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REFINING INDUSTRY

OF THE

UNITED STATES

WITH

List of Refineries, Capacity and Investment

and the

Oil Jobbers of America

By H. G. JAMES

PRICE \$1.00

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1916

THE DERRICK PUBLISHING COMPANY

OIL CITY, PENN'A.

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FOREWORD.

The demand for the article on the refineries of the United States has been so great, that The Derrick Publishing Company presents it in pamphlet form.

It is the first attempt to gather a list of the refineries of the United States, with their location and capacity. There are doubtless some inaccuracies in the list, but since the article was published in the Daily Derrick, those to which the Derrick's attention was called have been corrected. That the refining companies found so few, would indicate the care with which the information was obtained.

The kaleidoscopic character of the business is forcibly illustrated by the fact that most of the corrections came from the completion of new refineries, and the addition to the capacity of others. These give an added refinery capacity of approximately 20,000 barrels of crude daily, more than when the publication of Mr. James' article began. These additions and corrections change somewhat the total figures, which it is impossible to correct without rewriting the pamphlet, and if this should be done other changes would be required in an endless chain.

As a review of the refining industry of the United States the article was complete when first written, and as such is submitted to the public.

THE DERRICK PUBLISHING CO.

THE
OFFICE OF THE
ATTORNEY GENERAL
STATE OF TEXAS
AUSTIN

Refining Industry of United States

The petroleum refining industry is like a kaleidoscope—always changing. Changes come so fast, the man who makes a success at it must be capable of quick action. He must think all the while a little ahead of the game. He who hesitates in the oil contest for success loses his opportunity. Like "The House of a Thousand Candles" it is "A Business of a Thousand Angles," and every angle is a nerve center of the enterprise. It is as "touchy" as a spoiled child. Prices are beyond the control of the manufacturer. They are gee-hawed by the cost of production and the peculiarities of the consuming market. A refiner can't make gasoline without making fuel oil. He can't advance the price of fuel oil beyond the competitive price of coal. The gasoline consumer demands an adequate supply. He growls if prices are high and demands a Federal investigation. Gasoline must bear the burden of manufacture. So gasoline prices are only incidentally and conditionally related to crude prices. The kaleidoscopic nature of the business is illustrated forcibly by the fact that Congress ordered an investigation of oil because prices were "unconscionably" low; the investigation was not actually made until prices were "warrantably" high; and before the report has been issued, prices are on the toboggan again. An Oklahoma refinery contracted for crude at 30 cents a barrel for three years. In a few months the market had advanced several hundred per cent. The contract was broken at the instance of the producers. Two months later only 50 per cent of the output of the field was being taken and the price was nearly back to the contract figure. Such is the Cynthia-of-the-minute character of this fluctuating business.

Steel Profits vs. Oil Profits.

Complaint is frequently made that earnings in oil are unwarrantably large. Fact is scores of other enterprises produce larger returns than oil. Some are so much larger as to sink oil into abject insignificance. Big profits in oil are generally made either by exceptional risk or by huge volume. Generally speaking petroleum profits are not unusual. You never hear of the thousands who lose. The public gets value received. Witness the amount of gasoline procurable at 15 cents; the amount of kerosene for 10 cents; and vaseline for five cents. Net earnings of the United States Steel corporation during the second quarter of this year averaged \$20.70 a ton. This is in excess of one cent a pound. A barrel of 42 gallons of gasoline weighs 277 pounds. If the refiner could realize a profit of one cent a pound, every barrel would return him \$2.77 profit. Therefore, a refinery running 5,000 barrels of crude a day, from which it secured 20 per cent. gasoline (some are getting as high as 30 per cent.), would have a profit of \$2,772 a day, or \$83,160 a month. And then he would have all of his products left. Miss Gasoline is shamed and

humiliated in the presence of this giant of industry, Mon. Sig. Steel. Indeed, refiners would be mighty well pleased if they could net 30 cents a barrel crude run.

And the steel corporation was proved innocent of the charge of monopoly.

Gathering Information.

The writer has been endeavoring the past year to secure a complete list of all oil refineries in the United States. Lists have appeared from time to time, but an effort to check these up shows that none of them has been wholly correct. The information, which we shall present in this article, is based upon letters received from various sources from the Atlantic to the Pacific coast during the past year. It is not claimed that this list is complete or wholly accurate. It is as complete as it has been possible to make it. In some instances information has been difficult to secure. It must be borne in mind that refineries the past two years have been built, as it were, over night. Again a refining plant which might have a charging capacity of 500 barrels today, next month might have a charging capacity of 1,000 or 1,500 barrels. Two or three years ago an independent refinery running 5,000 barrels a day was an exceptionally large concern. Today there are independent refineries with daily running capacity of 15,000 to 30,000 barrels. Their number is rapidly increasing. Some of these are merely what is termed "skimming" plants. Others are complete refineries, turning out all products of refined oils and greases. Western refiners are now turning attention to making lubricants. The field is widening. The Independents are realizing their opportunity. One company can no longer do all the business. It is too big.

There was a time when it was practically true that the Standard Oil Company was the oil business of America. But this is not true today. The Independent movement has been growing by leaps and bounds. The Standard Oil group owns only a small percentage of production and now controls only about one-half of refinery capacity. This brings forcibly to attention the fact that there are now three classes of refiners in this country. First, the Standard Oil Company group with its mighty forces; second, is that large group of big Independents who come in strict and forceful competition with the Standard Oil Company; and third, there is that large element of small Independents who shy with equal timidity in the presence of both the big Independents and the Standard Oil group, and who are in a particular class by themselves. But no one is clothed with prophetic vision sufficient to say what the morrow may bring forth. Some of the greatest factors in the manufacturing

end of oildom today, yesterday were struggling in this third class. There are great opportunities in oil and during the past two or three years practically all that has been necessary to make a success has been native ability, quick action and good connections.

Just now an unprecedented number of new and exceptionally large refineries is being built or is planned for. I cannot say that they will or will not overproduce the market. To a casual observer it would seem that they will. Propheying about oil is hazardous. The prices of automobiles are coming down. I have talked with the representatives of several of the largest motor manufacturers the past week and they tell me the capacity of their factories is sold six months to a year ahead. This means a big increase in gasoline consumption. I presume the situation will work itself out. If there is too much gasoline next year, a period of no new refineries will follow and the twin law of averages and compensation will demonstrate their accuracy again.

But there is one thing of which I am morally certain and that is the petroleum refining business during the next five years is going to pass through the greatest evolution of its history. My opinion is that methods are going to be completely revolutionized and that much larger volumes of crude will be treated and greater precipitation of gasoline secured at a decidedly less expense. The progress in this particular made the past year has been quite remarkable. More than this, much more about oil and its contents and how to treat it is going to be known. Chemists and researchers are constantly amazed over what their experiments develop. "But most refiners are too intent on making money to 'run down' these discoveries.

The Mid-Continent field will continue for some time to be the center of activity. Intense energy is displayed here. Nothing is too big to undertake. The field possesses many natural advantages. Sixty gravity gasoline produced from Mid-Continent crude equals 56 gravity from the far-famed Pennsylvania crude,

and it has been found possible to make just as good lubricants from this oil as from Pennsylvania. So with the immense volume of crude, the probable future supply, the great marketing centers and natural advantages, the first is quite certain to hold its enviable position for a long while. More than 60 per cent of the gasoline of the country now comes from the Mid-Continent region. As it is found possible to make acceptable grades of low gravity gasoline, this volume will increase. The time is near at hand when the standard grade of motor gasoline will be 50 gravity with 410 end point. It may not be generally known, but the bulk of motor fuel sold in one of the largest cities of the United States tests only 54 gravity, but it is a good, satisfactory product.

