

# DEAD OR CREOSOTE OIL

LETTER

FROM

THE CHAIRMAN  
OF  
THE UNITED STATES TARIFF COMMISSION

TRANSMITTING

IN RESPONSE TO SENATE RESOLUTION No. 470  
(SEVENTY-FIRST CONGRESS) A REPORT  
ON DEAD OR CREOSOTE OIL



MARCH 24 (calendar day, MARCH 28), 1932.—Referred to the  
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## LETTER OF TRANSMITTAL

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UNITED STATES TARIFF COMMISSION,  
*Washington, March 25, 1932.*

SIR: In compliance with Senate Resolution No. 470, of the third session of the Seventy-first Congress, I have the honor to transmit herewith the report of the United States Tariff Commission pertaining to dead or creosote oil. The resolution reads as follows:

*Resolved*, That the United States Tariff Commission is hereby directed to investigate, under section 332 of the tariff act of 1930, the difference in the costs of production and delivery to the principal market or markets of the United States during the calendar years 1928, 1929, and 1930 of dead or creosote oil provided for in paragraph 1651 of the tariff act of 1930, when produced in the principal competing country and a like or similar article produced in the United States, and to report thereon to the Senate as soon as practicable; and be it further

*Resolved*, That if this investigation discloses that the domestic cost of production exceeds the costs of production abroad in the principal competing country, the commission shall include in its report a statement as to the rate or rates of duty necessary to equalize said cost difference based on the American selling price as defined in section 402 (g) of the Tariff Act of 1930.

Respectfully,

ROBERT L. O'BRIEN,  
*Chairman.*

The PRESIDENT OF THE SENATE,  
*Washington, D. C.*



## DEAD OR CREOSOTE OIL

UNITED STATES TARIFF COMMISSION,  
*Washington, March 25, 1932.*

The PRESIDENT OF THE SENATE,  
*Washington, D. C.*

SIR: The United States Tariff Commission herein reports the results of an investigation of the differences in costs of production of dead or creosote oil in the United States and in the principal competing country, and its findings with respect thereto.

This report is in response to Senate Resolution No. 470 of the Seventy-first Congress.

### FINDINGS OF THE COMMISSION

1. Dead or creosote oil is free of duty under paragraph 1651 of the tariff act of 1930. It was also free of duty under the act of 1922 and previous acts.

2. The domestic production of creosote oil increased from 28,864,000 gallons in 1921 (37,557,000 gallons in 1920 and 33,874,000 gallons in 1922) to 126,779,000 gallons in 1928 and 127,750,000 gallons in 1929; it fell only slightly—to 122,572,000 gallons in 1930 and to approximately 118,115,000 gallons in 1931.

3. The imports of creosote oil amounted to 33,239,000 gallons in 1921 and increased in nearly every year until 1927 when the total was 95,915,000 gallons. Since then they have declined in each year, amounting in 1928 to 88,385,000 gallons, in 1929 to 79,301,000 gallons, in 1930 to 66,922,000 gallons and 36,885,000 gallons in 1931.

4. On the average during the 3-year period covered by the cost investigation, domestic production amounted to 125,700,000 gallons and the imports to 78,203,000 gallons, the domestic product being 61.19 per cent of the consumption; in 1931 the domestic product was 76.23 per cent of the total.

5. While there are many grades of creosote oil used for various purposes the great bulk, both of that made in the United States and of that imported from the United Kingdom, is made to conform to specifications for use in the preservation of wood; the domestic product, considered as an aggregate, is like or similar to the grades manufactured in the United Kingdom for export to the United States, considered as an aggregate.

6. Senate Resolution No. 470 specifically directed the commission to ascertain domestic and foreign costs for the years 1928, 1929, and 1930; these years, taken together, constitute a representative period of time, although the conditions as regards costs of production differ during the several years.

7. The principal competing country during the period covered by the investigation was the United Kingdom.

8. The markets for creosote oil are chiefly wood-treating plants which are widely distributed throughout the United States. The commission selected for the purpose of cost comparison in this investigation a number of towns in which both the domestic and foreign products were sold, or towns representative of areas in which both were sold.

9. By reason of the fact that creosote oil is a joint product along with other products of the distillation of coal tar, as well as by reason of the fact that coal tar is itself a by-product of the coke and gas industries, there are various methods of computing the cost of production of creosote oil. The method used by the commission in the cost comparison set forth in paragraph 10 is described in the summary of information. Other methods of computation of costs are also described and the results set forth.

10. The cost of production of creosote oil in the United States averaged 10.82 cents per gallon for the 3-year period covered by the investigation. The corresponding cost of production of creosote oil produced for export to the United States in the principal competing country was 10.14 cents per gallon.

The cost of transportation and of other delivery charges on creosote oil to the principal markets in the United States from the domestic plants, weighted according to their respective shipments to each market, was 2.19 cents per gallon during the 3-year period covered by the investigation, and the corresponding cost from the plants in the principal competing country to the same markets was 3.33 cents per gallon.

The total cost of production of domestic creosote oil, including transportation and other delivery charges to the principal markets in the United States, was thus, for the 3-year period, 13.01 cents per gallon, and the corresponding cost of the product of the principal competing country was 13.47 cents per gallon.

The total cost of production of domestic creosote oil, including transportation and other delivery charges to the said markets, was 13.74 cents per gallon during 1928, 12.84 cents in 1929, and 12.70 cents in 1930. The corresponding cost of the product of the principal competing country was 15 cents in 1928, 12.70 cents in 1929, and 12.34 cents in 1930.

The results of other methods of computing the domestic and the foreign costs are set forth in the attached summary of information.

11. Beginning in September, 1931, the United Kingdom went off the gold standard and the exchange of the pound sterling depreciated as compared with the dollar, the depreciation since that time having ranged from about 20 to 30 per cent. Inasmuch as the Senate resolution specified the three years 1928 to 1930 as the basis for the cost investigation, the commission did not undertake to ascertain the effect of this depreciation of the pound sterling upon costs, but it has examined the statistics of imports of creosote oil into the United States from the United Kingdom since the depreciation set in. During the four months, October, 1931, to January, 1932, the total imports from all countries amounted to 11,948,000 gallons, or at the rate of about 36,000,000 gallons annually, whereas the imports for the corresponding months in the preceding year were 13,992,000 gallons, or at the rate of about 42,000,000 gallons annually. The im-



ports from the United Kingdom from October, 1931, to January, 1932, were 5,098,000 gallons as compared with 6,529,000 gallons in the corresponding months of the preceding year. Table 21 in the appendix gives the imports from each of the leading countries for each month since January, 1930.

### CONCLUSIONS

On the basis of the facts shown by the investigation with respect to the differences in costs of production during the 3-year period, including transportation and delivery to the principal markets in the United States, in different years and by different methods of computation, some of which differences show a very small excess of domestic over foreign costs and others a very small excess of foreign over domestic costs, the commission finds no sufficient warrant on the basis of cost differences for a duty on creosote oil.

The attention of the Senate is called to the detailed discussion in the attached summary of information with regard to the methods of computing the cost of creosote oil and with regard to the causal factors affecting that cost both in the United States and in the principal competing country.

Respectfully submitted.

ROBERT L. O'BRIEN,  
*Chairman.*

THOMAS WALKER PAGE,  
*Vice Chairman.*

EDGAR B. BROSSARD,

LINCOLN DIXON,

JOHN LEE COULTER,

IRA M. ORNBURN,

*Commissioners.*

## SUMMARY OF INFORMATION OBTAINED IN THE INVESTIGATION

### I. INTRODUCTION

The present report is made in response to Senate Resolution No. 470 of the Seventy-first Congress, which reads as follows:

*Resolved*, That the United States Tariff Commission is hereby directed to investigate, under section 332 of the tariff act of 1930, the difference in the costs of production and delivery to the principal market or markets of the United States during the calendar years 1928, 1929, and 1930 of dead or creosote oil provided for in paragraph 1651 of the tariff act of 1930, when produced in the principal competing country and a like or similar article produced in the United States, and to report thereon to the Senate as soon as practicable; and be it further

*Resolved*, That if this investigation discloses that the domestic cost of production exceeds the costs of production abroad in the principal competing country, the commission shall include in its report a statement as to the rate or rates of duty necessary to equalize said cost difference based on the American selling price as defined in section 402 (g) of the Tariff Act of 1930.

#### INVESTIGATION UNDER SECTIONS 332 AND 336 OF THE TARIFF ACT OF 1930

While the investigation was conducted under section 332 of the tariff act of 1930, as directed by the resolution, the rules of practice and procedure in investigations under section 336 were followed in view of the fact that the resolution provides that, "the commission shall include in its report a statement as to the rate or rates of duty necessary to equalize said cost difference \* \* \* if the investigation discloses that the domestic cost of production exceeds the costs of production in the principal competing country." Under the circumstances, a public hearing was held on October 30, 1931, at which interested parties were given an opportunity "to be present, to produce evidence, and to be heard."

#### REPRESENTATIVE PERIOD OF TIME

Ordinarily, under section 336, the commission determines in a preliminary study whether one, two, or more years shall be selected as a representative period of time for proper cost comparisons. In the resolution the calendar years 1928, 1929, and 1930 are specifically prescribed as the representative period of time. The report, therefore, presents data for each of these years as well as the average of the 3-year period.

#### LIKE OR SIMILAR COMMODITY

The commodity to which reference is made in the resolution, dead or creosote oil, may be of different qualities or grades and may be used for different purposes. The commission found, however, that

a large quantity of creosote oil, like or similar to that produced in the United States, was and is produced in the principal competing country and exported to the United States, where it is sold in competition with the like or similar domestic product. Differences in qualities, grades, and uses are fully considered in the report transmitted herewith.

#### PRINCIPAL COMPETING COUNTRY

The resolution is similar to the provision of section 336 in that costs are required for the principal competing country, rather than the average foreign costs of production in general as prescribed in some resolutions. In this respect, therefore, the commission followed the general rules in connection with investigations under section 336, and it was found that the United Kingdom was the principal competing country during each of the three years for which cost data were requested in the resolution.

