	34,567	33,455	31,104	30,807	31,351	31,548	31,654
Pennsylvania	7,931	8,383	7,995	6,940	7,918	10,049	8,938	8,969	8,088	8,257	8,174	8,178	8,514
Texas	91,488	89,458	91,673	94,510	98,208	113,644	110,205	102,142	97,024	98,465	99,927	100,402	101,592
Utah	690	688	685	560	703	795	600	594	471	474	690	553	468
West Virginia	742	771	729	696	718	768	722	710	742	729	688	671	698
Wyoming, Idaho	9,307	9,429	9,627	9,668	10,233	10,110	10,044	9,821	9,739	10,120	10,495	10,200	10,315
Total	255,783	254,007	255,900	259,126	270,679	290,813	285,964	275,951	264,368	264,723	269,776	267,852	271,928

[1] Final figures.

TABLE 44.—Stocks of crude petroleum in continental United States in 1952, by classification and location

[Thousands of barrels]

Classification and location	Jan. 1	Jan. 31	Feb. 29	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
At refineries:													
Arkansas	682	627	608	686	601	700	593	631	529	464	457	681	727
California, Washington	8,544	9,352	10,136	10,084	10,335	11,051	11,784	11,441	11,649	10,650	11,189	10,601	11,146
Colorado	252	162	164	210	260	228	215	177	212	200	257	197	165
Georgia, Delaware, South Carolina	216	324	324	389	392	362	159	317	281	351	305	204	156
Illinois, Minnesota, Wisconsin	5,040	4,529	4,847	4,641	4,739	4,231	4,207	5,036	4,549	4,403	4,322	4,008	4,294
Indiana	1,856	1,907	1,792	1,740	1,845	1,814	1,756	1,758	1,720	1,621	1,742	1,692	1,860
Kansas, Nebraska	2,417	2,342	2,305	2,417	2,942	2,887	2,754	2,419	2,090	1,654	1,553	1,445	1,619
Kentucky, Tennessee	1,385	1,656	1,487	1,419	1,636	1,384	1,496	1,447	1,451	1,202	1,280	896	1,374
Louisiana, Alabama	3,699	4,086	3,905	4,199	4,562	4,203	4,341	4,449	4,306	4,247	4,391	4,176	4,143
Maryland	1,077	1,380	1,322	1,416	1,195	1,152	1,225	1,384	1,279	1,286	1,199	1,217	1,431
Massachusetts, Rhode Island	840	896	876	801	801	730	792	812	790	595	530	452	724
Michigan	681	517	509	468	516	503	503	554	514	526	419	382	429
Mississippi	26	17	22	21	21	21	16	16	23	19	18	15	14
Missouri	219	236	215	262	249	265	255	194	222	192	212	208	299
Montana	657	567	560	538	861	759	589	475	447	446	624	639	531
New Jersey	5,590	5,149	5,645	6,173	7,205	7,279	7,314	6,195	6,336	5,485	6,225	6,484	6,464
New Mexico	106	103	129	138	157	167	127	113	104	110	145	105	108
New York	612	801	794	717	1,032	1,154	919	1,092	1,112	1,120	961	999	959
Ohio	1,416	1,221	1,213	1,115	1,407	1,351	1,367	1,301	1,193	1,328	1,195	1,277	1,200
Oklahoma	3,534	3,480	3,477	3,575	3,776	3,652	4,027	4,007	3,661	3,490	3,703	3,605	3,530
Pennsylvania	6,132	6,593	6,286	5,233	5,955	8,149	7,125	7,183	6,331	6,606	6,439	6,256	6,702
Texas	15,786	14,976	16,435	15,906	17,107	19,294	18,912	17,964	17,451	18,012	17,449	16,968	17,158
Utah	525	535	533	414	539	517	451	415	327	330	520	386	307
West Virginia	39	62	28	54	44	55	85	67	63	65	58	53	57
Wyoming, Idaho	980	918	1,002	996	982	967	938	905	857	839	891	831	878
Total at refineries	62,311	62,436	64,614	63,612	69,159	72,875	71,950	70,352	67,497	65,241	66,084	63,777	66,275

TABLE 44.—Stocks of crude petroleum in continential United States in 1952, by classification and location—Continued

[Thousands of barrels]

Classification and location	Jan. 1	Jan. 31	Feb. 29	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Pipeline and tank-farm stocks:													
Arkansas	1,237	1,266	1,303	1,342	1,386	1,366	1,397	1,507	1,485	1,522	1,534	1,545	1,524
California	16,499	16,499	15,976	15,683	15,605	15,223	15,152	16,169	15,579	15,774	15,995	15,961	16,692
Colorado	373	348	348	305	494	473	483	430	360	351	436	441	420
Illinois	14,625	14,787	13,934	14,241	13,883	14,256	14,266	14,083	13,798	13,732	14,114	13,838	13,322
Indiana	2,082	2,134	2,238	2,695	2,703	2,870	2,592	2,596	2,398	2,501	2,420	2,186	2,128
Kansas, Nebraska, North Dakota	8,396	8,410	8,573	8,231	9,043	8,936	8,736	8,180	7,248	7,920	9,033	8,598	8,719
Kentucky, Tennessee	1,730	1,787	1,847	1,857	1,872	1,841	1,886	2,012	1,996	1,989	1,970	1,894	1,867
Louisiana, Alabama	8,658	8,703	8,559	8,519	7,829	8,449	7,649	8,587	8,433	8,874	8,768	9,104	8,796
Michigan	761	620	567	596	767	810	920	979	1,042	1,023	1,026	993	1,034
Mississippi	1,452	1,362	1,280	1,320	1,357	1,276	1,346	1,312	1,328	1,263	1,251	1,255	1,311
Missouri-Iowa	6,120	6,472	6,757	6,778	7,203	6,796	6,705	6,454	6,310	6,554	6,772	6,645	7,103
Montana	520	391	470	462	591	456	573	573	521	584	600	613	623
New Jersey, Florida	205	378	347	557	763	496	479	426	331	251	270	174	348
New Mexico	1,022	983	1,264	1,439	1,446	1,087	1,147	869	992	1,189	1,090	1,096	1,138
New York	203	195	186	110	148	147	145	121	170	188	177	211	183
Ohio	6,617	6,108	5,361	5,788	6,147	6,801	6,895	6,462	6,402	6,683	6,410	6,238	6,126
Oklahoma	25,148	24,239	24,771	24,687	26,195	28,267	29,125	28,083	26,073	25,952	26,308	26,528	26,794
Pennsylvania	1,629	1,630	1,549	1,542	1,803	1,740	1,653	1,631	1,597	1,491	1,580	1,757	1,647
Texas	69,662	68,422	69,158	72,494	75,081	86,280	84,283	77,868	73,363	74,353	76,438	77,094	78,499
Utah	152	142	141	127	155	265	130	160	127	126	154	152	140
West Virginia	538	549	536	477	509	543	472	478	514	499	470	458	476
Wyoming	7,852	8,046	8,150	8,172	8,771	8,623	8,491	8,361	8,327	8,761	9,084	8,844	8,962
Total pipeline and tank-farm stocks	175,481	173,471	173,315	177,422	183,751	197,001	194,525	187,341	178,394	181,580	185,900	185,625	187,852
Producers' stocks	17,991	18,100	17,971	18,092	17,769	20,937	19,489	18,258	18,477	17,902	17,792	18,450	17,801
Grand total: 1952 [1]	255,783	254,007	255,900	259,126	270,679	290,813	285,964	275,951	264,368	264,723	269,776	267,852	271,928
1951 [1]	248,463	243,107	235,247	233,824	243,180	248,418	248,170	250,847	254,276	254,900	262,266	261,100	255,783

[1] Final figures.

PRICES AND VALUE

The average value of crude petroleum at the well was $2.53 per barrel in both 1951 and 1952. New Mexico, Wyoming, Colorado, and Nebraska were the only States that had increases in average value The total value of crude petroleum at the well was $5.7 billion in 1951 and $5.8 billion in 1952. There were no changes in the posted prices of representative types of crude in 1952.

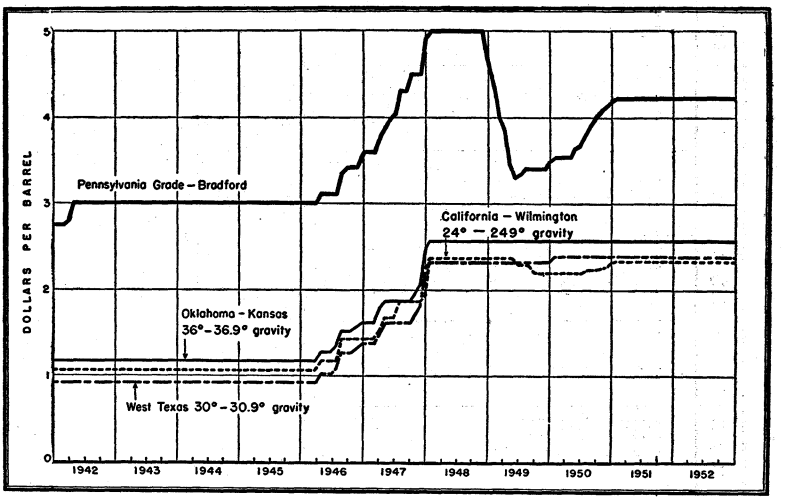

FIGURE 5.—Posted prices of selected grades of crude petroleum in the United States, 1942–52, by months.

TABLE 45.—Value of crude petroleum at wells in the United States, 1951–52, by States

State	1951		1952 [1]	
	Total (thousands of dollars)	Average per barrel	Total (thousands of dollars)	Average per barrel
Arkansas	$73,900	$2.48	$72,700	$2.46
California	797,760	2.25	801,310	2.23
Colorado	70,670	2.54	74,340	2.55
Illinois	166,870	2.77	162,140	2.76
Indiana	30,530	2.75	33,180	2.75
Kansas	294,320	2.57	293,780	2.56
Kentucky	32,190	2.77	33,240	2.76
Louisiana:				
Gulf Coast	500,240	2.65	528,410	2.65
Northern	114,440	2.63	111,450	2.62
Total, Louisiana	614,680	2.65	639,860	2.64
Michigan	37,880	2.72	35,250	2.66
Mississippi	82,970	2.24	80,810	2.23
Montana	22,130	2.47	21,550	2.25
Nebraska	5,960	2.33	6,100	2.44
New Mexico	129,160	2.45	146,070	2.47
New York	17,990	4.23	18,030	4.23
Ohio	9,580	3.05	9,610	2.99
Oklahoma	480,250	2.57	493,240	2.56
Pennsylvania	48,220	4.25	47,420	4.25
Texas:				
Gulf Coast	651,190	2.72	634,300	2.73
West Texas	953,200	2.50	1,001,020	2.51
East Texas proper	266,840	2.65	258,090	2.65
Other districts	739,560	2.56	759,450	2.55
Total, Texas	2,610,790	2.58	2,652,860	2.58
West Virginia	10,370	3.76	9,710	3.76
Wyoming	148,200	2.15	149,170	2.18
Alabama, Florida, Missouri, North Dakota, Tennessee, Utah, Virginia	5,990	2.00	9,910	2.01
Grand total	5,690,410	2.53	5,790,280	2.53

[1] Preliminary figures.

TABLE 46.—Posted price per barrel of petroleum at wells in the United States in 1952, by grade, with date of change

Date	Pennsylvania Grade		Corning Grade in Buckeye Pipe Line Co.[2]	Western Kentucky [3]	Illinois Basin [4]	Midland, Mich.[5]	Oklahoma-Kansas [6]	
	Bradford and Allegany districts [1]	In Southwest Pennsylvania pipelines [2]					34°–34.9°	36°–36.9°
Jan. 1	$4.25	$3.82	$2.70	$2.77	$2.77	$2.80	$2.53	$2.57

Date	Panhandle Texas (Carson, Gray, Hutchinson, and Wheeler Counties), 35°–35.9° [7]	West Texas, 30°–30.9° [7]	Lea County, N. Mex. 30°–30.9° [7]	South Texas, Duval-Mirando, 24°–24.9° [7]	East Texas [7]	Gulf Coast			
						Conroe, Tex.[8]	Texas, 30°–30.9° [8]	Texas, 20°–20.9° [8]	Louisiana, 30°–30.9° [9]
Jan. 1	$2.55	$2.38	$2.38	$2.53	$2.65	$2.83	$2.60	$2.40	$2.55

Date	Rodessa, La., 36°–36.9° [9]	Smackover, Ark.[10]	Elk Basin, Wyo., 30°–30.9° [9]	Salt Creek, Wyo., 36°–36.9° [11]	California [12]			
					Coalinga, 32°–32.9°	Kettleman, 37°–37.9°	Midway-Sunset, 19°–19.9°	Wilmington, 24°–24.9°
Jan. 1	$2.57	$2.08	$2.14	$2.57	$2.61	$2.80	$2.00	$2.33

[1] The Tide Water Associated Oil Co.
[2] The South Penn Oil Co.
[3] Sohio Corp.
[4] The Ohio Oil Co.
[5] The Pure Oil Co.
[6] Standard Oil Co. (Indiana).
[7] Humble Oil & Refining Co.
[8] The Texas Co.
[9] Esso Standard Oil Co.
[10] Arkansas Fuel Oil Co.
[11] Stanolind Oil & Gas Co.
[12] Standard Oil Co. of California.

REFINED PRODUCTS

GENERAL REVIEW

The total demand for all petroleum and refined products averaged 7.7 million barrels daily in 1952, a gain of 254,000 barrels daily or 3.4 percent compared with 1951. This relatively small gain in total demand, compared with a 9.7-percent increase in 1951, reflects the leveling of the high rate of exports in the months after the shutdown of the Abadan refinery in Iran in June 1951; the unexpanding general industrial activity for the year, partly due to the refinery and steel strikes in the middle of 1952 and partly to a much smaller rate of increase in the oil requirements by the Armed Forces in 1952.

The new supply of refined products is comprised of refinery output from crude oil, the production of light oils from natural gas, and imports of refined products.

Total crude runs to stills averaged 6.7 million barrels daily in 1952, a gain of 176,000 barrels daily, only 2.7 percent compared with the 13.2-percent increase in 1951. This relatively small gain was related primarily to the smaller increase in total demand, as the increase in refined-product stocks was about 24 million barrels in 1952 compared with the gain of 29 million in 1951.

The production of light oils recovered from natural gas and a small amount of motor benzol from coke ovens blended with gasoline averaged 606,000 barrels daily in 1952, a gain of 44,000 barrels daily or 7.8 percent compared with 1951. About 62 percent of the light oils from natural gas were included with gasoline in 1952, of which 47 percent were blended at refineries and 15 percent represented the quantity blended outside refineries, exports, and losses. Of the remaining 38 percent, 36 percent was marketed as liquefied gases for fuel or chemical uses and 2 percent as other finished oil products.

Imports of all refined mineral-oil products into continental United States increased from 354,000 barrels daily in 1951 to 384,000 in 1952, a gain of almost 9 percent. About 98 percent of these imports came from the Caribbean countries and Mexico. Residual fuel oil comprised about 91 percent of these imports in 1952. Product imports exceeded product exports by 7.9 million barrels.

Stocks of refined products were computed on a new basis in 1952 because of a revision in the definition of bulk terminals and are not comparable with the old basis for preceding years. To measure the effect of the change, data were also computed on the new basis for 1951 (see table 1, footnote 6). On the new basis, total refined stocks at the beginning of 1951 were increased 14.4 million barrels and were 19 million barrels larger at the end of the year; the resulting change in product stocks during 1951 (new basis) was an increase of 28.8 million barrels compared with the gain of 24.3 million (old basis). This increase of 4.5 million barrels in stocks resulted in a corresponding decrease in total and domestic demand. In comparing 1952 with 1951 it is necessary to use the new stock base. The four major products—gasoline, kerosine, distillate fuel, and residual fuel—were affected by the change.

TABLE 47.—Salient statistics of the major refined petroleum products in continental United States, 1948–52

[Thousands of barrels]

Product	1948	1949	1950	1951 [1]	1951 [2]	1952 [2 3]
Motor fuel:						
Production	921,923	962,417	1,024,462	1,140,843	1,140,843	1,189,781
Imports	302		156	463	463	1,626
Exports	37,302	39,347	24,721	40,136	40,136	36,860
Stocks, end of year	101,060	110,417	116,024	125,243	135,306	135,599
Domestic demand	871,270	913,713	994,290	1,091,951	1,089,566	1,154,254
Kerosine:						
Production	121,914	102,152	118,512	135,742	135,742	132,300
Imports	135		245			
Exports	3,495	2,533	2,078	6,843	6,843	7,963
Stocks, end of year	23,941	20,888	19,723	24,928	27,088	26,842
Domestic demand	112,220	102,672	117,844	123,694	123,241	124,583
Distillate fuel oil:						
Production	380,700	340,825	398,912	475,801	475,801	521,264
Transfers from crude	3,543	2,701	2,537	2,863	2,863	2,705
Imports	2,546	1,825	2,602	1,767	1,767	2,674
Exports	21,293	12,295	12,653	22,555	22,555	33,916
Stocks, end of year	71,429	[4] 75,435	71,948	80,722	86,619	99,582
Domestic demand	340,576	329,278	394,885	449,102	447,278	479,764
Residual fuel oil:						
Production	466,317	424,909	425,217	469,377	469,377	454,784
Transfers from crude	23,847	[5] 4,750	5,325	6,006	6,006	6,343
Imports	53,269	75,175	120,036	119,166	119,166	128,510
Exports	13,011	12,641	16,228	28,999	28,999	27,921
Stocks, end of year	64,021	60,193	40,750	41,979	42,853	48,706
Domestic demand	500,543	496,021	553,793	564,321	564,397	555,863

See footnotes at end of table.

TABLE 47.—Salient statistics of the major refined petroleum products in continental United States, 1948–52—Continued

[Thousands of barrels]

Product	1948	1949	1950	1951 [1]	1951 [2]	1952 [2 3]
Lubricants:						
Production	51,416	45,389	51,735	61,489	61,489	55,600
Imports	101					
Exports {Grease	396	392	383	447	447	445
Exports {Oil	12,996	12,520	13,869	16,982	16,982	15,601
Stocks, end of year	9,843	9,219	7,849	9,617	9,617	11,021
Domestic demand	35,983	33,101	38,853	42,292	42,292	38,150
Wax (1 barrel=280 pounds):						
Production	3,515	3,208	4,462	4,814	4,814	4,331
Imports	27					
Exports	994	1,031	1,193	1,349	1,349	1,036
Stocks, end of year	551	473	504	723	723	575
Domestic demand	2,348	2,255	3,238	3,246	3,246	3,443
Coke (5 barrels=1 short ton):						
Production	14,494	16,959	17,224	18,977	18,977	18,123
Exports	2,521	2,480	2,493	4,385	4,385	4,206
Stocks, end of year	646	698	408	519	519	513
Domestic demand	11,670	14,427	15,021	14,481	14,481	13,923
Asphalt (5.5 barrels=1 short ton):						
Production	51,919	49,007	58,240	66,302	66,302	70,312
Imports	1,557	1,185	1,795	2,462	2,462	2,896
Exports	1,628	1,569	983	1,258	1,258	2,267
Stocks, end of year	5,657	4,918	5,293	6,620	6,620	6,321
Domestic demand	49,962	49,362	58,677	66,179	66,179	71,240
Road oil:						
Production	7,915	7,691	6,928	6,100	6,100	6,998
Stocks, end of year	501	366	397	402	402	453
Domestic demand	8,027	7,826	6,897	6,095	6,095	6,947
Still gas (1 barrel=3,600 cubic feet):						
Production	81,159	82,621	83,743	96,294	96,294	95,275
Liquefied gases:						
Production [6]	23,676	23,469	29,083	33,045	33,045	30,968
Transfers of liquefied gas [7] from natural-gasoline plants	42,991	45,982	58,184	70,341	70,341	79,983
Exports	1,089	1,279	1,632	2,121	2,121	2,401
Stocks, end of year	593	527	657	668	668	638
Domestic demand	65,508	68,238	85,505	101,254	101,254	108,580
Miscellaneous:						
Production	6,929	4,236	4,717	7,201	7,201	7,258
Exports	213	220	250	373	373	195
Stocks, end of year	714	735	808	1,071	1,071	1,036
Domestic demand	6,506	3,995	4,394	6,565	6,565	7,098
Unfinished gasoline:						
Rerun (net)	917	418	[8] 243	353	353	[8] 489
Stocks, end of year	8,275	7,857	8,100	7,747	7,747	8,236
Other unfinished oils:						
Rerun (net)	513	10,006	6,891	11,367	11,367	5,909
Transfers of cycle products	1,914	2,470	2,927	3,411	3,411	4,110
Imports	1,114	3,688	7,713	5,263	5,263	5,010
Stocks, end of year	61,885	58,037	61,786	59,093	59,093	62,304
Shortage	2,768	585	(712)	(2,648)	(2,648)	(2,552)

[1] Figures are on old basis and comparable with preceding years.
[2] Figures of stocks and demand are on new basis due to redefinition of bulk terminal (see table 1, footnote 6). Stock figures as of January 1, 1951, are as follows: motor fuel, 123,702; kerosine, 21,430; distillate fuel oil, 76,021; residual fuel oil, 41,700.
[3] Preliminary except stock figures.
[4] Figure on new basis due to additional terminal storage reported in the East Coast; figure on old basis, 75,207.
[5] Beginning January 1949 for California crude petroleum intended for charging cracking units excluded from transfers and considered as run to stills. Figure for 1948 on new basis and comparable with subsequent years, 6,699. Consequent adjustments were made in production of products.
[6] Liquefied refinery gases.
[7] Liquefied petroleum gases.
[8] Negative quantity; represents net excess of unfinished oils produced over unfinished oils rerun.

TABLE 48.—Runs to stills and output of petroleum products at refineries in the United States, 1948–52

[Thousands of barrels]

Product	1948 [1]	1949	1950	1951	1952 [2]
Input:					
Crude petroleum:					
Domestic	1,924,335	1,789,756	1,918,854	2,188,677	2,235,198
Foreign	124,014	154,465	176,013	181,727	206,061
Total crude petroleum	2,048,349	1,944,221	2,094,867	2,370,404	2,441,259
Natural-gas liquids	76,218	85,457	94,639	99,250	103,898
Total input	2,124,567	2,029,678	2,189,506	2,469,654	2,545,157
Output:					
Gasoline	895,986	939,051	998,093	1,108,880	1,155,916
Kerosine	121,914	102,152	118,512	135,742	132,300
Distillate fuel oil	379,340	340,825	398,912	475,801	521,264
Residual fuel oil	479,988	424,909	425,217	469,377	454,784
Lubricants	51,416	45,389	51,735	61,489	55,600
Wax [3]	3,515	3,208	4,462	4,814	4,331
Coke [3]	14,494	16,959	17,224	18,977	18,123
Asphalt [3]	51,919	49,007	58,240	66,302	70,312
Road oil	7,916	7,691	6,928	6,100	6,998
Still gas [3]	81,159	82,621	83,743	96,294	95,275
Liquefied gases	23,676	23,469	29,083	33,045	30,968
Other finished products	6,929	4,236	4,717	7,201	7,258
Unfinished gasoline (net)	[4] 917	[4] 418	243	[4] 353	489
Other unfinished oils (net)	4,464	[4] 10,006	[4] 6,891	[4] 11,367	[4] 5,909
Shortage [5]	2,768	585	(712)	(2,648)	(2,552)
Total output	2,124,567	2,029,678	2,189,506	2,469,654	2,545,157

[1] Includes California data on a new basis to compare with subsequent years.
[2] Preliminary figures.
[3] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.
[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.
[5] Includes losses or gains (parentheses) in volume during processing.

Exports of refined products remained at a high level in 1952 but increased only 5.5 percent compared with the 64.0-percent increase in 1951. The relative gain in the first half of 1952 was 36.4 percent compared with a decline of 12.9 percent in the latter half, reflecting the easing of the world shortage in products that resulted from shutdown of the Abadan refinery in June 1951. The increase of 7.4 million barrels in product exports, including shipments to Territories and possessions in 1952, included gains of 11.4 million for distillate fuel oil and 1.1 million for kerosine and declines of 3.3 million for gasoline, 1.1 million for residual fuel oil, and 0.7 million for other refined products.

The domestic demand in continental United States rose from 7 million barrels daily in 1951 (new basis) to 7.3 million barrels daily in 1952—a gain of 3.4 percent. The changes by products included gains of 7.0 percent in distillate fuel oil, 5.7 percent in gasoline, 0.6 in kerosine, and 1.2 percent in other products; the demand for residual fuel oil declined 1.7 percent.

TABLE 49.—Percentage yields of refined petroleum products from crude oil in the United States, 1943–52

Product	1943	1944	1945	1946	1947	1948	1948[1]	1949	1950	1951	1952[2]
Finished products:											
Gasoline:											
Cracked	22.0	23.2	23.3	22.5	[3]	[3]	[3]	[3]	[3]	[3]	[3]
Straight run	15.1	16.2	17.6	17.1	[3]	[3]	[3]	[3]	[3]	[3]	[3]
Total gasoline	37.1	39.4	40.9	39.6	40.2	40.3	40.1	43.7	43.0	42.4	43.0
Kerosine	5.0	4.7	4.7	6.0	6.0	6.0	6.0	5.2	5.6	5.7	5.4
Distillate fuel oil	14.8	14.4	14.5	16.6	16.8	18.7	18.5	17.5	19.0	20.0	21.3
Residual fuel oil	29.2	27.7	27.3	24.9	24.1	23.0	23.5	21.7	20.2	19.7	18.6
Lubricating oil	2.7	2.5	2.4	2.7	2.8	2.5	2.5	2.3	2.5	2.6	2.3
Wax	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Coke	.5	.5	.6	.6	.7	.7	.7	.9	.8	.8	.7
Asphalt	2.6	2.3	2.3	2.6	2.7	2.6	2.5	2.5	2.8	2.8	2.9
Road oil	.2	.1	.2	.4	.4	.4	.4	.4	.3	.3	.3
Still gas	6.1	6.1	6.0	5.1	4.6	4.0	4.0	4.2	4.0	4.1	3.9
Other	.7	1.1	1.1	1.3	1.3	1.5	1.5	1.4	1.6	1.7	1.5
Unfinished products (net):											
Gasoline	[4]	.1	[5] .3	[4] [5]	[6]	[6]	[6]	[6]	[6]	[6]	[6]
Other	.2	.1	[5] .3	[5] .1	[7]	[7]	[7]	[7]	[7]	[7]	[7]
Shortage	.7	.8	.4	.1	.2	.1	.1	------	------	[5] .3	[5] .1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Yields computed on the new basis for California to compare with subsequent years.
[2] Preliminary figures.
[3] Not separated after 1946.
[4] Less than 0.05 percent.
[5] Negative percentage; represents excess rerun over produced.
[6] Added to finished gasoline production in computing yields after 1946.
[7] Added to crude in computing yields after 1946.