There need be no fear about the future supply of crude. There need be little apprehension on the part of refiners of a gasoline substitute that will put the refiner out of business. Other liquids may be found that will explode in internal combustion engines, but there is scarcely any likelihood of a competitor of gasoline.

The oil business has had a very extended "infancy," and the expression may be thread-worn, but in point of development it is still in its swaddling clothes. This has been shown by the wonderful progress of the past two years. Even since I began gathering the data for this story so many changes have taken place I have been compelled to revise again and again. New refineries are being projected so fast and old ones are increasing so rapidly that I fear this story will be out of date before it is printed.

I am presenting this statistical information with the hope that it will prove of much interest and value to the trade, and I trust if any errors have crept into these statements that corrections may be sent me for future guidance. It is hoped thereby to finally work out of this effort a complete and reliable directory of American oil refineries.

PETROLEUM REFINERIES IN THE UNITED STATES.

(Showing as fully as possible year built, investment and daily consumption of crude.)

California.		Year Built.	Approximate Investment.	Ap. Bbls. Crude Used D'y.
Name.	Location.			
Standard Oil Company, Point Richards	Point Richards	1902		
Standard Oil Company, El Segunda	El Segunda	1913	\$65,834,200	65,000
Standard Oil Company, Kern River	Kern River	1914		20,000
Union Oil Co., of California, Oleum	Oleum	1895		3,000,000	25,000
Union Oil Co. of California, Avila	Avila			
Union Oil Co. of California, Bakersfield	Bakersfield			
Union Oil Co. of California, Brea	Brea			
Union Oil Co. of California, Los Angeles	Los Angeles			
Union Oil Co. of California, Orcutt	Orcutt			
Union Oil Co. of California, Santa Paula	Santa Paula			
Associated Oil Co., Avon	Avon	1913	1,400,753	12,500
Associated Oil Co., Gaviota	Gaviota	1899	530,567	(b'th pl'ts)
Phoenix Refining Co., Bakersfield	Bakersfield	1902		1,200
Monarch Oil Refining Co., Berkley	Berkley	1910		8600
Pin-al-Dome Refining Co., Betteravla	Betteravla	1911	250,000	1,500
St. Helens Petroleum Co., Brea	Brea			
Puente Oil Co., Chino	Chino	1896		1,000
Paraffine Paint Co., Emeryville	Emeryville	1895		300
			Other plants built since 1895	

Refining Industry of the United States.

American Oilfields Co., Fellows	1912	150,000	8,000
Ventura Refining Co., Fillmore	1915	.....	.....
California-Fresno Oil Co., Fresno	1901	50,000	100
Pacific States Refineries, Fruitvale	1902	90,000	800
Pacific States Refineries, Coalinga .....	.....	.....	250
² Hanford Oil Refinery, Inc., Hanford	1913	45,000	.....
³ Eastern Consolidated Oil Co., Kern River Field	1904	5,000,000	*1,000
Klng Refining Co., Kern River Field	1901	.....	*500
Producers Refining Co., Kern River Field	1904	50,000	150
Warren Bros., Kern River Field	1914	.....	*1,500
⁴ Warren Bros., Rodeo	1903	.....	*800
⁵ General Petroleum Co., Kerto	1913	.....	100
General Petroleum Co., Vernon	1913	300,000	8,000
Asphaltum Oil & Refining Co., Los Angeles .....	.....	.....	500
² Amalgamated Oil Co., Los Angeles	1905	.....	3,000
California Oil & Asphalt Co., Los Angeles	1911	100,000	1,000
Denimore-Stabler Refining Co., Los Angeles	1902	.....	650
Huasteca Petroleum Co., Los Angeles .....	.....	.....	.....
Lincoln Motor Co., Los Angeles .....	.....	.....	.....
Pioneer Roll Paper Co., Los Angeles	1904	80,000	500
Service Oil & Asphalt Co., Los Angeles	1893	.....	800
Shell Co. (Trumbull Refining Co.), Los Angeles .....	.....	.....	.....
S. A. Thompson Oil Co., Los Angeles .....	.....	.....	.....
Yosemite Oil Refining Co., Los Angeles	1898	30,000	600
O'Neal Refining Co., Long Beach .....	.....	.....	.....
Santa Maria Oil Fields, Ltd., Roadamite .....	.....	.....	.....
San Diego A-1 Refinery, San Diego	1911	30,000	.....
Capitol Crude Oil Co., Santa Paula .....	.....	.....	.....
Tulare Refinery, Tulare .....	.....	.....	.....
British California Oil Co., Vernon .....	.....	.....	.....
Hercules Oil Refining Co., Vernon	1900	.....	1,000
Jordan Oil Co., Vernon	1900	.....	300
National Oil Refining Co., Waits	1906	85,000	150
Adalaine, Consolidated Road Oil Co., Maricopa	1910	.....	300
Sunset Monarch Oil Co., Maricopa	1907	.....	*1,500
⁶ American Oriental Co., Martinez .....	.....	.....	6,000
Shell Company of California, Martinez	1915	.....	.....
Richfield Oil Co., Olanda .....	.....	.....	.....
A. F. Gilmore, Sherman .....	.....	.....	.....

Idle California Refinerles

Beckett Refinery, Arroyo Grande .....	.....	.....	.....
Volcan Oil Co., Bakersfield	1901	.....	*400
Capitol Refining Co., Berkeley	1900	.....	*600
More Refinery, Goleta .....	.....	.....	.....
Ensign-Baker Refining Co., Hadley, San Luis	1910	.....	*1,000
Obispo county .....	.....	.....	.....
Buckeye Refining Co., Kern River Field	1901	.....	.....
Barber Asphalt Paving Co., Los Angeles	1890	.....	{ 1,000
Continental Oil Co., Los Angeles	1907	.....	{ 1,400
Guaranty Oil Co., Los Angeles .....	.....	.....	*600
Southern Refining Co., Los Angeles	1900	.....	1,000
General Petroleum Co., Mojave	1914	.....	700
Sunset Oil & Refining Co., Obispo or Ostend	1903	.....	8,000
Producers & Refiners Oil Co., Oil Port, San Luis Obispo Co.	1906	.....	2,000
Pacific Roofing & Refining Co., San Francisco	1903	.....	5,000
Fruzman Refining Co., San Francisco .....	.....	.....	*300
Sunset Oil & Refinery Co., San Pedro .....	.....	.....	.....
California Liquid Asphalt, Hadley, San Luis Obispo Co. ....	.....	.....	{ 450
Columbia Oil, Asphalt & Refining Co., Carpenteria .....	.....	.....	{ 1,000
*—Number of tons of asphalt.	.....	.....	.....
1.—Leased to American Oilfields Co.	.....	.....	.....
2.—Topping plants only.	.....	.....	.....
3.—At point of dissolution.	.....	.....	.....
4.—Lubricating plant operated by Shell Company.	.....	.....	.....
5.—Asphalt and road oil plant.	.....	.....	.....
6.—Operated by Shell Company on short time lease.	.....	.....	.....
7.—Formerly Los Angeles Oil Refining Co.

Utah.

Utah Refining Co., Salt Lake City	1907	\$ 35,000	500
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Colorado.