#### PRINCIPAL MARKET OR MARKETS

The resolution follows the general principles of section 336 with regard to the principal market or markets of the United States, and in this respect, therefore, the commission followed the rules set forth with reference to the principal market or markets.

In general, therefore, while creosote oil is on the free list as specified in paragraph 1651 of the tariff act of 1930, and not subject to investigation under section 336, and while Senate Resolution 470 specified that the investigation be conducted under section 332 of the tariff act of 1930, which provides for the making of surveys, this investigation was carried forward under the rules of practice and procedure prescribed for investigations under section 336, so as to show differences in costs of production between the United States and the principal competing country of the like or similar article when delivered in the principal market or markets of the United States, during a representative period of time.

#### NATURE OF CREOSOTE OIL

Creosote oil is a product of the distillation of coal tar. Coal tar in turn is a product principally of the destructive distillation of bituminous coal. In the United States about 7 per cent and in the United Kingdom from 50 to 65 per cent of the coal tar is produced by gas works as a by-product, along with coke and various other commodities, of the manufacture of coal gas from coal. The remainder is produced in the coke industry by the use of so-called by-product coke ovens, where, along with various other commodities, it is a by-product of the major product, coke. A species of tar is also derived from the manufacture of water gas, but except in negligible amounts this is not a raw material for creosote oil.

The fact that coal tar is a by-product is important with respect to the problem of determining the costs of creosote oil, domestic and foreign. Its significance is discussed in the section dealing with costs.

According to the census of 1927 the total value of products of the manufactured gas industry was \$485,100,000 (not including certain net items directly connected with the production of gas), of which

the value of gas itself produced for sale was \$446,245,000; the value of coke produced for sale, \$25,514,000; the value of coal-gas tar produced for sale, \$4,449,000; and the value of all other by-products produced for sale, \$8,892,000. Coal-gas tar is thus a very minor product of the industry even for those plants which produce tar used for distillation to creosote oil.

According to the same census, the total value of coke-oven products (including products made in beehive ovens as well as by-product ovens) was \$368,851,000, of which coke itself represented \$247,188,000; gas sold, \$53,725,000; tar sold, \$14,570,000 (a further substantial amount being consumed as fuel); and other by-products sold (chiefly ammonia products), \$53,368,000. Here again tar is a relatively minor product.

As shown more fully below, only part of the coal tar produced in the United States is subjected to those processes of which creosote oil is one of the joint products. A considerable fraction of the output of tar is burned as fuel, and another considerable fraction is made into refined tars, which are chiefly used as a binder in road making, in the manufacture of roofing material, or for impregnating paper and felt. In other words, tar has alternative uses, a fact which affects the calculation of its value as material for creosote oil production.

Finally, creosote oil is a joint product of the distillation of coal tar. The nature and the quantities of the other products obtained from distillation of coal tar depend on whether the coal tar used is gas-house tar or coke-oven tar. The reason for this difference is that in the by-product coke oven certain products, notably benzol and toluol, are separated from the tar in the coking process itself, whereas in the gas works these products remain in the tar and are separated by the subsequent distillation process. As shown more fully below the domestic tar-distilling plants, since they use chiefly coke-oven tar, have a distribution of products considerably different from that of the tar-distilling plants of the United Kingdom, which use chiefly coal-gas tar. The major products, other than creosote oil, resulting from the distillation of coke-oven tar are pitch, tar acids, naphthalene, and high-boiling neutral oils, but there are a number of others. From gas-house tar, there are obtained, in addition to the products mentioned, benzol, toluol, and other minor products. For the tar-distilling plants in the United States covered by the present investigation, creosote oil, on the average for the three years 1928-1930, represented about two-thirds of the total value of the products derived in distillation for the purpose of obtaining creosote oil, not counting operations in which the major product sought is refined tar; whereas in the United Kingdom creosote oil represented about one-third of the total value of the products of such distillation.

#### USES OF CREOSOTE OIL

By far the principal use of creosote oil is for impregnating wood to preserve it against decay. Approximately 95 per cent of the consumption in the United States is in this use, the remainder being consumed chiefly in the manufacture of lampblack and disinfectants. The practice of impregnating wood is particularly important for treating railway ties. Approximately 60 per cent of the total con-

sumption of creosote oil by wood-preserving plants in this country is for treating railway ties, 20 per cent for treating telegraph and telephone poles, and the remainder for construction timbers.

Because of the great mileage of the railways in the United States and of the prevalence of the use of wood ties the domestic consumption of creosote oil is very large, probably greater than that of all the other countries of the world combined. In many of the European countries there is much greater employment of stone, concrete, and steel for railway ties than in the United States.

#### USES OF JOINT AND ALTERNATIVE PRODUCTS

As already stated, the alternative uses of tar are for the production of creosote oil and its joint products and for the production of refined tar. Refined tar is used chiefly, both in the United States and in foreign countries, for road making, roofing material, and impregnating building materials. Both in the United States and in the United Kingdom large quantities of coal tar are thus converted into refined tar; the proportion so converted is considerably larger in the United Kingdom than in the United States.

Next to creosote oil, pitch is, in both countries, much the largest joint product of tar distillation, and in the United Kingdom exceeds in quantity, although not in value, the production of creosote oil. Abroad the most important use of pitch is as a binder in making briquets from pulverized coal. On the Continent, especially in Germany, there is a very large production of so-called brown coal or lignite, which is relatively unsatisfactory fuel in its original state, but which when converted into briquets is of much greater utility. A large part of the British production of pitch is exported to Germany for this use and considerable quantities are also similarly used in the United Kingdom itself. In the United States there is relatively little manufacturing of briquets. Other uses of pitch are in core binders, roofing, battery seals, targets, electrode binders, paint bases, and waterproofing compounds. The demand for pitch in the United States, however, is so limited that a large part of the production is burned as fuel.

Other products of coal-tar distillation are tar acids and naphthalene, used chiefly in the manufacture of coal-tar dyes, medicinals, and in the synthetic resin industry.

## II. GENERAL DATA

#### SUMMARY OF DOMESTIC PRODUCTION AND IMPORTS

The production of creosote oil on a large scale is a relatively new industry in the United States. The use of this product as a preservative for wood was unimportant prior to about 1903, but it developed rapidly from that time on. The production of creosote oil was of somewhat earlier development in Europe, largely because of the demand for the joint product pitch, for making briquets, and at the outset practically the entire domestic requirement was supplied by imports. The first available statistics with regard to the origin of the creosote used by wood-treating plants in the United States are for the year 1909. In that year the total consumption for this purpose was reported as 51,426,000 gallons, of which 13,862,000 gallons,

or 27 per cent, was domestic and 37,564,000 gallons, or 73 per cent, was imported. By 1913 the consumption of the domestic product had risen to 41,700,000 gallons and that of the imported to 66,673,000 gallons, the domestic proportion being 38 per cent. During the later years of the war and the immediate postwar years there was a great decline in imports, partly because of the shutting off of supplies from Germany. In the meantime domestic production increased only moderately. Beginning about 1921 there was a rapid increase both in imports and domestic production. Imports reached their peak in 1927 and declined during each year covered by the investigation, also in 1931, and domestic production reached its peak in 1929.

Table 1 shows the quantity and value of domestic production and of imports for each year from 1917 to 1931, inclusive. The figures are not exactly comparable with those in Table 20 in the appendix. This table relates to the consumption of domestic and imported creosote by treating plants, and in which the domestic product includes not only creosote oil proper but creosote coal-tar solution, refined water-gas tar solution, and paving oil when these products are used by wood-treating plants.

TABLE 1.—*Creosote oil: Domestic production and imports*

Year	Domestic production			Total imports		
	Quantity	Value f. o. b. plant	Cents per gallon	Quantity	Value	Cents per gallon
	<i>U. S. gallons</i>			<i>U. S. gallons</i>		
1917.....	42,702,000	\$3,740,000	8.8	129,078,000	\$2,185,000	7.5
1918.....	44,712,000	4,428,000	9.9	1,545,000	163,000	10.6
1919.....	43,434,000	4,265,000	9.8	11,268,000	1,374,000	12.2
1920.....	37,557,000	4,395,000	11.7	13,427,000	3,796,000	20.6
1921.....	28,864,000	3,189,000	11.0	33,239,000	4,757,000	14.3
1922.....	33,874,000	3,698,000	10.9	41,668,000	4,240,000	10.2
1923.....	38,637,000	4,287,000	11.0	64,200,000	10,071,000	15.7
1924.....	41,041,000	4,780,000	11.7	89,668,000	13,464,000	15.0
1925.....	43,668,000	5,752,000	13.2	84,868,000	10,973,000	12.9
1926.....	75,496,000	9,768,000	12.9	87,519,000	11,720,000	13.4
1927.....	76,395,000	9,848,000	12.9	95,915,000	15,437,000	16.1
1928.....	126,779,000	16,507,000	13.0	88,385,000	13,928,000	15.8
1929.....	127,750,000	15,279,000	12.6	79,301,000	10,119,000	12.8
1930.....	122,572,000	13,299,000	11.4	66,922,000	7,806,000	11.7
1931.....	118,115,000			36,885,000	3,598,000	9.8