The yield of gasoline (naphtha included) from crude oil increased from 42.4 percent to 43.0 in 1952 and distillate fuel oil from 20.0 percent to 21.3. The yield of residual fuel oil declined from 19.7 percent to 18.6 and kerosine from 5.7 percent to 5.4. The continued decline in the residual yield reflected the increasing relative demand for the more valuable products and the gain in residual imports that supplied a larger part of the demand for that product.

The average prices of representative refinery products in specified markets have been shown over a series of years as a general indication of price trends.

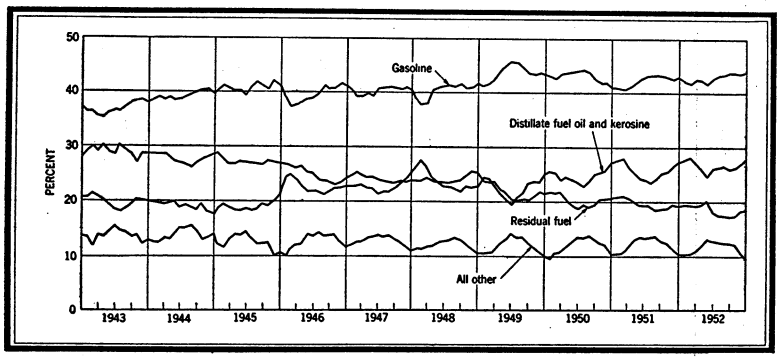

FIGURE 6.—Yields of principal products from crude run to stills in the United States, 1943–52, by months.

TABLE 50.—Stocks of refined petroleum products in continental United States at end of month, 1951–52

[Thousands of barrels]

Product	January	February	March	April	May	June	July	August	September	October	November	December
1951 [1]												
Gasoline	128,139	137,478	141,688	138,992	133,227	129,183	123,183	116,460	116,930	111,901	115,812	127,120
Kerosine	18,634	14,776	15,135	17,639	21,974	26,204	29,679	32,728	35,773	35,759	32,116	27,088
Distillate fuel oil	62,163	51,348	46,744	48,239	59,272	72,140	84,282	94,028	104,082	109,544	101,666	86,619
Residual fuel oil	41,251	40,716	38,366	37,623	39,879	42,398	46,320	48,365	49,608	49,573	46,491	42,853
Lubricating oil	8,160	8,386	8,209	8,393	8,451	8,444	8,662	8,875	8,866	8,914	9,111	9,617
Wax	517	498	503	545	580	601	640	673	706	690	701	723
Coke	430	578	592	626	613	560	496	484	472	412	415	519
Asphalt	6,094	7,055	8,074	8,649	8,508	8,026	7,131	5,853	5,213	4,479	5,366	6,620
Road oil	410	380	661	699	764	759	659	571	452	333	353	402
LR-gases	605	572	749	817	791	708	661	624	658	638	645	668
Miscellaneous	781	825	805	852	893	923	902	882	902	1,036	1,072	1,071
Unfinished gasoline	8,006	7,706	7,991	8,687	8,431	7,826	7,748	7,742	7,600	6,963	6,911	7,747
Other unfinished oils	58,446	59,971	60,087	61,274	61,930	63,036	61,193	61,241	62,223	61,787	61,401	59,093
Total 1951	333,636	330,289	329,604	333,035	345,313	360,838	371,556	378,526	393,485	392,029	382,060	370,140
1952												
Gasoline	136,161	143,910	152,556	143,512	116,039	112,232	108,708	110,750	113,698	111,770	121,645	127,792
Kerosine	22,679	18,530	16,817	18,955	19,614	23,061	27,387	32,401	35,021	33,289	32,199	26,842
Distillate fuel oil	66,969	55,369	48,750	51,634	51,648	65,911	85,775	104,257	117,252	120,721	116,096	99,582
Residual fuel oil	39,523	38,295	37,971	38,561	38,821	45,688	52,245	54,061	56,200	53,052	53,069	48,706
Lubricating oil	9,856	10,049	10,169	10,154	9,610	9,694	9,775	9,620	9,745	9,869	10,561	11,021
Wax	693	680	712	691	640	642	606	620	600	566	559	575
Coke	670	710	818	797	788	612	517	490	484	435	482	513
Asphalt	7,323	8,400	9,424	9,644	9,133	7,898	6,419	5,321	4,157	3,797	5,007	6,321
Road oil	490	572	676	812	830	890	799	630	396	345	389	453
LR-gases	786	735	732	771	753	666	616	618	677	699	709	638
Miscellaneous	994	977	1,055	1,111	1,267	1,170	1,180	1,144	1,116	1,109	1,087	1,036
Unfinished gasoline	8,178	8,002	8,133	8,378	7,617	7,934	7,858	7,842	7,293	8,292	7,864	8,236
Other unfinished oils	57,155	55,652	57,594	58,578	60,684	62,845	62,344	62,919	61,884	62,684	62,832	62,304
Total 1952	351,477	341,881	345,407	343,598	317,444	339,243	364,229	390,673	408,523	406,628	412,499	394,019

[1] New basis for comparison with 1952.

TABLE 51.—Runs to stills and output of petroleum products at refineries in the United States, 1951–52, by months

[Thousands of barrels]

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Input:													
Crude petroleum	199,958	183,745	200,535	185,488	199,521	197,246	200,322	202,721	196,752	199,826	198,258	206,032	2,370,404
Natural-gas liquids	8,045	7,028	7,997	7,803	8,274	7,586	7,982	8,658	8,804	9,318	8,917	8,838	99,250
Total input	208,003	190,773	208,532	193,291	207,795	204,832	208,304	211,379	205,556	209,144	207,175	214,870	2,469,654
Output:													
Gasoline	91,818	81,363	90,137	84,629	93,965	93,003	95,833	96,533	93,808	96,260	93,893	97,638	1,108,880
Kerosine	12,715	11,475	12,371	11,511	10,698	9,815	10,220	10,506	10,915	11,262	12,083	12,171	135,742
Distillate fuel oil	44,244	39,742	41,129	35,139	37,500	37,614	38,067	38,335	38,453	40,159	40,726	44,693	475,801
Residual fuel oil	42,397	38,696	41,771	36,908	39,202	38,303	39,516	37,993	36,843	37,944	39,111	40,693	469,377
Lubricating oil	5,061	4,339	5,108	5,175	5,454	5,094	5,241	5,379	4,905	5,432	5,144	5,157	61,489
Wax [1]	445	388	438	437	469	406	394	414	373	359	361	330	4,814
Coke [1]	1,636	1,438	1,483	1,431	1,675	1,574	1,629	1,595	1,580	1,640	1,673	1,623	18,977
Asphalt [1]	3,748	3,538	4,436	5,036	6,180	6,631	7,077	7,500	6,859	6,739	4,866	3,692	66,302
Road oil	186	69	434	249	574	887	1,009	1,246	666	367	255	158	6,100
Still gas [1]	6,988	6,199	7,607	7,821	9,139	8,963	9,273	8,962	8,279	7,944	7,334	7,785	96,294
LR-gases	3,000	2,828	3,112	2,809	2,617	2,454	2,463	2,716	2,530	2,690	2,697	3,129	33,045
Other miscellaneous	508	551	666	640	594	582	629	647	519	655	686	524	7,201
Unfinished gasoline (net)	[2] 94	[2] 300	285	696	[2] 256	[2] 605	[2] 78	[2] 6	[2] 142	[2] 637	[2] 52	836	[2] 353
Other unfinished oils (net)	[2] 4,326	492	[2] 645	603	[2] 71	590	[2] 2,704	[2] 340	310	[2] 1,166	[2] 1,056	[2] 3,054	[2] 11,367
Shortage (or overage) [3]	(323)	(45)	200	207	55	(479)	(265)	(101)	(342)	(504)	(546)	(505)	(2,648)
Total output	208,003	190,773	208,532	193,291	207,795	204,832	208,304	211,379	205,556	209,144	207,175	214,870	2,469,654
1952 [4]													
Input:													
Crude petroleum	205,829	193,524	205,825	193,039	152,062	204,762	214,729	220,661	210,510	213,358	211,456	215,504	2,441,259
Natural-gas liquids	8,459	8,113	8,038	8,041	7,398	8,437	8,761	8,938	9,186	9,759	9,317	9,451	103,898
Total input	214,288	201,637	213,863	201,080	159,460	213,199	223,490	229,599	219,696	223,117	220,773	224,955	2,545,157

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TABLE 51.—Runs to stills and output of petroleum products at refineries in the United States, 1951–52, by months—Continued

[Thousands of barrels]

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Output:													
Gasoline	95,905	90,165	95,134	89,860	71,150	95,075	102,134	104,680	102,849	102,323	102,465	104,176	1,155,916
Kerosine	13,040	10,742	11,964	10,978	7,084	9,519	11,083	11,620	10,498	10,919	11,792	13,061	132,300
Distillate fuel oil	45,141	44,314	43,402	39,353	30,432	43,640	45,735	46,933	45,053	45,183	45,310	46,768	521,264
Residual fuel oil	41,483	38,352	39,482	37,602	30,336	36,827	38,337	38,822	36,887	37,321	38,984	40,351	454,784
Lubricating oil	4,963	4,456	4,921	4,831	3,492	4,855	4,668	4,857	4,694	4,940	4,507	4,416	55,600
Wax [1]	351	358	341	337	287	346	331	415	375	404	381	405	4,331
Coke [1]	1,657	1,551	1,604	1,479	1,003	1,335	1,529	1,583	1,616	1,568	1,553	1,645	18,123
Asphalt [1]	3,331	3,956	4,066	5,076	5,552	7,044	7,610	8,214	8,113	7,739	5,493	4,118	70,312
Road oil	175	167	212	373	609	1,083	1,404	1,141	826	522	278	208	6,998
Still gas [1]	7,455	7,296	7,821	7,796	5,743	8,364	9,171	9,051	8,635	8,151	7,757	8,035	95,275
LR-gases	3,402	2,708	2,795	2,716	1,968	2,155	2,231	2,347	2,467	2,688	2,656	2,835	30,968
Other miscellaneous	580	573	607	646	703	605	609	545	554	643	494	699	7,258
Unfinished gasoline (net)	431	[2] 176	131	245	[2] 761	317	[2] 76	[2] 16	[2] 549	999	[2] 428	372	489
Other unfinished oils (net)	[2] 3,144	[2] 2,467	1,214	27	1,499	1,518	[2] 1,310	[2] 289	[2] 1,797	252	[2] 249	[2] 1,163	[2] 5,909
Shortage (or overage) [3]	(482)	(358)	169	(239)	353	516	34	(304)	(525)	(535)	(220)	(971)	(2,552)
Total output	214,288	201,637	213,863	201,080	159,460	213,199	223,490	229,599	219,696	223,117	220,773	224,955	2,545,157

[1] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.
[2] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.
[3] Figures in parentheses represent overage.
[4] Preliminary figures.

TABLE 52.—Runs to stills and output of petroleum products at refineries in the United States, 1951–52, by districts

[Thousands of barrels]

	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Oklahoma, Kansas, etc.	Texas inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas-Louisiana inland etc.	Rocky Mountain	California	Total
1951											
Input:											
Crude petroleum	370,394	65,455	438,427	189,699	89,511	571,991	183,065	28,889	83,843	349,130	2,370,404
Natural-gas liquids	3,709	492	11,572	9,049	13,598	28,751	4,548	1,406	1,735	24,390	99,250
Total input	374,103	65,947	449,999	198,748	103,109	600,742	187,613	30,295	85,578	373,520	2,469,654
Output:											
Gasoline	144,351	29,139	228,134	101,799	58,804	258,073	85,839	11,375	40,157	151,209	1,108,880
Kerosine	16,397	3,937	27,185	6,226	4,935	47,139	21,538	2,784	2,305	3,296	135,742
Distillate fuel oil	90,032	9,345	76,350	44,408	13,761	125,331	43,386	6,345	16,118	50,725	475,801
Residual fuel oil	84,266	10,483	63,485	24,014	15,564	94,065	22,529	2,866	17,909	134,196	469,377
Lubricating oil	11,261	5,422	6,026	4,717	79	20,653	6,492	1,893	249	4,697	61,489
Wax [1]	1,612	394	301	490		897	721		92	307	4,814
Coke [1]	1,801	317	8,598	1,398	323	1,303	1,718	660	874	1,985	18,977
Asphalt [1]	17,228	2,245	11,566	6,321	3,878	4,662	3,279	3,631	2,979	10,513	66,302
Road oil	209		1,394	464		30	3	15	1,617	2,368	6,100
Still gas [1]	12,330	3,865	21,973	7,313	3,387	24,631	5,299	1,325	3,156	13,015	96,294
LR-gases	4,884	112	3,540	1,194	2,039	9,960	6,198	480	206	4,432	33,045
Other miscellaneous	472	324	1,031	702	605	986	987	483	15	1,596	7,201
Unfinished gasoline (net)	[2] 609	[2] 144	[2] 159	[2] 63	1,010	140	[2] 221	2	[2] 24	[2] 285	[2] 353
Other unfinished oils (net)	[2] 9,859	40	2,554	[2] 1,847	[2] 2,783	11,870	[2] 6,349	[2] 1,030	[2] 439	[2] 3,524	[2] 11,367
Shortage (or overage) [3]	(272)	468	(1,979)	1,612	1,507	1,002	(3,806)	(534)	364	(1,010)	(2,648)
Total output	374,103	65,947	449,999	198,748	103,109	600,742	187,613	30,295	85,578	373,520	2,469,654

TABLE 52.—Runs to stills and output of petroleum products at refineries in the United States, 1951–52, by districts—Continued

[Thousands of barrels]

	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Oklahoma, Kansas, etc.	Texas inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas-Louisiana inland etc.	Rocky Mountain	California	Total
1952 [4]											
Input:											
Crude petroleum	376,769	66,880	449,171	199,141	93,888	585,258	191,072	29,122	88,030	361,928	2,441,259
Natural-gas liquids	3,252	215	12,313	9,422	15,577	29,170	4,749	1,454	1,983	25,763	103,898
Total input	380,021	67,095	461,484	208,563	109,465	614,428	195,821	30,576	90,013	387,691	2,545,157
Output:											
Gasoline	150,849	30,734	236,899	112,514	64,166	263,968	89,215	11,911	42,645	153,015	1,155,916
Kerosine	16,189	3,553	27,760	5,266	4,695	47,184	20,512	2,542	2,513	2,086	132,300
Distillate fuel oil	89,972	10,620	81,830	47,012	15,135	144,891	48,729	7,138	17,193	58,744	521,264
Residual fuel oil	85,514	9,997	61,161	21,435	14,239	91,209	20,882	2,413	17,306	130,628	454,784
Lubricating oil	10,771	4,970	5,220	4,258	133	17,944	5,555	1,965	200	4,584	55,600
Wax [1]	1,396	378	247	503	33	816	576	----------	84	298	4,331
Coke [1]	1,439	257	8,503	1,490	347	1,432	1,023	675	818	2,139	18,123
Asphalt [1]	17,556	2,157	12,248	7,118	3,803	4,788	3,818	3,683	3,390	11,751	70,312
Road oil	101	----------	1,426	891	----------	8	3	5	1,985	2,579	6,998
Still gas [1]	12,890	3,893	21,791	6,998	4,234	23,022	4,637	1,058	3,393	13,359	95,275
LR-gases	4,162	124	3,769	1,510	1,618	8,025	6,153	473	207	4,927	30,968
Other miscellaneous	500	225	1,079	525	1,382	673	952	479	13	1,430	7,258
Unfinished gasoline (net)	[2] 1,351	[2] 54	500	[2] 15	791	1,037	[2] 467	4	[2] 30	74	489
Other unfinished oils (net)	[2] 9,263	[2] 42	1,402	[2] 1,923	[2] 2,911	8,657	[2] 3,104	[2] 1,620	[2] 261	3,156	[2] 5,909
Shortage (or overage) [3]	(704)	283	(2,351)	981	1,800	774	(2,663)	(150)	557	(1,079)	(2,552)
Total output	380,021	67,095	461,484	208,563	109,465	614,428	195,821	30,576	90,013	387,691	2,545,157

[1] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.
[2] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.
[3] Figures in parentheses represent overage.
[4] Preliminary figures.

The average value of Regular Grade gasoline at Oklahoma refineries rose from 10.56 cents per gallon in 1951 to 10.60 cents in 1952. The tank-wagon price of kerosine at Chicago was 15.80 cents per gallon in both 1951 and 1952. The price of a selected bright stock at Oklahoma refineries declined from 29.25 cents per gallon to 27.34 cents. Bunker "C" oil at New York declined from $2.32 per barrel to $2.31, and No. 2 distillate heating oil at New York rose from 9.15 cents per gallon to 9.45 cents.

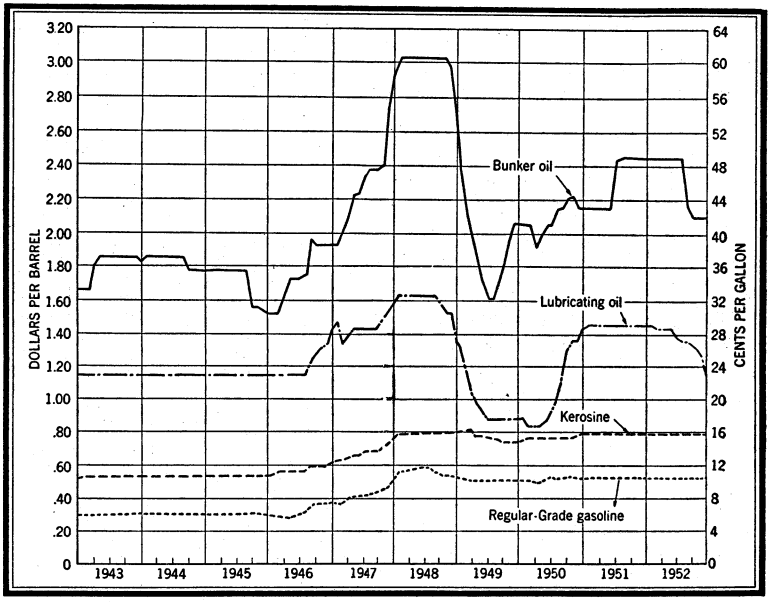

FIGURE 7.—Prices of Bunker "C" oil at New York Harbor, bright stock at Oklahoma refineries, tank-wagon prices of kerosine at Chicago, and regular-grade gasoline at refineries in Oklahoma, 1943–52, by months.

REFINERY CAPACITY

The total crude-oil capacity of refineries in the United States increased from 7.3 million barrels daily on January 1, 1952 to 7.6 million barrels on January 1, 1953—a 4.2-percent gain. The principal increases in capacity in 1952, by refinery districts, were: 86,000 barrels daily in the Texas Gulf district, 64,000 in California, 54,000 in Indiana-Illinois, 25,000 in the Louisiana Gulf, 21,000 in the East Coast, and 16,000 each in the Appalachian and Rocky Mountain districts.

The total capacity under construction on January 1, 1953, was 510,000 barrels daily, including 139,000 in the Louisiana Gulf Coast, 108,000 in the East Coast, and 74,000 each in the Texas Gulf and Indiana-Illinois districts, 53,000 in the Oklahoma-Kansas district, and 25,000 in California. In the 4 years from January 1, 1949, to January 1, 1953, total crude-oil capacity at refineries increased 1.2 million barrels daily (18.6 percent).

TABLE 53.—Petroleum-refinery capacity in the United States, Jan. 1, 1948–53

Year	Number of refineries				Capacity (barrels per day)			
	Operating	Shut down	Total	Under construction	Operating	Shut down	Total	Under construction
1948	352	38	390	2	5,825,566	208,686	6,034,252	367,250
1949	336	39	375	3	6,230,505	208,490	6,438,995	341,500
1950	320	47	367	2	6,222,998	473,302	6,696,300	145,600
1951	325	32	357	1	6,701,815	261,829	6,963,644	160,100
1952	327	23	350	----------	7,161,366	171,519	7,332,885	282,680
1953	315	28	343	4	7,481,701	[1] 156,960	7,638,661	509,721

[1] Includes 18,941 reported as inoperable without reconditioning.

AVIATION GASOLINE

The total demand for aviation grades of gasoline rose from 65.2 million barrels in 1951 to 77 million in 1952, an 18-percent increase. The increase included gains of 2.8 million in exports, 4.6 million in domestic civilian demand, and 4.4 million in deliveries to the Armed Forces. The increase, by grades, comprised 11.2 million barrels for 100-octane and over and only 0.4 million for lower finished grades and 0.2 million for components.

All gasoline data in this chapter include aviation gasoline. "Transfers out" represents rejected material returned to regular grades of gasoline. Data on aviation gasoline do not include all fuel used for aviation purposes. The use of jet fuels, blended from low-grade gasoline, kerosine, and distillate fuel oil, has expanded rapidly. At present, jet fuel is not reported as a separate oil product but its constituents—low-grade gasoline, kerosine, and distillate fuel oil—are included in the data on these products. A considerable number of small planes use automotive types of gasoline.

TABLE 54.—Salient statistics of aviation gasoline in the United States in 1951, by months

[Thousands of barrels]

	1951													1950
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Production:														
100-octane and above	4,091	4,144	5,017	4,464	4,900	4,426	4,663	5,159	4,853	4,792	5,266	5,435	57,210	39,235
Other grades	1,698	866	1,096	1,059	1,365	1,339	1,268	1,231	1,097	1,695	1,124	1,120	14,958	12,036
Transfers out [1]	454	315	364	445	569	594	774	656	383	544	393	403	5,894	4,922
Exports	415	416	880	692	906	808	1,308	1,300	1,316	1,173	1,645	1,407	12,266	7,056
Stocks, end of period:														
100-octane and above	3,518	3,837	4,048	4,053	4,006	3,817	3,844	3,925	4,369	3,895	3,853	4,356	4,356	3,744
Other grades	4,295	4,418	4,518	4,537	4,589	4,488	4,161	3,639	3,546	3,831	3,873	3,921	3,921	3,476
Domestic demand: All grades	4,327	3,837	4,558	4,362	4,785	4,653	4,149	4,875	3,900	4,959	4,352	4,194	52,951	39,517
Total demand,[2] by grades:														
100-octane and above	4,129	3,726	4,687	4,356	4,843	4,513	4,500	4,923	4,296	5,144	5,165	4,809	55,091	37,567
Other finished	542	507	683	640	821	867	847	944	875	767	722	651	8,866	8,523
Components	71	20	68	58	27	81	110	308	45	221	110	141	1,260	483
Production, by districts:														
100-octane and above:														
District 1	381	390	515	471	394	246	452	569	489	473	674	763	5,817	2,940
District 2	430	366	498	502	611	537	464	717	607	498	411	489	6,130	3,544
District 3	2,121	2,280	2,741	2,258	2,693	2,502	2,472	2,528	2,527	2,563	3,125	3,005	30,815	20,973
District 4	70	61	72	62	63	45	71	61	62	106	71	66	810	374
District 5	1,089	1,047	1,191	1,171	1,139	1,096	1,204	1,284	1,168	1,152	985	1,112	13,638	11,404
Total	4,091	4,144	5,017	4,464	4,900	4,426	4,663	5,159	4,853	4,792	5,266	5,435	57,210	39,235
Other grades: [3]														
District 1	102	31	51	40	288	315	170	158	−13	45	114	−2	1,299	636
District 2	310	218	335	216	64	36	206	66	61	254	146	157	2,069	1,653
District 3	1,025	398	392	683	719	747	614	757	736	1,239	498	742	8,550	7,486
District 4	−7	−1	10	−9	33	38	3	15	22	−12	22	15	129	196
District 5	268	220	308	129	261	203	275	235	291	169	344	208	2,911	2,065
Total	1,698	866	1,096	1,059	1,365	1,339	1,268	1,231	1,097	1,695	1,124	1,120	14,958	12,036
Stocks, by districts, end of period:														
100-octane and above:														
District 1	321	258	595	624	645	468	546	560	615	559	674	562	562	220
District 2	636	658	564	495	572	548	573	658	683	592	570	622	622	653
District 3	1,686	1,845	1,699	1,729	1,703	1,932	1,661	1,724	1,947	1,741	1,858	2,243	2,243	1,963
District 4	23	23	17	13	23	22	26	26	24	25	32	28	28	16
District 5	852	1,053	1,173	1,192	1,063	847	1,038	957	1,100	978	719	901	901	892
Total	3,518	3,837	4,048	4,053	4,006	3,817	3,844	3,925	4,369	3,895	3,853	4,356	4,356	3,744

TABLE 54.—Salient statistics of aviation gasoline in the United States in 1951, by months—Continued

[Thousands of barrels]

	1951													1950
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Other grades:														
District 1	487	489	552	531	585	641	534	532	458	480	584	583	583	373
District 2	849	1,016	1,208	1,329	1,217	1,072	920	811	685	737	736	792	792	702
District 3	2,174	2,085	1,833	1,890	1,921	1,903	1,861	1,513	1,587	1,949	1,809	1,817	1,817	1,696
District 4	56	47	46	26	43	61	46	45	51	26	29	30	30	74
District 5	729	781	879	761	823	811	800	738	765	639	715	699	699	631
Total	4,295	4,418	4,518	4,537	4,589	4,488	4,161	3,639	3,546	3,831	3,873	3,921	3,921	3,476
Total demand,[2] by districts:														
District 1	263	477	142	431	364	453	375	538	471	544	564	870	5,492	3,220
District 2	580	402	734	663	702	736	664	763	755	782	579	536	7,896	4,644
District 3	2,622	2,336	3,288	2,593	3,149	2,755	3,161	3,220	2,746	3,240	3,371	3,083	35,564	25,389
District 4	74	69	89	77	69	65	85	77	80	116	78	60	939	524
District 5	1,203	969	1,185	1,290	1,407	1,452	1,172	1,577	1,164	1,450	1,405	1,052	15,326	12,796
Total	4,742	4,253	5,438	5,054	5,691	5,461	5,457	6,175	5,216	6,132	5,997	5,601	65,217	46,573

[1] Reject material used as automotive gasoline.
[2] Includes exports.
[3] Includes 90- to 99-octane, below 90-octane and net production of components. The negative production figures reported in some months by districts represent transfers of stocks of components outside the group.