United Oil Co. (Standard), Florence	1887	500,000	3,000
Florence Oil Co., Florence	1889	200,000	1,000
The Inland Refinery, Boulder	1906	125,000	1,500

Wyoming.

Midwest Refining Co., Casper	1912	18,000,000	12,000
Continental Refining Co., Casper	1915	2,000,000	5,000
Northwestern Oil Refining Co., Cowley	1909	61,000	300
Ohio Oil Co., Greybull	1916	.....	Building
Greybull Refining Co., Greybull	1915	*500,000	2,000

New Mexico.

Oil Refinery, Farmington	1915	20,000	150
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Kansas.

Standard Oil Company of Kansas, Neodesha	1892	1,500,000	8,000
Lesh Refining Co., Arkansas City	1914	30,000	1,200
Kanotex Refining Co., Caney	1906	650,000	800
¹ Chanute Refining Co., Chanute	1907	300,000	2,000
Kansas Co-Operative Refining Co., Chanute	1906	200,000	500
² Kansas Crude Oil Co., Chanute .....	.....	.....	Idle
Uncle Sam Oil Co., Cherryvale	1906	125,000	400
¹ Cudahy Refining Co., Coffeyville	1909	1,400,000	4,500
Kansas Oil Refining Co., Coffeyville	1906	300,000	1,800
National Refining Co., Coffeyville	1907	500,000	5,000
Great Western Oil Refining Co., Erie	1905	754,000	500
Miller Petroleum Refining Co., Humboldt	1906	73,625	500
³ Hutchinson Refining Co., Hutchinson	1915	5,000	150
Petroleum Products Co., Independence	1909	1,500,000	3,500
Kansas City Refining Co., Kansas City	1906	275,000	1,800
⁴ Uncle Sam Oil Co., Kansas City .....	.....	.....	Rebuilding
Eastern Kansas Oil Co., Moran	1905	300,000	300
O.-K. Refining Co., Niotaze	1905	275,000	1,200
Rollin Oil Refining, Rollin	1904	20,000	100
Rosedale Refining Co., Rosedale	1915	25,000	1,000
Wichita Independent Oil & Refining Co., Wichita	1914	20,000	1,000

Missouri.

Standard Oil Company of Indiana, Sugar Creek	1907	\$ 3,000,000	12,000
Willhoit Refining Co., Joplin	1914	120,000	750
St. Joseph Viscosity Oil & Refining Co., St. Joseph	1915	16,000	304

Oklahoma.

⁵ Carter Oil Co., Norfolk	1916	\$ 3,500,000	25,000
Crystal White Refining Co., Allen	1915	10,000	300
Ardmore Refining Co., Ardmore	1914	100,000	4,800
Cosden & Co., Bigheart	1908	80,000	800
Cosden & Co., Cushing	1911	100,000	2,000
Cosden & Co., Tulsa	1912	1,500,000	15,000
Boynton Refining Co., Boynton	1916	45,000	1,000
Continental Refining Co., Bristow	1914	168,000	1,380
Consolidated Oil Refining Co., Cleveland	1913	100,000	650
² Webster Refining Co., Coaltion	1911	.....	Idle
¹ Chanute Refining Co., Cushing	1914	600,000	4,500
Consumers Refining Co., Cushing	1912	864,791	4,500
Cushing Refining Co., Cushing	1912	445,000	3,250
Hillman Refining Co., Cushing	1914	12,000	800
International Refining Co., Cushing	1915	200,000	3,000
⁶ Illinois Oil Co., Cushing	1914	65,000	1,000
⁷ Peerless Refining Co., Cushing	1914	600,000	2,750
⁸ Roxana Petroleum Co., Cushing	1916	1,000,000	10,000
Lawton Refining Co., Lawton	1916	20,000	300
¹ Cudahy Refining Co., Muskogee	1905	95,000	300
Muskogee Refining Co., Muskogee	1905	350,000	2,000
⁵ Oilton Refining Co., Oilton	1916	6,000	300
Capital Refining Co., Oklahoma City	1915	20,000	300
Oklahoma Refining Co., Oklahoma City	1906	280,667	2,000
American Refining Co., Okmulgee	1907	583,109	2,500
Indianahma Refining Co., Okmulgee	1910	1,258,000	3,750
Sapulpa Refining Co., Okmulgee	1915	10,000	800
¹ Sapulpa Refining Co., Sapulpa	1908	749,997	3,500
⁵ Tiger Refining Co., Okmulgee	1916	50,000	1,600
Ponca Refining Co., Ponca City	1912	600,000	3,250
Phoenix Refining Co., Sand Springs	1913	300,000	3,000
Pierce Oil Corporation, Sand Springs	1913	875,000	10,000
North American Refining Co., Pemeta	1915	150,000	2,000
Constantin Refining Co., Tulsa	1911	400,000	6,000
Pan-American Refining Co., Tulsa	1916	75,000	1,500
The Texas Co., Tulsa	1910	350,000	10,000
⁴ Uncle Sam Oil Co., Tulsa	1906	50,000	600
¹ Milliken Refining Co., Vinita	1910	989,800	8,000
Southern Oil Corporation, Yale	1915	60,000	2,000
Sun Oil Co., Yale	1915	100,000	2,500
Webster Oil & Gasoline Co., Yale	1915	17,030	800
Planet Refining Co., Blackwell	1916	.....	500
Mid-Continent Gasoline Co., Tulsa	1916	.....	.....

Louisiana.

Standard Oil Company, Baton Rouge	1910	\$ 6,000,000	20,000
⁶ Federal Oil & Refining Co., Alexandria	1915	150,000	1,000
Pelican Oil Refining Co., Chalmette	1915	25,000	800
Louisiana Oil Refining Co., Gas Center	1913	600,000	1,250
Mexican Petroleum Corporation, Destrahan .....	.....	.....	.....
¹ Freeport & Tampico Fuel Oil Corporation, Mereaux .....	.....	.....	.....
Liberty Oil Co., Ltd, New Orleans	1915	30,000	300
National Oil Works, New Orleans .....	.....	.....	.....
² Corona Oil Co. (Dutch Shell Co.), New Orleans	1916	.....	10,000
Record Oil Refining Co., New Orleans .....	.....	.....	.....
⁵ Developers Oil & Refining Co., Shreveport	1915	250,000	.....
Caddo Oil Refinery, Shreveport	1913	125,000	1,700
Purified Petroleum Products Co., Shreveport .....	.....	.....	500
Shreveport Oil Refining Co., Shreveport	1911	50,000	1,300
³ Consolidated Oil Refining Co., Shreveport	1916	.....	2,500
⁴ American Oil Refinery, Inc., Shreveport .....	.....	.....	150

Refining Industry of the United States.

Texas.