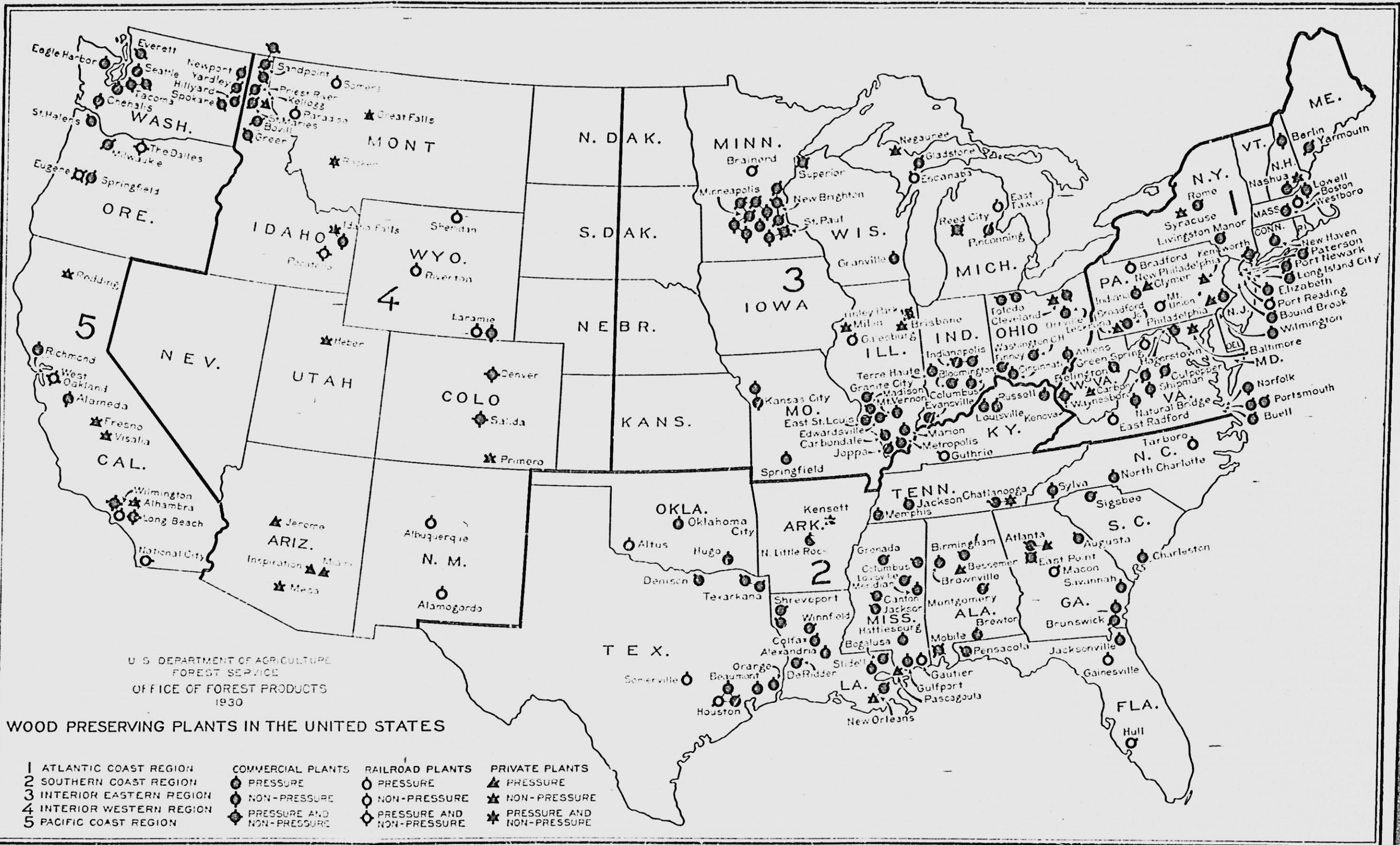
Source: Production, Census of Dyes and Other Synthetic Organic Chemicals, U. S. Tariff Commission; imports, Foreign Commerce and Navigation of the United States, Department of Commerce.

<sup>1</sup> Fiscal year.

<sup>2</sup> Preliminary figure obtained by deducting imports from approximate consumption.

#### DOMESTIC PRODUCTION BY REGIONS

Tar-distilling plants are located chiefly in the vicinity of large cities where a supply of gas-house tar is available, or in the vicinity of by-product coke plants. Whereas beehive coke is ordinarily produced at the coal mines, by-product coke is chiefly manufactured close to steel works where not only the coke can be utilized, but also the gas produced in the process. As the result of these geographic conditions, the centers of the production of creosote oil may be grouped into seven districts: (1) Eastern United States, including the vicinity of New York harbor, Philadelphia, and Norfolk; (2) the steel region of western Pennsylvania, eastern Ohio, and northern West Virginia; (3) the Toledo-Detroit region; (4) the steel region in the vicinity of Chicago, including one plant near Mil-



waukee; (5) the central interior, with plants in the vicinity of St. Louis and Indianapolis (these are not important steel-producing areas, but major centers of wood-treating plants); (6) Alabama-Tennessee steel district, and (7) scattered plants west of the Mississippi River.

Table 2 shows for 1928, 1929, and 1930 the production of creosote oil in each of these regions. The accompanying map shows these producing districts together with the location of the plants included in the investigation.

TABLE 2.—*Creosote oil: Domestic production by regions*

Producing region	1928	1929	1930	Annual average 1928-1930	
				Amount	Per cent
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	
All regions.....	93,932,000	118,298,000	113,810,000	108,680,000	100.00
Eastern.....	14,596,000	17,076,000	19,644,000	17,106,000	15.74
Pennsylvania-Ohio-West Virginia steel region.....	23,604,000	36,232,000	34,726,000	31,521,000	29.00
Toledo-Detroit.....	4,335,000	3,477,000	4,393,000	4,068,000	3.74
Chicago steel region.....	21,892,000	22,265,000	17,001,000	20,386,000	18.76
Central interior.....	6,190,000	12,522,000	12,207,000	10,309,000	9.49
Alabama-Tennessee.....	12,135,000	15,148,000	14,455,000	13,913,000	12.80
West of Mississippi River.....	11,171,000	11,578,000	11,384,000	11,378,000	10.47

#### DOMESTIC CONSUMPTION BY REGIONS

The geographic distribution of the consumption of creosote oil is widely different from that of its production. Wood-treating plants, which are the principal consumers, are situated for the most part either at centers of railroad transportation or of the production of railway ties and other wood products requiring preservative treatment. The map facing this page shows the location of the wood-preserving plants in the United States in 1930.

From the standpoint of consumption of creosote oil the United States may be conveniently divided into five regions, the Eastern, the Southern, the Central, the Western, and the Pacific coast regions.

Table 3 shows the annual average production of creosote oil in each of these consuming regions, together with the consumption, distinguishing the domestic and the imported product. It also shows what percentage of the consumption in each district is domestic and what is imported.

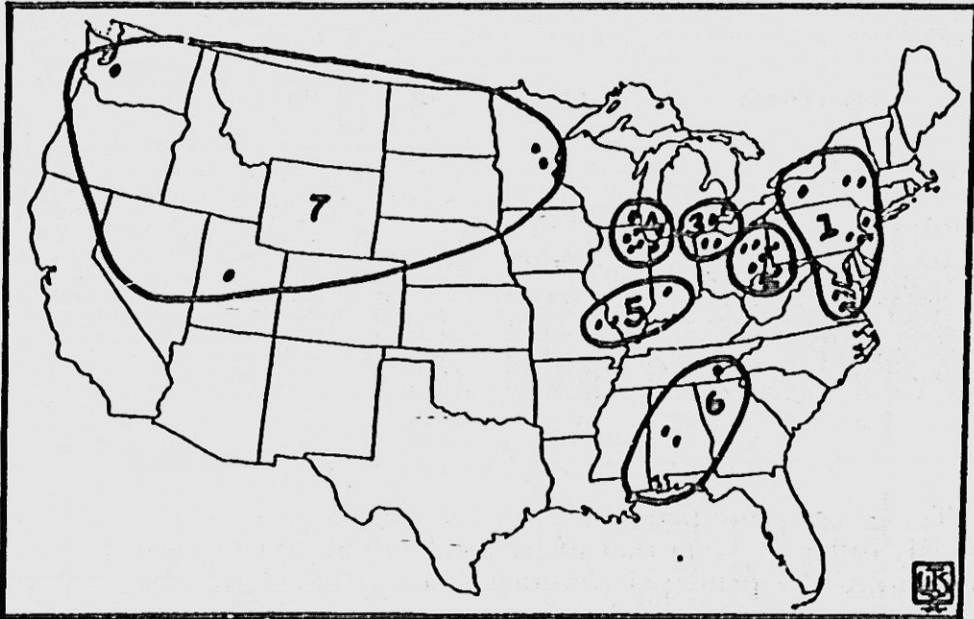
TABLE 3.—*Consumption of creosote oil, by regions, annual averages, 1928-1930*

Region	Production in the region	Consumption			Percentage of consumption	
		Domestic	Foreign	Total	Domestic	Foreign
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>		
Eastern.....	42,913,000	26,457,000	5,233,000	31,690,000	83½	16½
Southern.....	13,913,000	48,369,000	60,747,000	109,116,000	44	56
Central.....	46,331,000	48,047,000	4,603,000	52,650,000	91	9
Western.....	3,724,000	8,404,000	1,148,000	9,612,000	88	12
Pacific coast.....	1,799,000	8,773,000	9,194,000	17,967,000	49	51
Total.....	108,680,000	140,110,000	80,925,000	221,035,000	63	37



The geographic distribution of the consumption of domestic creosote oil is decidedly different from that of the imported product. In the districts in which there is a large production of domestic creosote, the Eastern and Central regions, the consumption of the domestic product is larger than that of the imported product, but the imported is the larger fraction in the Southern district and on the Pacific coast.

A more detailed classification of consuming areas is presented in connection with the analysis of costs of transportation.



Creosote oil: Domestic producing plants, grouped by districts

Table 4 shows, by percentages based on Table 3, the distribution of the total consumption and of the consumption of the domestic and the imported product among the several consuming districts and also the distribution of the production among those districts.