TABLE 55.—Salient statistics of aviation gasoline in the United States in 1952, by months

[Thousands of barrels]

	1952 [1]													1951
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Production:														
100-octane and above	5,480	5,002	5,873	5,195	4,358	5,147	5,584	6,104	5,549	6,458	5,973	6,050	66,773	57,210
Other grades	1,031	1,204	1,123	990	805	919	1,141	1,133	1,452	984	1,369	1,426	13,577	14,958
Transfers out [2]	245	237	181	275	173	206	234	122	108	255	194	120	2,350	5,894
Exports	1,281	1,305	1,155	1,280	390	1,064	1,608	1,238	1,322	1,209	1,578	1,655	15,085	12,266
Stocks, end of period:														
100-octane and above	4,483	4,421	4,507	3,761	4,422	3,863	3,920	4,496	4,280	4,827	4,611	4,851	4,851	4,356
Other grades	4,018	4,126	4,115	3,915	3,539	3,555	3,507	3,522	3,987	3,731	3,983	4,432	4,432	3,921
Domestic demand: All grades	4,761	4,618	5,585	5,576	4,315	5,339	4,874	5,286	5,322	5,687	5,534	5,012	61,909	52,951
Total demand [3] by grades:														
100-octane and above	5,358	5,060	5,797	5,947	3,687	5,707	5,516	5,513	5,758	5,945	6,185	5,811	66,284	55,091
Other finished	596	751	768	840	805	666	815	839	764	839	819	759	9,261	8,866
Components	88	112	175	69	213	30	151	172	122	112	108	97	1,449	1,260
Production by districts:														
100-octane and above:														
District 1	547	511	441	549	673	620	489	505	524	498	464	490	6,311	5,817
District 2	689	578	734	498	373	608	558	585	557	538	521	577	6,816	6,130
District 3	3,096	2,982	3,544	3,127	2,226	2,628	3,275	3,644	3,327	4,290	3,795	3,714	39,648	30,815
District 4	60	51	74	50	14	71	86	85	87	76	62	69	785	810
District 5	1,088	880	1,080	971	1,072	1,220	1,176	1,285	1,054	1,056	1,131	1,200	13,213	13,638
Total	5,480	5,002	5,873	5,195	4,358	5,147	5,584	6,104	5,549	6,458	5,973	6,050	66,773	57,210
Other grades: [4]														
District 1	−55	−64	61	16	27	−83	90	149	38	−2	−15	7	169	1,299
District 2	48	268	38	141	1	204	151	75	176	214	165	259	1,740	2,069
District 3	749	725	839	670	526	652	688	640	1,005	506	968	1,023	8,991	8,550
District 4	30	18	−9	12	11	30	7	22	15	18	29	15	198	129
District 5	259	257	194	151	240	116	205	247	218	248	222	122	2,479	2,911
Total	1,031	1,204	1,123	990	805	919	1,141	1,133	1,452	984	1,369	1,426	13,577	14,958
Stocks, by districts, end of period:														
100-octane and above:														
District 1	412	447	336	379	466	283	371	361	353	457	467	401	401	562
District 2	645	603	615	543	541	632	505	612	677	603	753	921	921	622
District 3	2,256	2,317	2,446	1,965	2,349	2,083	2,135	2,568	2,417	2,992	2,449	2,505	2,505	2,243
District 4	35	21	24	16	21	17	16	19	17	13	18	22	22	28
District 5	1,135	1,033	1,086	858	1,045	848	893	936	816	762	924	1,002	1,002	901
Total	4,483	4,421	4,507	3,761	4,422	3,863	3,920	4,496	4,280	4,827	4,611	4,851	4,851	4,356

TABLE 55.—Salient statistics of aviation gasoline in the United States in 1952, by months—Continued

[Thousands of barrels]

	1952 [1]													
	January	February	March	April	May	June	July	August	September	October	November	December	Total	1951
Other grades:														
District 1	463	393	450	437	446	363	354	425	478	465	455	452	452	583
District 2	758	876	752	758	655	720	728	584	646	654	613	727	727	792
District 3	1,991	2,017	2,082	1,998	1,688	1,784	1,745	1,785	2,117	1,811	2,054	2,400	2,400	1,817
District 4	49	53	32	29	26	41	30	33	32	30	44	44	44	30
District 5	757	787	799	693	724	647	650	695	714	771	817	809	809	699
Total	4,018	4,126	4,115	3,915	3,539	3,555	3,507	3,522	3,987	3,731	3,983	4,432	4,432	3,921
Total demand [3] by districts:														
District 1	474	476	556	534	599	796	479	584	507	401	448	562	6,416	5,492
District 2	758	768	880	692	477	652	825	695	602	819	556	552	8,276	7,896
District 3	3,801	3,497	4,092	4,242	2,586	3,340	3,811	3,754	4,124	4,363	4,956	4,271	46,837	35,564
District 4	64	79	83	70	23	90	105	101	105	100	72	80	972	939
District 5	945	1,103	1,129	1,318	1,020	1,525	1,262	1,390	1,306	1,213	1,080	1,202	14,493	15,326
Total	6,042	5,923	6,740	6,856	4,705	6,403	6,482	6,524	6,644	6,896	7,112	6,667	76,994	65,217

[1] Preliminary except stock figures.
[2] Reject material used as automotive gasoline.
[3] Includes exports.
[4] Includes 90–99 octane, below 90-octane, and net production of components. The negative production figures reported in some months by districts represent transfers of stocks of components outside the group.

MOTOR FUEL

The total demand for motor fuel set another new record, increasing from 1,130 million barrels in 1951 to 1,191 million in 1952, a 5-percent daily gain. Domestic demand increased from 1,090 million barrels to 1,154, a 6-percent gain. Exports declined from 40 million barrels to 37 million (8 percent). Domestic demand for aviation gasoline, included in demand for motor fuels, rose from 5.3 million barrels in 1951 to 62 million in 1952. Imports of motor fuel increased from 0.5 million barrels to 1.6 million.

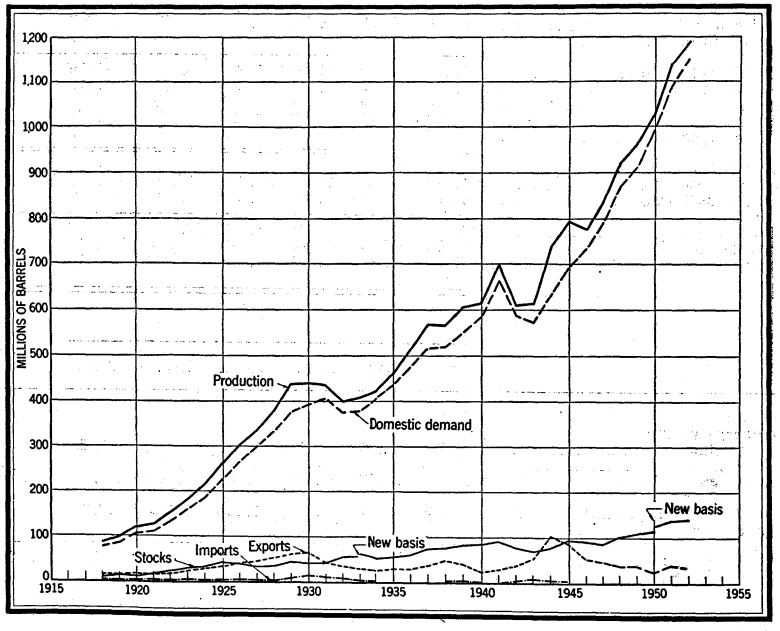

FIGURE 8.—Production, domestic demand, exports, imports, and stocks of motor fuel in the United States, 1918–52.

TABLE 56.—Salient statistics of motor fuel in the United States, 1950 (total) and 1951, by months

[Thousands of barrels]

	1951						
	Jan.	Feb.	Mar.	Apr.	May	June	July
Production:							
Refinery gasoline:							
Gasoline	81,738	72,432	79,774	74,422	83,033	82,692	85,140
Naphtha	2,085	1,903	2,366	2,404	2,658	2,725	2,741
Natural gas liquids	17,247	15,570	17,716	16,646	16,581	15,864	16,298
Less sales of LP-gases and transfers of cycle products [1]	6,781	6,059	6,368	6,048	5,352	5,027	5,402
Motor benzol, etc	9	9	6	6	6	12	10
Total production	94,248	83,855	93,494	87,430	96,926	96,266	98,757
Daily average	3,040	2,995	3,016	2,914	3,127	3,209	3,186
Imports	133	48	12	4	93	1	12
Exports	1,788	1,607	2,349	2,412	2,867	3,000	4,215
Daily average	58	57	76	80	92	100	136
Stocks, end of period:							
Finished gasoline	120,473	129,537	133,465	130,501	123,830	119,769	113,734
Natural gas liquids	7,474	7,842	8,109	8,522	9,079	10,043	10,065
Total stocks	127,947	137,379	141,574	139,023	132,909	129,812	123,799
Domestic demand	80,670	72,864	86,962	87,573	100,266	96,364	100,567
Daily average	2,602	2,602	2,805	2,919	3,234	3,212	3,244

	1951						1950 (total)
	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Production:							
Refinery gasoline:							
Gasoline	86,011	82,986	84,851	82,956	86,652	982,687	881,703
Naphtha	1,864	2,018	2,091	2,020	2,148	26,943	21,751
Natural gas liquids	16,910	16,973	18,040	18,066	18,843	204,754	181,961
Less sales of LP-gases and transfers of cycle products [1]	5,880	5,790	6,409	7,124	7,512	73,752	61,111
Motor benzol, etc	8	40	44	45	16	211	158
Total production	98,913	96,227	98,617	95,963	100,147	1,140,843	1,024,462
Daily average	3,191	3,208	3,181	3,199	3,231	3,126	2,807
Imports	2	8	134	6	10	463	156
Exports	4,674	4,806	3,827	4,732	3,859	40,136	24,721
Daily average	151	160	123	158	124	110	68
Stocks, end of period:							
Finished gasoline	106,704	106,547	101,837	105,117	117,057	117,057	108,669
Natural gas liquids	9,883	9,578	9,003	8,379	8,186	8,186	7,355
Total stocks	116,587	116,125	110,840	113,496	125,243	125,243	116,024
Domestic demand	101,453	91,891	100,209	88,581	84,551	1,091,951	994,290
Daily average	3,273	3,063	3,233	2,953	2,727	2,992	2,724

[1] LP-gases and other natural-gas liquids used for other than motor fuel.

TABLE 57.—Salient statistics of motor fuel in the United States, 1951 (total) and 1952, by months

[Thousands of barrels]

	1952 [1]						
	Jan.	Feb.	Mar.	Apr.	May	June	July
Production:							
Refinery gasoline:							
Gasoline	85,708	80,246	84,924	79,777	62,352	84,784	91,482
Naphtha	1,738	1,806	2,172	2,042	1,400	1,854	1,891
Natural-gas liquids	19,035	18,049	18,709	17,878	16,770	17,271	17,628
Less sales of LP-gases and transfers of cycle products [2]	7,953	6,988	6,727	7,183	6,063	5,608	6,020
Motor benzol, etc	23	21	15	39	26	39	41
Total production	98,551	93,134	99,093	92,553	74,485	98,340	105,022
Daily average	3,179	3,212	3,197	3,085	2,403	3,278	3,388
Imports	89	70	4	2	685	308	277
Exports	3,026	2,723	2,444	3,107	1,626	2,361	3,456
Daily average	98	94	79	104	52	79	111
Stocks, end of period:							
Finished gasoline	136,161	143,910	152,556	143,512	116,039	112,232	108,705
Natural-gas liquids	7,896	8,585	9,527	9,366	9,246	10,035	10,095
Total stocks	144,057	152,495	162,083	152,878	125,285	122,267	118,803
Domestic demand	86,863	82,043	87,065	98,653	101,137	99,305	105,307
Daily average	2,802	2,829	2,809	3,288	3,262	3,310	3,397

	1952 [1]						1951 (total)
	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
Production:							
Refinery gasoline:							
Gasoline	93,676	91,671	90,515	91,194	92,787	1,029,116	982,687
Naphtha	2,066	1,992	2,049	1,954	1,938	22,902	26,943
Natural-gas liquids	18,232	18,211	19,562	19,360	20,769	221,474	204,754
Less sales of LP-gases and transfers of cycle products [2]	6,574	6,934	7,296	7,650	9,097	84,093	73,752
Motor benzol, etc	27	37	43	36	35	382	211
Total production	107,427	104,977	104,873	104,894	106,432	1,189,781	1,140,843
Daily average	3,465	3,499	3,383	3,496	3,433	3,251	3,126
Imports	149	9	10	13	10	1,626	463
Exports	2,953	2,740	3,157	4,012	5,255	36,860	40,136
Daily average	95	91	102	134	170	101	110
Stocks, end of period:							
Finished gasoline	110,750	113,698	111,770	121,645	127,792	127,792	117,057 [3] 127,120
Natural-gas liquids	9,722	8,925	8,890	8,584	7,807	7,807	8,186
Total stocks	120,472	122,623	120,660	130,229	135,599	135,599	125,243 [3] 135,306
Domestic demand	102,954	100,095	103,689	91,326	95,817	1,154,254	1,091,951 [3] 1,089,566
Daily average	3,321	3,337	3,345	3,044	3,091	3,154	2,992 [3] 2,985

[1] Preliminary figures except stock figures.
[2] LP-gases and other natural-gas liquids used for other than motor fuel.
[3] New basis.

Production.—Domestic production of motor fuel rose from 1,140.8 million barrels in 1951 to 1,189.8 million in 1952. Production in 1952 consisted of 1,052.0 million barrels of gasoline and naphtha refined from crude oil and 137.8 million barrels of light oil from natural gas and motor benzol. The total from natural gas and motor benzol does not include 84.1 million barrels representing transfers to other products, including liquefied gases and kerosine and distillate fuel classed as transfers of cycle products. Domestic production plus imports of 1.6 million barrels provided a new supply of 1,191.4 million barrels. Stocks of finished and natural gasoline increased 0.3 million, resulting in an indicated total demand for motor fuel of 1,191.1 million barrels.

TABLE 58.—Production of gasoline in the United States in 1952, by district and month [1]

[Thousands of barrels]

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
Gasoline:													
East Coast	11,634	10,777	11,481	11,164	12,339	11,964	12,364	12,869	12,678	12,619	12,321	13,069	145,279
Appalachian	2,667	2,359	2,524	2,145	2,029	2,564	2,666	2,562	2,589	2,468	2,584	2,905	30,062
Indiana, Illinois, Kentucky, etc	18,885	18,059	18,210	17,527	11,037	18,499	20,050	20,653	19,789	19,346	19,665	19,357	221,077
Oklahoma, Kansas, etc	8,257	8,102	8,313	7,352	5,810	8,080	9,763	9,755	9,043	8,982	9,027	9,335	101,819
Texas Inland	3,789	3,757	3,840	3,816	4,378	3,965	4,368	4,000	4,003	4,176	4,018	4,079	48,189
Texas Gulf Coast	20,220	18,489	19,467	18,076	6,470	18,493	19,919	20,681	20,917	20,515	21,287	21,249	225,783
Louisiana Gulf Coast	6,097	5,599	6,838	6,533	6,641	6,496	6,844	7,181	7,122	7,677	7,170	7,704	81,852
Arkansas, Louisiana Inland, etc	920	860	806	800	574	845	850	929	922	930	834	961	10,231
Rocky Mountain	3,549	3,044	3,310	2,642	2,640	3,489	3,701	3,688	3,638	3,200	3,693	3,858	40,452
California and Washington	9,690	9,200	10,135	9,722	10,434	10,389	10,957	11,408	10,970	10,602	10,595	10,270	124,372
Total gasoline	85,708	80,246	84,924	79,777	62,352	84,784	91,482	93,676	91,671	90,515	91,194	92,787	1,029,116
Naphtha:													
East Coast	179	138	285	210	183	259	228	148	172	183	167	166	2,318
Appalachian	35	38	43	13	33	20	41	36	37	48	47	66	457
Indiana, Illinois, Kentucky, etc	194	291	323	224	119	374	359	350	280	337	314	344	3,509
Oklahoma, Kansas, etc	109	148	124	145	54	95	112	101	93	90	106	96	2,273
Texas Inland	22	38	23	60	59	43	36	28	35	14	22	20	400
Texas Gulf Coast	709	706	843	855	371	519	832	881	866	854	751	828	9,015
Louisiana Gulf Coast	246	212	239	295	283	250	19	215	200	215	276	164	2,614
Arkansas, Louisiana Inland, etc	16	13	17	23	18	17	21	22	24	19	17	19	226
Rocky Mountain	19	12	18	19	10	22	17	26	14	22	20	11	210
California and Washington	209	210	257	198	270	255	226	259	271	267	234	224	2,880
Total naphtha	1,738	1,806	2,172	2,042	1,400	1,854	1,891	2,066	1,992	2,049	1,954	1,938	22,902
Percent yield of gasoline and naphtha [2]	42.0	41.8	42.6	42.5	41.8	42.8	43.2	43.3	43.9	43.9	43.8	43.9	43.0
Natural-gas liquids blended at refineries	8,459	8,113	8,038	8,041	7,398	8,437	8,761	8,938	9,186	9,759	9,317	9,451	103,898
Total production:													
East Coast	12,024	11,134	11,943	11,524	12,741	12,570	12,902	13,295	13,109	13,104	12,808	13,695	150,849
Appalachian	2,743	2,443	2,610	2,171	2,070	2,591	2,713	2,605	2,633	2,527	2,645	2,983	30,734
Indiana, Illinois, Kentucky, etc	20,096	19,282	19,611	18,774	11,720	19,793	21,435	21,967	21,127	20,912	21,299	20,883	236,899
Oklahoma, Kansas, etc	9,271	9,007	9,110	8,085	6,384	8,848	10,660	10,622	10,053	10,072	10,072	10,330	112,514
Texas Inland	5,076	5,107	5,155	4,998	5,823	5,158	5,830	5,344	5,493	5,578	5,335	5,269	64,166
Texas Gulf Coast	23,325	21,460	22,541	21,221	8,372	21,527	23,060	24,220	24,467	24,197	24,716	24,862	263,968
Louisiana Gulf Coast	6,760	6,224	7,451	7,236	7,340	7,105	7,217	7,701	7,684	8,346	7,846	8,305	89,215
Arkansas, Louisiana Inland, etc	1,050	1,029	979	951	704	983	988	1,054	1,091	1,067	932	1,083	11,911
Rocky Mountain	3,706	3,184	3,467	2,818	2,791	3,651	3,869	3,888	3,845	3,423	3,926	4,077	42,645
California and Washington	11,854	11,295	12,267	12,082	13,205	12,849	13,460	13,984	13,347	13,097	12,886	12,689	153,015
Total: 1952	95,905	90,165	95,134	89,860	71,150	95,075	102,134	104,680	102,849	102,323	102,465	104,176	1,155,916
1951	91,818	81,363	90,137	84,629	93,965	93,003	95,833	96,533	93,808	96,260	93,893	97,638	1,108,880

[1] Preliminary figures.
[2] Based on crude runs to stills adjusted for net change in stocks of unfinished oils.

Yields.—The average refinery yield of gasoline and naphtha from crude oil increased from 42.4 percent in 1951 to 43.0 percent in 1952. This increase in yield resulted from the gain of only 2.7 percent in total crude runs compared with the increase of 5.1 percent in total gasoline demand and would have been relatively greater except for the small increase in finished gasoline stocks of 0.7 million barrels in 1952 compared with the increase of 10.8 million barrels in 1951.

Exports.—Exports of gasoline from continental United States declined 9 percent in 1952 compared with the 62-percent increase in in 1951. Total exports in 1952 amounted to 36.9 million barrels, a decline of 3.3 million. Shipments to noncontiguous areas rose from 7.0 million barrels in 1951 to 7.6 million in 1952, and exports to other countries declined from 33.1 million in 1951 to 29.2 million in 1952. Exports of aviation gasoline, included in the total, increased from 12.3 million barrels in 1951 to 15.1 million in 1952. Thus the decline in exports was primarily in motor gasoline to other countries. Complete data on the destination of gasoline exports is not available for security reasons. The largest decline, however, was indicated in exports to Europe.

Domestic Demand.—The domestic demand for gasoline and naphtha set another new record in 1952, increasing from 1,090 million barrels in 1951 to 1,154 million in 1952, an increase of 5.7 percent on a daily average basis.

The annual survey of the Bureau of Public Roads includes an analysis of civilian motor-fuel consumption based on tax returns from the States. The total shown in this survey is considerably smaller than the domestic demand shown by the Bureau of Mines. The difference represents the exclusion of deliveries of aviation and motor gasoline to the Armed Forces, naphthas used for industrial purposes, the low-grade gasoline blended in jet fuels, and some losses in production and distribution before the point of tax incidence. On the other hand, the survey includes an increasing amount of diesel fuels, other than gasoline, used by trucks.

In 1952 the total motor-fuel usage shown by the Bureau of Public Roads was 1,084 million barrels, including 966 million highway use, 106 million for nonhighway uses and 12 million barrels allowed for losses. Included in the total and for highway use was about 19 million barrels of special fuels other than gasoline. The net highway use of gasoline was 947 million barrels, a gain of about 6 percent compared with 1951.

Production and Consumption by States.—The table showing gasoline production and consumption by States indicates the areas of surplus production and deficit supply. The refinery production figures were compiled by the Bureau of Mines and do not include the light oils recovered from natural gas or used outside refineries. The consumption figures by States were compiled by the American Petroleum Institute and include deliveries to the Armed Forces for use in continental United States but exclude military shipments abroad.

In 1952 refinery production was 1,156 million barrels and consumption by States 1,106 million, providing an excess for export.

The Gulf Coast States (Texas, Louisiana, Mississippi, and Alabama) showed a refinery production of 420 million barrels and a consumption of 137 million—a surplus of 283 million barrels. Shipments from this area include 178 million barrels by boat and 26 million by pipeline to the Atlantic Coast States and shipment of 30 million barrels by

pipeline to States to the north and west. This district also supplied a considerable part of the country's gasoline exports.

The Atlantic Coast States produced 167 million barrels of gasoline in 1952 and consumed 363 million—a deficit of 196 million. Receipts of 178 million barrels by boat and 26 million by pipeline from the Gulf coast more than offset the deficit to permit for shipments to the West, military deliveries, exports, and an addition of about 3 million barrels to stocks.

TABLE 59.—Production and consumption of gasoline in the United States, 1950–52, by States

[Thousands of barrels]

State	1950		1951		1952 [1]	
	Production	Consumption [2]	Production	Consumption [2]	Production	Consumption [2]
Alabama	(3)	13,653	(3)	15,363	(3)	16,321
Arizona		5,569		7,485		7,485
Arkansas	7,756	9,147	9,004	10,119	9,329	10,672
California	[4] 139,867	91,776	[4] 151,209	104,527	[4] 153,015	106,836
Colorado	3,844	10,828	4,210	11,736	4,253	12,516
Connecticut		12,154		12,903		13,664
Delaware		2,395		2,591		2,793
District of Columbia		4,715		4,911		4,943
Florida		20,922		22,955		25,185
Georgia	[5] 7,820	18,442	[5] 8,104	20,326	[5] 8,580	22,075
Idaho	(6)	4,756	(6)	5,005	(6)	5,250
Illinois	[7] 71,215	54,276	[7] 87,124	56,564	[7] 91,720	58,219
Indiana	63,320	29,222	66,514	31,179	65,246	33,168
Iowa		22,734		23,237		23,959
Kansas	[8] 46,088	17,701	[8] 46,466	18,723	[8] 51,646	19,798
Kentucky	[9] 13,210	13,640	[9] 13,504	14,648	[9] 14,711	15,623
Louisiana	[3] 84,125	13,195	[3] 88,210	14,302	[3] 91,797	15,510
Maine		5,400		5,718		6,014
Maryland	(5)	12,830	(5)	13,966	(5)	15,351
Massachusetts	[10] 1,455	23,634	[10] 1,762	24,366	[10] 1,509	24,823
Michigan	11,787	46,611	15,931	49,535	16,929	50,704
Minnesota	(7)	22,046	(7)	22,529	(7)	23,904
Mississippi	(3)	10,333	(3)	11,241	(3)	11,873
Missouri	(8)	28,207	(8)	30,138	(8)	32,377
Montana	6,756	5,389	7,732	5,533	8,158	5,944
Nebraska	(8)	10,986	(8)	11,650	(8)	12,222
Nevada		1,818		2,182		2,284
New Hampshire		3,187		3,303		3,424
New Jersey	51,172	31,378	58,262	33,255	61,131	35,409
New Mexico	2,717	5,453	3,143	5,973	4,101	6,721
New York	9,171	63,046	9,871	66,373	12,111	70,035
North Carolina		22,268		24,125		25,825
North Dakota		6,249		6,434		6,647
Ohio	50,117	53,173	58,059	55,978	62,464	58,646
Oklahoma	51,906	16,813	55,333	17,692	60,868	18,891
Oregon		12,313		13,021		13,530
Pennsylvania	79,181	53,056	80,299	56,451	81,957	59,056
Rhode Island	(10)	4,072	(10)	4,349	(10)	4,494
South Carolina	(5)	11,024	(5)	12,399	(5)	13,834
South Dakota		6,634	(8)	6,842	(8)	7,059
Tennessee	(9)	16,752	(9)	18,327	(9)	19,767
Texas	274,326	70,322	316,877	83,668	328,134	93,663
Utah	7,658	4,948	10,302	5,375	11,226	5,696
Vermont		2,320		2,396		2,545
Virginia		19,830		21,891		23,746
Washington	(4)	16,221	(4)	17,414	(4)	18,081
West Virginia	1,978	8,945	2,194	9,369	2,124	9,704
Wisconsin	(7)	23,571	(7)	24,648	(7)	25,815
Wyoming	[6] 12,624	3,124	[6] 14,770	3,358	[6] 14,907	3,541
Total	998,093	967,078	1,108,880	1,046,073	1,155,916	1,105,642

[1] Preliminary figures.
[2] American Petroleum Institute.
[3] Alabama and Mississippi included with Louisiana.
[4] Washington included with California.
[5] Maryland and South Carolina included with Georgia.
[6] Idaho included with Wyoming.
[7] Minnesota and Wisconsin included with Illinois.
[8] Missouri, Nebraska, and South Dakota (1951–52) included with Kansas.
[9] Tennessee included with Kentucky.
[10] Rhode Island included with Massachusetts.