Magnolia Petroleum Co., Beaumont	1902	\$ 3,885,183	25,000
Magnolia Petroleum Co., Corsicana	1898	559,176	3,000
Magnolia Petroleum Co., Ft. Worth	1914	457,840	12,000
¹ United Oil & Refining Co., Beaumont	1903	75,000	300
Central Oil Co., Corsicana	1903	75,000	300
The Texas Co., Dallas	1908	600,000	15,000
The Texas Co., Port Arthur	1902	7,000,000	30,000
The Texas Co., Fort Neches	1906	1,200,000	10,000
Gulf Refining Co., Port Worth	1911	.....	6,000
Gulf Refining Co., Port Arthur	1901	.....	55,000
Producers Refining Co., Gainesville	1915	700,000	13,000
² Houston Oil Co., Houston Heights .....	.....	.....	Idle
Wichita Valley Refining Co., Iowa Park	1914	100,000	1,000
³ Avis Wood Refining Co., Jacksboro	1915	75,000	300
⁴ Petroleum Refining Co., Houston	1916	750,000	Building
Pierce-Fordyce Oil Association, Texas City	1911	1,250,000	3,000
Pierce-Fordyce Oil Association, Fort Worth	1912	1,500,000	6,000
Pure Oil Refining Co., Houston	1916	.....	200
⁵ Orange Refining Co., Orange .....	.....	.....	Idle
Oriental Oil Co., Oriental	1912	140,000	1,000
Dixie Oil & Refining Co., San Antonio	1913	100,000	2,000
Thrall Refining Co., Thrall	1915	100,000	1,000
Panhandle Refining Co., Wichita Falls	1915	100,000	2,000

Illinois.

Standard Oil Company, Alton .....	.....	\$ 3,250,000	20,000
Leader Refining Co., Casey .....	.....	250,000	800
² Consolidated Oil Refining Co., No. 2, East St. Louis	1909	50,000	1,000
³ Consolidated Oil Refining Co. No. 3, East St. Louis	1915	35,000	300
⁴ Anderson & Gustafson, East St. Louis	1916	5,000	200
Idaho Refining Co., East St. Louis	1907	100,000	750
Central Refining Co., Lawrenceville	1908-9	3,000,000	3,000
Indian Refining Co., Lawrenceville	1910	1,320,000	11,000
The Texas Co., Lockport	1911	625,000	5,000
Wabash Refining Co., Robison	1907	250,000	600
Smith Oil & Refining Co., Rockford .....	.....	.....	.....

Maryland.

Standard Oil Company of New Jersey, Baltimore .....	.....	\$ 2,750,000	10,000
Prudential Oil Corporation, Baltimore	1915	1,750,000	4,000
¹⁰ The Intercoastal Oil Co., East Brooklyn	1913	.....	1,500
U. S. Asphalt Refining Co., East Brooklyn	1911	.....	5,000
Red "C" Oil Mfg. Co., Highlandtown .....	.....	.....	.....

New Jersey.

Standard Oil Company of New Jersey, Bayonne .....	.....	\$37,000,000	45,000
Standard Oil Company of New Jersey, Bayway .....	.....	15,000,000	30,000
Standard Oil Company of New Jersey, Jersey City .....	.....	10,000,000	15,000
⁵ Vacuum Oil Co., Paulsboro .....	.....	2,000,000	.....
Galena-Signal Oil Co., Elizabeth .....	.....	7,500,000	.....
Tidewater Oil Co., Bayonne	1879	25,991,598	10,000
Columbia Oil Co. of New York, Bayonne .....	.....	.....	1,000
Valvoline Oil Co., Edgewater .....	.....	.....	.....
Columbia Refining Co., Jersey City .....	.....	.....	100

New York.

Standard Oil Company of N. Y., New York City (4 plants)	1882	\$32,000,000	20,000
Standard Oil Company of New York, Buffalo .....	.....	.....	.....
Vacuum Oil Co., Olean .....	.....	*5,000,000	12,000
Vacuum Oil Co., Lubricating plants, Rochester .....	.....	.....	.....
Mexican Petroleum Co., Mariners' Harbor, New York City .....	.....	.....	.....
Wellsville Refining Co., Wellsville	1901	664,000	800

Ohio.

Standard Oil Company of Ohio, Cleveland	1870	\$ 3,500,000	15,000
Solar Refining Co., Lima	1886	2,500,000	10,000
Canfield Oil Co., Cleveland	1907	150,000	300
Great Western Oil Co., Cleveland .....	.....	.....	400
National Refining Co., Findlay .....	.....	.....	1,000
National Refining Co., Marietta .....	.....	.....	500
Craig Oil Co., Ironville	1890	.....	1,200
Paragon Refining Co., Toledo .....	.....	.....	1,000
Sun Oil Co., Toledo .....	.....	.....	1,000
Lake Carriers Oil Co., Cleveland	75,000	500

Indiana.

Standard Oil Company of Indiana, Whiting	\$25,400,000	60,000
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Kentucky.

¹² Standard Oil Company, Barbourville	Building
¹³ Indian Refining Co., Georgetown

Massachusetts.

Galena-Signal Oil Co., Boston
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Refining Industry of the United States.

Pennsylvania.

Atlantic Refining Co., Point Breeze	1866		35,000
Atlantic Refining Co., Pittsburgh	1862	\$20,100,176	3,500
Atlantic Refining Co. (Eclipse Oil Works), Franklin	1872		8,000
¹¹ Galena-Signal Oil Co., Franklin	1869		.....
Emery Manufacturing Co., Bradford	1888	610,368	1,200
Kendall Refining Co., Bradford	1882	357,688	400
Butler County Oil Refining Co., Bruin	1911	400,000	800
Valvoline Oil Co., Butler			1,000
Valvoline Oil Co., Struthers .....			.....
Amber Oil & Realty Co., Clarendon .....			.....
Clarendon Refining Co., Clarendon		70,000	300
Levi Smith Limited, Clarendon	1884		300
Tiona Refining Co., Clarendon	1886	236,000	400
Canfield Oil Co., Coraopolis	1897	130,000	370
¹² Pittsburgh Oil Refining Co., Coraopolis	1892		1,500
Pennsylvania Oil Products Refining Co., Eldred	1913	227,000	300
Emlenton Refining Co., Emlenton	1891	400,000	500
¹³ Bayerson Oil Works, Erie .....			.....
¹⁴ United Oil Mfg. Co., Erie .....			.....
Freedom Oil Refinery, Freedom			1,500
Pennsylvania Refining Co., Karns City	1903	60,000	100
Starlight Refining Co., Karns City*	1892	60,000	100
Pure Oil Co., Marcus Hook			4,550
Sun Company, Marcus Hook			3,000
Island Petroleum Co., Neville Island			650
James B. Berry's Sons Co., Oil City .....			.....
Continental Refining Co., Oil City			750
Crystal Oil Works, Oil City			500
Germania Refining Co., Oil City		2,000,000	2,500
Germania Refining Co., Rouseville	1892	(both)	(both)
Independent Refining Co., Oil City	1880		*1,000
W. H. Daugherty & Son Refining Co., Petrolia			200
Petrolia Refining Co., Petrolia .....			.....
Gulf Refining Co., Gibsons Point .....			.....
Crew Levick Co. ....			.....
Seaboard Oil Works, Philadelphia .....			.....
Bessemer Refining Co., Titusville			660
Pennsylvania Paraffine Works, Titusville			500
Glade Oil Works, Warren			500
Sunlight Oil & Gasoline Co., Philadelphia .....			.....
A. D. Miller's Sons Co., Pittsburgh	1862	500,000	700
Waverly Oil Works Co., Pittsburgh	1880	400,000	500
Coldwater Refining Co., Raymilton .....			.....
Empire Oil Works, Reno	1886	250,000	800
American Oil Works, Titusville			550
Titusville Oil Works, Titusville	1887		750
Conewango Refining Co., Warren	1899	500,000	400
Cornplanter Refining Co., Warren	1888	960,000	1,000
Mutual Refining Co. Ltd., Warren	1909	166,795	400
Seneca Oil Works, Warren	1893	350,000	500
Superior Oil Works, Ltd., Warren	1901	155,641	320
United Refining Co., Warren	1902	300,000	400
Warren Refining Co., Warren	1890		500
Wilburine Oil Works, Ltd., Warren			1,500
Beaver Refining Co., Washington	1890	115,000	150
Franklin Oil Works, Franklin	1877	20,000	300

Tennessee.