TABLE 4.—Percentage distribution of the production and consumption of creosote oil, by districts, average 1928-1930

Consuming district	Per cent of total consumption of—			Per cent of total domestic production of creosote oil
	All creosote oil	Domestic creosote oil	Foreign creosote oil	
All districts.....	100	100	100	100
1. Eastern.....	14	19	6	44
2. Southern.....	50	35	75	13
3. Central.....	24	34	6	33
4. Western.....	4	6	2	4
5. Pacific coast.....	8	6	11	1

#### SOURCES OF IMPORTS AND PRINCIPAL COMPETING COUNTRY

As previously stated, this investigation was conducted in the same manner as investigations under section 336 of the tariff act of 1930. Under that section, domestic costs must be compared with the costs in

the principal competing country. The principal competing country for creosote oil is the United Kingdom. This fact is brought out in Table 5 which shows the imports into the United States by countries from which shipped.

TABLE 5.—*Dead or creosote oil: General imports by countries*

Year	United Kingdom	Belgium	Netherlands	Germany	All other <sup>1</sup>
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>
1928.....	44,009,816	21,977,802	18,312,329	1,158,661	2,926,466
1929.....	39,383,991	17,944,092	20,157,187	275	1,815,030
1930.....	27,484,886	13,794,365	20,736,875	891,490	4,014,211
1931 <sup>2</sup> .....	13,085,330	11,002,837	9,882,907	.....	2,913,828

Source: Foreign Commerce and Navigation of the United States, Department of Commerce.

<sup>1</sup> Principally Japan and Canada.

<sup>2</sup> Preliminary figures

For the three years 1928-30, the period covered by the investigation, the average annual importation from all countries combined was 78,202,667 gallons, and the imports from the United Kingdom 36,959,564 gallons, or 47.3 per cent of the total. The next most important country competing in the United States market is Germany, although that fact does not appear directly from the statistics of imports, since a large part of the imports credited to the Netherlands and Belgium are actually of German origin. In order to establish that the United Kingdom and not Germany was the principal competing country in 1930, it was necessary to trace the country of origin of shipments from the Netherlands and Belgium in that year.

In Table 20 in the appendix imports from each principal country are shown for a longer period of years, and in Table 21 by months after January, 1930.

#### EXPORTS OF CREOSOTE OIL

The export statistics compiled by the Department of Commerce do not distinguish creosote oil prior to 1931, when they amounted to 1,872,545 gallons, valued at \$253,830. They went chiefly to Canada, Mexico, and Panama.

#### PLANTS COVERED BY THE INVESTIGATION

The investigation of costs of production of creosote oil in the United States covered 13 companies, operating 37 plants. The total production of creosote oil in these plants during the 3-year period covered by the investigation was 326,039,239 gallons, or an annual average of 108,680,000 gallons. The reported total production of creosote oil in the United States during these years was 377,101,000 gallons, so that the investigation covered approximately 85 per cent of the industry.

The investigation of costs in the United Kingdom covered 7 companies, operating 13 plants. Their production of all grades of creosote oil during the 3-year period was 75,899,859 gallons, or an annual average of 25,300,000 gallons. There are no statistics of the

total production of creosote oil in the United Kingdom, but on the basis of careful estimates it appears that the investigation of the commission covered approximately 30 per cent of the total.

The statistics of yields obtained from tar distillation and of average unit values of the several products presented in this report, as well as the figures of cost, relate only to the plants covered by the cost investigation, but they may be taken as substantially representative of the total business.

#### DIFFERENCES BETWEEN THE DOMESTIC AND THE BRITISH TAR-DISTILLING INDUSTRY

There are very considerable differences in the general economic position between the domestic industry and that of the United Kingdom. Points brought out more fully in subsequent paragraphs may be briefly summarized as follows:

1. In the United Kingdom all the available coal tar is normally distilled either for refined tars or for creosote oil and pitch as chief products, whereas in the United States much of it is burned for fuel.

2. In the United Kingdom the quantity of coal-gas tar produced and used for distillation considerably exceeds the quantity of coke-oven tar, whereas in the United States the production of coke-oven tar is from twelve to fifteen times as great as that of coal-gas tar.

3. In both countries tar is distilled in part by concerns which produce the tar, and in part by concerns which buy it. In the United Kingdom there are also cooperative distillers. In the United States, the greater part of the creosote oil production is by purchasers of tar, while in the United Kingdom it is by producers of tar.

4. The relative importance of distillation for obtaining refined tar as against distillation for obtaining creosote and its joint products is somewhat greater in the British than in the domestic industry.

5. Pitch is a product of much greater importance in the British than in the American industry and little, if any, of it is burned in Europe, whereas large quantities are burned in the United States.

6. By reason of the much greater importance of coal-gas tar in the British industry, the miscellaneous joint products (benzol, toluol, etc.) constitute a much larger proportion of the total output in quantity and value than in the United States.

7. The United States is a large importer of creosote oil whereas normally the greater part of the production in the United Kingdom is exported, the bulk going to this country. In 1929 and 1930, however, considerable quantities of creosote oil were consumed as fuel in the United Kingdom.

8. The grades of creosote oil produced in the United Kingdom for export to the United States, normally constituting the bulk of the British production, are comparable with the bulk of the domestic production. In addition there are other less important grades produced in both countries.

*Disposition of coal tar.*—Table 6 shows the disposition of the coal tar produced in the United States and the United Kingdom, the average realization price of the product sold, and the average unit value for fuel of the product consumed as fuel in the United States.

TABLE 6.—Disposition of coal tar in the United States and in the United Kingdom

Year	Sold or distilled by producer		Burned by producer		Realization price		
	United States <sup>1</sup>	United Kingdom <sup>2</sup>	United States	United Kingdom	United States <sup>3</sup>	United Kingdom	Fuel value of tar burned in United States <sup>4</sup>
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>Cents per gallon</i>	<i>Cents per gallon</i>	<i>Cents per gallon</i>
1928.....	414,783,000	408,000,000	273,562,000	None.	5.30	8.61	2.60
1929.....	440,484,000	465,000,000	287,710,000	None.	5.10	4.36	2.57
1930.....	416,454,000	475,000,000	231,032,000	None.	4.90	4.94	2.51
Average.....	423,907,000	448,000,000	204,101,000	-----	5.10	4.94	2.58

<sup>1</sup> About 4 per cent of the 1930 sales were for use as fuel.<sup>2</sup> Estimated from production of tar products.<sup>3</sup> Coke and by-products, Bureau of Mines.<sup>4</sup> In terms of bituminous coal delivered.

It will be seen that in this country the quantity of coal tar at present available greatly exceeds the amount used for distillation purposes. The quantity produced was formerly very much less because of the predominance of the beehive method of making coke, but at the present time the great bulk of the coke is made in by-product ovens with a consequent large output of tar, much of which is burned. In the table the value of tar for fuel in the United States is computed on the basis of the value, delivered, of the quantity of bituminous coal possessing the same heating value. It should be stated, however, that certain steel manufacturers consider tar as a peculiarly advantageous fuel for open-hearth operations and this may in part account for the fact that, although the market value when sold for distillation is much higher, there is nevertheless a large consumption as fuel.

The demand in Europe for pitch and road tars is sufficient to warrant the distillation of all the coal tar available in the United Kingdom. However, the demand for creosote oil is not always sufficient to justify its sale for wood impregnation and at times, as in 1929 and 1930, considerable quantities of it are used as fuel.

*Kinds of tar distilled.*—Table 7 shows the reported total production of coal-gas tar and coke-oven tar in the United States and the estimated production in the United Kingdom. The relative importance of the two materials is entirely different in the two countries. The result of this difference with respect to the products realized by tar distillation is brought out by a subsequent table.

TABLE 7.—Production of coal-gas tar and coke-oven tar in the United States and in the United Kingdom

Year	Production coal-gas tar		Production coke-oven tar		Total production	
	United States <sup>1</sup>	United Kingdom <sup>2</sup>	United States <sup>1</sup>	United Kingdom <sup>2</sup>	United States <sup>1</sup>	United Kingdom <sup>2</sup>
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>
1928.....	58,500,000	240,000,000	631,844,767	170,000,000	688,344,767	410,000,000
1929.....	47,329,311	274,000,000	680,864,366	194,000,000	728,193,677	468,000,000
1930.....	45,000,000	280,000,000	602,485,929	198,000,000	647,485,929	478,000,000
Average.....	49,609,770	264,667,000	638,398,354	187,333,000	688,008,124	452,000,000
Per cent.....	7	58½	93	41½	100	100

<sup>1</sup> Bureau of Mines.<sup>2</sup> Estimated.

*Classes of tar-distilling plants.*—In both countries the tar-distillation industry is conducted in part by concerns which produce tar and in part by concerns which buy it; in the United Kingdom there are also cooperative tar-distilling plants.

Table 8 shows for the United States and the United Kingdom the quantity of tar distilled by concerns which are themselves the producers of tar and by concerns which buy tar. In the United Kingdom the cooperative distillers handle the product as agents for the tar producers, the latter in substance receiving as pay for their tar the value of products less the cost of conversion (including normal return to capital). This fact has an important bearing upon the significance of the costs for creosote oil in the United Kingdom.

TABLE 8.—Quantities of coal tar distilled by producers, purchasers, and cooperative distillers, United States and United Kingdom

Year	Purchasers of tar		Producers of tar		Cooperative distillers	
	United States	United Kingdom	United States	United Kingdom	United States	United Kingdom
	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>	<i>U. S. gallons</i>
1928.....	236,871,000	28,781,000	31,613,000	50,121,000	None.	21,922,000
1929.....	260,854,000	31,615,000	50,317,000	58,283,000	None.	21,295,000
1930.....	249,032,000	30,797,000	52,388,000	58,112,000	None.	25,785,000
Average.....	248,919,000	30,364,000	44,773,000	55,505,000	None.	23,994,000

The trend of coal-tar distillation in the United States seems to be toward distillation by the tar producer at the point of production. It is relatively uneconomical to transport tar by rail, and since the tar-producing units, as a whole, are as advantageously located for the marketing of creosote oil as are the distilling units, the tendency appears to be to distill the tar where produced. Since 1927 there have been in the United States at least nine distilling installations made at tar producers' plants. During the period of the investigation, producer-distillers increased their production about 59 per cent, and purchaser-distillers' production decreased about 13 per cent.