TABLE 60.—Transportation of petroleum products by pipelines in 1951–52, by months

[Thousands of barrels]

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Turned into lines: [1]													
Motor fuel	24,931	22,755	28,527	28,427	30,351	29,248	28,626	32,973	31,813	31,392	29,421	27,488	345,952
Kerosine	2,823	2,426	2,308	1,560	1,484	1,135	1,043	956	1,180	1,900	2,876	3,898	23,589
Distillate fuel oil	10,307	8,949	8,317	6,158	5,741	5,808	5,429	5,209	5,641	7,701	9,003	11,180	89,443
LP-gases	300	323	254	215	86	129	126	147	176	212	234	265	2,467
Delivered from lines: [1]													
Motor fuel	24,049	21,599	26,900	28,082	31,381	29,320	30,435	31,665	30,895	32,583	29,240	27,360	343,509
Kerosine	2,845	2,538	2,309	1,555	1,214	941	1,027	933	947	1,483	2,779	3,787	22,358
Distillate fuel oil	10,682	9,905	8,882	6,387	4,935	4,501	4,812	5,077	4,934	6,714	9,377	11,811	88,017
LP-gases	196	251	249	190	80	110	120	120	148	198	222	207	2,091
Shortage (or overage): [2]													
Motor fuel	----------	1	72	31	89	52	98	153	93	95	98	13	795
Kerosine	41	32	46	28	22	26	22	9	----------	25	62	32	345
Distillate fuel oil	19	28	(20)	11	18	4	22	22	25	32	(13)	26	174
LP-gases	13	25	20	12	17	17	18	11	22	19	16	19	209
Stocks in lines and working tanks at end of month:													
Motor fuel	14,268	15,423	16,978	17,292	16,173	16,049	14,142	15,297	16,122	14,836	14,919	15,034	15,034
Kerosine	853	709	662	639	887	1,055	1,049	1,063	1,296	1,688	1,723	1,802	1,802
Distillate fuel oil	5,691	4,707	4,162	3,922	4,710	6,013	6,608	6,718	7,400	8,355	7,994	7,337	7,337
LP-gases	91	138	123	136	125	127	115	131	137	132	128	167	167
1952 [3]													
Turned into lines: [1]													
Motor fuel	27,748	28,411	31,040	31,139	30,308	31,357	34,554	34,630	33,124	33,796	31,886	31,154	379,147
Kerosine	3,461	2,799	2,375	1,606	1,143	1,379	955	1,197	1,696	2,796	3,041	3,368	25,816
Distillate fuel oil	12,474	9,896	7,723	6,701	5,177	6,953	7,914	7,611	7,029	9,693	9,534	13,015	103,720
LP-gases	230	206	245	168	134	147	143	123	196	298	345	332	2,567
Delivered from lines: [1]													
Motor fuel	27,157	27,078	29,811	32,065	33,166	32,219	34,271	34,273	32,896	34,668	30,350	30,733	378,687
Kerosine	3,677	2,898	2,463	1,718	982	1,113	906	975	1,545	2,617	3,111	3,506	25,511
Distillate fuel oil	12,801	11,057	9,594	7,077	4,829	5,290	5,884	5,957	6,561	9,052	9,727	13,759	101,588
LP-gases	239	203	203	181	118	96	113	114	173	237	264	352	2,293
Shortage (or overage): [2]													
Motor fuel	32	59	53	41	79	55	119	66	139	148	143	(68)	866
Kerosine	65	47	52	43	27	29	30	54	17	38	18	59	479
Distillate fuel oil	(2)	9	(9)	24	----------	2	(9)	67	(9)	18	16	22	129
LP-gases	16	14	10	12	12	18	13	27	18	21	34	30	225
Stocks in lines and working tanks at end of month:													
Motor fuel	15,593	16,867	18,043	17,076	14,139	13,222	13,386	13,677	13,766	12,746	14,139	14,628	14,628
Kerosine	1,521	1,375	1,235	1,080	1,214	1,451	1,470	1,638	1,772	1,913	1,825	1,628	1,628
Distillate fuel oil	7,012	5,842	3,980	3,580	3,928	5,589	7,628	9,215	9,692	10,315	10,106	9,340	9,340
LP-gases	142	131	163	138	142	175	192	174	179	219	266	216	216

[1] The quantities "Turned into lines" and "Delivered from lines" are on a net basis, eliminating intersystem transfers, and are not comparable with data published previous to 1949.
[2] Figures in parentheses represent overage. [3] Preliminary figures.

303707—54——26

TABLE 61.—Movement of petroleum products by pipelines between PAW districts in the United States in 1951–52, by months [1]

[Thousands of barrels]

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
From district 1 to district 2:													
Gasoline	264	223	305	249	242	270	190	139	158	164	72	144	2,420
Kerosine				9	17	10				18			54
Distillate fuel oil			13	14	45	56	61		13	19	12	17	250
From district 3 to district 1:													
Gasoline	884	813	963	1,299	1,188	1,283	1,293	1,372	1,313	1,642	1,627	1,936	15,613
Kerosine	486	428	334	201	192	157	216	145	182	332	676	892	4,241
Distillate fuel oil	441	286	393	271	286	257	290	283	263	360	413	661	4,204
From district 3 to district 2:													
Gasoline	1,814	1,385	1,947	2,074	2,315	2,151	1,985	2,536	2,499	2,464	2,115	2,017	25,302
Kerosine	216	212	89	43	88	68	15	55	39	176	177	258	1,436
Distillate fuel oil	559	652	513	507	215	311	371	356	438	468	690	582	5,662
From district 3 to district 4:													
Gasoline	137	148	194	188	213	214	221	225	219	228	215	211	2,413
Kerosine	18	15	8	18	9	4	5	7	9	12	10	26	141
Distillate fuel oil	9	9	2	10	12	10	11	13	7	9	10	8	110
1952													
From district 1 to district 2:													
Gasoline	32	57	63	122	83	157	34	131	56	200	218	192	1,345
Kerosine	8					10					12		30
Distillate fuel oil	6					6	17	15			12		56
From district 3 to district 1:													
Gasoline	1,775	2,182	2,278	2,021	2,066	1,908	2,234	2,483	2,312	2,531	2,353	2,297	26,440
Kerosine	848	527	611	406	239	136	221	216	416	909	912	948	6,389
Distillate fuel oil	672	595	540	525	267	202	487	536	490	608	492	821	6,235
From district 3 to district 2:													
Gasoline	1,490	1,652	2,008	2,506	2,812	2,232	2,752	2,568	2,703	2,369	2,556	1,949	27,597
Kerosine	193	159	152	95	28	68	13	49	51	102	184	146	1,240
Distillate fuel oil	790	423	497	303	215	418	254	436	314	578	548	929	5,705
From district 3 to district 4:													
Gasoline	220	107	157	229	288	205	249	249	252	257	130	126	2,469
Kerosine	14	24	23	1	1	4		6	5	2	8	23	111
Distillate fuel oil	27	11	17	24	11	16	10	8	13	22	9	9	177

[1] Excludes shipment from District 4 to District 5.

The Pacific Coast district (California, Oregon, Washington, Nevada, and Arizona) produced 153 million barrels of gasoline in 1952 and consumed 148 million—a surplus of 5 million. There were small movements in and out of the district and some exports.

The Mountain States (Montana, Idaho, Wyoming, Colorado, Utah, and New Mexico) produced 43 million barrels of gasoline and consumed 40 million in 1952—a surplus of 3 million that represented the balance of movements in and out and the addition of about 1 million barrels to stocks.

The remaining Central States produced 373 million barrels and consumed 418 million barrels of gasoline—a deficit of 45 million. Supply was supplemented by a reduction of about 2 million barrels in stocks. Pipeline receipts were 29 million barrels, 28 million from the Gulf Coast area and 1 million from the Atlantic Coast area. The rest of the supply came in by tank car or river movements.

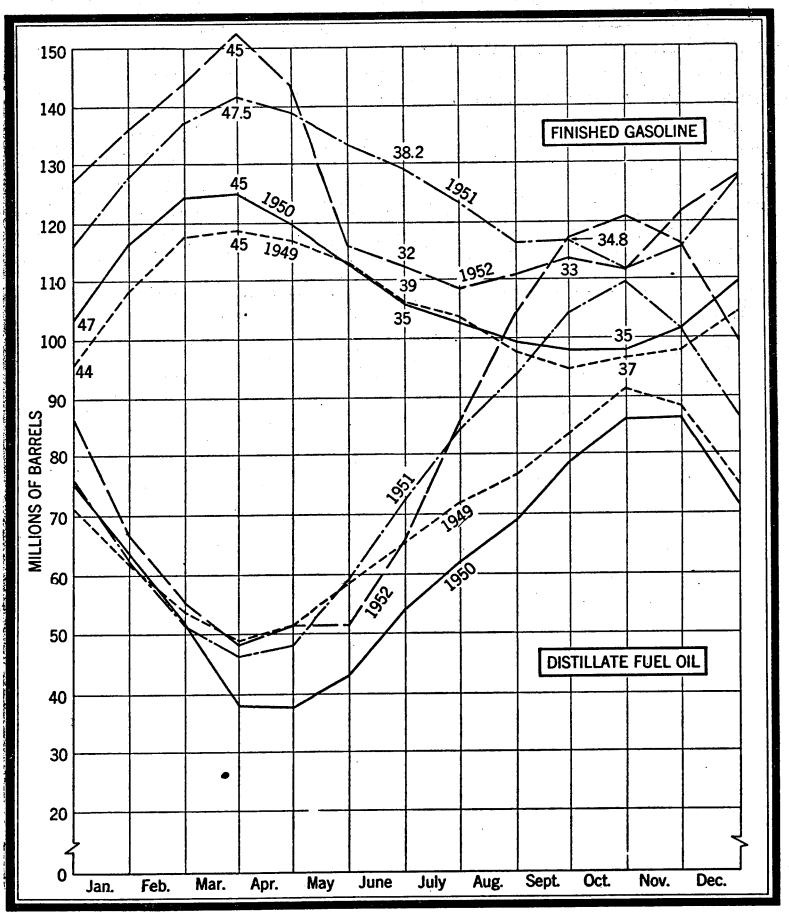

FIGURE 9.—Stocks of finished gasoline in the United States, 1949–52, by months, with data on day's supply at certain periods; also stocks of distillate fuel oil, 1949–52, by months.

Although by no means complete, this review of available data gives a general idea of the distribution and consumption of gasoline.

Methods of Distribution.—Product pipelines were constructed primarily to provide less expensive transportation of gasoline to inland markets in the upper middle west and the southern half of the Atlantic Coast area. The flow of distillate fuel oil and kerosine through these lines has been steadily increasing. Total products delivered, exclusive of liquefied gases, increased from 454 million barrels in 1951 to 506 million in 1952. Gasoline represented 75 percent of the total pipeline flow in 1952, distillate fuel 20 percent, and kerosine 5 percent. The movements between districts are shown in table 61, but by far the largest movement is between States in District 2. The most important water course for transporting oil products is the Gulf–East Coast route, although significant quantities also move in the inland waterways and along the Pacific Coast.

Stocks.—Stocks of finished gasoline, as reported, include stocks held at refineries, bulk terminals, and by pipelines but do not include stocks held in secondary distributors tanks, or by consumers, or in military custody. A change in the definition of bulk terminals in 1952 greatly increased the volume of stocks reported, particularly by major distributors in the East Coast district. For comparison with stock figures in 1952, 1951 data has been computed on a comparable basis. Stocks of finished gasoline (new basis) were 7.7 million barrels larger on January 1, 1951, and 10.1 million greater on December 31, 1952. Stocks increased 10.8 million barrels (new basis) compared with the increase of 8.4 million on the old basis and resulted in a corresponding decrease of 2.4 million barrels in the indicated total gasoline demand in 1951.

TABLE 62.—Stocks of gasoline in the United States in 1952 at end of month, by district and month

[Thousands of barrels]

	January	February	March	April	May	June	July	August	September	October	November	December
Finished gasoline: [1]												
East Coast	27,168	27,636	30,743	31,603	27,875	27,819	27,088	28,154	28,551	28,323	29,421	30,202
Appalachian	5,097	5,498	5,974	5,605	4,807	5,016	4,957	5,004	5,100	5,221	5,507	5,529
Indiana, Illinois, Kentucky, etc	31,689	33,705	35,773	33,081	25,246	24,544	23,956	23,675	24,449	22,884	25,775	27,579
Oklahoma, Kansas, etc	15,145	16,812	18,382	16,832	12,481	10,613	10,595	11,349	11,310	11,242	12,895	14,373
Texas Inland	5,557	6,186	6,568	6,082	4,331	3,865	3,678	3,968	3,968	4,240	4,771	5,004
Texas Gulf Coast	20,599	22,688	22,178	19,646	13,348	13,451	13,046	13,731	15,616	15,402	16,180	16,185
Louisiana Gulf Coast	7,465	7,360	7,687	7,712	5,948	5,647	5,724	5,917	5,899	6,183	6,511	7,050
Arkansas, Louisiana Inland, etc	3,309	3,675	3,507	3,005	2,626	2,776	2,887	2,856	2,511	2,517	3,025	3,215
Rocky Mountain	5,226	5,504	6,264	5,386	4,741	4,429	3,524	3,046	3,066	2,964	3,953	5,028
California	14,906	14,846	15,480	14,560	14,636	14,072	13,253	13,050	13,223	12,794	13,607	13,627
Total finished gasoline	136,161	143,910	152,556	143,512	116,039	112,232	108,708	110,750	113,698	111,770	121,645	127,792
Unfinished gasoline:												
East Coast	1,414	1,535	1,454	1,223	1,185	1,440	1,289	1,239	1,126	1,188	1,097	953
Appalachian	312	317	307	289	269	233	264	279	278	315	314	277
Indiana, Illinois, Kentucky, etc	950	870	828	773	766	708	899	1,090	995	1,140	1,090	1,184
Oklahoma, Kansas, etc	154	175	213	192	182	173	211	160	134	150	147	197
Texas Inland	346	394	406	465	410	381	381	334	267	306	326	392
Texas Gulf Coast	3,143	2,997	3,098	3,444	2,993	3,120	3,044	2,841	2,659	3,196	3,070	3,380
Louisiana Gulf Coast	489	410	407	540	442	497	400	389	431	444	412	392
Arkansas, Louisiana Inland, etc	5	5	6	8	8	4	5	7	7	9	9	9
Rocky Mountain	132	122	116	125	114	126	123	134	125	129	136	119
California	1,233	1,177	1,298	1,319	1,248	1,252	1,242	1,369	1,271	1,415	1,263	1,333
Total unfinished gasoline	8,178	8,002	8,133	8,378	7,617	7,934	7,858	7,842	7,293	8,292	7,864	8,236
Total finished and unfinished gasoline:												
East Coast	28,582	29,171	32,197	32,826	29,060	29,259	28,377	29,393	29,677	29,511	30,518	31,155
Appalachian	5,409	5,815	6,281	5,894	5,076	5,249	5,221	5,283	5,378	5,536	5,821	5,806
Indiana, Illinois, Kentucky, etc	32,639	34,575	36,601	33,854	26,012	25,252	24,855	24,765	25,444	24,024	26,865	28,763
Oklahoma, Kansas, etc	15,299	16,987	18,595	17,024	12,663	10,786	10,806	11,509	11,444	11,392	13,042	14,570
Texas Inland	5,903	6,580	6,974	6,547	4,741	4,246	4,059	4,302	4,235	4,546	5,097	5,396
Texas Gulf Coast	23,742	25,685	25,276	23,090	16,341	16,571	16,090	16,572	18,275	18,598	19,250	19,565
Louisiana Gulf Coast	7,954	7,770	8,094	8,252	6,390	6,144	6,124	6,306	6,330	6,627	6,923	7,442
Arkansas, Louisiana Inland, etc	3,314	3,680	3,513	3,013	2,634	2,780	2,892	2,863	2,518	2,526	3,034	3,224
Rocky Mountain	5,358	5,626	6,380	5,511	4,855	4,555	3,647	3,180	3,191	3,093	4,089	5,147
California	16,139	16,023	16,778	15,879	15,884	15,324	14,495	14,419	14,469	14,209	14,870	14,960
Total: 1952	144,339	151,912	160,689	151,890	123,656	120,166	116,566	118,592	120,991	120,062	129,509	136,028
1951	128,479	137,243	141,456	139,188	132,261	127,595	121,482	114,446	114,147	180,800	112,028	124,804 [2] 134,867

[1] Includes stocks of finished gasoline at refineries and bulk terminals, and in pipelines.
[2] New basis to compare with 1952.

TABLE 63.—Days' supply of motor fuel on hand in the United States at end of month, 1951–52 [1]

Month	1951			1951 [2]			1952 [3]		
	Finished gasoline	Natural gas liquids	Total motor fuel	Finished gasoline	Natural gas liquids	Total motor fuel	Finished gasoline	Natural gas liquids	Total motor fuel
January	45.3	2.8	48.1	48.4	2.8	51.2	46.6	2.7	49.3
February	45.0	2.7	47.7	47.9	2.7	50.6	49.8	3.0	52.8
March	44.5	2.7	47.2	47.4	2.7	50.1	45.0	2.8	47.8
April	39.2	2.6	41.8	42.1	2.6	44.7	43.3	2.8	46.1
May	37.4	2.7	40.1	40.2	2.8	43.0	34.3	2.7	37.0
June	35.4	3.0	38.4	38.2	3.0	41.2	32.0	2.9	34.9
July	33.2	3.0	36.2	36.1	2.9	39.0	31.8	3.0	34.8
August	33.1	3.1	36.2	36.4	3.1	39.5	32.3	2.8	35.1
September	31.7	2.9	34.6	34.7	2.9	37.6	33.0	2.6	35.6
October	32.7	2.9	35.6	36.2	2.9	39.1	35.2	2.8	38.0
November	36.9	2.9	39.8	40.3	2.9	43.2	37.3	2.6	39.9
December	40.4	2.8	43.2	43.9	2.8	46.7	42.6	2.6	45.2

[1] Stocks divided by daily average total demand (domestic demand plus exports) for succeeding month.
[2] New basis for comparison with 1952, resulting from a redefinition of bulk terminals.
[3] Preliminary figures.

Prices.—The average posted dealer tank wagon price for Regular Grade gasoline (exclusive of all taxes) in 50 representative cities in the United States provides an index of gasoline prices at the wholesale level. This average price declined from 15.33 cents per gallon in 1951 to 15.27 cents in 1952. The average service-station price (exclusive of all taxes) declined from 20.31 cents per gallon in 1951 to 20.24 cents. Total local, State, and Federal taxes increased from an average of 6.84 cents per gallon in 1951 to 7.32 cents in 1952. The average local tax remained the same at 0.9 cent per gallon, the average State tax rose from 5.16 cents to 5.23, and the average Federal tax increased from 1.59 cents per gallon in 1951 to 2.00 in 1952.

TABLE 64.—Average monthly prices of gasoline in the United States, 1951–52, in cents per gallon

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1951													
Monthly average at refineries in Oklahoma, Regular, 82-octane [1]	10.56	10.56	10.56	10.56	10.56	10.56	10.56	10.56	10.56	10.56	10.55	10.50	10.56
Average of 50 cities on 1st of month: [2]													
Dealer's net (excl. tax)	15.46	15.45	15.45	15.45	15.45	15.18	15.15	15.26	15.29	15.20	15.29	15.34	15.33
Service station (including State and local taxes only)	25.85	25.76	25.73	25.68	25.56	25.24	25.33	25.52	25.45	25.40	25.64	25.63	25.56
1952													
Monthly average at refineries in Oklahoma, Regular, 82-octane [1]	10.50	10.50	10.45	10.34	10.49	10.64	10.69	10.69	10.69	10.69	10.69	10.69	10.60
Average of 50 cities on 1st of month: [2]													
Dealer's net (excl. tax)	15.33	15.14	15.13	15.27	15.24	15.34	15.37	15.31	15.31	15.30	15.24	15.23	15.27
Service station (including State and local taxes only)	27.58	27.36	27.25	27.46	27.50	27.83	27.83	27.78	27.57	27.70	27.49	27.38	27.56

[1] National Petroleum News. [2] American Petroleum Institute; compiled by The Texas Co.

OTHER REFINED PRODUCTS

Kerosine

As total demand for kerosine in 1952 was 2 percent greater than in 1951 and production was 3 percent lower, it was necessary to withdraw a small quantity from stocks to meet requirements. The domestic demand for kerosine in 1952 was 1 percent greater than in 1951, while exports, which comprised 6 percent of total demand, were 16 percent greater.

The smaller output of kerosine in 1952 was attributable entirely to a lower percentage yield, as runs to stills were slightly higher. This is the reverse of what had happened in 1951, when higher runs had resulted in a 15-percent greater production.

Only three refinery areas increased kerosine production in 1952. In the Indiana-Illinois-Kentucky district, which is credited with about a fifth of total production, the output was up by 2 percent, while in the Texas Gulf, where over a third is produced, only a minor gain was reported in 1952. Production in the Rocky Mountain area, relatively unimportant in volume, increased 9 percent. The gains in these districts in 1952 were due principally to increased crude runs, as percentage yields remained about the same as in 1951. Approximately 16 percent of the kerosine originates in the Louisiana Gulf area, where the volume dropped 5 percent in 1952 due to a lower percentage yield. In the remaining refinery districts, where declines in kerosine production were reported, the output for California was down 37 percent—because of a lower percentage yield, although the quantity involved was relatively small.

Moderate weather was undoubtedly the main factor that kept the gain in the domestic demand for kerosine down to less than 1 percent in 1952 compared with 1951. The market for kerosine showed an expansion of about 5 percent in the first 3 months of 1952, but there were declines of 6 and 3 percent, respectively, in the second and third quarters, when the heating demand was of minor importance. The replenishment of consumer's stocks and a somewhat colder October than in 1951 resulted in a 2-percent gain in domestic requirements in the final quarter of 1952.

Exports increased from 5 percent of the total demand in 1951 to 6 percent in 1952, and the total exported increased over 16 percent in the latter period. The more important quantities in 1952 went to Canada (832,000 barrels), the United Kingdom (1,166,000), Egypt (1,930,000), and to India (2,028,000). The large quantities exported to the United Kingdom, Egypt, and India in 1951 and 1952 represented kerosine previously acquired from the Abadan refinery.

Stocks of kerosine, which increased one-fourth in 1951, were 8 percent higher at the end of 1952. Quantities held at refineries declined 6 percent from 12.9 million barrels at the close of 1951 to 12.1 million in December 1952, while those at bulk terminals and in transit in pipelines were up one-fifth from 12.1 million barrels in 1951 to 14.7 million in 1952. Year-end stocks of kerosine in 1952 represented about a 49-day supply at the January 1953 daily rate of demand compared with a 51-day supply on hand 12 months previously. The day's supply of kerosine at the close of 1951 was based on stocks of 27.1 million barrels (new basis).

In 1952 year-end stocks of kerosine showed gains in five of the refinery districts—East Coast, Appalachian, Indiana-Illinois-Kentucky, Oklahoma-Kansas, and Rocky Mountain, but inventories in other areas declined. Nearly half of the year-end stocks—45 percent—was reported in the East Coast, and the total quantity there was 37 percent greater than in 1951. The Indiana-Illinois-Kentucky area reported over one-fifth of the kerosine inventory at the close of 1952, a gain of 13 percent over 1951. Relatively important quantities are also held in the Texas and the Louisiana Gulf Coast areas, although the quantities declined in those districts by 38 and 6 percent, respectively, during 1952.

TABLE 65.—Salient statistics of kerosine in the United States, 1951–52, by district and month

Month and district	Production (thousand barrels)		Yield (percent)		Exports (thousand barrels)		Domestic demand (thousand barrels)		Stocks, end of period (thousand barrels)	
	1951	1952 [1]	1951	1952 [1]	1951	1952 [1]	1951	1952 [1]	1951	1952
Month:										
January	12,715	13,040	6.2	6.2	132	816	15,633	16,633	16,673	22,679
February	11,475	10,742	6.3	5.5	209	283	14,789	14,608	13,150	18,530
March	12,371	11,964	6.2	5.8	76	824	11,788	12,853	13,657	16,817
April	11,511	10,978	6.2	5.7	260	690	8,646	8,150	16,262	18,955
May	10,698	7,084	5.4	4.7	777	921	5,852	5,504	20,331	19,614
June	9,815	9,519	5.0	4.7	418	804	5,559	5,268	24,169	23,061
July	10,220	11,083	5.0	5.1	683	874	6,429	5,883	27,277	27,387
August	10,506	11,620	5.2	5.3	1,048	592	6,494	6,014	30,241	32,401
September	10,915	10,498	5.6	4.9	1,413	722	6,637	7,156	33,106	35,021
October	11,262	10,919	5.6	5.1	796	421	10,190	12,230	33,382	33,289
November	12,083	11,792	6.1	5.6	615	427	14,902	12,455	29,948	32,199
December	12,171	13,061	5.8	6.0	416	589	16,775	17,829	24,928	26,842
Total	135,742	132,300	5.7	5.4	6,843	7,963	{123,694 / [2]123,241}	124,583	{24,928 / [2]27,088}	26,842
District:										
East Coast	16,397	16,189	4.3	4.2					8,801	12,009
Appalachian	3,937	3,553	6.0	5.3					787	821
Indiana, Illinois, Kentucky, etc	27,185	27,760	6.2	6.2					5,146	5,835
Oklahoma, Kansas, etc	6,226	5,266	3.3	2.6					1,567	1,579
Texas Inland	4,935	4,695	5.3	4.9					411	395
Texas Gulf Coast	47,139	47,184	8.4	8.2	(3)	(3)	(3)	(3)	4,488	2,806
Louisiana Gulf Coast	21,538	20,512	11.4	10.6					2,330	2,194
Arkansas, Louisiana Inland, etc	2,784	2,542	9.3	8.3					720	511
Rocky Mountain	2,305	2,513	2.7	2.8					302	354
California	3,296	2,086	0.9	0.6					376	338
Total	135,742	132,300	5.7	5.4	6,843	7,963	{123,694 / [2]123,241}	124,583	{24,928 / [2]27,088}	26,842

[1] Preliminary figures.
[2] New basis for comparison with 1952.
[3] Not available.

The annual survey conducted by the Bureau of Mines indicated that the sales of kerosine in 1952 remained at virtually the same level reported in 1951. There was little change in the quantities indicated as sold for range oil in the 2 years; however, that sold as tractor fuel was 11 percent less than in 1951, while kerosine sold for "all other uses" in 1952 was slightly less than the 1951 total.

Sales of range oil, which can be either kerosine or No. 1 fuel oil, were about the same as in 1951; however, the quantity of kerosine used as range oil increased slightly in 1952, although No. 1 fuel oil was lower by 2 percent in 1952.