Cumberland Refining Co., Nashville	1915	15,000	400
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West Virginia.

Standard Oil Company of New Jersey, Parkersburg			2,500
Galena-Signal Oil Co., Parkersburg
Elk Refining Co., Falling Rock	1914	\$ 100,000	400
¹⁵ Petroleum Products Co., Jacksonburg			200
¹⁶ Ohio Valley Refining Co., St. Marys	1913	600,000	1,000
¹⁷ Indian Refining Co., Staunton	1916		Building

Arkansas.

¹⁸ Fort Smith Refining Co., Fort Smith			Idle
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*—Estimated.

¹—Merged with Sinclair Corporation.

²—Not operating.

³—Patented process.

⁴—Leased on short time contract to Mid-Continent Refining Co.

⁵—Building.

⁶—Formerly New State Refining Co.

⁷—Formerly Jane Oil & Gas Co.

⁸—Formerly Indian Refining Co.

⁹—Being reconstructed.

¹⁰—Handles distillates from U. S. Asphalt Refining Co.

¹¹—300,000 bbls. of lub. annually, Galena plants.

¹²—Merged with Robinson Oil Corporation.

¹³—Compounding plant.

¹⁴—Devoted entirely to compounding lubricating oils and distributing refined oils.

¹⁵—Formerly High Grade Petroleum Refining Co.

Petroleum Refineries in the United States.

State.	No. of Refrs.	Estim'd Bbls. C'de	Estimated Inv't'm't.
*California	76	211,300	\$ 81,000,000
Utah	1	500	35,000
Colorado	3	5,000	825,000
Wyoming	4	34,000	18,561,000
New Mexico	1	150	15,000
**Kansas	21	34,250	8,252,000
Oklahoma	41	1,055,075	17,500,600
Missouri	3	13,000	3,136,000
Texas	23	179,800	47,350,000
Louisiana	16	42,150	7,750,000
Illinois	11	39,650	8,600,000
Indiana	1	60,000	26,400,000
Ohio	10	30,900	6,600,000
Pennsylvania	56	109,470	40,000,000
New York	11	45,000	50,000,000
New Jersey	10	111,000	105,600,000
West Virginia	6	4,500	2,250,000
Maryland	5	20,500	5,250,000
†Kentucky	2	.....	.....
Tennessee	1	.....	.....
Total	302	1,043,245	\$428,124,600

Idle

Building

Total active

*—19 plants not operating.
 **—If present plans materialize, Kansas' refining capacity will be increased 50 per cent during the next year.

Of the 1,043,245 bbls. a day capacity, approximately 500,000 is owned by the Standard Oil Company.

Total daily refinery capacity 1,043,245 bbls.; daily crude production 1915, 834,000 bbls.

†—When the Carter Oil Co., Roxana Petroleum Co., Tiger Refining Co., and Oilton Refining Co. complete their plants, Oklahoma refineries will be using 145,000 bbls. of oil a day. A number of established plants are materially increasing their capacity.

‡—One building; other not operating.

Concrete Facts.

There are 302 refineries in the United States.

Total capacity of refineries is in excess of 1,000,000 bbls. a day.

Total daily crude production in 1915 was 834,000 bbls. a day.

If it were attempted to operate all these refineries at full capacity, there would not be enough crude to keep them going.

Of the 1,000,000 bbls. capacity, the Standard Oil Company is credited with 495,000 bbls. It is building additional refineries.

In this list of 302 refineries 11 are in course of construction and 26 are idle, leaving 265 in active operation. An additional list shows 40 new refineries building or projected. They will bring the refinery capacity of the United States up to 1,193,245 bbls. a day or more.

Other refineries are talked of and some will probably be built during the coming year in addition to those listed.

The total investment in oil refineries in the United States is estimated to exceed \$428,000,000.

To this might properly be added the amount invested in pipe lines, which would probably aggregate over \$200,000,000, making a grand total of over \$628,000,000.

It is estimated pipe line systems in and from the Mid-Continent field agree-

gate approximately \$100,000,000 gross valuation.

Casinghead gasoline is not taken into consideration in these figures. But it does affect materially refinery output.

No oil is produced in the State of New Jersey, but more money is invested in refineries there than in any other State.

There are 57 active refineries in California and 19 idle plants, making a total of 76.

It is not claimed these figures are absolutely accurate. They are as nearly accurate as it has been possible to ascertain. Letters were sent to every refinery in the United States asking for information, and the list has been checked over many times. A few refiners refused to give information and some did not reply, accounting for the blank spaces.

In some States, as in Oklahoma, Kansas, Missouri and Texas, these figures represent the actual amount of crude used daily by the refineries. In some of the other States the figures represent the charging capacity of the refinery.

It costs 11 cents a barrel to pump crude oil from Oklahoma to Chicago, a distance of 700 miles, and 16 cents a bbl. to pump crude oil from Oklahoma to the Gulf, a distance of 500 miles.

Gasoline Production.

The Federal Trade Commission recently announced that, according to reports made to it of gasoline manufactured in 1915, the Standard Oil Company produced 681,721,716 gallons and independent refineries reporting made 393,671,343 gallons, or a total of 1,075,393,150 gallons. If the Standard Oil Company were handling 495,000 bbls. of crude a day and getting 20 per cent of gasoline, as present capacity figures seem to suggest, it will make this year 1,517,670,000 gallons of gasoline, or more than twice as much as it made in 1915.

In the new order of things refiners are fast becoming not only manufacturers, but producers, transporters and marketers also. The producer, holding them up for exorbitant premiums when crude was scarce, forced them to become producers; the heavy transportation rates charged by railroads and many annoying delays in delivery, compelled them to build their own pipe lines and buy their own tank cars, so that Mid-Continent refiners now own approximately 2,000 miles of pipe lines and about 8,000 tank cars. Strife and marketing annoyances have caused many refiners to establish their own selling and distributing stations, so that now from Maine to California refiners own thousands of retail gasoline stations, which have become noted for their architectural attractiveness. The total result is that conditions are improving rapidly. Some profess a vision of a dawned day when the producer will sell his oil to the independent refiner on the same basis that he sells to the big pipe lines, and that instead of excessive premiums he will look upon the refiners who provide a market for 150,000 bbls. a day of his crude product as his friends and not his enemies to exploit. The railroads who

are paid millions of dollars annually in freight on oil, to say nothing of other large business, are coming to court petroleum trade; and the oil jobber and the refiner have already come to greasy pastures and shady nooks where they lie down in peace together, having found there is no profit or pleasure in quarrelling and "doing" each other.

New Refineries Under Construction.

The remarkable growth of the refining industry is no more aptly illustrated than in the statement that at the present time there are approximately 302 refineries in the United States, representing the growth of the business of the last half century. According to a published statement, there were only 181 in 1914. At the present time there are also 40 new refineries either in course of construction or authorized by regular charter to begin business. While a majority of these companies have been organized to operate in the Mid-Continent region, the list embraces pretty largely the entire country, extending from Baltimore, Md., to the Gulf of Mexico and in the far northwest. While these new refineries are being built, the capacity of old plants is being increased to even a greater extent. Probably no other industry in the United States has witnessed such a marvelous increase in its production as the oil refining business. This has been caused very largely by the wonderful development of American automobiles.