*Alternative methods of distilling tar.*—As already stated, tar may be treated primarily for the purpose of obtaining (1) refined tar, or (2) creosote oil, pitch, and related products. The commission did not undertake to obtain costs from concerns which confine themselves to the production of refined tar, but both in the United States and in the United Kingdom the great bulk of the output of refined tar is produced by concerns which also produce creosote. The records of these producers are kept in such a way that it is not possible to state the quantity and value of the joint products obtained when running for creosote oil as distinguished from the by-products obtained when running for refined tar. Table 9, which shows by percentages the products obtained from distillation by the plants covered by the cost investigation, therefore represents the hybrid results of the two distinct methods of dealing with tar.

TABLE 9.—Yields of products from distillation per 100 gallons of coal tar in the United States and in the United Kingdom<sup>1</sup>

(In United States gallons)

Distillation product	United States				United Kingdom			
	1928	1929	1930	Average	1928	1929	1930	Average
Creosote:								
Export.....					21.55	17.57	11.72	16.71
Other.....					6.70	9.65	14.50	10.47
Total.....	39.74	42.03	42.88	41.67	28.25	27.22	26.22	27.18
Refined tars.....	18.83	16.09	17.00	17.19	25.11	26.61	29.93	27.33
Pitch.....	38.95	39.36	37.86	38.72	35.54	34.34	31.34	33.64
Tar acids.....	1.62	.96	1.04	1.18	1.79	1.60	1.47	1.61
Naphthalene.....	.29	.79	.57	.57	.55	1.50	1.92	1.36
Anthracene.....					.10	.16	.04	.10
Pyridine.....	.01	.01	.01	.01	.07	.06	.06	.06
All other.....	.56	.76	.64	.66	8.59	8.51	9.02	8.71
Total.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

<sup>1</sup> See text as to basis of data; includes only plants covered by the cost investigation.

Table 10 shows percentages of total value for each product shown in the preceding table. In the United States the value of the creosote oil produced during the 3-year period was about three and one-half times as great as that of the refined tars, whereas in the United Kingdom the value of the former exceeded that of the latter by only about 20 per cent.

TABLE 10.—Percentage of total value of all products of coal-tar distillation represented by each product in the United States and in the United Kingdom<sup>1</sup>

Distillation product	United States				United Kingdom			
	1928	1929	1930	Average	1928	1929	1930	Average
Creosote:								
Export.....					23.51	20.19	12.56	19.03
Other.....					7.06	7.57	8.65	7.72
Total.....	52.86	53.37	55.51	53.88	30.57	26.76	21.21	26.75
Refined tars.....	16.92	12.09	17.18	15.17	23.11	20.68	22.97	22.28
Pitch.....	18.15	24.43	15.77	19.78	20.46	17.47	17.96	18.71
Tar acids.....	10.45	6.46	8.16	8.22	6.31	6.61	5.89	6.28
Naphthalene.....	.57	2.31	1.94	1.66	1.24	2.22	2.61	1.99
Anthracene.....					.05	.15	.06	.07
Pyridine.....	.07	.05	.06	.06	.55	.47	.47	.50
All other.....	.98	1.29	1.38	1.23	17.71	24.64	28.83	23.42
Total.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

<sup>1</sup> See text as to basis of data; includes only plants covered by the cost investigation.

Table 11 shows the average unit sales value of the several products of tar distillation in the United States and the United Kingdom. In both countries the average unit value of creosote oil considerably exceeds that of refined tars.

TABLE 11.—Average unit sales value at works of products of coal-tar distillation in the United States and in the United Kingdom<sup>1</sup>

[In cents per United States gallon]

Distillation product	United States				United Kingdom			
	1928	1929	1930	Average	1928	1929	1930	Average
Creosote:								
Export.....					13.6	11.3	9.8	11.8
Other.....					13.1	7.7	5.5	7.7
Total.....	13.9	12.6	11.5	12.6	13.5	10.0	7.4	10.2
Refined tars.....	9.4	7.5	9.0	8.6	11.5	7.7	7.0	8.5
Pitch.....	4.9	6.2	3.7	5.0	7.2	5.0	5.2	5.8
Tar acids.....	67.7	67.1	69.3	68.0	43.9	40.6	36.6	40.4
Naphthalene.....	20.3	29.2	29.9	28.1	28.4	14.6	12.4	15.2
Anthracene.....					6.6	9.0	12.7	7.3
Pyridine.....	118.0	105.0	121.0	114.0	100.0	75.9	67.1	81.4
All other.....	18.3	16.8	18.2	17.8	25.7	28.5	29.3	27.9
Weighted average.....	10.5	9.9	8.9	9.7	12.5	9.8	9.2	10.4

<sup>1</sup> Includes only sales of plants covered by the cost investigation.

*The position of pitch.*—It will be seen from Tables 9 and 10 that pitch is a relatively more important product, both in quantity and still more in value, in the United Kingdom than in the United States. The percentages which pitch form of the total for all products are scarcely comparable by reason of the differences between the two countries with respect to the importance of refined tars and of "all other products," but a significant comparison may be made on the basis of the ratio between the figures for pitch and those for creosote oil. In the United States the production of pitch in quantity is somewhat less than that of creosote oil, whereas the reverse is the case in the United Kingdom. In the United States the value of creosote oil, on the average for the 3-year period, was about  $2\frac{3}{4}$  times greater than that of pitch, whereas in the United Kingdom the former exceeded the latter by less than 50 per cent. This difference is accounted for by the strong demand for pitch in Europe in the manufacture of briquets.

The American producers of creosote oil have practically never been able to find markets for all of the pitch they make. An exception to this condition was during the British coal strike in 1926, when large quantities of domestic pitch were exported. In 1928 domestic producers found markets for 68 per cent of their pitch production, in 1929 for 63 per cent, and in 1930 for only 52 per cent. The remaining quantities were partly consumed as fuel, but large amounts have been stored in "pitch bays" in the hope that the demand may improve.—The value of pitch consumed as fuel is about  $2\frac{1}{2}$  cents per gallon, calculated on the basis of the equivalent in bituminous coal; this is about half the market price of the crude coal tar.

By reason of the low value of pitch burned in the United States, the average unit value f. o. b. plant, of all pitch produced by the tar refiners was, in 1928 and again in 1930, decidedly lower than the

corresponding average in the United Kingdom. In 1929, however, on account of the relatively high price of pitch sold, the average at home was considerably higher than abroad.

*General comparison of products of tar refining.*—Table 9 shows that on the average for the three years, only a fraction of 1 per cent in quantity of the output of tar-distilling plants in the United States consisted of the group "all other products," comprising such items as toluol and benzol. The corresponding average for the United Kingdom was very much higher, 8.7 per cent, the difference being due, as already stated, to the much greater proportion of coal-gas tar used by the British plants. The difference between the two countries with respect to the value of these miscellaneous products was much greater still; they represented about  $1\frac{1}{4}$  per cent of the total value of all products of distillation at home as compared with more than 23 per cent in the United Kingdom. (See Table 10.) The average unit value per gallon of these miscellaneous products, as a group, was considerably higher abroad than at home; this fact being attributable to the difference in composition of the group rather than to differences in unit prices of the same articles.

Table 10 shows that during the 3-year period creosote oil constituted on the average nearly 54 per cent of the total value of products of tar-distilling plants in the United States. The corresponding proportion for the United Kingdom was less than half as high,  $26\frac{3}{4}$  per cent. This conspicuous difference is due to two factors already brought out in the preceding paragraphs, namely, the greater importance in the United Kingdom than in the United States of refined tars and "all other products." Creosote oil is the dominant product in this country whereas it is only one of a group of important products in the United Kingdom.

*Disposition of British creosote oil.*—Table 9 shows that on the average for the 3-year period creosote oil for export constituted 16.7 per cent of the total quantity of the products of the British tar-distilling industry (British plants covered by the investigation only) whereas creosote oil used for consumption in the United Kingdom itself (including fuel) constituted only 10.5 per cent. The individual years show wide differences with respect to the relation between export and other creosote oil, the former being far the greater part of the total in 1928 but considerably less than half of the total in 1930. There was also a difference between the three individual years with respect to the relation between the unit value of the export creosote oil and that of the other oil. In 1928 the two were of approximately the same average unit value whereas in 1930 the average for the export product was nearly 80 per cent higher than for the product used in the home country, this being due to the fact that the latter was mostly sold for fuel.

In 1931 and 1932, strong markets for road tars in the United Kingdom and briquetting pitch on the Continent have tended to stimulate British production of refined tar and pitch, and to decrease production of creosote oil.

*Grades and comparability of creosote oil.*—In the United States, three grades of creosote oil and five grades of creosote coal-tar



solution are produced. In addition, small quantities of buyers' specification grades are produced from time to time. However, grade 1 of the American Railway Engineers Association and the American Wood Preservers' Association probably accounts for more than 85 per cent of the total output. Most of the domestic consumption of creosote oil, whether of foreign or domestic origin, meets these specifications.

Abroad, at least 17 grades are produced, of which "Standard specification for export to the United States" is produced in greatest quantity. Complete analyses of shipments from the United Kingdom and from domestic sources, purchased over a period of years by one of the principal consumers in the United States, have been compared with standard specifications and found to be comparable in practically every detail.

Comparability is further established by the fact that both foreign and domestic creosote oils are used for the preservation of all forms of wood, are applied in the same type of equipment, and, in many cases, receive and consumed in wood-treating plants without regard to origin.

Table 12 shows in percentages the disposition of the creosote oil produced by the British companies from whom costs were obtained.

TABLE 12.—*Relative importance of grades of creosote oil produced in the United Kingdom*

Grade made for	1928	1929	1930	3-year average
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Export to United States.....	78.27	64.54	44.70	61.48
Other export.....	0.81	5.10	2.70	2.90
Home use.....	20.83	17.25	27.85	21.98
Fuel.....	2.09	13.02	24.75	13.58

Unit sales price of grades of creosote oil in the United Kingdom, 1928-1930, and average, are shown in Table 13.