TABLE 66.—Sales of kerosine in the United States, 1951–52, by district, State, and use

[Thousands of barrels]

District [1] and State	Sold as range oil		Tractor fuel		All other uses		Total	
	1951	1952	1951	1952	1951 [2]	1952	1951	1952
District 1:								
Connecticut	4,923	4,851	13	12	127	171	5,063	5,034
Delaware	634	529	7	6	49	45	690	580
District of Columbia	227	234	3	4	132	121	362	359
Florida	1,729	1,682	87	102	814	867	2,630	2,651
Georgia	1,810	1,826	140	141	625	659	2,575	2,626
Maine	2,965	2,872	18	41	314	295	3,297	3,208
Maryland	1,465	1,482	47	110	696	594	2,208	2,186
Massachusetts	12,615	11,983	34	6	789	793	13,438	12,782
New Hampshire	1,432	1,340	10	4	52	42	1,494	1,386
New Jersey	4,931	4,046	8	11	1,070	1,551	6,009	5,608
New York	9,884	8,140	69	65	1,001	943	10,954	9,148
North Carolina	4,363	7,484	165	97	2,120	2,999	6,648	10,580
Pennsylvania	2,627	2,335	137	46	1,397	1,309	4,161	3,690
Rhode Island	2,860	2,661	62	51	161	127	3,083	2,839
South Carolina	2,014	3,203	58	42	1,365	1,411	3,437	4,656
Vermont	831	604	11	8	67	63	909	675
Virginia	1,822	1,995	19	16	1,003	946	2,844	2,957
West Virginia	326	257	7	4	195	145	528	406
Total	57,458	57,524	895	766	11,977	13,081	70,330	71,371
District 2:								
Illinois	3,777	3,483	351	315	1,453	1,381	5,581	5,179
Indiana	2,537	2,465	122	117	1,621	1,617	4,280	4,199
Iowa	1,714	1,709	411	350	923	881	3,048	2,940
Kansas	745	737	209	190	390	363	1,344	1,290
Kentucky	704	772	70	67	620	595	1,394	1,434
Michigan	2,917	3,550	150	124	1,862	1,856	4,929	5,530
Minnesota	1,544	1,634	83	60	596	777	2,223	2,471
Missouri	1,622	1,601	52	43	661	660	2,335	2,304
Nebraska	608	698	86	79	166	197	860	974
North Dakota	613	676	76	75	210	191	899	942
Ohio	1,660	1,665	61	54	634	653	2,355	2,372
Oklahoma	910	829	161	150	813	782	1,884	1,761
South Dakota	671	612	78	76	89	92	838	780
Tennessee	1,508	1,529	78	77	978	891	2,564	2,497
Wisconsin	1,650	1,674	186	116	781	850	2,617	2,640
Total	23,180	23,634	2,174	1,893	11,797	11,786	37,151	37,313
District 3:								
Alabama	738	798	87	85	786	853	1,611	1,736
Arkansas	949	954	135	127	693	655	1,777	1,736
Louisiana	662	685	156	162	732	725	1,550	1,572
Mississippi	511	538	127	132	637	613	1,275	1,283
New Mexico	249	202	12	18	84	75	345	295
Texas	2,301	1,881	361	317	2,820	2,604	5,482	4,802
Total	5,410	5,058	878	841	5,752	5,525	12,040	11,424
District 4:								
Colorado	187	243	41	39	43	48	271	330
Idaho	29	35	2	2	19	25	50	62
Montana	174	186	29	22	64	69	267	277
Utah	16	19	3	2	9	10	28	31
Wyoming	76	81	3	4	145	135	224	220
Total	482	564	78	69	280	287	840	920
District 5:								
Arizona	2	4			47	48	49	52
California	74	67			2,334	1,074	2,408	1,141
Nevada	1	1			9	11	10	12
Oregon	10	9			172	146	182	155
Washington	6	5			212	236	218	241
Total	93	86			2,774	1,515	2,867	1,601
Total United States	86,623	86,866	4,025	3,569	32,580	32,194	123,228	122,629

[1] States are grouped according to petroleum-marketing districts rather than to conventional geographic regions.

[2] Includes jet propulsion.

TABLE 67.—Sales of range oil in the United States, 1950–52, by States

[Thousands of barrels]

State	1950	1951	1952	
			Total	Percent of U. S. total
Massachusetts	13,505	13,479	12,744	12.4
New York	10,386	10,489	8,732	8.5
North Carolina	3,872	4,458	7,589	7.4
Illinois	6,184	6,936	6,555	6.4
Michigan	3,979	4,667	5,335	5.2
Connecticut	5,238	5,251	5,131	5.0
New Jersey	5,426	5,481	4,527	4.4
Indiana	2,516	3,397	3,330	3.2
South Carolina	2,022	2,075	3,258	3.2
Wisconsin	2,526	3,319	3,210	3.1
Maine	3,093	3,112	3,090	3.0
Rhode Island	3,058	3,028	2,782	2.7
Minnesota	2,454	2,666	2,724	2.7
Pennsylvania	2,838	2,937	2,652	2.5
Missouri	2,308	2,448	2,389	2.3
Texas	2,064	2,826	2,386	2.3
Iowa	2,188	2,502	2,377	2.3
Ohio	1,926	2,126	2,246	2.2
Virginia	1,723	1,926	2,091	2.0
Georgia	1,797	1,898	1,917	1.9
Florida	1,601	1,800	1,751	1.7
Tennessee	1,370	1,568	1,594	1.6
Maryland	1,336	1,489	1,541	1.5
New Hampshire	1,636	1,525	1,443	1.4
Arkansas	964	1,050	1,051	1.0
Oklahoma	923	1,012	942	.9
All other	7,729	9,382	9,426	9.2
Total	94,662	102,847	102,813	100.0

There were a few minor changes in kerosine prices during 1952. The quotation for 41°–43° gravity, water-white kerosine at refineries in Oklahoma declined from 9.31 cents a gallon at the end of December 1951 to an average of 9.25 cents on February 14. After March 10, 1952, two postings were made for this grade in Oklahoma, one "for shipment to Oklahoma points only" and one "for shipment to northern destinations." The average price for the latter group was fractionally higher during 1952. The quotations were slightly lower in March and April but settled at 8.88 cents a gallon for the last 8 months of the year. Kerosine and/or No. 1 fuel oil at New York Harbor remained unchanged at 10.15 cents a gallon during 1951 and through June 1952. Minor price adjustments occurred in July and in August, but the price stood at 10.75 cents a gallon for the balance of the year. The tank-wagon price of kerosine at Chicago remained at 15.8 cents a gallon during 1951 and all of 1952. The posting for tank wagon at New York City (Manhattan and Queens), remained at 13.6 cents a gallon during 1951 and until July 1, 1952, when the Office of Price Stabilization increased the ceiling price to 14.4 cents to attract more light-grade heating oils into the area.

TABLE 68.—Monthly average prices of kerosine in the United States, 1951–52

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1951													
41°–43° gravity, water-white kerosine at refineries, Oklahoma, cents per gallon	9.44	9.44	9.44	9.40	9.31	9.31	9.31	9.31	9.31	9.31	9.31	9.31	9.35
Kerosine (and/or No. 1 fuel oil) at New York Harbor, cents per gallon	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15
Kerosine, tank-wagon at Chicago, do	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80
Kerosine, tank-wagon at New York City [1], do	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60
1952													
41°–43° gravity, water-white kerosine at refineries, Oklahoma, cents per gallon	9.31	9.28	9.11	8 93	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.97
Kerosine (and/or No. 1 fuel oil) at New York Harbor, cents per gallon	10.15	10.15	10.15	10.15	10.15	10.15	10.77	10.77	10.75	10.75	10.75	10.75	10.45
Kerosine, tank-wagon at Chicago, do	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80
Kerosine, tank-wagon at New York City [1], do	13.60	13.60	13.60	13.60	13.60	13.60	14.40	14.40	14.40	14.40	14.40	14.40	14.00

[1] Manhattan and Queens.

California oil companies shipped 22,000 barrels of kerosine by railroad and truck to other Western States in 1952 compared with 20,000 in 1951. Kerosine, including imports, received in the West Coast area totaled 2,000 barrels in 1952, but none was received in 1951.

Kerosine shipped by tanker and barge from the Gulf area to Atlantic coast ports declined slightly from 43.5 million barrels in 1951 to 41.8 million in 1952. The quantity originating in Texas dropped from 34.1 million barrels in 1951 to 32.3 million in 1952, and shipments from Louisiana were 9.5 million barrels in both years.

The Oil and Gas Division of the United States Department of the Interior publishes figures covering barge shipments of kerosine from the Gulf coast and Arkansas up the Mississippi River and its tributaries. Mississippi River traffic declined from 10 million barrels in 1951 to 6.4 million in 1952. Barge shipments from Texas declined slightly from 2.6 million barrels in 1951 to 2.1 million in 1952, and shipments from Louisiana were down sharply from 6.2 million barrels in 1951 to 3.5 million in 1952. Arkansas and Mississippi shipped 1.2 million barrels in 1951 and 786,000 in 1952. Kerosine consigned to District 2 dropped from 9.3 million barrels in 1951 to 6.1 million in 1952. Quantities consigned to District 3 were 665,000 barrels in 1951 and 254,000 in 1952, but only small quantities (60,000 barrels in 1951 and 38,000 in 1952) reached District 1.

In 1952, as in 1951, there were numerous changes in the tanker rate for kerosine shipped from Gulf coast ports to New York. A rate of $1.084 a barrel posted November 30, 1951, prevailed until March 6, 1952, when it dropped to $1.046. The "low" rate for the year (39.9 cents a barrel) was announced on June 4; it then fluctuated and stood at 41.6 cents a barrel on the closing day of December. The average freight rate for kerosine from this source was 65.1 cents a barrel in 1952 compared with 73.9 cents in 1951.

Distillate Fuel Oil

The supply and distribution pattern for distillate fuel oil in 1952 was similar to that prevailing in 1951. Production, which was greater by 19 percent in 1951 and 10 percent in 1952, was not only ample to satisfy 99 percent of the overall requirements in these years, but considerable quantities were diverted to storage. Imports and "transfers" from crude had minor importance as a source of supply during these 2 years. The domestic market for distillate fuel oil increased 14 percent in 1951 and 7 percent in 1952, to absorb 94 percent of the available supply in 1951 and 91 percent in 1952. Exports of distillate fuel oils increased 78 percent in 1951 and 50 percent in 1952.

The lower rate of increase in the domestic demand for distillate fuel oils in 1952 was related to the milder weather during the year and also to a slightly lower rate of gain in the number of oil burners in use during the year. The market expanded throughout the year, except in the third quarter, when demand was down 1 percent over that in the previous quarter. In the first 3 months of 1952 there was an increase of 9 percent compared with an increase of 22 percent in the first quarter of 1951. A warmer March in 1952 was evidently a factor that leveled heating oil requirements. In the second quarter of 1952 the gain in the domestic demand was 7 percent compared with 11 percent in 1951. During the last quarter demand rose 8 percent contrasted with an important increase of 13 percent in the like quarter of 1951.

TABLE 69.—Salient statistics of distillate fuel oil in the United States, 1951–52, by month and district

[Thousands of barrels]

Month and district	Production		Yield (percent)		Transfers, east of California [1]		Imports		Exports		Domestic demand		Stocks, end of period	
	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]
Month:														
January	44,244	45,141	21.7	21.6	229	259	250	218	916	2,083	57,331	63,185	58,424	66,969
February	39,742	44,314	21.7	22.6	211	236	128	255	844	1,916	50,074	54,489	47,587	55,369
March	41,129	43,402	20.4	21.2	253	257	35	262	980	1,459	45,046	49,081	42,978	48,750
April	35,139	39,353	19.0	20.4	262	236	121	174	1,552	2,958	32,182	33,921	44,736	51,634
May	37,500	30,432	18.8	20.2	243	135	359	252	2,204	2,938	25,361	27,867	55,273	51,648
June	37,614	43,640	19.1	21.5	241	222	264	73	1,419	3,857	24,134	25,815	67,839	65,911
July	38,067	45,735	18.7	21.2	235	229	30	404	2,454	3,213	24,280	23,291	79,437	85,775
August	38,335	46,933	18.9	21.2	248	226	57	86	3,357	2,542	27,288	26,221	87,432	104,257
September	38,453	45,053	19.6	21.2	234	218	211	33	2,804	3,473	27,285	28,836	96,241	117,252
October	40,159	45,183	20.0	21.2	233	228	153	436	2,512	3,031	31,713	39,347	102,561	120,721
November	40,726	45,310	20.4	21.4	248	225	33	233	1,494	3,217	47,157	47,176	94,917	116,096
December	44,693	46,768	21.4	21.6	256	234	126	248	2,019	3,229	57,251	60,535	[3] 80,722	99,582
Total	475,801	521,264	20.0	21.3	2,863	2,705	1,767	2,674	22,555	33,916	449,102 [3] 447,278	479,764	80,722 [3] 86,619	99,582
District:														
East Coast	90,032	89,972	23.7	23.3	-------	-------	[4]	[4]	[4]	[4]	[4]	[4]	26,637	36,811
Appalachian	9,345	10,620	14.3	15.9	-------	-------							1,141	2,180
Indiana, Illinois, Kentucky, etc	76,350	81,830	17.5	18.3	374	379							15,892	18,265
Oklahoma, Kansas, etc	44,408	47,012	23.2	23.4	424	357							9,957	10,866
Texas Inland	13,761	15,135	14.9	15.6	1,200	1,187							1,710	1,862
Texas Gulf Coast	125,331	144,891	22.4	25.1	462	439							12,220	11,344
Louisiana Gulf Coast	43,386	48,729	22.9	25.1	89	80							3,328	4,181
Arkansas, Louisiana Inland, etc	6,345	7,138	21.2	23.2	67	81							1,031	965
Rocky Mountain	16,118	17,193	19.1	19.5	247	182							1,734	1,834
California	50,725	58,744	14.4	16.4	-------	-------							7,072	11,274
Total	475,801	521,264	20.0	21.3	2,863	2,705	1,767	2,674	22,555	33,916	449,102 [3] 447,278	479,764	80,722 [3] 86,619	99,582

[1] Figures represent crude oil used as fuel on pipelines, which is considered part of the demand for distillate. No transfers reported from California district for 1951 and 1952.
[2] Preliminary figures.
[3] New basis for comparison with 1952.
[4] Figures not available.

TABLE 70.—Sales of distillate fuel oil [1] in the United States, 1948–52, by uses

[Thousands of barrels]

Use	1948	1949	1950	1951	1952
Railroads	31,006	38,604	48,703	59,962	68,002
Vessels (including tankers)	14,511	13,121	12,872	14,393	17,213
Gas and electric power plants	14,856	12,550	13,207	9,612	8,350
Smelters, mines, and manufacturing industries	29,932	26,424	37,121	[2] 42,567	42,760
Heating oils	200,024	190,387	220,947	[2] 249,758	263,379
Fuel oil (No. 1) sold as range oil	13,534	12,279	14,793	16,224	15,947
U. S. Army, Navy, Air Force, and Coast Guard	9,071	6,109	6,553	8,430	9,644
Oil company fuel	3,625	4,151	5,692	[2] 7,811	7,976
Miscellaneous uses	25,414	25,571	35,418	40,151	45,939
Total United States	341,973	329,196	395,306	448,908	479,210
Exports and shipments to U. S. Territories and possessions	21,293	12,295	12,653	[2] 22,555	33,916
Total	363,266	341,491	407,959	[2] 471,463	513,126

[1] Includes diesel fuel. [2] Revised.

Oil companies reported a 7-percent increase in sales of distillate-grade fuel oil in 1952. All principal uses of light fuel oils gained in 1952 over 1951, except quantities delivered to gas and electric power utilities and the No. 1 grade sold for range burner fuel. The railroads continued to increase purchases of light fuel oils, especially diesel grades, and to decrease purchases of the heavy oils, reflecting the changeover from oil-burning locomotives to diesel engines. Shipments of light fuel oils to railroads increased 13 percent in 1952, and the quantity shipped was nearly twice that of the heavy grades. The use of light fuel oils, mostly diesel grades, by vessels also increased and was 20 percent greater in 1952. Vessels engaged in foreign trade purchased 10.3 million barrels of light fuel oils in 1952, a 36-percent gain over the 1951 total of 7.6 million barrels, according to publications of the Bureau of the Census, United States Department of Commerce. Vessels using coastal and inland waterways received indicated quantities of 6.9 million barrels in 1952 and 6.8 million in 1951.

Sales of light fuel oils to gas and electric power plants in 1952 declined 13 percent in 1952. High prices for fuel oils have caused a shift to competitive fuels, such as coal and natural gas, and electric power utilities have increased consumption of these sharply in recent years. Light grades of fuel oil consumed by the electric power companies declined from 5.5 million barrels in 1951 to 5.1 million in 1952, according to the Federal Power Commission; manufactured-gas companies consumed 4.1 million barrels in 1951 and 2.7 million in 1952, according to statistics compiled by the American Gas Association. Use of light fuel oil at smelters, mines, and manufacturing plants remained about the same as in 1951. This static condition in the market for distillate oils used by the manufacturing industry for fuel in 1952 was not unexpected. The prolonged steel strike in mid-1952 reduced the need for fuel oils by industrial plants.

As the average number of domestic burners in use increased only 10 percent in 1952 and the weather was 5 percent warmer in 1952 as measured by degree-days, sales of distillate fuel oils (Grades 1–4) for domestic burners increased only 6 percent.

Sales of light fuel oils to the Armed Services increased only 14 percent.

Oil companies use a relatively small amount of light fuel oils in their operations and reported only a 2-percent increase in consumption in 1951.

Because the Iranian oil crisis remained unsettled, the United States supplied unusually large quantities of distillate fuel oils to foreign countries and the noncontiguous Territories; exports, which had doubled in 1951, expanded an additional 50 percent in 1952. The more important markets were Canada, 9.7 million barrels; Netherlands Antilles, 6.7 million; Sweden, 1.1 million; Norway, 1.2 million; United Kingdom,

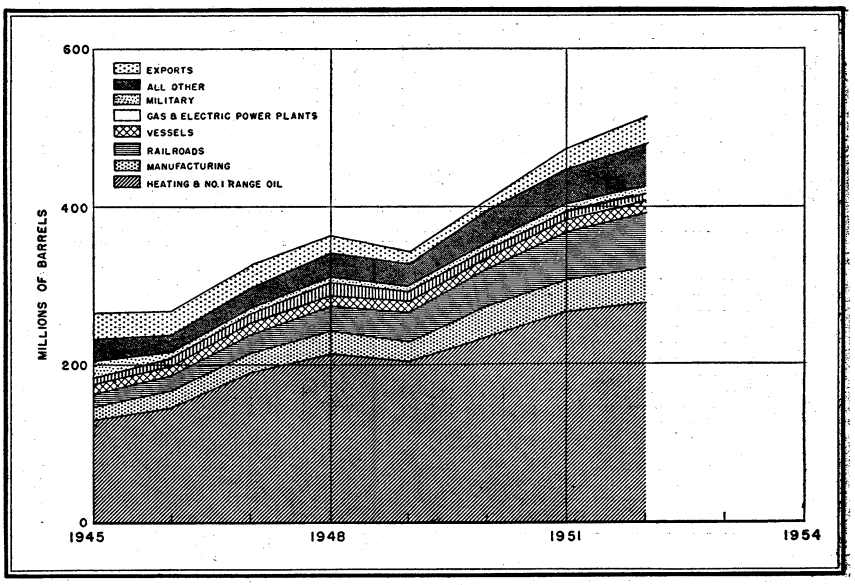

FIGURE 10.—Sales of distillate fuel oil, including diesel oil and range oil, in the United States, 1945–52, by uses.

4.5 million; Netherlands, 593,000; Aden, 1.5 million; India, 703,000; Japan, 505,000; and Egypt, 572,000.

Production of distillate fuel oil increased by 10 percent in 1952 compared with a 19-percent increase in 1951. The lower percentage gain in 1952 resulted from a lower rate of gain in crude runs—3 percent in 1952 in contrast to a 13-percent rise in 1951. This less favorable crude-run situation in 1952 was somewhat counterbalanced by a higher percentage yield for light fuel oils—21.3 percent against 20 in 1951.

Gains in distillate-fuel-oil output were reported for all refinery districts, except the East Coast in 1952. The decline in that area, which produced 17 percent of the total, was inconsequential. About 28 percent of the national total came from the Texas Gulf area, where production was up by 15.6 percent in 1952. Refineries in the Indiana-Illinois-Kentucky district furnished 16 percent of the light fuel oils, and output in that district rose by 7.2 percent. Producing areas of secondary importance, such as Oklahoma-Kansas-Missouri, Louisiana Gulf, and California, gained 5.9, 12.3, and 15.8 percent, respectively, for the year.

TABLE 71.—Sales of distillate fuel oil[1] in the United States, 1948–52, by district and State

[Thousands of barrels]

District[2] and State	1948	1949	1950	1951	1952
District 1:					
Connecticut	10,487	9,510	11,067	11,777	12,286
Delaware	866	1,013	1,285	1,556	1,702
District of Columbia	2,789	2,246	2,433	2,982	3,368
Florida	4,068	3,824	4,648	5,343	6,863
Georgia	2,593	2,604	3,202	3,962	4,262
Maine	2,638	2,576	3,496	3,935	4,276
Maryland	8,442	7,691	8,981	10,898	11,189
Massachusetts	20,919	19,741	22,769	27,261	28,064
New Hampshire	1,455	1,945	2,765	3,102	3,442
New Jersey	28,755	26,993	30,521	32,298	33,028
New York	45,902	45,252	52,173	56,334	59,373
North Carolina	3,220	3,491	4,354	5,490	6,360
Pennsylvania	22,198	20,849	28,266	34,585	35,827
Rhode Island	3,413	3,408	4,116	4,260	4,343
South Carolina	1,662	1,630	1,854	2,202	2,491
Vermont	875	1,054	1,117	1,166	1,212
Virginia	5,319	5,380	7,855	9,156	9,800
West Virginia	585	554	651	1,229	1,188
Total	166,186	159,761	191,553	217,536	229,074
District 2:					
Illinois	21,622	19,582	26,320	28,517	29,061
Indiana	8,429	8,080	10,776	13,205	13,968
Iowa	7,435	7,610	8,925	9,791	10,204
Kansas	4,094	3,185	4,527	5,552	5,695
Kentucky	1,980	1,956	2,274	2,753	3,250
Michigan	13,713	14,562	18,493	20,334	22,268
Minnesota	10,229	10,094	12,448	14,560	15,478
Missouri	8,110	6,822	7,815	8,684	10,224
Nebraska	3,744	3,386	3,707	3,829	4,071
North Dakota	1,312	1,616	1,939	2,026	2,456
Ohio	10,120	9,442	12,059	14,474	15,953
Oklahoma	1,571	1,929	1,928	2,223	2,192
South Dakota	1,434	1,510	1,893	2,133	2,399
Tennessee	2,143	2,125	3,062	3,428	3,487
Wisconsin	8,609	8,279	10,285	11,437	11,803
Total	104,545	100,178	126,451	142,946	152,509
District 3:					
Alabama	2,493	2,340	2,692	2,846	3,073
Arkansas	1,838	2,162	2,414	2,244	2,325
Louisiana	4,268	4,021	4,619	5,224	5,840
Mississippi	1,002	1,010	1,271	1,507	1,502
New Mexico	653	715	950	972	1,224
Texas	10,120	9,238	12,790	16,183	19,022
Total	20,374	19,486	24,736	28,976	32,986
District 4:					
Colorado	1,976	1,683	1,831	2,036	2,503
Idaho	1,570	1,562	1,770	2,291	2,457
Montana	1,810	1,965	2,478	2,851	3,063
Utah	1,448	1,474	2,001	2,334	3,263
Wyoming	1,600	1,504	1,732	1,893	2,103
Total	8,404	8,188	9,812	11,405	13,389
District 5:					
Arizona	1,342	1,021	1,020	1,233	1,341
California	22,573	21,232	19,212	22,031	23,875
Nevada	1,363	1,772	1,843	2,102	2,158
Oregon	6,181	6,343	7,725	8,534	8,974
Washington	11,005	11,215	12,954	14,145	14,904
Total	42,464	41,583	42,754	48,045	51,252
Total United States	341,973	329,196	395,306	448,908	479,210

[1] Includes diesel fuel oil.

[2] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

Comparatively small amounts of light crude oil are used by pipeline companies as fuel and are classified as "Transfers" for accounting purposes; they represented approximately 0.5 percent of the total supply of light fuel oils in both 1951 and 1952. "Transfers" in 1952 were about 6 percent less than in 1951.

Although imports of distillate fuel oil into continental United States increased by half (52.8 percent) in 1952 over 1951, imports represented less than 1 percent of the total available supply. The larger quantities in 1951 and 1952 came from Netherlands Antilles, Venezuela, Saudi Arabia, and Bahrein.

Light-fuel-oil stocks reported on December 31, 1952, were approximately a quarter higher than at the end of 1951. Quantities held at refineries—49.0 million barrels—were 10 percent over the 1951 inventory of 44.7 million, and those at bulk terminals and in pipelines—50.5 million barrels—were 21 percent above the 1951 total of 41.9 million barrels. The distillate-fuel-oil inventory at the end of 1952 represented a 48-day supply at the January 1953 daily rate of domestic demand and compares with a 43-day reserve on hand a year previous. The number of days' supply at the close of 1951 is based on stocks of 86.6 million barrels or those on a new basis for comparison with the 1952 year-end quantity.

Large accumulations of distillate-fuel-oil stocks were reported for all areas in 1952, except the Texas Gulf and Arkansas–Louisiana Inland districts. Quantities held in the Texas Gulf at the end of 1952 were 7 percent lower and declined from 15 percent of the national total in 1951 to 11 percent in 1952. Relatively minor stocks in the Arkansas–Louisiana Inland area declined 6 percent in 1952. Stocks in the East Coast section—which represented 33 percent of the national total in 1951 and 37 percent in 1952—were 38 percent larger than in 1951. Nearly a fifth of the distillate stocks was reported in the Indiana–Illinois–Kentucky district, where there was an increase of 15 percent in 1952. The Oklahoma–Kansas–Missouri and the California districts each reported about 11 percent of the total distillate stocks at the close of 1952, and the gains in these districts were 9 and 59 percent, respectively.

Overland shipments of distillate fuel oil from the Pacific coast area to other Western States increased 5 percent from 521,000 barrels in 1951 to 548,000 in 1952. Tanker shipments from California to east coast ports have dropped sharply during the Korean War period from 1.6 million barrels in 1950 to 34,000 in 1951 and down to only 6,000 barrels in 1952. Meanwhile, both domestic shipments and imports received in the west coast marketing area increased by two-thirds from 1.7 million barrels in 1951 to 2.8 million in 1952. This fuel from outside sources represented about 3 percent of the available supply in 1951 and 4 percent in 1952.

Water-borne shipments of distillate fuel oil from Gulf ports to the east coast have become increasingly significant since 1949 and increased 6 percent to 137.7 million in 1952. Water-borne light fuel oil originating in Texas totaled 106.3 million barrels in 1951 and 109.8 million in 1952, a 3-percent gain, while that from Louisiana totaled 27.8 million in 1952, an 18-percent increase.

Reports released by the Oil and Gas Division, United States Department of the Interior, had indicated for several years increasing use of barge transportation of distillate fuel oil from the Gulf Coast

303707—54——27

area and Arkansas up the Mississippi River and its tributaries. However, this traffic declined sharply in 1952 to 7.1 million barrels from 13.1 million in 1951, evidently from competition of pipelines which transported a substantially greater proportion than in the previous year. River barge shipments of distillate grades originating in Texas declined from 4.1 million barrels in 1951 to 1.7 million in 1952, and shipments from Louisiana were lower by half or 3.7 million barrels in 1952 compared with 7.4 million in 1951. Conversely, quantities shipped by barge from points in Mississippi and Arkansas increased from 1.5 million barrels in 1951 to 1.7 million in 1952. The bulk of the light fuel oil transported by barge was destined to District 2, where the total received declined from 12.4 million barrels in 1951 to 6.8 million in 1952. Distillates shipped to District 3 were 409,000 barrels in 1951 and 174,000 in 1952; quantities shipped to District 1 were 283,000 barrels in 1951 and 136,000 in 1952.