One of the surprising features of recent petroleum refining development has been the vast amount of capital the industry has attracted and the unexpected places refineries have been built. It is not a far stretch of fancy to imagine every State after a while having one or more refineries. Think of the south becoming an oil refining center. Texas and Louisiana snatching away from Pennsylvania and Ohio their oleaginous laurels. Now comes Alabama boasting it is to have an oil refinery, and Tennessee. Already 20 or more States have refineries, and nearly every State has a number of grease-making plants. Next we may expect refineries in Florida and Maine. Authorities estimate that since the "Big War" began the oil business has drawn to its industrials \$432,293,000. A great deal of this has gone into the refining branch of the business.

Among the plants now being built or for which charters have been taken are the following:

Oklahoma Refining Co. is contemplating the erection of a skimming plant at Ringling, Okla., a railroad center for the Cushing pool.

The Milliken Co., incorporated in June, or since the former Milliken Refining Co was merged with the Sinclair Oil & Refining Co., is authorized to refine, market and distribute crude oil and its products. The new company is incorporated for \$1,000,000. It has just purchased a 150-acre site at Arkansas City, Kan., and will erect a 10,000 bbl. plant.

The Roxana Petroleum Co. is now engaged in building a 10,000 bbl. plant, special topping process, at Cushing, Okla.

The Gasoline Corporation announces that it will erect several plants in Oklahoma to produce gasoline from distillates.

J. E. Crosbie, president of the Central National bank, of Tulsa, Okla., and one of the largest individual oil producers in the Mid-Continent field, authorized the announcement that he, in connection with other producers, will build a large refinery in the immediate vicinity of Tulsa and that work will commence at once. He said that he expected F. A. Gillespie will be one of the directors and officers of the company.

The Cumberland Refining Co., chartered at Nashville, Tenn., capitalized at \$25,000, is investigating the desirability of locating a refinery at Augusta, Kan.

It has been publicly stated that the Empire Gas & Oil Co. will erect a refinery at Wichita, Kan.

The Antilles Oil Co., of New York, incorporated under the laws of Delaware, is capitalized at \$5,000,000. The incorporators are J. F. Curtin, S. A. Anderson and H. O. Coughland, all of New York City.

Washington Refining Co., Cedar Rapids, Iowa; capitalized at \$90,000; incorporators, Luther A. Brewer and H. J. Archter.

Warren, Pa., capitalists, with \$50,000 capital, propose building a 3,000 bbl. plant at Clarendon, Pa.

Announcement has been made that the Gas Engine Efficiency Co., of St. Louis, Mo., will erect a refining plant in that city.

The Standard Oil Company has started work on a new refinery at Barbourville, Ky.

The Petroleum Refining Co., incorporated for \$1,000,000, by authority of Fred C. Smith, J. S. Cullinan, James L. Autry, W. C. Hogg, T. P. Lee and E. F. Woodward, is to build a refinery on the ship channel six miles southeast of Houston, Texas.

Robert Ligon, manager of the Wichita Valley Refining Co., at Iowa Park, Texas, has contracted to erect a refinery at El Paso, Texas.

The Dutch-Shell Co., under the title of Corona Oil Co., is building a refinery at New Orleans, La. It is stated this plant will use a skimming method similar to the Trumbull patent.

The Consolidated Oil Refining Co. is building a 2,500 barrel plant at Shreveport, La.

It is announced the Indian Refining Co. is erecting a refining plant at Staunton, W. Va.

The Wyoming Producing and Refining Co. has been incorporated under the laws of Delaware; capital stock, \$1,000,000; incorporators, S. A. Anderson, S. B. Howard, J. F. Curtin, all of New York City.

The Crew-Levick Co. has purchased a tract of 50 acres on Petty's Island in the Delaware river, and will build a large refining and oil exporting plant there.

The Northwestern Oil & Refining Co., incorporated at Cheyenne, Wyo., with a capital of \$500,000; incorporators, R. J. Messier, Fritz Marquardson, S. O. Foxworthy, E. Morrell, C. C. Mondoe, Wil-

Ham Parr, W. S. Hurlbut, Karl J. Wagner, W. W. Butan, C. H. Tomcraay, Nick Saracene and James Brazzolaro, all of Denver, Colo. This company proposes to develop oil claims and to refine oil at Salt Creek in Natrona county and in Johnson county, Wyoming.

The New Process Gasoline Co. has been incorporated at Wilmington, Delaware; capital stock, \$500,000; incorporators, H. E. Latter, N. P. Coffin, and C. C. M. Egner.

Plans are being made whereby Dr. Rittman and business associates of Pittsburgh, Pa., are to join forces with California oil interests and go into the refining business in California in a large way.

The El Merito Refining Co. has been organized to construct a plant at Santa Paula, Ventura county, Cal., about 40 miles from Los Angeles. R. M. Dunham, organizer of the company, has a new refining process by which he asserts he can make 95 per cent of gasoline from the higher grades of Ventura county oil. This company has a Rittman license also.

The Gulf Refining Co. will erect an oil refining plant at New Decatur, Ala.

The Shreveport & Mexican Fuel Oil Corporation will build a refining and storage plant on its Saxonholm property in Louisiana, which will be second only to the Standard Oil Company's plant at Baton Rouge.

The Wyatt Oil & Refining Co., of Douglas, Wyo., is to erect an oil refining plant.

The Duluth Refining Co. is constructing at Sapulpa, Okla., a refinery of 1,000 bbls. daily capacity to manufacture gasoline only. The new Landes process of distillation will be employed.

An oil refinery with a capacity of 2,000 barrels a day will soon be in operation in Wichita, Kan. This company will handle oil from the Eldorado and Augusta fields. The incorporators of the company are H. Kaufman, J. W. Craig, Guy Baysinger and W. A. Stout.

The Standard Oil Company of Indiana, has selected a site for a new refining plant at Greynull, Wyo. The first unit with be 20 stills. It will be an up-to-the-minute model. The Burton process of refining will be used. The new plant will take from the Greynull Refining Co. the residue that is left after the gasoline and kerosene are extracted and convert the same into the many products that are made from crude oil.

L. L. Marcell, of Chanute, Kan., former secretary and treasurer of the Chanute Refining Co. which recently sold to the Sinclair Oil & Refining Co., Walter Campbell, of Tulsa, Okla., former purchasing agent of the Chanute Refining Co. and recently with the Sinclair Oil & Refining Co., and others, have organized the Economy Oil & Gas Co., have acquired 30,000 acres of leases in Kansas and Oklahoma, and announce that a refinery is to be built as soon as the material can be had. The capital stock of the Economy Oil & Gas Co. is \$300,000.

The Pan-American Petroleum Co. has finished a plant at Tulsa, Okla., which has a charging capacity of 2,000 bbls.,

but it is announced that this will be increased to 4,000 bbls. in the near future.

The Laurel Oil & Gas Co., general offices in Philadelphia, Pa., contemplates the erection of a 2,000 bbl. refinery in Oklahoma.

The new refinery at Baltimore of the Inter-Ocean Oil Co., of New York, is to be erected at Curtis Bay, instead of Canton. Storage tanks will be erected on the Canton side and the crude oil will be carried across the harbor to the refinery, which will be built on a 105-acre tract belonging to the U. S. Asphalt Refining Co., an Inter-Ocean subsidiary. Work on a pipe line from the Maryland Pipe Line Co. to the site of the storage tanks has already begun. The new refinery will use Mid-Continent, Illinois and Mexican crude.