TABLE 13.—*Unit sales prices of grades of creosote oil in the United Kingdom*

[In cents per United States gallon]

Grade made for	1928	1929	1930	3-year average
Export to the United States.....	13.6	11.3	9.8	11.8
Other export.....	6.5	7.9	6.5	7.3
Home use.....	13.8	10.6	7.7	10.3
Fuel.....	8.3	3.6	2.7	3.3
All grades.....	13.5	10.0	7.4	10.2

### III. COMPARATIVE COSTS OF PRODUCTION AND DELIVERY

The commission included in the scope of the creosote oil investigation not only the costs of production of the oil at the foreign and domestic plants but also the cost of transportation and delivery

to the principal markets in the United States. Because of the fact that transportation charges will be given in various tables in connection with the plant cost data, the marketing and transportation information will be given before the details of plant costs are considered.

#### PRINCIPAL MARKETS AND COSTS OF DELIVERY

Creosote oil is consumed chiefly by wood-treating plants and these are scattered widely throughout the country. The commission has selected for the purpose of this investigation a number (about 44) of cities and towns in which there is a large consumption and which may be considered representative. In most of these towns there was during the period covered by the investigation some consumption both of the domestic product and of the foreign product. In several, however, the consumption was confined to the one or the other, but in these instances the markets have been so selected, on the basis of geographic proximity and comparative freight rates, that transportation costs to a point supplied by domestic producers are fairly comparable with transportation costs to a neighboring point supplied from abroad.

The commission ascertained the actual average unit cost of transportation during the 3-year period 1928-1930 from each domestic plant covered by the cost investigation to each of the selected markets, and where two or more plants shipped to the same market, these costs were combined into an average weighted by the shipments from the respective plants.

By reason of the fact that much of the British creosote oil exported to the United States is handled through central agencies, it was impossible to ascertain how much was shipped from each plant covered by the cost investigation to each of the selected markets. Consequently the weighted average cost of transportation of all British export creosote oil to the British seaports was ascertained, and the cost of ocean transportation and inland transportation in the United States was ascertained for the total quantity actually shipped to the given market by the British selling agencies.

The selected markets have been grouped into regions and sub-regions, the cost of delivery to each of these being calculated by weighting the domestic costs according to the shipments to the several markets from the domestic plants covered by the investigation, and by weighting the British costs according to the British shipments.

Table 14 shows by market areas the results of this calculation of costs of transportation.

TABLE 14.—Costs of transportation and delivery of domestic and foreign creosote oil to selected markets in the United States

Market area	Foreign transportation and delivery costs				Domestic transportation cost		
	Quantity delivered, 1928-1930	Transportation to port of entry	Inland transportation (U. S.)	Total transportation and delivery costs	Total transportation cost	Quantity delivered, 1928-1930	District from which area is principally supplied
	U. S. gallons	Cents per gallon	Cents per gallon	Cents per gallon	Cents per gallon	U. S. gallons	
Eastern.....	10, 196, 409	2. 20	1. 79	3. 99	1. 76	12, 680, 053	1, 3
(a) New York.....	3, 316, 000	2. 31	2. 48	4. 79	1. 88	3, 582, 760	1, 3
(b) New Hampshire and Connecticut.....	4, 236, 409	2. 07	1. 68	3. 75	1. 99	4, 937, 319	1
(c) New Jersey.....	2, 644, 000	2. 28	1. 10	3. 38	1. 39	4, 169, 974	1, 3
South Atlantic.....	5, 464, 620	1. 81	. 17	1. 98	2. 17	17, 470, 860	1, 2, 6
(a) Coast.....	4, 920, 128	1. 79	.....	1. 79	2. 58	12, 440, 298	1, 2, 6
(b) Interior.....	544, 492	1. 98	1. 74	3. 72	1. 17	5, 030, 562	6
Gulf coast, except Texas.....	4, 585, 013	1. 74	. 12	1. 86	2. 09	25, 172, 078	1, 2, 6
Texas.....	18, 295, 176	1. 64	.....	1. 64	2. 37	12, 355, 925	1, 2, 4
South central interior.....	17, 787, 449	1. 90	1. 53	3. 43	2. 16	5, 446, 277	2, 4, 5, 6
Central interior, east of Mississippi River.....	11, 592, 796	1. 93	2. 72	4. 65	1. 39	39, 748, 367	1, 2, 3, 4, 5
Central interior, west of Mississippi River.....	20, 651, 041	1. 91	2. 53	4. 44	2. 58	19, 294, 929	4, 5, 6
Pacific coast.....	20, 459, 460	3. 24	. 02	3. 20	3. 39	6, 617, 863	5, 7
(a) California.....	13, 188, 195	3. 28	. 03	3. 31	3. 70	4, 768, 054	7
(b) Washington, Oregon.....	7, 271, 265	3. 17	.....	3. 17	2. 59	1, 849, 809	5, 7
Total.....	109, 031, 964	2. 13	1. 20	3. 33	2. 19	138, 786, 352	.....

The average cost of delivering British creosote oil to the principal markets in the United States during the 3-year period was 3.33 cents per gallon, and the corresponding average cost of delivering the domestic product, 2.19 cents. The relation between the domestic and the foreign costs of transportation differs greatly in the different districts. To the South Atlantic area, the Gulf coast and the Pacific coast, the domestic costs exceed the foreign costs, but in the other districts the reverse is the case.

#### PLANT COST OF CREOSOTE OIL.—METHODS OF COMPUTING COSTS OF PRODUCTION

*Allocation of general costs.*—Since creosote oil is a joint product, and since distillation of tar for the purpose of obtaining creosote oil and its joint products is alternative with its distillation for the primary purpose of obtaining refined tar, it is evident that the cost of coal tar, which represents over two-thirds of the total costs in the industry, must be allocated among the several products. The most appropriate method of allocation is on the basis of the relative net value of the products—that is, the value of sales less the costs directly attributable to the given product. If the allocation were based on quantity—that is, treating the tar going into each product as costing the same—the result would be normally to show the more valuable products selling at a profit and the less valuable at a loss.

Certain of the expenses of treating tar are likewise of a joint character and must be allocated according to the value of the products. Other expenses are directly connected with the finishing process for the several individual products, and those connected with creosote oil can be charged directly to that product.

The producers of creosote oil, both in the United States and in the United Kingdom, generally do not attempt to determine the cost of production of any one product of coal-tar distillation. The commission, to establish the cost of production of creosote oil, has found it necessary to apply the principle set forth.

#### TAR AS AN ELEMENT OF COST

Since tar represents about two-thirds of the total cost of producing creosote oil, both in the United Kingdom and in the United States, the cost of producing creosote oil depends largely on the cost of tar. Conversely, however, the cost of tar depends largely on the value or selling price of creosote oil and of the other products of distillation. This is true to a peculiar degree because coal tar is itself a by-product of the manufacture of gas or of coke. — The share of the expenses of those industries which is assignable to coal tar depends on the price that can be obtained for it, which price in turn depends on the values of the various products extracted from the tar. By reason of the fact that the greater part of the British creosote oil is ordinarily marketed in the United States, the British value of tar, and consequently the cost of creosote oil in the United Kingdom, depends in a considerable measure on the price received for the creosote oil in the United States. Prices received for pitch and other joint products are other important factors.

This situation with respect to the cost of tar is the more significant because a large fraction of the production of creosote oil is by concerns which do not buy tar but either produce it themselves or, in the United Kingdom, receive it from tar producers on a cooperative basis, returning to those producers the value of the products obtained less the cost of conversion (including normal return to capital). With these British cooperative concerns the cost of tar is a direct function of the values of the finished products. In the case of creosote oil, manufacturers who are themselves producers of tar, the cost of tar shown in the accounts varies with the policy of the concern; in some cases it is based on the price the producer might expect to get if it sold the tar to others, in some cases on the value actually obtained, or expected to be obtained, from the products, and in some cases on the value of tar for its alternative use as fuel. About 18 per cent of the domestic output of creosote oil is by producers who carry the cost of tar in their books on the basis of fuel value. No foreign producer covered by the investigation computed the cost of tar in this manner, tar not being consumed as fuel in the United Kingdom.

The commission, as the general basis of the cost comparison for creosote oil, has accepted the item of cost of tar as it appears on the books of the several tar-distilling concerns. The results of a different method, using, as the basis of tar cost, the prevailing prices at which tar was sold, are mentioned in the following discussion.

## THE VALUE OF PITCH IN THE UNITED STATES

In the application of the principle of allocating costs according to sales value of the several products, the cost of creosote oil is affected by the value assigned to each other product. In the domestic industry, a question arises as to the value to be assigned to pitch, for the reason that during part of the period covered by the cost investigation certain domestic producers, as already stated, stored large quantities of pitch instead of selling it. The pitch thus stored could not have been sold at the price received for the quantities actually sold. The commission assigned to this unsold pitch a price representing its value as fuel; this has been computed on the assumption that the heating power of pitch was 16 per cent greater than that of bituminous coal, the price of coal being taken at the level prevailing in the given region.<sup>1</sup>

## BASIS OF BRITISH COSTS

It has been shown (p. 17) that during 1929 and 1930 a considerable part of the British output of creosote oil was sold for fuel at a price much lower than that of the product exported to the United States. Following the principle of allocating the cost of tar and other joint costs according to the value of the products, the cost of the creosote oil exported to the United States during these years was considerably higher than that of other creosote oil produced in the United Kingdom. For comparison with domestic costs, British costs have been computed on the basis of the product exported to the United States.

## GENERAL COST COMPARISON

Table 15 shows for the three years 1928-1930 combined, average domestic and British costs on the basis described. The total cost at plant for the domestic product was 10.8 cents per gallon, whereas the cost of the British product exported to the United States was 10.1 cents. Including transportation to the selected markets in the United States, the domestic cost was 13 cents and the foreign cost, 13.5 cents.