In 1952, as in the previous year, the tanker rate for No. 2 distillate fuel oil shipped from Gulf coast ports to New York fluctuated considerably. A charge of $1.138 a barrel, effective November 30, 1951, remained unchanged until March 6, 1952, when it declined to $1.105 a barrel. A downward trend continued until early June, when the "low" of 42 cents a barrel for the year was reached. Subsequent fluctuations increased the rate to 64.7 cents early in December and to 43.7 cents a barrel at the year end. The average tanker rate for light fuel oil for the year was 68.9 cents a barrel compared with 78.1 cents in 1951.

There were minor changes in quotations for distillate fuel oil at some points in 1952. No. 2 straw fuel oil at refineries in Oklahoma declined from 8.5 cents a gallon in January 1952 to 8.3 cents on March 7. After this date there were 2 price postings, 1 for shipments within Oklahoma and the other for shipments to northern destinations. The quotation applying to interstate shipments reached a low of 7.7 cents a gallon in August and increased slightly to 7.9 cents in October to average 8.1 cents for the year compared with 8.5 cents in 1951. The price for No. 2 distillate at New York Harbor remained unchanged at 9.15 cents a gallon during 1951, and until July 1952 when the price fluctuated upward after the Office of Price Stabilization granted an increase of 0.8 cent a gallon in the East Coast district. These advances were followed by a minor decline in August. The average price for the year was 9.45 cents a gallon compared with 9.15 cents in 1951. The quotation for light diesel fuel at shore plants and for ships at New York Harbor also remained unchanged during 1951 and through June 1952. Minor changes after the midyear resulted in slightly higher average postings for 1952 than for 1951. The price of diesel oil for vessels at New Orleans and San Pedro remained unchanged during 1951 and 1952.

TABLE 72.—Monthly average prices of distillate fuel oil and diesel fuel in the United States, 1951–52

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1951													
No. 2 Straw fuel oil at refineries, Oklahoma, cents per gallon	8.56	8.56	8.56	8.52	8.40	8.38	8.38	8.38	8.38	8.44	8.50	8.50	8.46
No. 2 fuel oil at New York Harbor, do	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15	9.15
Diesel oil, shore plants, New York Harbor, do	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55	9.55
Diesel oil for ships:													
New York, dollars per barrel	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
New Orleans, do	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49
San Pedro, do	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
1952													
No. 2 Straw fuel oil at refineries, Oklahoma, cents per gallon	8.50	8.40	8.27	8.20	8.19	8.09	7.88	7.71	7.81	7.84	7.88	7.88	8.05
No. 2 fuel oil at New York Harbor, do	9.15	9.15	9.15	9.15	9.15	9.15	9.77	9.77	9.75	9.75	9.75	9.75	9.45
Diesel oil, shore plants, New York Harbor, do	9.55	9.55	9.55	9.55	9.55	9.55	10.17	10.20	10.20	10.20	10.20	10.20	9.87
Diesel oil for ships:													
New York, dollars per barrel	3.90	3.90	3.90	3.90	3.90	3.90	4.20	4.24	4.24	4.24	4.24	4.24	4.07
New Orleans, do	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49
San Pedro, do	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44

As with wholesale prices, there were only minor changes in representative retail prices for light fuel oils, according to monthly reports of the Bureau of Labor Statistics, United States Department of Labor. A quotation of 12.71 cents a gallon for No. 2 distillate at New York, effective in November 1951, remained unchanged through June 1952 when there was a slight increase to 13.58 cents, at which it remained for the rest of the year. The average quotation for No. 2 distillate at New York was 13.15 cents a gallon in 1952 compared with 12.70 cents in 1951. The retail price of 13.57 cents a gallon for No. 2 distillate at Chicago, announced in May 1951, remained unchanged during 1952 and differed little from the 1951 average (13.59 cents).

Residual Fuel Oil

Production of residual fuel oil declined 3 percent in 1952; however, production was supplemented by increased "transfers" and imports, so that the supply was not only adequate to satisfy the slightly lower domestic and export demand, but also permitted a considerable surplus to be diverted to storage. The residual-fuel-oil supply-and-demand situation had differed somewhat in 1951, when production increased 10 percent, imports had declined slightly, domestic requirements had increased during the year, and exports were nearly double the 1950 total. Only a comparatively small quantity of heavy fuel oil was added to stocks in 1951.

An expanding domestic demand for residual fuel oils, evident in 1949, leveled in 1951 to a 2-percent increase over 1950 demand; this downward trend was accelerated in 1952, when there was an actual decline of 2 percent in the market because the wider distribution of natural gas, made possible by new pipelines, adversely affected the demand for heavy fuel oils in 1951 and 1952. In the first quarter of 1952 there was a 3-percent decline in domestic requirements compared with the same period of 1951. This was followed by a sharp drop of 10 percent in the second quarter and upturns of 1 percent in the third quarter and 6 percent in the closing quarter of 1952 over the comparable totals in 1951.

The slightly lower volume of residual-fuel-oil sales in 1952 resulted chiefly from a rapidly declining demand for these heavy grades of oil by the railroads, whose purchases were 27 percent less in 1952 than in 1951, although the smaller requirement of the military forces was also a contributing factor. Vessels loaded 3 percent more heavy fuel oils for bunkering purposes in 1952 than in 1951. Vessels engaged in foreign trade purchased 65.2 million barrels of heavy oil for bunkers in 1952, a 2-percent increase over 1951. The indicated demand for residual oils by vessels using coastal and inland waterways was 45.2 million barrels in 1952 compared with 43.2 million in 1951.

TABLE 73.—Salient statistics of residual fuel oil in the United States, 1951–52, by month and district

[Thousands of barrels]

Month and district	Production		Yield (percent)		Transfers [1]				Imports		Exports		Domestic demand		Stocks, end of period	
					East of California		California									
	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952
By months:																
January	42,397	41,483	20.8	19.8	377	446	120	187	13,842	12,938	946	2,138	56,223	56,246	40,317	39,523
February	38,696	38,352	21.1	19.6	325	401	106	174	12,089	11,860	1,036	2,219	51,088	49,796	39,409	38,295
March	41,771	39,482	20.8	19.3	327	372	110	201	11,347	12,750	1,474	2,408	53,974	50,721	37,516	37,971
April	36,908	37,602	20.0	19.5	281	365	116	133	10,577	10,473	1,446	2,864	47,042	45,119	36,910	38,561
May	39,202	30,336	19.6	20.2	338	328	130	210	9,768	10,989	2,927	3,103	44,104	38,500	39,317	38,821
June	38,303	36,827	19.5	18.1	298	345	98	190	8,682	8,929	2,902	3,139	42,230	36,285	41,566	45,688
July	39,516	38,337	19.5	17.7	333	259	147	130	6,672	7,677	3,612	2,819	39,459	37,027	45,163	52,245
August	37,993	38,822	18.7	17.6	337	277	293	300	7,357	6,656	3,446	2,145	40,454	42,004	47,243	54,061
September	36,843	36,887	18.8	17.4	309	247	286	242	6,532	7,790	3,454	1,760	39,547	41,267	48,212	56,200
October	37,944	37,321	18.9	17.5	351	271	211	250	9,737	11,331	3,045	1,926	44,995	50,395	48,415	53,052
November	39,111	38,984	19.6	18.4	408	332	147	191	10,583	10,436	2,403	1,622	50,883	48,304	45,378	53,069
December	40,693	40,351	19.4	18.6	407	328	151	164	11,980	16,681	2,308	1,778	54,322	60,109	41,979	48,706
Total	469,377	454,784	19.7	18.6	4,091	3,971	1,915	2,372	119,166	128,510	28,999	27,921	564,321 [3] 564,397	555,863	41,979 [3] 42,853	48,706
By districts:																
East Coast	84,266	85,514	22.2	22.2											10,381	12,298
Appalachian	10,483	9,997	16.0	14.9											823	787
Indiana, Illinois, Kentucky, etc	63,485	61,161	14.6	13.7	764	736									5,715	4,976
Oklahoma, Kansas, etc	24,014	21,435	12.5	10.7	429	236									1,789	1,491
Texas Inland	15,564	14,239	16.9	14.7	557	600									1,126	1,173
Texas Gulf Coast	94,065	91,209	16.8	15.8	254	255			(4)	(4)	(4)	(4)	(4)	(4)	6,040	6,895
Louisiana Gulf Coast	22,529	20,882	11.9	10.8	757	669									1,886	1,861
Arkansas, Louisiana Inland, etc	2,866	2,413	9.6	7.8	545	424									142	161
Rocky Mountain	17,909	17,306	21.3	19.6	785	1,051									1,111	1,135
California	134,196	130,628	38.0	36.4			1,915	2,372							12,966	17,929
Total	469,377	454,784	19.7	18.6	4,091	3,971	1,915	2,372	119,166	128,510	28,999	27,921	564,321 [3] 564,397	555,863	41,979 [3] 42,853	48,706

[1] Represents crude oil used as fuel on leases and for general industrial purposes.
[2] Preliminary figures.
[3] New basis for comparison with 1952.
[4] Figures not available.

TABLE 74.—Sales of residual fuel oil [1] in the United States, 1948–52, by uses

[Thousands of barrels]

Use	1948	1949	1950	1951	1952
Railroads	89,588	63,467	60,878	54,998	39,989
Vessels (including tankers)	95,763	89,362	92,947	107,007	110,412
Gas and electric power plants	56,812	80,092	93,062	70,550	70,497
Smelters, mines, and manufacturing industries	117,780	122,633	148,111	157,279	158,373
Heating oils	58,639	60,414	72,716	76,164	79,151
U. S. Army, Navy, Air Force, and Coast Guard	24,655	22,724	28,333	38,054	37,185
Oil company fuel	56,637	51,667	53,263	54,056	54,421
Miscellaneous uses	6,623	4,574	4,898	5,280	5,745
Total United States	506,497	494,933	554,208	563,388	555,773
Exports and shipments to U. S. Territories and possessions	13,011	12,641	16,228	[2] 28,999	27,921
Total	519,508	507,574	570,436	[2] 592,387	583,694

[1] Includes Navy grade and crude oil burned as fuel. [2] Revised.

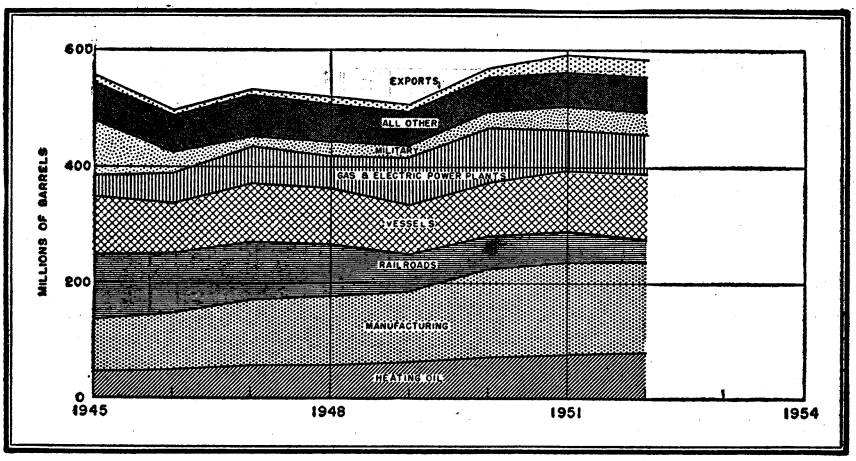

FIGURE 11.—Sales of residual fuel oil in the United States, 1945–52, by uses.

Sales of heavy fuel oils credited to the gas and electric-power utilities remained about the same as in 1951, although consumption figures released by the Federal Power Commission showed an increase from 58.1 million barrels in 1951 to 62.0 million in 1952 in the quantity used to generate electric power. According to the American Gas Association, heavy fuel oil consumed by manufactured-gas companies declined from 12.1 million barrels in 1951 to 8.7 million in 1952. Purchases by smelters, mines, and manufacturing plants increased less than 1 percent over the 1951 total.

Oil companies reported a 4-percent gain in sales of heavy grades of heating oils in 1951. Milder weather in 1952 was evidently the main factor slowing the rate of expansion.

TABLE 75.—Sales of residual fuel oil [1] in the United States, 1948–52, by district and State

[Thousands of barrels]

District [2] and State	1948	1949	1950	1951	1952
District 1:					
Connecticut	10,066	14,515	16,845	14,888	13,475
Delaware	1,043	1,921	2,373	1,888	2,501
District of Columbia	855	1,427	1,188	1,688	1,915
Florida	16,132	15,671	17,009	20,322	24,789
Georgia	3,375	4,227	4,733	5,619	5,816
Maine	2,342	2,704	3,550	3,178	4,032
Maryland	13,276	13,521	14,168	15,814	14,852
Massachusetts	18,082	23,476	30,715	29,883	30,003
New Hampshire	909	1,175	1,873	2,326	2,295
New Jersey	33,680	37,973	49,092	44,775	44,153
New York	45,871	49,168	61,829	52,684	50,966
North Carolina	461	560	990	1,109	1,257
Pennsylvania	37,240	35,391	41,110	42,614	42,491
Rhode Island	7,917	8,508	10,891	10,030	9,756
South Carolina	2,496	2,610	3,652	4,145	5,230
Vermont	258	281	382	300	300
Virginia	10,590	12,200	12,883	18,037	20,294
West Virginia	1,171	1,366	1,587	1,464	1,337
Total	205,764	226,694	274,870	270,764	275,462
District 2:					
Illinois	15,276	15,570	19,517	20,257	20,455
Indiana	13,497	13,343	15,841	16,850	17,230
Iowa	742	1,176	1,321	1,365	1,217
Kansas	10,166	8,226	5,893	7,110	6,071
Kentucky	1,303	1,679	1,260	1,007	738
Michigan	11,051	11,403	12,708	13,743	14,153
Minnesota	1,315	1,467	2,432	2,431	2,430
Missouri	6,609	5,260	5,389	5,379	5,146
Nebraska	329	422	550	467	334
North Dakota	447	358	297	224	120
Ohio	16,089	16,779	18,004	18,017	17,670
Oklahoma	7,723	5,438	4,783	3,890	3,011
South Dakota	288	262	294	231	239
Tennessee	890	919	1,398	1,331	1,097
Wisconsin	1,497	1,515	1,712	1,861	2,042
Total	87,222	83,817	91,399	94,163	91,953
District 3:					
Alabama	2,296	1,891	2,271	2,417	2,677
Arkansas	2,080	1,833	2,273	2,051	1,497
Louisiana	19,434	15,220	11,221	10,953	10,422
Mississippi	411	314	348	257	173
New Mexico	685	460	696	532	831
Texas	63,376	48,481	48,560	50,464	46,508
Total	88,282	68,199	65,369	66,674	62,108
District 4:					
Colorado	886	783	1,050	1,068	1,203
Idaho	456	480	629	945	1,029
Montana	4,935	3,702	4,222	4,958	4,220
Utah	1,585	3,639	4,767	4,979	4,851
Wyoming	3,877	2,959	3,024	3,252	2,819
Total	11,739	11,563	13,692	15,202	14,122
District 5:					
Arizona	1,841	1,087	1,448	1,157	542
California	79,031	77,171	78,397	85,884	79,127
Nevada	4,372	1,514	2,889	2,685	2,266
Oregon	14,892	12,845	12,429	12,215	13,168
Washington	13,304	12,043	13,715	14,644	17,025
Total	113,490	104,660	108,878	116,585	112,128
Total United States	506,497	494,933	554,208	563,388	555,773

[1] Includes some crude oil burned as fuel.

[2] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

The quantity of heavy fuel oils consumed by the petroleum industry has changed very little in recent years and in 1952 was less than 1 percent above 1951 requirements. The petroleum industry has been shifting to other sources of energy, such as natural and refinery gases, liquefied petroleum gases, and purchased electricity; moreover, smaller gains in crude production and runs at refineries were a factor.

As in 1951, unusually high exports and shipments of residual fuel oil to the noncontiguous Territories of the United States, due largely to closing of the Abadan refinery, were reported in 1952, although the total for the year was 4 percent less than in 1951. The export market absorbed about 5 percent of the available supply of heavy fuel oils both in 1951 and 1952. The more important quantities were shipped to the following countries in 1952: Canada, 7.1 million barrels; Mexico, 2.2 million; Cuba, 1.8 million; Chile, 1.3 million; the United Kingdom, 1.0 million; and Japan, 4.5 million barrels.

A 3-percent decline in the production of residual fuel oils in 1952, in contrast to a 10-percent gain in 1951, was definitely due to a lower yield—18.6 percent in 1952 compared with 19.7 percent in 1951—as crude runs during the year increased 3 percent. Heavy fuel oils produced at petroleum refineries represented 79 percent of the total supply in 1951 and 77 percent in 1952.

All refinery districts reported lower production of residual fuel oils in 1952, except the East Coast, which supplied about 19 percent of the total and reported a gain of about 2 percent. The general decline in the output of heavy fuel oils in 1952 was in contrast to production the previous year, when all districts increased output over 1950, except for the Arkansas-Louisiana Inland district, where production is relatively unimportant. Production from refineries in California, which process approximately 30 percent of the heavy grades, and those in the Texas Gulf, which process about 20 percent, was 3 percent lower than in 1951. The Indiana-Illinois-Kentucky district, the only other region producing an important quantity reported a volume decline of 4 percent in 1952.

"Transfers," or heavy crude petroleum used as fuel on oil-company leases and in industrial plants, usually represent about 1 percent of the overall supply of heavy fuel oils and were 6 percent greater than in 1951. Transfers reported in the California refinery district increased 24 percent in 1952 to represent 37 percent of the national total in 1952. Heavy crude transfers consumed in other parts of the country declined 3 percent in 1952.

Imports of heavy fuel oils, which had increased 60 percent in 1950 and declined 1 percent in 1951, increased in 1952, when receipts from abroad were up 8 percent over 1951. The residual fuel oil imported comprised 20 percent of the overall supply in 1951 and 22 percent in 1952. Although imports from most were small, 19 foreign countries shipped heavy fuel oils into the United States in 1952. The two important sources were the Netherlands Antilles and Venezuela.

The import duty on heavy fuel oils was reduced in 1952, in accordance with a bilateral trade agreement with Venezuela, effective October 11, which lowered the excise duty on fuel oils below 25° A. P. I. gravity from 10½ cents to 5¼ cents a barrel. The agreement continued the rate of 10½ cents a barrel on the lighter grades above 25° A. P. I. gravity. No quota was placed on the amounts of these imports.

Year-end stocks of heavy fuel oil increased 16 percent in 1952 compared with a 3-percent gain in 1951. Increases were reported for all refinery districts, where important quantities of residuals were stored, except the Indiana-Illinois-Kentucky area, which reported a 13-percent decline during 1952. Lower stock levels were also indicated for the Appalachian, Oklahoma-Kansas, and Louisiana Gulf districts, although the quantities involved were small. On the east coast, where about a fourth of total stocks of the heavy grades is usually held, stocks were up 19 percent at the close of 1952. In the Texas Gulf coast, where about 14 percent is stored, the increase was 14 percent and in California, where well over a third of the total was reported, there was a 38-percent increase. The increase in residual-fuel-oil stocks in California in 1952 was largely the result of greatly increased receipts from outside sources, including imports and a smaller demand, both within the west coast marketing area and for outgoing shipments.

Although heavy fuel oils held at refineries increased 14 percent from 33.0 million barrels in 1951 to 37.7 million at the close of 1952, they represented only 77 percent of the national total in 1952 compared with 79 percent in 1951. Quantities reported at bulk plants and in pipelines were up by nearly a quarter, from 8.9 million barrels in 1951 to 11.0 million in 1952.

Year-end residual stocks in 1952 sufficed for a 26-day supply at the January 1953 daily rate of domestic demand and were comparable to a 24-day reserve available at the close of 1951. The days' supply at the end of 1951 is based on stocks of 42.9 million barrels or those on a new basis for comparison with the 1952 year-end total.

Shipments of heavy fuel oil from the Pacific Coast district declined sharply from 23.4 million barrels in 1951 to 19.1 million in 1952. Exports, which declined from 18.0 million barrels in 1951 to 13.4 million in 1952, represented most of the decline. Rail and truck shipments from California to other Western States also declined from 467,000 barrels in 1951 to 291,000 in 1952, but shipments to Alaska and Hawaii increased 12 percent to 5.5 million barrels in 1952. There were no tanker shipments of residual fuel oil from California to the east coast in 1952 and only 140,000 barrels in 1951 compared with the record total of 15.4 million in 1950. Receipts of residuals in the west coast, including imports, rose appreciably from 356,000 barrels in 1951 to 1.7 million in 1952, largely to replenish stocks, which had declined to a low level in 1951 and to provide ample supplies for any possible military needs.

Tanker and barge shipments of residual fuel oil from the Gulf area to Atlantic coast ports declined by 2 percent from 60.4 million barrels in 1951 to 59.1 million in 1952. The quantity originating in Texas was 5 percent lower, declining from 52.9 million barrels in 1951 to 50.5 million in 1952; shipments from Louisiana increased from 7.5 million barrels in 1951 to 8.7 million in 1952—a 15-percent gain.

Barge shipments of heavy fuel oil from the Gulf coast and Arkansas to ports on the Mississippi River and its tributaries declined sharply from 6.1 million barrels in 1951 to 2.8 million in 1952. The principal decline was in the quantity of residual fuel oil loaded in Louisiana, which dropped from 3.9 million barrels in 1951 to 786,000 in 1952. Decreases in water-borne shipments were also evident for Texas, where shipments declined from 2.1 million barrels in 1951 to 2.0 million in

1952, and for Mississippi and Arkansas, where shipments declined from 52,000 barrels in 1951 to 25,000 barrels in 1952. The most important change in destination of residual fuel oil was noted for District 2, where deliveries of heavy fuel oil decreased from 3.4 million barrels in 1951 to 656,000 in 1952, probably because of wider distribution of natural gas in the area. District 1 received 2.7 million barrels of heavy fuel oil via inland waterways in 1951 and 2.1 million in 1952, and a small quantity was received in District 3—7,000 barrels in 1951 and 1,000 in 1952.

The tanker rate for Bunker "C" fuel oil shipped from the Gulf coast to New York declined from an average of 87.4 cents a barrel in 1951 to 74.7 cents in 1952. The high in 1952 was $1.315 a barrel. In 1952 this rate prevailed from January 1 through 14 and again from January 23 through March 13 when the rate declined to a low of 37.2 cents a barrel posted for August 6. At the year end the rate stood at 43.8 cents a barrel.

Heavy-fuel-oil prices fell in 1952 in contrast to rising quotations reported in 1950 and 1951. The posting for No. 6 grade at refineries in Oklahoma, which averaged $1.72 a barrel in January 1952, dropped steadily during the first half of the year and reached $1.03 a barrel on July 18, where it remained unchanged until the year-end. The average price for the year was $1.26 a barrel compared with $1.80 in 1951. The average posted price for No. 5 fuel oil at New York Harbor was the only quotation to show even a slight increase in 1952. An average price of $3.40 a barrel announced in June 1951 held until August 5, 1952, when it fell to $3.31 for the remainder of the year. The average price for No. 5 at New York Harbor was $3.36 a barrel for 1952 compared with $3.27 for 1951. Bunker "C" heavy fuel oil at New York sold at $2.45 a barrel until early August 1952, when 2 adjustments brought the average price down to $2.10 for the last 4 months, an average of $2.31 for the year compared with $2.32 a barrel for 1951. The posted price for Bunker "C" at New Orleans followed a similar pattern; changes in August 1952 lowered the quotation from $1.85 a barrel to $1.60, resulting in an average of $1.75 for the year against $1.85 in 1951. A lower price for Bunker "C" at San Pedro, Calif., effective in mid-January 1952, brought the year's average down to $1.70 a barrel compared with $1.78 in 1951.

TABLE 76.—Monthly average prices of residual fuel oil in the United States, 1951–52

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1951													
No. 6 fuel oil at refineries, Oklahoma....dollars per barrel	1.88	1.88	1.88	1.88	1.78	1.78	1.78	1.78	1.78	1.74	1.73	1.73	1.80
No. 5 fuel oil at New York Harbor.....do....	3.10	3.10	3.10	3.10	3.10	3.37	3.40	3.40	3.40	3.40	3.40	3.40	3.27
Bunker "C" for ships:													
New York.....do....	2.15	2.15	2.15	2.15	2.15	2.43	2.45	2.45	2.45	2.45	2.45	2.45	2.32
New Orleans.....do....	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
San Pedro.....do....	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
1952													
No. 6 fuel oil at refineries, Oklahoma....dollars per barrel	1.72	1.60	1.52	1.44	1.40	1.28	1.08	1.03	1.03	1.03	1.03	1.03	1.26
No. 5 fuel oil at New York Harbor.....do....	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.32	3.31	3.31	3.31	3.31	3.36
Bunker "C" for ships:													
New York.....do....	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.16	2.10	2.10	2.10	2.10	2.31
New Orleans.....do....	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.64	1.60	1.60	1.60	1.60	1.75
San Pedro.....do....	1.73	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70

Lubricants

The refinery production of lubricating oils and greases decreased from 61.5 million barrels in 1951 to 55.6 million in 1952. Of the total decrease (5.9 million barrels), 2.7 million was in the Texas Gulf district, 0.9 million in the Louisiana Gulf district, 0.8 million in the Indiana-Illinois district, and about 0.5 million barrels each in the East Coast, Appalachian, and Oklahoma-Kansas districts. In 1952 the percentage of total production by leading districts was 32.3 percent in Texas Gulf, 19.4 percent in the East Coast, 10.0 percent in the Louisiana Gulf, 9.4 percent in the Indiana-Illinois district, 8.9 percent in the Appalachian district, 8.2 percent in California, 7.7 percent in the Oklahoma-Kansas district, and 4.1 percent in other districts.