The Marion Refining Co., Claremore, Okla., has been organized with \$250,000 capital, by G. W. Fry, A. S. Nelson and A. M. White.

Home Oil Refining Co., Yale, Okla., capital, \$10,000; incorporators, Thad Spencer, W. O. Croy, A. E. Sloan and others. A site has been purchased and work started.

The Wichita Independent Oil & Refining Co. has just purchased a 20-acre site at Wichita, Kan., and will erect thereon a 2,000 bbl. refinery to replace its present small plant in that city. The company is completing a well in the Eldorado field which is swabbing 1,600 bbls. a day. It is the intention to build a pipe line from this lease to the proposed new refinery, 35 miles. The company markets its entire output through its own stations.

Refineries Building or Projected.

Name.	Location.	Capacity Bbls.
Northwestern Oil & Refining Co., Salt Creek, Wyo.		500
Wyoming Producing & Refining Co., Wyo.	
Wyatt Oil & Refg., Douglas, Wyo.	
Midwest Refg. Co., Grass Valley, Wyo.	
Ohio Oil Co., Greynull, Wyo.	
Milliken & Co., Arkansas City, Kan.		10,000
J. V. Foster, Eldorado, Kan.		4,000
Craig, Kaufman, et al., Eldorado, Kan.		2,000
Empire Oil & Gas Co., Wichita, Kan.		10,000
Uncle Sam Oil Co., Kansas City, Kan.		Reb'd
Marion Refining Co., Claremore, Okla.	
Home Oil Refining Co., Yale, Okla.		500
Roxana Petroleum Co., Cushing, Okla.		10,000
Duluth Refining Co., Sapulpa, Okla.		1,000
Crosbie & Gillespie, Tulsa, Okla.		3,000
Shreveport & Mexican Fuel Oil Co., Saxonholm, La.	
Federal Oil & Refining Co., Alexandria, La.		1,000
Corona Oil Co., New Orleans, La.		10,000
Developers Oil & Refining Co., Shreveport, La.		2,500
Consolidated Oil Refining Co., Shreveport, La.		2,500
American Oil Refinery, Inc., Shreveport, La.		150
New Orleans Refining Co., New Orleans, La.	
United Oil & Refining Co., Beaumont, Texas		Reb'd
Petroleum Refining Co., Houston, Texas	
Mr. Mineros, Petrolia, Texas		1,000
Standard Oil Co., Barboursville, Ky.	
Indian Refining Co., Staunton, W. Va.	
Crew-Levick Co., Petty Island, Philadelphia, Pa.	
Inter-Ocean Oil Co., Curtis Bay, Md.	
Gulf Refining Co., New Decatur, Ala.	

Robert Ligon, El Paso, Texas	100
Yale Refining Co., Yale, Okla.....	150
Superior Refining Co., Yale, Okla.....	150
Katy Refining Co., Yale, Okla.	150
Wichita Independent Oil & Refining Co.	
Wichita, Kan.	2,000
Total number of refineries, 40.	
Estimated new capacity, 152,400 bbls.	

Marketed Petroleum.

Reports issued by the United States Geological Survey touching the amount of petroleum marketed during the first half of 1916 indicate a slight decrease compared with the corresponding period in 1915. It is difficult to account for any such conclusion. In fact, those closely in touch with the situation in the middle west place little credence in the statement. It is just possible the figures are correct, taking the entire country into consideration, but even this is doubtful. The doubt is based upon the fact that there are 600,000 or 800,000 more automobiles now than a year ago; that refining capacity has been increased 50 per cent or more during the past 12 months; that every refinery has been running full blast; that weather conditions have not been more favorable all over the country to motor for years than they have been this summer; and the further fact that the Mid-Continent field was able to find a market for its entire crude output until the volume exceeded 400,000 bbls. a day, whereas last year millions of barrels of crude were placed in storage on a smaller production. There never has been such a volume of gasoline and motor fuel manufactured in this country as there has been this year—and yet up until this time it has practically all found a market. Only large companies carry any appreciable amount of gasoline in storage. There is every indication that the figures of the United States Geological Survey are incorrect. In further evidence of this contention exports of gasoline in May of this year were 29,734,789 gallons as compared with 19,231,753 gallons in April. In June exports of gasoline jumped to 34,651,800 gallons, or almost twice as much as in April. The total exports of gasoline for the fiscal year 1916 ending June 30, were 287,219,755 gallons, compared with 241,008,306 gallons in 1915, and 185,578,776 in 1914. These figures seem to support the claim of increased consumption of petroleum this year, notwithstanding the statement of the Geological Survey.

The refining of crude oil has undergone a remarkable change during the past 18 months; probably a greater evolution than has marked any other period of equal duration in the history of the business. There have been several contributing causes. First of these might properly be named Cushing, with its great supply of high grade crude. This presented peculiar possibilities to refiners. Second was the remarkable growth of gasoline consumption. This necessitated devising means of producing more motor fuel from crude. The result has been a larger quantity at lower gravities. But the quality of these lower gravities has been vastly improved. Two years ago the basic gravity of motor gasoline was 60 to 64 de-

grees. Today 58 gravity is most generally used. Very little 60-61 gravity gasoline is sold any more. On the other hand, there is a general tendency toward 54 to 56 gravity gasoline—it used to be called naphtha, and is yet to a considerable extent, but it will not be long until everything above 50 gravity will be known as gasoline. The consumer of 68-70 gasoline must pay 25 cents a gallon at the Kansas or Oklahoma refinery.

The truth of the matter is that refiners have suddenly learned that gravity alone does not make a motor fuel. Low gravity gasoline cannot be used for dry cleaning, but low gravity gasoline, properly treated, makes a better motor fuel. The difference is in the end point. Consumers, like refiners, are just beginning to appreciate what end point means. The refiner is treating his oils far more intelligently and scientifically than formerly, proving conclusively the need and value of a competent research department which is now planned, after much agitation, by the Government. The possibilities of petroleum, it is firmly believed, have only been hunted at.

Necessity, we have long been told, is the mother of invention. Necessity drove the refiners to a better knowledge of the business of refining crude oil. In this field in particular, the price of gasoline at the factory has exceeded the local selling price at place of distribution. While the manufacturer was able to sell his output in distant fields, he became concerned over the ability of the jobber to hold on until conditions adjusted themselves again; he feared the jobber, like the cow that learned to eat sawdust, would succumb about the time conditions changed and the refiner needed him again for a marketer.

So the refiner began studying how he could make a lower gravity gasoline that he could sell the jobber at a price giving him a margin of profit.

The refiner surprised himself. To his amazement he discovered it was possible to make a 57 gravity product just as good as, or better than, many 60 gravity gasolines placed on the market. To illustrate: Taking a 40 gravity Cushing crude, a first-class 58 gravity gasoline is made by starting the initial at 125 and cutting the end point at 410. Now let us suppose the initial of this same treatment is 140 and the end point 460, you will secure a large quantity, but a far inferior product. In other words, a 58 gravity gasoline as first described above is much superior article than a 60-61 with an initial of 130 and end point of 435. Today it is possible, for instance, to take a Cherokee crude, less light content, and make a really superfine grade or 57 gasoline with end point of 360. The gravity comes down quicker. So much depends upon the boiling point that gravity after all is of minor importance as gasoline is now made.