TABLE 15.—Comparative domestic and British costs of creosote oil, average for the period 1928-1930

[Cents per United States gallon]

	Domestic cost	Foreign cost (grades for export to United States)
Coal tar.....	7.27	6.64
Conversion—		
Manufacturing expense.....	2.29	2.24
Other expense.....	1.26	1.26
Total cost at works.....	10.82	10.14
Transportation to selected United States markets.....	2.19	3.33
Total delivered cost.....	13.01	13.47

<sup>1</sup> Because of its physical condition, the stored pitch probably could not in fact be sold as fuel at the price computed in this manner, but, on the other hand, if market conditions should change favorably, as the producers of pitch hoped when they stored it, the pitch would be sold for nonfuel uses at a higher price than that used in the cost calculation.

The decline in the price of creosote oil and of other products of coal tar during the latter part of 1929 and 1930 resulted in lower prices for tar and, consequently, in a lower cost of production for creosote oil. This was true both in the United States and in the United Kingdom. Table 16 shows the comparative cost figures for the individual years. In 1928 the domestic cost, including delivery, was 1.26 cents below the foreign cost. There was an excess of domestic over foreign cost in 1929 amounting to 0.14 cent, and in 1930 amounting to 0.36 cent.

TABLE 16.—Comparative domestic and British costs of creosote oil

[Cents per United States gallon]

Creosote oil	Cost at works			Transportation to United States markets <sup>1</sup>	Total delivered cost
	Tar	Conversion	Total		
1928					
Domestic.....	8.19	3.36	11.55	2.19	13.74
Foreign-export grades.....	8.02	3.65	11.67	3.33	15.00
1929					
Domestic.....	7.15	3.50	10.65	2.19	12.84
Foreign-export grades.....	5.86	3.51	9.37	3.33	12.70
1930					
Domestic.....	6.70	3.71	10.41	2.19	12.70
Foreign-export grades.....	6.72	3.29	9.01	3.33	12.34

<sup>1</sup> Not computed separately for each year; figures not always for the 3-year period.

In addition to comparing domestic and British costs of creosote oil on the basis set forth, the commission has made a calculation of the costs on a different basis regarding the value of tar used as material. Instead of using the item of cost of tar as it appears on the books of the several producers of creosote oil, representing in some instances the fuel value, the prevailing price of tar sold for distillation in the several tar-producing areas has been substituted. This procedure increases both the domestic and the foreign costs of creosote oil, but the increase is greater in the domestic cost. In appraising the significance of a cost comparison on this basis, consideration should be given to the fact that in the United States during the period covered by the investigation large quantities of tar were burned as fuel by the producers and that if this tar had been sold for distillation the price of tar to distillers would probably have been lower than it actually was.

For the 3-year period 1928-1930, this method of calculation shows an average domestic cost of creosote oil, including delivery to the selected markets, of 13.78 cents per gallon, and an average British cost of creosote oil made for export to the United States of 13.77 cents per gallon. For the individual years this method of cost comparison shows in 1928 an excess of foreign over domestic costs amounting to 1.46 cents per gallon, in 1929 an excess of domestic

over foreign costs of 0.73 cent, and in 1930 an excess of domestic over foreign costs of 1.29 cents.

In addition to the calculation of British costs of creosote oil produced for export to the United States, a calculation has been made on the basis of the total output of creosote oil by the British concerns covered by the investigation. As already stated, during part of this period, on account of the unfavorable market conditions in the United States, the British producers used or sold a considerable part of the creosote produced, for fuel. When this creosote is taken into consideration, along with that exported, a change occurs in the allocation of the cost of tar and general conversion expenses among the several products, a relatively smaller proportion being assigned to creosote oil, with a consequent lower total cost of that product.

In appraising the significance of this method of calculating British costs, consideration should be given to the fact that, if the usual proportion of the creosote oil produced in the United Kingdom had been exported to the United States throughout this period, the result might have been to reduce the price both of British creosote and domestic creosote in the American market with a consequent readjustment, under the method of allocating costs, of the cost of creosote oil in both countries; moreover, the price of tar in both countries might have been affected, with a further resulting change in the costs of creosote oil, both domestic and foreign.

The average cost of all grades of British creosote oil during the period 1928-1930, computed on the basis of the cost of tar as carried on the books of the several companies, was 12.25 cents per gallon, including delivery to the selected markets in the United States. The domestic cost computed by this method, as already stated, was 13.01 cents per gallon. The domestic cost represents a product averaging somewhat higher in grade than the foreign cost, since the grades of creosote oil used in the United Kingdom, whether for fuel or other purposes, are, on the whole, somewhat lower than the grades made for export to the United States, whereas the latter are comparable with the domestic product.

#### CREOSOTE OIL PRODUCED AT DIFFERENT COST LEVELS

The cost of creosote oil differs materially for different producing concerns. In the United States the range is particularly great because, as already stated, some concerns in their accounts carry the cost of tar at fuel value and others at the price paid for it, which is usually much higher. Table 17 shows the costs in the United States for concerns divided into six groups ranging from those with the lowest to those with the highest cost. The classification is based on cost at works, exclusive of transportation, but the table also shows for each group the cost of transportation, not to all the markets supplied by the group but to the selected markets used in the general cost comparison. (See p. 20.) It also separates the British concerns into two groups; to carry the classification further would result in disclosing individual operations, but it may be stated that the great bulk of the output in the second group distinguished (with a cost

exceeding 9 cents per gallon) was at a cost of less than 12 cents. The British costs shown in this table relate only to the grades produced for export to the United States. The cost calculations are made by the same methods as for Table 15.

TABLE 17.—Costs of production of creosote oil for plants classified according to average unit cost at works, average for the period 1928-1930

[Cents per United States gallon]

Production cost at works	Tar cost	Manufacturing expense	Other expense	Total cost at works	Transportation expense <sup>1</sup>	Delivered cost	Per cent total production
<b>DOMESTIC PRODUCT</b>							
Under 9 cents.....	2.53	3.08	0.79	6.40	3.04	9.44	19.2
Over 9 cents.....	8.41	2.09	1.38	11.88	1.86	13.74	80.8
9 to 10 cents.....	6.75	1.89	1.25	9.89	2.08	11.97	2.3
10 to 11 cents.....	8.52	1.50	.82	10.84	1.92	12.76	21.0
11 to 12 cents.....	8.05	2.02	1.32	11.39	1.52	12.91	21.2
12 to 13 cents.....	8.53	2.36	1.70	12.59	2.57	15.16	20.0
Over 13 cents.....	9.13	3.06	1.85	14.04	1.27	15.31	7.3
Average.....	7.27	2.29	1.26	10.82	2.19	13.01	100.0
<b>BRITISH PRODUCT</b>							
(Grades for export to United States)							
Under 9 cents.....	4.92	1.84	.84	7.60	3.33	10.93	8.4
9 cents and over.....	6.80	2.28	1.30	10.38	3.33	13.71	91.6
Average.....	6.64	2.24	1.26	10.14	3.33	13.47	100.0

<sup>1</sup> To selected markets. (See p. 20.)

This table shows that nearly one-fifth of the domestic product was produced at a cost, according to the methods of tar valuation used by the producers themselves, of less than 9 cents per gallon at works. For this group, which includes chiefly producers who carry the cost of tar at its fuel value, the average cost of tar is very much lower than for the other groups, most producers in which buy tar or carry it in their costs at its market value. The bulk of the production in the United States is at costs ranging from 10 to 13 cents at works. A much smaller proportion of the British than of the American product is produced at a cost at works under 9 cents, but on the other hand, as already stated, very little is produced at a cost exceeding 12 cents per gallon.

#### DOMESTIC COSTS BY DISTRICTS

Table 18 shows the cost of creosote oil produced in the several regions of the United States distinguished on page 10. These costs are based on the same methods as were used for the general cost comparison in Table 15.



TABLE 18.—*Costs of production of creosote oil in the United States, by producing regions, average for the period 1928-1930*

[Cents per United States gallon]

Region	Tar cost	Manu- facturing expense	Other expense	Total cost at works	Transpor- tation expense <sup>1</sup>	Delivered cost	Per cent total pro- duction
1. Eastern.....	8.16	2.24	1.24	11.64	1.50	13.14	15.7
2. Pennsylvania-Ohio-West Vir- ginia.....	5.59	2.26	1.41	9.26	3.02	12.28	29.0
3. Toledo-Detroit.....	8.78	2.00	1.13	11.91	.99	12.90	3.7
4. Chicago (steel district).....	7.23	2.39	1.16	10.78	1.86	12.64	18.8
5. Central interior.....	7.42	2.46	1.23	11.11	1.57	12.68	9.5
6. Alabama-Tennessee.....	9.06	1.43	.83	11.32	1.68	13.00	12.8
7. West of Mississippi River.....	7.84	3.22	1.66	12.72	3.32	16.04	10.5
Average.....	7.28	2.29	1.26	10.82	2.19	13.01	100.0

<sup>1</sup> To selected market. (See p. 20.)

It will be seen that the cost is lowest in District 2 (western Pennsylvania, eastern Ohio, and northern West Virginia) and that this fact is wholly attributable to the low cost of tar in that district; this low cost in turn is explained by the fact that certain of the producers of creosote oil in that district are themselves producers of tar and carry the tar in their costs at its fuel value.