TABLE 77.—Salient statistics of lubricants in the United States, 1951–52, by month and district

Month and district	Production (thousand barrels)		Yield (percent)		Domestic demand (thousand barrels)		Stocks, end of period (thousand barrels)	
	1951	1952 [1]	1951	1952 [1]	1951	1952 [1]	1951	1952
By months:								
January	5,061	4,963	2.5	2.4	3,540	3,381	8,160	9,856
February	4,339	4,456	2.4	2.3	3,115	2,827	8,386	10,049
March	5,108	4,921	2.5	2.4	3,691	2,990	8,209	10,169
April	5,175	4,831	2.8	2.5	3,544	3,509	8,393	10,154
May	5,454	3,492	2.7	2.3	3,858	2,525	8,451	9,610
June	5,094	4,855	2.6	2.4	3,631	3,414	8,444	9,694
July	5,241	4,668	2.6	2.2	3,348	3,224	8,662	9,775
August	5,379	4,857	2.6	2.2	3,591	3,343	8,875	9,620
September	4,905	4,694	2.5	2.2	3,313	3,433	8,866	9,745
October	5,432	4,940	2.7	2.3	4,085	3,711	8,914	9,869
November	5,144	4,507	2.6	2.1	3,420	2,800	9,111	10,561
December	5,157	4,416	2.5	2.0	3,156	2,993	9,617	11,021
Total	61,489	55,600	2.6	2.3	42,292	38,150	9,617	11,021
By districts:								
East Coast	11,261	10,771	3.0	2.8			2,694	3,142
Appalachian	5,422	4,970	8.3	7.4			579	870
Indiana, Illinois, Kentucky, etc.	6,026	5,220	1.4	1.2			1,085	1,180
Oklahoma, Kansas, etc.	4,717	4,258	2.5	2.1			536	690
Texas Inland	79	133	.1	.1			20	7
Texas Gulf Coast	20,653	17,944	3.7	3.1	(2)	(2)	3,111	3,322
Louisiana Gulf Coast	6,492	5,555	3.4	2.9			696	805
Arkansas, Louisiana Inland, etc.	1,893	1,965	6.3	6.4			98	138
Rocky Mountain	249	200	.3	.2			114	112
California	4,697	4,584	1.3	1.3			684	755
Total	61,489	55,600	2.6	2.3	42,292	38,150	9,617	11,021

[1] Preliminary figures.
[2] Figures not available.

The total demand for lubricants declined from 59.7 million barrels in 1951 to 54.2 million in 1952, a decline of 5.5 million, including a drop of 1.4 million in exports and a decrease of 4.1 million (10 percent) in domestic demand. No figures are available on the relative demand for industrial and automotive uses. The improved quality of lubricants and the increasing practice of reclaiming lubricants for reuse are factors in reducing the quantity required.

TABLE 78.—Average monthly refinery prices of five selected grades of lubricating oil in the United States, 1951–52, in cents per gallon

[National Petroleum News]

Year and grade	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1951													
Oklahoma:													
200 viscosity, No. 3 color, neutral	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
150–160 viscosity at 210°, bright stock, 10–25 pour test	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420–425 flash, 25 pour test	29.00	29.00	29.00	29.14	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.35
600 steam-refined, cylinder stock, filterable	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Gulf Coast: 500 viscosity, No. 2½–3½ color, neutral	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1952													
Oklahoma:													
200 viscosity, No. 3 color, neutral	18.00	17.05	16.81	16.50	16.50	15.55	15.00	15.00	14.81	14.50	14.45	13.19	15.61
150–160 viscosity at 210°, bright stock, 10–25 pour test	29.25	28.77	28.75	28.75	28.75	27.80	27.25	27.25	26.87	26.25	25.36	23.09	27.34
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420–425 flash, 25 pour test	29.50	29.50	29.50	29.50	29.50	29.50	29.40	28.75	28.55	28.50	28.50	28.11	29.07
600 steam-refined, cylinder stock, filterable	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Gulf Coast: 500 viscosity, No. 2½–3½ color, neutral	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

Liquefied Gases

The sale of liquefied gases for fuel, chemical, and motor-fuel uses has expanded rapidly, and these gases now rank after kerosine in total demand. Liquefied gases are derived from two sources—production from liquids recovered from natural gas at natural-gasoline and allied plants and at refineries from the treatment of still gas. The products are identical.

The production at oil refineries declined from 33.0 million barrels in 1951 to 31.0 million in 1952, but the transfers of production from natural-gasoline plants increased from 70.3 million barrels in 1951 to 80.0 million in 1952. The oil-refinery output was 32 percent of the total in 1951 and 28 percent in 1952.

The total demand for liquefied gases rose from 103.4 million barrels in 1951 to 111.0 million in 1952, a gain of 7 percent. Exports increased from 2.1 million barrels to 2.4 million, and domestic demand rose from 101.3 million barrels to 108.6 million.

Other Products

Wax.—The total refinery production of wax decreased from 4.8 million barrels in 1951 to 4.3 million in 1952 (converted at the rate of 280 pounds to the barrel). Of the total decrease in production of 483,000 barrels in 1952, 216,000 was in the East Coast district, 145,000 in the Louisiana Gulf, 81,000 in the Texas Gulf, and 54,000 in the Indiana-Illinois district. Part of the decline in production was due to an increase of 219,000 barrels in stocks in 1951 and a decline of 148,000 in 1952. Total demand for wax in 1952 amounted to 4.5 million barrels, including exports of 1.0 million and a domestic demand

TABLE 79.—Salient statistics of wax in the United States, 1951–52, by type, month, and district

[Thousands of barrels] [1]

Month and district	Production						Domestic demand (all types)		Exports (all types)		Stocks, end of period					
	1951			1952 [2]							1951			1952 [2]		
	Microcrystalline	Fully refined	Other	Microcrystalline	Fully refined	Other	1951	1952 [2]	1951	1952 [2]	Microcrystalline	Fully refined	Other	Microcrystalline	Fully refined	Other
By months:																
January	41	216	188	27	167	157	318	299	114	82	76	172	269	85	225	383
February	37	192	159	32	172	154	285	266	122	105	59	162	277	82	215	383
March	39	235	164	24	184	133	301	225	132	84	61	170	272	93	232	387
April	38	218	181	26	173	138	279	283	116	75	61	180	304	86	228	377
May	48	229	192	24	141	122	283	267	151	71	72	187	321	82	212	336
June	26	209	171	27	184	135	269	267	116	77	69	184	348	97	229	316
July	37	188	169	26	160	145	245	280	110	87	69	196	375	99	208	299
August	39	209	166	29	202	184	279	301	102	100	78	192	403	95	205	320
September	25	212	136	27	196	152	245	301	95	94	95	198	413	88	201	311
October	30	212	117	43	205	156	281	350	94	88	88	212	390	86	192	288
November	25	179	157	41	186	154	248	296	102	92	83	215	403	87	197	275
December	29	180	121	30	195	180	213	308	95	81	90	239	394	81	200	294
Total	414	2,479	1,921	356	2,165	1,810	3,246	3,443	1,349	1,036	90	239	394	81	200	294
By districts:																
East Coast	174	899	539	160	786	450					17	74	96	18	58	39
Appalachian	21	137	236	8	80	290					15	34	27	17	23	21
Indiana, Illinois, Kentucky, etc	6	237	58	5	208	34					1	10	94	1	10	77
Oklahoma, Kansas, etc	101	34	355	92	47	364					26	7	17	21	7	19
Texas Inland				4		29	[3]	[3]	[3]	[3]						
Texas Gulf Coast	81	640	176	54	526	236					30	27	65	22	21	69
Louisiana Gulf Coast	20	162	539	23	155	398					1	11	64	1	7	32
Rocky Mountain	11	63	18	10	65	9						7	31	1	13	37
California		307			298							69			61	
Total	414	2,479	1,921	356	2,165	1,810	3,246	3,443	1,349	1,036	90	239	394	81	200	294

[1] Conversion factor: 280 pounds to the barrel.
[2] Preliminary figures.
[3] Figures not available.

of 3.4 million barrels. Compared with 1951, total demand declined 116,000 barrels, exports decreased 313,000, and domestic demand gained 197,000.

TABLE 80.—Average monthly refinery price of 124°–126° white crude scale wax at Pennsylvania refineries, 1948–52, in cents per pound

[National Petroleum News]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1948	8.57	8.75	8.71	8.50	8.50	8.38	8.13	8.10	7.45	7.38	7.38	6.30	8.01
1949	5.38	5.23	5.28	5.25	4.97	4.95	4.92	4.90	4.18	3.98	4.60	4.63	4.85
1950	4.24	3.63	3.63	3.63	3.59	3.50	3.51	3.80	4.35	4.94	5.52	6.58	4.24
1951	6.64	6.63	6.63	6.55	6.30	6.10	5.75	5.47	5.31	5.26	5.24	5.13	5.92
1952	4.83	4.73	4.40	4.38	4.35	4.25	4.14	4.12	3.93	3.88	3.82	3.81	4.22

Coke.—The production of petroleum coke declined in 1952 and was 18.1 million barrels compared with 19.0 million in 1951 (converted at the rate of 5 barrels to the short ton). The largest decreases in production were 0.7 million barrels in the Louisiana Gulf district and 0.4 million in the East Coast. The Indiana-Illinois district was the largest producer, accounting for 45.3 percent of the total in 1951 and 46.9 percent in 1952.

The total demand for petroleum coke decreased from 18.9 million barrels in 1951 to 18.1 million in 1952. Exports declined from 4.4 million barrels in 1951 to 4.2 million in 1952, and domestic demand declined from 14.5 million barrels to 13.9 million.

TABLE 81.—Salient statistics of petroleum coke in the United States, 1951–52, by month and district [1]

Month and district	Production (thousand barrels)		Yield (percent)		Domestic demand (thousand barrels)		Stocks, end of period (thousand barrels)	
	1951	1952 [2]	1951	1952 [2]	1951	1952 [2]	1951	1952
By months:								
January	1,636	1,657	0.8	0.8	1,503	1,203	430	670
February	1,438	1,551	.8	.8	1,034	1,076	578	710
March	1,483	1,604	.7	.8	1,091	1,241	592	818
April	1,431	1,479	.8	.8	1,015	888	626	797
May	1,675	1,003	.9	.7	1,282	700	613	788
June	1,574	1,335	.8	.7	1,125	1,060	560	612
July	1,629	1,529	.8	.7	1,314	1,310	496	517
August	1,595	1,583	.8	.7	1,092	1,206	484	490
September	1,580	1,616	.8	.8	1,237	1,343	472	484
October	1,640	1,568	.8	.7	1,359	1,303	412	435
November	1,673	1,553	.8	.7	1,196	1,198	415	482
December	1,623	1,645	.8	.8	1,233	1,395	519	513
Total	18,977	18,123	0.8	0.7	14,481	13,923	519	513
By districts:								
East Coast	1,801	1,439	0.5	0.4			-------	-------
Appalachian	317	257	.5	.4			-------	1
Indiana, Illinois, Kentucky, etc.	8,598	8,503	2.0	1.9			206	167
Oklahoma, Kansas, etc.	1,398	1,490	.7	.7			38	48
Texas Inland	323	347	.3	.4	(3)	(3)	2	37
Texas Gulf Coast	1,303	1,432	.2	.2			3	2
Louisiana Gulf Coast	1,718	1,023	.9	.5			-------	-------
Arkansas, Louisiana inland	660	675	2.2	2.3			73	60
Rocky Mountain	874	818	1.0	.9			14	17
California	1,985	2,139	.6	.6			183	181
Total	18,977	18,123	.8	.7	14,481	13,923	519	513

[1] Conversion factor: 5.0 barrels to the short ton.
[2] Preliminary figures.
[3] Figures not available.

Asphalt and Road Oil.—The total demand for petroleum asphalt increased from 67.4 million barrels in 1951 to 73.5 million in 1952 (converted at the rate of 5.5 barrels to the short ton). Domestic demand in 1952 was 71.2 million barrels, a gain of 5.1 million or almost 8 percent. Exports increased from 1.3 million barrels in 1951 to 2.3 million in 1952. The domestic demand for road oil rose from 6.1 million barrels in 1951 to 7.0 million in 1952. Sales of asphalt and types of product are contained in the Asphalt chapter of the Minerals Yearbook.

Still Gas.—The production of still gas declined from 96.3 million barrels in 1951 to 95.3 million in 1952. In cubic feet, the decrease was from 347 billion in 1951 to 343 billion in 1952. The conversion from cubic feet to barrels is in terms of the crude-oil equivalent to balance the refinery input and output rather than on the basis of heating value. The major part of the still gas is consumed as refinery fuel.

Miscellaneous Oils.—The production of miscellaneous oils rose from 7.0 million barrels in 1951 to 7.3 million in 1952.

TABLE 82.—Production of still gas in the United States, 1950–52, by districts

District	1950		1951		1952[1]	
	Million cubic feet	Equivalent, in thousand barrels	Million cubic feet	Equivalent, in thousand barrels	Million cubic feet	Equivalent, in thousand barrels
East Coast	40,428	11,230	44,388	12,330	46,404	12,890
Appalachian	12,730	3,536	13,914	3,865	14,015	3,893
Indiana, Illinois, Kentucky, etc.	67,651	18,792	79,103	21,973	78,448	21,791
Oklahoma, Kansas, etc.	22,255	6,182	26,327	7,313	25,193	6,998
Texas Inland	10,706	2,974	12,193	3,387	15,242	4,234
Texas Gulf Coast	73,887	20,524	88,672	24,631	82,879	23,022
Louisiana Gulf Coast	19,490	5,414	19,076	5,299	16,693	4,637
Arkansas, Louisiana Inland, etc.	2,668	741	4,770	1,325	3,809	1,058
Rocky Mountain	8,964	2,490	11,361	3,156	12,215	3,393
California	42,696	11,860	46,854	13,015	48,092	13,359
Total	301,475	83,743	346,658	96,294	342,990	95,275

[1] Preliminary figures.

TABLE 83.—Production of miscellaneous finished oils in the United States in 1952, by district and class

[Thousands of barrels]

District	Petrolatum	Absorption oil	Medicinal oil	Specialties	Solvents	Other	Total
East Coast	12		36	333	119		500
Appalachian	169			56			225
Indiana, Illinois, Kentucky, etc.	98			872		109	1,079
Oklahoma, Kansas, etc.	309	155		36		25	525
Texas Inland		1,228		13		141	1,382
Texas Gulf Coast	139	191		208	10	125	673
Louisiana Gulf Coast	3	49		898		2	952
Arkansas, Louisiana Inland, etc.	107	369		3			479
Rocky Mountain	1	5				7	13
California		23	35	385	124	863	1,430
Total	838	2,020	71	2,804	253	1,272	7,258

INTERCOASTAL SHIPMENTS

Shipments of mineral oils, crude and refined, from Gulf coast ports to east coast ports decreased from 630 million barrels in 1951 to 614 million in 1952. The intercoastal shipments of crude petroleum declined from about 195 million barrels in 1951 to 180 million in 1952. The movement of products remained the same at 435 million barrels. There was an increase in product shipments to the east coast in 1952, of 7.7 million barrels for distillate fuel and declines of 2.3 million for gasoline, 2.1 million for lubricants, 1.7 million for kerosine, 1.3 million for residual fuel, and 0.5 million barrels for other products.

The movement of crude oil to the east coast is related to the rate of refinery runs and the volume of crude oil imported in that district. The movement of products is affected by refinery output, relative demand for various products, and the amount of residual imported in the east coast.

Intercoastal shipments of refined oils from California to east coast ports, which amounted to 23.5 million barrels in 1950, declined from 0.6 million barrels in 1951 and 0.5 million in 1952, including 0.3 million of lubricants and 0.2 million of other oils. The decline was due, in part, to the Korean hostilities and to the increase in military requirements from California.

303707—54——28

TABLE 84.—Mineral oils, crude and refined, shipped by tanker from Gulf coast to east coast ports of the United States, 1951–52, by classes[1]

[Thousands of barrels]

Year and class	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Crude petroleum	14,457	15,299	17,475	15,307	15,996	15,435	15,606	15,341	16,791	17,372	17,505	18,329	194,913
Gasoline	12,739	12,989	16,777	15,430	17,441	15,717	15,507	15,422	15,468	14,933	14,927	12,686	180,126
Kerosine	5,109	4,666	4,756	3,059	3,015	2,126	3,141	3,056	2,819	2,902	4,087	4,780	43,516
Distillate fuel oil	15,876	12,988	13,406	10,296	8,796	8,125	8,341	9,888	9,643	8,803	10,824	12,967	129,953
Residual fuel oil	6,164	5,867	5,642	4,302	3,678	4,730	5,779	3,961	4,839	4,676	4,901	5,840	60,379
Lubricating oils	702	669	941	709	903	1,102	1,423	670	710	651	747	652	9,879
Miscellaneous oils	857	889	1,584	766	901	1,084	940	905	722	979	744	550	10,921
Total	55,904	53,367	60,581	49,869	50,730	48,319	50,827	49,243	50,992	50,316	53,735	55,804	629,687
1952													
Crude petroleum	15,179	14,209	13,245	14,387	16,079	15,889	14,341	15,385	15,912	14,296	14,435	16,361	179,718
Gasoline	12,386	13,384	17,270	16,585	9,910	15,055	15,762	17,223	15,230	15,630	14,829	14,534	177,798
Kerosine	4,858	4,221	4,269	3,468	1,636	2,700	3,471	3,074	2,431	3,241	4,021	4,393	41,783
Distillate fuel oil	14,456	16,448	14,553	11,735	6,915	9,429	10,053	10,438	7,177	8,513	11,651	16,286	137,654
Residual fuel oil	5,283	4,398	4,953	6,592	1,989	3,735	4,022	5,577	5,114	5,926	5,505	6,028	59,122
Lubricating oils	539	606	1,097	593	472	888	522	565	598	725	381	769	7,755
Miscellaneous oils	496	497	407	642	444	1,151	1,024	1,320	1,239	1,224	1,127	846	10,417
Total	53,197	53,763	55,794	54,002	37,445	48,847	49,195	53,582	47,701	49,555	51,949	59,217	614,247

[1] Oil and Gas Division, U. S. Department of the Interior.

FOREIGN TRADE [5]

Foreign trade statistics (in this section), as reported by the United States Department of Commerce, differ slightly from those used in other sections of this chapter. Bureau of Mines petroleum import statistics pertain to *continental* United States only, and its export statistics include not only foreign countries but also shipments to the Territories. Imports of crude petroleum and unfinished oils shown in table 86 are obtained by the Bureau of Mines from petroleum companies on a custody basis to balance refinery reports and therefore differ from the totals reported by the Department of Commerce.

Imports.—Total imports of crude petroleum and petroleum products into continental United States increased 13.7 percent from 1951 to 1952. They constituted 11.2 percent of the total new supply in continental United States in 1951 and 12.2 percent in 1952. Total imports exceeded total exports (including shipments to the Territories) by 100 percent in 1951 and by 119.6 percent in 1952.

Crude petroleum and residual fuel oil together made 97 percent of the total mineral-oil imports into continental United States both in 1951 and 1952 (table 87). Crude petroleum alone represented 58.1 percent of the total in 1951 and 59.8 percent in 1952 (table 87).

Venezuela supplied 59.6 percent of the crude petroleum imported into the United States in 1951 and 57.5 percent in 1952. Crude-petroleum receipts from Mexico decreased by almost one-third in 1952 compared with the previous year. Imports from Canada, while still relatively small, more than doubled in 1952. Crude-petroleum imports from the Middle East increased 51.3 percent, those from Saudi Arabia increased 81 percent, and those from Kuwait increased 23 percent over 1951. In 1952, for the first time the United States imported crude from Sumatra, Indonesia; as a result, receipts from British Borneo (transshipped from British Malaya) were less than half the 1951 total.

Residual-fuel-oil imports into continental United States and the Territories increased 8.0 percent from 1951. The Netherlands Antilles supplied 78.0 percent of the total in 1951 and 74.4 percent in 1952. Venezuela furnished 20 percent in 1951 and 23 percent in 1952, and Mexico furnished considerably more than in 1951.

The comparatively small quantities of distillate fuel oil imported into the United States and the Territories were increased 24.2 percent in 1952. Caribbean countries furnished 52.5 percent in 1951 and 71.9 percent in 1952; receipts from countries in the Middle East dropped from 47.4 percent of the 1951 total to 27.5 percent in 1952.

Imports of unfinished oil, as reported by the United States Department of Commerce, decreased 40 percent from 1951 to 1952; receipts from Mexico dropped almost two-thirds. Receipts from Venezuela more than doubled those in 1951.

[5] By F. X. Jordan, Petroleum and Natural Gas Branch, Fuels and Explosives Division, Bureau of Mines.

TABLE 85.—Crude petroleum and major petroleum products imported for consumption into continental United States, 1951–52, by countries, in thousands of barrels [1]

[U. S. Department of Commerce]

Country	Crude petroleum	Motor fuel [2]	Kerosine	Distillate oil [3]	Residual oil [4]	Unfinished oil	Total
1951							
North America:							
Canada	473	74	(5)	2	2	2	553
Canal Zone				(5)			(5)
Guatemala					1		1
Mexico	12,889				214	4,573	17,676
Netherlands Antilles		401		1,059	[6] 95,202	25	[6] 96,687
Trinidad and Tobago	220	7		67	1,835	108	2,237
Total	13,582	482	(5)	1,128	[6] 97,254	4,708	[6] 117,154
South America:							
Colombia	16,683						16,683
Venezuela	[6] 105,739			400	24,611	557	[6] 131,307
Total	122,422			400	24,611	557	[6] 147,990
Europe:							
Denmark					(5)		(5)
Germany	(5)	(5 6)		(5)			(5 6)
United Kingdom		(5)		(5)			(5)
Total	(5)	(6)		(5)	(5)		(5 6)
Asia:							
British Malaya	3,543			1			3,544
Indonesia	(5)						(5)
Kuwait	21,648						21,648
Saudi Arabia	16,161			960			17,121
State of Bahrein			(6)	419	104		523
Total	41,352		(6)	1,380	104		42,836
Africa:							
French Morocco			(5)				
French West Africa			(5)				
Total			(5)				
Grand total	[6] 177,356	[6] 482	(5)	2,908	[6] 121,969	5,265	[6] 307,980
Imports into United States Territories and possessions from foreign countries:							
Alaska		(5)					(5)
Hawaii				1,138			1,138
Puerto Rico		15			2,803		2,818
Total		15		1,138	2,803		3,956
Total net imports into continental United States	[6] 177,356	[6] 467	(5)	1,770	[6] 119,166	5,265	[6] 304,024
1952							
North America:							
Canada	1,127	998	(5)	14	48	59	2,246
Canal Zone				4	4		8
Jamaica					5		5
Leeward and Windward Islands					19		19
Mexico	8,344				1,168	1,852	11,364
Netherlands Antilles		605	20	2,097	98,315	3	101,040
Trinidad and Tobago		101	9	23	1,609		1,742
Total	9,471	1,704	29	2,138	101,168	1,914	116,424
South America:							
Argentina					(5)		(5)
Brazil	(5)						(5)
Chile				1			1
Colombia	16,234						16,234
Ecuador	(5)						(5)
Venezuela	119,325	136		477	30,726	1,237	151,901
Total	135,559	136		478	30,726	1,237	168,136

See footnotes at end of table.

TABLE 85.—Crude petroleum and major petroleum products imported for consumption into continental United States, 1951–52, by countries, in thousands of barrels [1]—Continued

Country	Crude petroleum	Motor fuel [2]	Kerosine	Distillate oil [3]	Residual oil [4]	Unfinished oil	Total
Europe:							
France				(5)	1		1
Germany					(5)		(5)
Norway				1	(5)		1
Switzerland		(5)					(5)
Trieste					1		1
United Kingdom	(5)	(5)				(5)	(5)
Total	(5)	(5)		1	2	(5)	3
Asia:							
Aden					1		1
Arabia Peninsula States	404				1		405
British Malaya	1,605			1	6		1,612
India					5		5
Indonesia	3,648				162		3,810
Iraq	706						706
Japan					33		33
Kuwait	26,652						26,652
Lebanon	176						176
Saudi Arabia	29,285	49		552	2		29,888
State of Bahrein				442	36		478
Total	62,476	49		995	246		63,766
Africa: Spanish					2		2
Grand total	207,506	1,889	29	3,612	132,144	3,151	348,331
Imports into United States Territories and possessions from foreign countries:							
Alaska		1					1
Hawaii		49		844	610		1,503
Puerto Rico		215	29	63	3,002		3,309
Total		265	29	907	3,612		4,813
Total net imports into continental United States	207,506	1,624		2,705	128,532	3,151	343,518

[1] Compiled by M. B. Price and E. D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.
[2] Includes naphtha but excludes benzol (benzol 1951, 1,603; 1952, 1,041 thousand barrels).
[3] Includes quantities imported free of duty for supplies of vessels and aircraft.
[4] Includes quantities imported free of duty for manufactures in bond and export, and for supplies of vessels and aircraft.
[5] Less than 1,000 barrels.
[6] Revised figure.

TABLE 86.—Mineral oils, crude and refined, imported into continental United States, 1951–52,[1] by months

[Thousands of barrels]

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1951													
Crude petroleum	15,472	13,096	14,971	15,319	16,051	16,889	16,940	16,404	15,000	13,054	12,760	13,117	179,073
Refined products:													
Motor fuel	133	48	12	4	93	1	12	2	8	134	6	10	463
Distillate fuel oil	250	128	35	121	359	264	30	57	211	103	33	126	1,767
Residual fuel oil	13,842	12,089	11,347	10,577	9,768	8,682	6,672	7,357	6,532	9,737	10,583	11,980	119,166
Asphalt	102	189	250	147	296	209	200	234	116	273	239	207	2,462
Unfinished oils	631	709	450	330	485	306	587	133	451	504	337	340	5,263
Total	30,430	26,259	27,065	26,498	27,052	26,351	24,441	24,187	22,318	23,855	23,958	25,780	308,194
1952[2]													
Crude petroleum	15,123	14,228	15,817	16,170	16,903	17,434	18,519	19,596	18,459	19,948	18,709	18,685	209,591
Refined products:													
Motor fuel	89	70	4	2	685	308	277	149	9	10	13	10	1,626
Distillate fuel oil	218	255	262	174	252	73	404	86	33	436	233	248	2,674
Residual fuel oil	12,938	11,860	12,750	10,473	10,989	8,929	7,677	6,656	7,790	11,331	10,436	16,681	128,510
Asphalt	260	238	134	183	362	236	248	197	380	262	100	296	2,896
Unfinished oils	838	609	384	666	298	371	516	551	396	173	20	188	5,010
Total	29,466	27,260	29,351	27,668	29,489	27,351	27,641	27,235	27,067	32,160	29,511	36,108	350,307

[1] Imports of crude as reported to Bureau of Mines; imports of refined products compiled from records of U. S. Department of Commerce; figures may differ slightly from those used in other sections of this chapter.

[2] Preliminary figures.

Exports.—With the continued shutdown of the Abadan refinery, United States exports and Territorial shipments of mineral oils continued high during 1952 and increased 3.6 percent over 1951. Refined product exports were 5.9 percent higher; kerosine and distillate fuel oils increased 16.4 and 50.4 percent, respectively. Exports of the other major refined oils and of crude petroleum were lower than in 1951. Continental United States continued to be a net importer of mineral oils, as the excess of all petroleum imports over petroleum exports, including shipments to the Territories, rose from 154.1 million barrels in 1951 to 190.8 million in 1952. The excess of crude-petroleum imports increased from 150.5 million barrels to 182.9 million, and the excess of residual fuel oil imports over exports rose from 90.2 million barrels to 100.6 million in 1952. Exports of all other refined products increased by 8.4 million barrels in 1952 and exceeded imports by 92.7 million barrels compared with 86.5 million in 1951.