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APPENDIX



## STATISTICAL TABLES

TABLE 19.—Relative quantity of domestic and imported creosote used by the treating plants of the United States

Year	Domestic creosote <sup>1</sup>	Per cent of total	Imported creosote	Per cent of total	Total
	<i>Gallons</i>		<i>Gallons</i>		<i>Gallons</i>
1909.....	13,862,171	27	37,564,041	73	51,426,212
1910.....	18,184,355	29	45,081,916	71	63,266,271
1911.....	21,510,629	29	51,518,706	71	73,027,335
1912.....	31,135,195	37	52,531,295	63	83,666,490
1913.....	41,700,167	38	60,673,192	62	108,373,359
1914.....	37,450,314	42	51,307,736	58	88,758,050
1915.....	46,563,968	55	37,501,007	45	84,065,005
1916.....	52,420,913	55	43,649,931	45	96,070,844
1917.....	64,862,415	78	18,259,141	22	83,120,878
1918.....	54,668,512	96	2,165,736	4	56,834,248
1919.....	61,474,865	90	6,493,974	10	67,968,839
1920.....	61,030,739	86	9,575,680	14	70,606,419
1921.....	49,331,725	64	28,242,307	36	77,574,032
1922.....	52,273,833	60	35,462,238	40	87,736,071
1923.....	66,620,940	52	62,367,297	48	128,988,237
1924.....	80,918,277	51	77,601,533	49	158,519,810
1925.....	80,333,692	47	89,389,985	53	169,723,677
1926.....	92,831,629	49	95,443,114	51	188,274,743
1927.....	130,106,386	59	91,061,509	41	221,167,895
1928.....	140,671,196	63	82,154,731	37	222,825,927
1929.....	134,063,664	59	92,310,563	41	226,374,227
1930.....	145,595,733	68	68,308,688	32	213,904,421

Source: Forest Service, Department of Agriculture, "Quantity of Wood Treated and Preservatives Used in the United States in 1930."

<sup>1</sup> Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar, water-gas tar solution and paving oil.

TABLE 20.—Creosote oil: General imports into the United States by countries

Year	United Kingdom			Netherlands		
	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>			<i>U. S. gallons</i>		
1917.....	25,988,284	\$1,950,716	\$0.075			
1918.....	1,125	862	.766			
1919.....	8,934,045	1,085,617	.122			
1920.....	12,661,527	2,589,331	.205	4,145,712	\$979,439	\$0.236
1921.....	19,466,800	3,115,056	.160	10,403,414	1,295,749	.125
1922.....	22,383,535	2,235,686	.100	14,471,820	1,528,941	.106
1923.....	42,352,723	6,897,368	.163	9,277,700	1,422,521	.153
1924.....	59,594,877	8,992,671	.151	10,324,675	1,611,622	.156
1925.....	36,549,854	4,692,650	.128	30,325,455	3,973,994	.131
1926.....	38,982,648	5,053,401	.130	23,454,374	3,168,693	.135
1927.....	38,270,105	6,230,595	.163	27,975,616	4,467,225	.160
1928.....	41,009,816	6,854,025	.166	18,312,329	2,916,702	.159
1929.....	39,383,991	5,067,042	.129	20,157,187	2,553,870	.129
1930.....	27,484,886	3,207,307	.117	20,736,875	2,433,778	.117
1931.....	13,085,330	1,240,349	.095	9,882,007	931,943	.094

TABLE 20.—Creosote oil: General imports into the United States by countries—Continued

Year <sup>1</sup>	Belgium			Germany		
	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>			<i>U. S. gallons</i>		
1921.....					\$280,948	\$0.094
1922.....	1,537,376	\$184,485	\$0.120	2,993,409	193,804	.081
1923.....	8,478,364	1,153,750	.136	2,406,364	470,337	.152
1924.....	11,054,665	1,744,817	.158	3,094,709	828,528	.125
1925.....	10,017,631	1,317,161	.131	6,634,494	512,835	.122
1926.....	21,724,070	3,007,472	.138	4,200,382	890	.349
1927.....	19,034,169	3,203,425	.168	2,550	628,452	.148
1928.....	21,977,802	3,537,583	.161	4,243,931	212,711	.184
1929.....	17,944,092	2,282,456	.127	1,158,661	36	.131
1930.....	13,794,365	1,585,699	.115	275	99,924	.112
1931.....	11,002,837	1,135,562	.103	891,490		

Year	Canada			Japan			All other countries		
	Quantity	Value	Unit value	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>			<i>U. S. gallons</i>			<i>U. S. gallons</i>		
1917.....	3,089,754	\$233,853	\$0.076						
1918.....	1,543,660	161,693	.105				— 462	\$314	\$0.680
1919.....	2,273,578	278,138	.122						
1920.....	1,610,903	227,624	.141	10	\$6	\$0.600			
1921.....	374,845	64,713	.173				904	152	.168
1922.....	768,442	97,533	.127						
1923.....	996,140	127,417	.128						
1924.....	2,069,073	286,151	.138						
1925.....	914,497	117,214	.128						
1926.....	2,363,905	360,607	.153				990,988	139,334	.141
1927.....	4,169,917	558,309	.134	415,000	68,400	.165	1,797,483	280,268	.156
1928.....	1,475,019	188,238	.128	1,450,547	218,877	.151			
1929.....	1,400,249	167,031	.119	414,781	48,944	.118			
1930.....	1,331,898	170,904	.128	2,671,096	307,159	.115	11,217	1,404	.125
1931.....	701,582	95,381	.125	2,145,494	193,509	.090	7,000	1,000	.142

<sup>1</sup> Figures not available for years 1917 to 1920, inclusive.

<sup>2</sup> Includes for Mexico 990,926 gallons valued at \$139,309.

<sup>3</sup> Includes for Mexico 553,249 gallons valued at \$85,028 and for France, 1,233,933 gallons valued at \$193,801.

TABLE 21.—Creosote oil: Monthly imports into the United States, by countries of shipment

Month	United Kingdom			Belgium			Netherlands		
	Quantity	Value	Unit value	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>
1930									
January.....	4,375,576	\$534,803	12.22	819,000	\$116,708	14.25	2,736,507	\$345,795	12.64
February.....	863,384	96,400	11.17				1,616,683	184,077	11.39
March.....	4,572,674	585,546	12.81	225,000	25,960	11.54			
April.....	4,761,567	571,123	11.99	672,193	76,010	11.31	2,581,059	295,224	11.44
May.....	1,032,913	112,826	10.92	800,000	86,755	10.84	1,913,015	233,220	12.19
June.....	886,785	95,155	10.73	2,897,251	306,699	10.59	4,338,599	529,312	12.20
July.....	4,660,008	524,075	11.25	1,280,603	164,890	12.88	800,000	96,274	12.03
August.....	1,011,296	110,484	10.92	3,398,403	416,246	12.25			
September.....	1,090,132	130,996	12.02	3,451,915	364,306	10.55	2,222,001	261,916	11.79
October.....	3,507,501	367,225	10.47				1,050,000	111,736	10.64
November.....							3,479,011	376,218	10.81
December.....	723,150	78,674	10.88	250,000	28,125	11.25			
Total.....	27,484,886	3,207,307	11.67	13,794,365	1,585,699	11.50	20,736,875	2,433,778	11.74

TABLE 21.—Creosote oil: Monthly imports into the United States, by countries of shipment—Continued

Month	United Kingdom			Belgium			Netherlands		
	Quantity	Value	Unit value	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>
1931									
January.....	2,299,734	232,697	10.12	889,924	94,750	10.65	130,666	14,104	10.80
February.....	2,919,369	267,451	9.16				541,629	52,565	9.70
March.....	3,277	445	13.68	1,348,305	148,314	11.00	832,661	80,092	9.62
April.....	2,284	454	19.88	2,517,515	271,096	10.77	2,301,194	211,794	9.20
May.....	2	5							
June.....	1,111,819	86,423	7.77	479,848	44,470	9.27	2,013,321	192,662	9.57
July.....	2,365,090	229,697	9.71	1,189,990	136,849	11.50	2,765,548	264,262	9.55
August.....				1,532,494	146,207	9.48	1,000,125	89,425	8.94
September.....									
October.....	3,404,824	330,146	9.70				297,863	27,039	9.08
November.....	978,941	93,031	9.50	1,924,761	168,917	8.78			
December.....				1,120,000	126,959	11.26			
Total.....	13,085,330	1,240,349	9.48	11,002,837	1,136,662	10.32	9,882,907	931,943	9.43
1932									
January.....	713,833	69,530	9.74				2,215,790	210,505	9.50

Month	Canada			Japan			All other		
	Quantity	Value	Unit value	Quantity	Value	Unit value	Quantity	Value	Unit value
	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>	<i>U. S. gallons</i>		<i>Cts. per gal.</i>
1930									
January.....	36,152	\$4,227	11.69	220,668	\$25,741	11.66			
February.....	105,444	9,245	8.77				888,264	\$99,015	11.14
March.....	159,704	22,469	14.07	210,000	23,100	11.00	3,226	909	28.18
April.....	123,575	16,643	13.47						
May.....	161,935	21,681	13.33	643,000	84,304	13.11			
June.....	129,648	17,013	13.12	315,461	34,070	10.80			
July.....	132,839	17,827	13.42	218,002	23,544	10.80	8,202	1,045	12.74
August.....	100,374	12,762	12.71						
September.....	83,670	11,039	13.19				1,890	210	11.11
October.....	116,328	14,904	12.89	410,660	45,832	11.16			
November.....	106,518	14,038	13.18	215,000	23,220	10.80			
December.....	75,711	9,066	11.97	438,405	47,348	10.80	1,125	149	13.24
Total.....	1,331,898	170,904	12.83	2,671,096	307,159	11.50	901,707	101,328	11.24
1931									
January.....	79,236	8,658	10.93	216,000	23,328	10.80	4,500	671	14.91
February.....	72,824	8,550	11.74	212,420	22,941	10.80			
March.....	57,761	8,083	13.99	435,000	36,975	8.51			
April.....	80,693	11,344	14.06				2,250	257	11.42
May.....	62,826	8,579	13.66						
June.....	50,334	6,440	12.79	192,000	15,360	8.00			
July.....	77,743	11,042	14.20	227,603	19,831	8.72			
August.....	64,450	7,511	11.65						
September.....	67,694	8,105	11.98	790	85	10.76			
October.....	56,738	7,161	12.62	861,781	74,989	8.70			
November.....	39,137	4,949	12.64						
December.....	52,166	4,959	9.51						
Total.....	761,582	95,381	12.52	2,145,494	193,509	9.02	6,750	928	13.75
1932									
January.....	69,271	6,314	9.11	214,469	18,251	8.51			