Crude-petroleum exports decreased 6.6 percent in 1952. Shipments to Japan were less than one-third the 1951 total. Canada continued to be the major importer of United States crude, receiving 76.0 percent of the total in 1952 compared with 74.0 percent the previous year. Cuba received 9.4 percent of the total in 1952 and 7.6 percent in 1951. Crude-petroleum exports to Europe were 5.5 percent of the total in 1952. None was shipped to the Territories.

Motor-fuel exports and Territorial shipments decreased more than 3 million barrels in 1952. Destinations of certain grades of aviation gasoline are not available for security reasons, but the totals are included in the grand total. The decrease from 1951 was largest for shipments to Europe, and to European possessions in Africa, reflecting the continued expansion in refinery capacity in European countries. Shipments to Asia increased over 1 million barrels to satisfy needs of the Indian Ocean area, which, without the Abadan refinery, remained deficient for the area's refined-product requirements. Exports to North American countries were about the same as in 1951, with larger shipments to Canada and the Netherlands Antilles offsetting smaller quantities to Mexico and Central America. Shipments to Alaska and Hawaii increased 13.8 percent in 1952.

Outgoing shipments of kerosine increased over 1 million barrels, with the largest gains in exports going to Canada, Argentina, India, Pakistan, and Egypt. Kerosine exports to Europe dropped 30.0 percent from 1951.

Exports and Territorial shipments of distillate fuel oil gained 50 percent over 1951. North America, principally the Netherlands Antilles and Canada, imported almost 7.0 million barrels more than in 1951. Europe's imports increased 2.0 million (indicating lack of flexibility in product yields). Asia increased its imports 1.5 million, accounted for by shipments to India and to the bunkering ports of Aden and Arabia, both formerly supplied from Abadan; and Africa increased 1.0 million, mainly to Egypt and the Union of South Africa. Exports to Mexico, the Philippines, Australia, New Zealand, and French Possession in Africa were notably lower.

Residual fuel-oil exports and shipments to the Territories decreased 3.7 percent from 1951. The largest decreases were in exports to Australia, the Philippines, British Malaya, Ceylon, and Chile. Increased shipments went to Canada, Cuba, Netherlands Antilles, Alaska and Hawaii, Japan, Aden, and New Zealand.

Total lubricating-oil exports and shipments to the Territories were 7.8 percent less than in 1951. Destinations for certain grades of lubricating oil are not available for security reasons, but the quantities are included in the grand totals. The limited country breakdown available indicates that smaller shipments to almost every country in Europe accounted for most of the decrease. Increased exports were reported for Mexico, Argentina, Switzerland, India, Taiwan, and Australia.

TABLE 87.—Crude petroleum and major petroleum products exported from the continental United States in 1952, by countries of destination, and shipments to and exports from Territories and possessions, in thousands of barrels [1] [2]

[U. S. Department of Commerce]

Destination	Crude petroleum	Motor fuel [3]	Kerosine	Distillate oil	Residual oil	Lubricating oil [3]	Wax	Total
North America:								
Canada	20,319	4,514	832	9,706	7,119	620	125	43,235
Canal Zone		127		427	326	5	(4)	885
Cuba	2,513	1,214	(4)	213	1,808	85	20	5,853
El Salvador		3	(4)	6	122	4	4	139
Guatemala		20	3	35	134	5	25	222
Honduras		11	5	64	223	8	3	314
Mexico		2,785	119	373	2,201	290	278	6,046
Netherlands Antilles		1,317		6,680	364	43		8,404
Nicaragua		5	1	9	60	5	2	82
Panama		(4)	37			5	1	43
Trinidad and Tobago						10	(4)	10
Other North America		55	18	126	11	31	12	253
Total	22,832	10,051	1,015	17,639	12,368	1,111	470	65,486
South America:								
Argentina	1,673	(4)	276	336		336		2,621
Bolivia		1	(4)	123		6	11	141
Brazil		132	54	30		450	25	691
Chile		5	(4)	49	1,327	64	5	1,450
Colombia		1	(4)	(4)		28	135	164
Peru		(4)				14	28	42
Uruguay		134	120			18	(4)	272
Venezuela		4				45	40	89
Other South America		4	2	15		16	14	51
Total	1,673	281	452	553	1,327	977	258	5,521
Europe:								
Belgium-Luxembourg		212	1	443	46	568	13	1,283
Denmark		8	48	28		75	1	160
France	685	2			(4)	207	30	924
Germany		419		207		70	1	697
Greece		6				42	3	51
Italy	185	63	(4)	(4)		217	55	520
Netherlands	106	(4)	1	593		307	6	1,013
Norway		338	16	1,180	469	42	5	2,050
Portugal		3	(4)			70	12	85
Sweden		188	8	1,131	289	126	4	1,746
Switzerland		(4)	(4)	53		22	5	80
Turkey		53	80	22		205	2	362
United Kingdom	499	1,334	1,166	4,521	1,039	1,825	43	10,427
Yugoslavia		(4)				32	6	38
Other Europe				(4)	61	222	25	308
Total	1,475	2,626	1,320	8,178	1,904	4,030	211	19,744
Asia:								
Aden				1,545	323	2		1,870
British Malaya		1	40	39	332	73	(4)	485
Ceylon			28			29	(4)	57
Formosa		2				94	7	103
Hong Kong		3	(4)			25	2	30
India		605	2,028	703	51	776	2	4,165
Japan	748	568		505	4,493	130	28	6,472
Pakistan		74	217	115	150	133	(4)	689
Philippines		6	1		68	116	17	208
Other Asia		9	18	27	4	289	25	372
Total	748	1,268	2,332	2,934	5,421	1,667	81	14,451

See footnotes at end of table.

TABLE 87.—Crude petroleum and major petroleum products exported from the continental United States in 1952, by countries of destination, and shipments to and exports from Territories and possessions, in thousands of barrels [1] [2]—Con.

[U. S. Department of Commerce]

Destination	Crude petroleum	Motor fuel [3]	Kerosine	Distillate oil	Residual oil	Lubricating oil [3]	Wax	Total
Africa:								
Algeria	-------	(4)	-------	-------	35	28	-------	63
Belgian Congo	-------	11	2	-------	14	48	(4)	75
Egypt	-------	1	1,930	572	102	259	(4)	2,864
French Equatorial Africa	-------	-------	2	24	30	7	-------	63
French Morocco	-------	(4)	-------	-------	36	29	(4)	65
French West Africa	-------	10	29	24	51	27	(4)	141
Gold Coast	-------	21	16	27	-------	19	-------	83
Mozambique	-------	173	(4)	62	-------	18	(4)	253
Union of South Africa	-------	564	(4)	290	-------	279	12	1,145
Other Africa	-------	125	22	493	17	195	1	853
Total	-------	905	2,001	1,492	285	909	13	5,605
Oceania:								
Australia	-------	1,198	1	315	686	460	2	2,662
New Zealand	-------	307	1	143	433	101	1	986
Other Oceania	-------	13	5	33	24	3	-------	78
Total	-------	1,518	7	491	1,143	564	3	3,726
Grand total	26,728	29,553	7,127	31,287	22,448	15,306	1,036	133,485
Shipments from continental United States to Territories and possessions:								
Alaska and Hawaii [5]	(6)	4,716	167	2,581	5,466	123	(6)	13,053
Puerto Rico	(6)	[7] 2,358	656	229	(6)	[7] 57	(6)	3,300
Virgin Islands	(6)	[7] 31	8	14	(6)	[7] 1	(6)	54
Wake	(6)	[7] 488	(4)	20	(6)	(7)	(6)	508
Other	(6)	[7] 36	13	21	(6)	[7] 3	(6)	73
Total	(6)	[7] 7,629	844	2,865	5,466	[7] 184	(6)	16,988
Exports from noncontiguous Territories and possessions to foreign countries:								
Alaska	-------	117	9	203	8	(4)	-------	337
Hawaii	-------	-------	-------	73	-------	-------	-------	73
Puerto Rico	-------	1	-------	-------	-------	-------	-------	1
Total	-------	118	9	276	8	(4)	-------	411
Total net shipments from continental United States	26,728	37,064	7,962	33,876	27,906	15,490	1,036	150,062

[1] Compiled by M. B. Price and E. D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

[2] Changes in Minerals Yearbook, 1951, pp. 1049–1050, are as follows: in thousands of barrels: Shipments from continental United States: Motor fuel—Alaska and Hawaii 4,141, other Territories 2,917, total 7,058; kerosine—other Territories 704, total 854; distillate oil—other Territories 287, total 2,845; lubricating oil—other Territories 66, total 199; total—Alaska and Hawaii 11,854, other Territories 4,021; total 15,875. Exports of distillate oil from Alaska to foreign countries 200, total 201; total Alaska 294, total all. 340. Total net shipments: Motor fuel 40,163, kerosine 6,842; distillate oil 22,555, lubricating oil 16,790, total 145,301.

[3] Country and continent totals excluded, but the grand totals include 12,904 thousand barrels of motor fuel and 6,048 thousand barrels of lubricating oils, for which country breakdown may not be published for security reasons.

[4] Less than 500 barrels.

[5] Figures represent shipments from refining companies for export to Alaska and Hawaii through Pacific coast ports, as reported to Bureau of Mines by shippers.

[6] Not separately classified.

[7] Due to changes in items included in classification, data are not strictly comparable to exports shown above.

TABLE 88.—Mineral oils, crude and refined, shipped from continental United States, including shipments to Territories and possessions, 1951–52, by class and month [1]

[Thousands of barrels]

Year and class	January	February	March	April	May	June	July	August	September	October	November	December	Total
1951													
Crude petroleum	2,913	2,471	2,640	3,615	1,791	2,342	2,320	2,361	2,199	1,947	1,858	2,147	28,604
Refined products:													
Motor fuel [2]	1,788	1,607	2,349	2,412	2,867	3,000	4,215	4,674	4,806	3,827	4,732	3,859	40,136
Kerosine	132	209	76	260	777	418	683	1,048	1,413	796	615	416	6,843
Distillate fuel oil	916	844	980	1,552	2,204	1,419	2,454	3,357	2,804	2,512	1,494	2,019	22,555
Residual fuel oil	946	1,036	1,474	1,446	2,927	2,902	3,612	3,446	3,454	3,045	2,403	2,308	28,999
Lubricants	1,210	998	1,594	1,447	1,538	1,470	1,675	1,575	1,601	1,299	1,527	1,495	17,429
Paraffin wax	114	122	132	116	151	116	110	102	95	94	102	95	1,349
Coke	111	256	378	382	406	502	379	515	355	341	474	286	4,385
Asphalt	27	70	76	62	178	71	161	163	172	53	93	132	1,258
Liquefied gases	146	117	203	234	124	152	206	181	205	189	182	182	2,121
Miscellaneous oils	24	32	37	40	36	42	34	30	24	28	18	28	373
Total refined	5,414	5,291	7,299	7,951	11,208	10,092	13,529	15,091	14,929	12,184	11,640	10,820	125,448
Total crude and refined	8,327	7,762	9,939	11,566	12,999	12,434	15,849	17,452	17,128	14,131	13,498	12,967	154,052
1952 [3]													
Crude petroleum	2,303	2,211	2,939	3,340	1,718	2,388	1,876	1,966	1,664	1,526	1,805	2,991	26,727
Refined products:													
Motor fuel [2]	3,026	2,723	2,444	3,107	1,626	2,361	3,456	2,953	2,740	3,157	4,012	5,255	36,860
Kerosine	816	283	824	690	921	804	874	592	722	421	427	589	7,963
Distillate fuel oil	2,083	1,916	1,459	2,958	2,938	3,857	3,213	2,542	3,473	3,031	3,217	3,229	33,916
Residual fuel oil	2,138	2,219	2,408	2,864	3,103	3,139	2,819	2,145	1,760	1,926	1,622	1,778	27,921
Lubricants	1,343	1,436	1,811	1,337	1,511	1,357	1,363	1,669	1,136	1,105	1,015	963	16,046
Paraffin wax	82	105	84	75	71	77	87	100	94	88	92	81	1,036
Coke	303	435	255	612	312	451	314	404	279	314	308	219	4,206
Asphalt	130	127	214	186	219	230	197	177	162	246	200	179	2,267
Liquefied gases	186	188	208	210	188	163	183	193	240	214	204	224	2,401
Miscellaneous oils	17	20	21	17	17	10	17	15	13	15	12	21	195
Total refined	10,124	9,452	9,728	12,056	10,906	12,449	12,523	10,790	10,619	10,517	11,109	12,538	132,811
Total crude and refined	12,427	11,663	12,667	15,396	12,624	14,837	14,399	12,756	12,283	12,043	12,914	15,529	159,538

[1] Compiled from records of U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data; figures may differ slightly from those used in other sections of this chapter.
[2] Includes benzol, naphtha, natural gasoline, and antiknock compounds.
[3] Preliminary figures.

WORLD PRODUCTION [6]

World production of crude petroleum increased 5 percent in 1952 compared with a percentage growth of 13 percent in 1951 and 12 percent in 1950. Except for Iran, where the petroleum dispute remained unsettled, and Mexico, all major producing countries increased production over 1951. The largest gains were Iraq, 75.7 million barrels; Kuwait, 68.5 million; United States, 44.3 million; Venezuela, 38.0 million; the U. S. S. R., an estimated 37.4 million; Saudi Arabia, 23.9 million; and Canada, 13.5 million. The United States furnished 52.4 percent of the world output in 1951 and 51.0 percent in 1952. Venezuela, the second largest producing country, furnished nearly 15 percent of the world total in both years. The countries of the Middle East (Bahrein Island, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, Turkey, and Egypt) increased their share from 16.8 percent in 1951 to 17.3 percent in 1952, despite the loss of Iranian production, except for local needs. North American production increased over 2 percent in 1952, as both the United States and Canada produced record quantities of crude petroleum. Mexico's production (excluding natural gasoline) was slightly less than in 1951.

All countries in South America increased production in 1952. Production in Venezuela established a new record and increased 6 percent over 1951. A new trade agreement with Venezuela, effective late in 1952, removed quota restrictions on Venezuelan oil imported by the United States and also lowered the duty. Increased production from the Velasquez and Casabe fields in Colombia more than offset the decline in production from the Government-operated De Mares concession. In Argentina the Government-controlled Yacimientos Petroliferos Fiscales increased production substantially, although private production declined from that in 1951. Peru's production was slightly higher than in 1951.

In Western Europe, Germany increased production 28 percent in 1952. France increased production almost 17 percent with increased output from the Lacq field in the southwestern part. Production in Italy increased notably over 1951. For Eastern Europe, reliable statistics are lacking, and estimates based on meager data must be used. It is estimated that the U. S. S. R. (including Sakhalin) increased production approximately 13 percent in 1952. Production in Rumania and Austria is estimated to have increased by about 2.0 and 5.0 million barrels, respectively, in 1952.

Substantial gains in production were made in the Middle East, despite the loss of Iranian production which declined 92 percent. Iraq increased production 116 percent, with completion in April 1952 of the 555-mile 30- to 32-inch-diameter pipeline from the Kirkuk field in Iraq to Banias, Syria. An outlet for the oil from the Mosul Petroleum Co. field at Ain Zalah, Iraq, was provided by completion of a new 12-inch-diameter pipeline 134 miles long from Ain Zalah to K.2 pump station on the main Kirkuk-Mediterranean pipeline system. Kuwait production was a third higher in 1952, and two new oil fields, Magwa and Ahmadi, were discovered during the year. Production in Saudi Arabia increased almost 9 percent, and in Qatar production from the Dukhan field increased 40 percent over 1951.

In the Far East, the United States of Indonesia raised production 13 percent chiefly by starting production from the Minas field in Central

[6] By F. X. Jordan, Petroleum and Natural Gas Branch, Bureau of Mines.

Sumatra. British Borneo's output increased 2 percent over 1951. Crude-oil production in Japan decreased 10 percent, and that in New Guinea dropped slightly.

TABLE 89.—World production of crude petroleum, by countries, 1948–52, in thousands of barrels [1]

[Compiled by Berenice B. Mitchell and Lee S. Petersen]

Country	1948	1949	1950	1951	1952 [2]
North America:					
Barbados	(3)	(3)			
Canada	12,287	21,305	29,044	47,615	61,103
Cuba [4] [5]	159	206	156	128	36
Mexico	58,508	60,910	72,443	77,312	77,275
Trinidad	20,111	20,617	20,632	20,843	21,258
United States	2,020,185	1,841,940	1,973,574	2,247,711	2,291,997
Total North America	2,111,250	1,944,978	2,095,849	2,393,609	2,451,669
South America:					
Argentina	23,734	22,589	23,353	24,465	24,807
Bolivia	464	678	616	523	526
Brazil	144	109	339	691	750
Chile			629	759	906
Colombia	23,801	29,722	34,060	38,398	38,652
Ecuador	2,563	2,617	2,632	2,708	2,839
Peru	14,069	14,796	15,012	16,110	16,403
Venezuela	490,015	482,316	546,783	622,216	660,254
Total South America	554,790	552,827	623,424	705,870	745,137
Europe:					
Albania [5]	1,500	2,188	2,800	1,200	1,100
Austria	6,149	[5] 6,100	[5] 10,200	[5] 15,477	[5] 20,400
Czechoslovakia	204	292	[5] 292	[5] 644	[5] 740
France	369	411	909	2,036	2,377
Germany, West	4,489	5,947	8,107	9,681	12,435
Hungary	3,647	3,791	[5] 3,700	[5] 3,500	[5] 3,500
Italy	71	71	63	135	487
Netherlands	3,443	4,314	4,897	4,942	4,975
Poland [5]	1,039	1,125	1,205	1,502	1,700
Rumania [5]	34,000	33,700	32,000	31,000	33,000
U. S. S. R. [5] [6]	218,000	237,700	266,200	285,000	322,400
United Kingdom	323	338	340	335	407
Yugoslavia	270	470	780	1,092	1,067
Total Europe [6]	273,504	296,447	331,493	356,544	404,588
Asia:					
State of Bahrein	10,915	10,985	11,016	10,994	11,004
Burma	341	248	[5] 450	[5] 645	645
China	533	730	[5] 730	[5] 730	[5] 730
India	1,875	1,906	1,867	1,949	1,900
Indonesia	31,765	43,206	48,400	55,453	62,495
Iran	190,384	204,712	242,475	[5] 127,600	[5] 10,100
Iraq	26,115	30,957	49,726	65,122	140,799
Japan	1,122	1,353	2,048	2,337	2,100
Kuwait	46,500	90,000	125,722	204,910	272,433
Pakistan	490	824	1,281	1,348	1,580
Qatar		750	12,268	18,009	25,255
Sarawak and Brunei	20,124	25,108	30,958	37,506	38,300
Saudi Arabia	142,853	174,008	199,547	277,963	301,861
Taiwan (Formosa)	23	22	23	21	18
Turkey	13	95	108	133	146
U. S. S. R.: Sakhalin [5]	7,000	7,000	7,000	7,000	7,000
Total Asia [6]	480,053	591,904	733,619	811,720	877,366
Africa:					
Algeria	1	2	24	49	357
Egypt	13,398	15,997	16,373	16,311	16,464
French Morocco	100	136	305	587	749
Total Africa	13,499	16,135	16,702	16,947	17,570
Oceania:					
Australia (Victoria)	1	1	1	2	
New Guinea	135	1,726	1,748	1,746	1,725
New Zealand	2	7	7	5	[5] 2
Total Oceania	138	1,734	1,756	1,753	1,727
Grand Total	3,433,234	3,404,025	3,802,843	4,286,443	4,498,057

[1] This table incorporates a number of revisions of data published in previous Petroleum chapters.
[2] Preliminary figures.
[3] Less than 500 barrels.
[4] Natural naphtha and gas oil.
[5] Estimate.
U. S. S. R. in Asia (except Sakhalin) included with U. S. S. R. in Europe

C. Helium

Helium

By H. S. Kennedy and H. P. Wheeler, Jr.

GENERAL SUMMARY

THE Bureau of Mines operates helium plants primarily to supply helium requirements of the Department of Defense and other Federal agencies which requisition supplies directly from the Bureau. Production of helium and conservation operations are responsibilities of the Department of the Interior, Bureau of Mines, under provisions of acts of Congress approved March 3, 1925, and September 1, 1937.

About 95 percent of all helium produced is used directly by the Federal Government or for the benefit of national defense activities and 3 percent for medical treatment. In 1952 helium production totaled 144,556,141 cubic feet, an alltime high. The 1952 production exceeded that of 1951 by 29 percent and was over 11 times larger than production in 1940.

PRODUCTION

Helium production for Government plants from 1921 to 1952 is given in table 1.

The Bureau of Mines achieved a unique record during January 1952, when Government helium plants produced their billionth cubic foot of helium, one of the most useful members of the family of rare gases that includes neon, argon, krypton, xenon, and radon.

Table 1.—Helium production in the United States, 1921–52

Year	Active plants	Production (cubic feet)
1921–January 1929 [1]	Fort Worth, Tex., plant	46,088,787
1929 (April)[1]–1941	Amarillo, Tex., plant	131,614,437
1942	do	33,252,582
1943	All plants	116,307,437
1944	do	126,933,130
1945	do	94,733,744
1946	Amarillo and Exell, Tex., plants	58,236,385
1947	Exell, Tex., plant	70,297,700
1948	do	63,143,513
1949	do	55,165,482
1950	Amarillo and Exell, Tex., plants	81,394,416
1951	Amarillo and Exell, Tex., and Otis, Kans., plants	112,047,244
1952	do	144,556,141
Total		[2] 1,133,770,998

[1] No helium was produced at Government helium plants in February or March 1929. The Fort Worth helium plant was shut down on Jan. 10, 1929, and the Amarillo helium plant was not put into operation until April.

[2] Includes 89,233,500 cubic feet extracted at the Exell plant and injected into the Government-owned Cliffside gas reservoir, for conservation, in calendar years 1945–49 and 1951–52.

The three plants operated by the Bureau during the year at Amarillo and Exell, Tex., and Otis, Kans., were not sufficient to meet increased demands, and the Navajo Helium Plant at Shiprock, N. Mex., which was held on a standby basis, was overhauled and placed in partial production in February 1953.

SHIPMENTS

The quantity of helium shipped approximately equals production, because storage facilities at the helium plants are limited to that necessary to give flexibility in operations. Plant storage is not intended to serve as a reservoir of helium for Government use but as a temporary receptacle to permit continuous plant operation when tank cars are not available. The Bureau made 570 tank-car, 129,843 cylinder, and 34 trailer shipments during the year. The Bureau was able to ship the year's supply only by employing various measures to increase the efficiency of tank-car operation. During the year 85 tank cars were available for shipment of helium. An additional 30 cars will be needed to transport estimated demand in 1954.

CONSUMPTION AND USES

The principal consumer of helium is the Federal Government, directly or through defense contracts. Historically, this trend emphasizes the close parallel between the demand for helium and war and defense efforts. Helium consumption in World War II rose from 11.6 million cubic feet in 1940 to a maximum of almost 127 million cubic feet in 1944 and dropped to 58 million cubic feet in 1946. The Korean action boosted the consumption to 112 million cubic feet in 1951 and to 145 million cubic feet in 1952, an alltime high. Helium consumption has been rising at a steady rate of about 30 percent per year.

Before World War II helium was used principally for inflating airships, and this is still the largest single use. However, other uses in the aggregate now consume more helium than is used for airship inflation. The development of inert shielded-arc welding early in World War II for welding metals such as aluminum, magnesium, and titanium, hitherto difficult or impossible to weld created an important new use for helium. The Weather Bureau uses helium for inflating small balloons to carry weather-recording instruments. Also, the Navy, Army, and Air Force require considerable quantities to gather weather data for their operations. A related use is for inflating large balloons for cosmic ray research. Helium is used in Atomic Energy Commission operations, missile operations, and research. Medical treatment utilizes helium mixed with oxygen for relief of respiratory ailments.

PRICES

The Helium Act specifies that the Bureau shall supply Federal agencies with helium at the cost of production. In 1952 the price to Federal agencies was $12.50 per 1,000 cubic feet at the production plants. The price to non-Federal purchasers was $13.50 per 1,000 cubic feet as specified in the Helium Regulations (30 CFR, part 1)

plus an additional charge of $2.00 for each 1,000 cubic feet if compressed into standard cylinders.

FOREIGN TRADE

Helium is not known to be produced in commercial quantities outside the United States. Small quantities are exported annually for research purposes, but only upon application to the Secretary of State and upon issuance by him of a license authorizing such exportation.

TECHNOLOGY

The Bureau of Mines produces Grade A helium with a purity of 99.995 percent. This grade is used in welding and for research and is shipped in containers that are kept clean and dry. Because the small percentage of impurities is difficult to determine, the Bureau has worked out a technique for liquefying the impurities from a large volume of Grade A helium and subsequently determining the percentages of the revaporized impurities in a mass spectrometer. This information enables users of helium to determine the effect of impurities on their research.

The Amarillo plant developed a procedure and equipment for utilizing subatmospheric liquid-nitrogen cooling to raise the purity of the produced helium before final purification with refrigerated activated charcoal. High-purity helium at this step in the process prolongs the cycle of the charcoal purifiers and makes final purification of the product more efficient.

Grade D helium, with a purity of 99.8 percent, is produced for airship and balloon inflation.

PART III. APPENDIX

Tables of Measurement

Volumetric measures

	U. S. gallons	Imperial gallons	Cubic feet	Barrels	Cubic centimeters	Liters	Cubic meters
1 U. S. gallon [1]	1	0.83268	0.13368	0.02381	3,785.4	3.7853	0.0037854
1 imperial gallon [2]	1.201	1	.16054	.028594	4,546.04	4.5460	.004546
1 cubic foot	7.4805	6.22888	1	.17811	28,317.01	28.316	.028317
1 barrel [3]	42	34.972	5.6146	1	158,987.55	158.98	.15899
1 cubic centimeter	.00026417	.00021996	.000035314	.0000062895	1	.00099997	.000001
1 liter	.26418	.219976	.035316	.0062899	1,000.027	1	.001000027
1 cubic meter	264.17	219.97	35.314	6.2898	1,000,000.	999.97	1

[1] 1 U. S. gallon = the volume occupied by 231 cubic inches.
[2] 1 imperial gallon = the volume occupied by 10 pounds of water at 62° F. when weighed against brass in air at 30″ barometric pressure.
[3] 1 Barrel = 42 U. S. gallons.

Weight measures

	Pounds	Kilograms	Short or net tons	Metric tons	Long ton
1 pound	1	0.45359	0.0005	0.00045359	0.00044643
1 short or net hundredweight	100.0	45.359	.05	.04536	.04464
1 gross or long hundredweight	112.0	50.802	.056	.05080	.05
1 kilogram	2.2046	1	.0011023	.001	.0009842
1 short or net ton	2,000	907.185	1	.90718	.89286
1 metric ton	2,204.6	1,000	1.1023	1	.98421
1 long ton	2,240	1,016.06	1.12	1.01606	1

NOTE.—1 English water ton = the volume occupied by 1 long ton of water at 60° F.

Index

By Mabel E. Winslow

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