In addition to this the refiner came to the necessity of furnishing the trade with a low gravity product that in extreme cases could be substituted for gasoline. This resulted in the appearance of what has come to be known as "greaseless naphtha." It proved simply one more step in the effort to save every-

thing in oil except the smell. It was found by taking the steam still butts and running them through the fire still a very acceptable substitute could be produced. In fact, retailers found that this greaseless naphtha gave quite general satisfaction as a moderate priced motor fuel. Large quantities of it have been sold during recent months. All greaseless naphtha is not made in this manner, however; some is being marketed as low as 50 gravity. It is claimed there is very little carbon and more heat units than in ordinary gasoline. While it may not ignite quite so readily in winter as high gravity gasoline, car owners who used it all last winter report they had no unusual difficulty starting their cars. This product dries clear, without any trace of oil, in from 10 to 20 minutes.

All this leads us down to this declaration: That he is an unwise refiner who does not give close attention to the scientific development of his business. The impossible thing today may be the telling factor tomorrow. Webster tells us history "abounds in false facts." He could not have spoken more truthfully if he had applied his axiom to oil refining. There is probably no other great and important industry so imperfectly understood. There are great possibilities in it for the trained young man of studious habits and possessed of engineering and investigating proclivities.

Unknown Land of the Future.

It is not possible to portray the future. Two years ago it was confidently believed refining was being overdone, and temporarily there was a flood of gasoline which sent prices to ruinous depths. But that period of depression was of comparatively short duration. Then came a few months of record prices. Conditions the past year have not been conducive to refinery building. It is a recognized fact that new refineries are not built on high priced crude, or when there is a scarcity of crude. It is a striking commentary that periods of large refinery construction have usually been contemporary with low priced refinery products. As evidence of this some 15 plants were erected in the Mid-Continent field during 40-cent crude, 6-cent gasoline and 1½-cent kerosene, and all old plants practically doubled in capacity. Since \$1.55 crude and 20-cent gasoline, it might truthfully be said there has been no refinery construction. Two fair-sized plants started before crude reached \$1.55 are not yet completed. One or two small refineries have been built but they have not been large enough to materially affect the market. It has been almost impossible the last year to secure prompt delivery of material. One 1,500-bbl. plant has been a year building. Then, too, there has been an almost unprecedented shortage of tank cars. Men have been afraid to embark in the business for fear that they would not be able to secure cars to market their output. The Union Tank Line Co. placed orders months ago for 2,000 additional cars and is 500 cars behind in delivery. It can't meet the demand for cars. Another thing that deters refin-

ery construction in times of high crude market is the insistence of producers upon cash payment and excessive premiums, whereas in times of overproduction the refiner can buy under the market at his own terms.

It is undoubtedly safe to say, taking the business as a whole, that refining of crude oil in itself is not an exceptionally profitable business. There are scores of plants that have been operating for many years on a close margin of profit. "Lean years" are so much more frequent than "fat years," that the refiner finds himself constantly drawing upon the profits of the "fat years" to carry him over the "lean years." The fabulous profits so much talked of are made, almost without exception, by combining several branches of the industry, such as producing, piping, refining, transporting in private tank cars and direct marketing, and the aggregate profits, especially in cases of unusual luck in drilling in gusher wells, startle the observer. But remember this: Such profits come only after huge investments. The fortunes made in Mid-Continent refining were built on solid gold foundations, representing millions of dollars. No truer saying was ever printed than this: "Them that has gits." Josh Cosden and Harry Sinclair proved their ability in oil. Then they could command millions for development. It is true in all things that "Like begets like." "Plant gold in an oil field and you get a harvest of gold in return,"—if it's a good season.

The Jobbers Inning.

An impression prevails that 1917 is going to be the jobber's inning period. The oil business, like many other things, runs in cycles. Already refiners are beginning to hedge and prepare for another of the inevitable seasons of congestion and low prices. Why these times must come, no one seems competent to explain, but that they do come is a matter of record. The strange thing about it is that the periods overlap each other so far that it is almost impossible to tell when and where one begins and the other ends. A year ago this time gasoline was a drug on the market at five to six cents a gallon. Suddenly there was a shortage, and prices shot skyward. At that time 60-61 gravity was called gasoline. During the past six months there has been a spectacular scramble among jobbers for gasoline. Directly in the midst of this shortage a change is felt. Like one laughing with joy, suddenly chilled with fever. The other day there was a dearth of tank cars; then all at once it is discovered there were tank cars to be had. Then there was a dearth again. When the crude market was advancing by leaps and bounds, marketers of gasoline stumbled over one another to place orders for supplies for months in advance, regardless, almost, of price. Later some of these same western marketers testified before the Federal Trade Commission that they were only able to weather the storm by virtue of the fact that they realized a profit on these early orders as the market afterward advanced, and because of

the further fact that refiners sold them gasoline several cents a gallon cheaper than they could sell it in other markets. That, I submit, was a magnificent display of cooperation. It cost some refiners \$10,000 to \$20,000 a month. What a contrast to those other days! Is it any wonder a kindly feeling now exists between jobber and refiner?

Now the crude market is again overproduced; only 50 per cent of the output is being taken; the price has been cut 50 cents a bbl.; premiums have been discontinued—and jobbers are placing orders for immediate needs only. They never buy ahead on a receding market. New refineries are springing up "everywhere" in bewildering numbers.

The effect of all this is instantly noticeable. In spite of the tremendous demand so far this summer, there is a noticeable falling off in orders and prices are weaker than they have been for months. And directly in the midst of this unparalleled time of prosperity, refiners are beginning to curtail their runs, reduce their stocks and get ready for a season of quiet in marketing circles. The refiner has learned his lesson; he is not going to hurt himself again by madly overproducing. The prompt action of refiners in preparing for changed conditions is a hopeful sign. We contend that the best interests of the country demand the right to these men to meet and agree to limit their output to the market.

Refinery Overproduction.

The writer confidently believes the crude depression is going to be of short duration. But what effect is the harvest of new refineries going to be? Present refineries will be able to overproduce the market this winter. This is forcibly illustrated by the fact that in face of the enormous consumption of gasoline this year, some refineries are compelled to curtail operations when, under ordinary conditions, there would be a shortage until snowfall. If refiners begin storing early this fall, there will be such an enormous amount of gasoline put into tanks next winter, prices will necessarily be depressed. At present the Roxana Petroleum Co. is erecting a 10,000 bbl. plant at Cushing; Cosden & Co. are increasing their capacity at Tulsa by 29,000 bbls. a day, which will make it the largest independent refinery in the world, and equal in size to almost any refinery operated by the Standard Oil Company; the Pan-American Refining Co. is completing a 1,500 bbl. plant at Tulsa; the Mid-Continent Refining Co. is able to start up a new 1,000 bbl. factory at Boynton; the Wichita Independent Oil & Refining Co. is doubling its capacity; the American Refining Co. at Okmulgee is installing additional stills and in a few weeks will have more than doubled its output, which has heretofore been about 2,000 bbls. a day of crude; the Phoenix Refining Co. will soon have a daily crude capacity of 4,000 bbls. against 2,000 bbls. at present. John T. Milliken, who recently sold his 6,000 bbl. refinery at Vinita, Okla., to the Sinclair Corporation, has completed arrangements to erect a 10,000 bbl. "petroleum distillery" at Arkansas City,

Kansas. More than 100,000 bbls. refinery capacity will have been added in a few months. The Standard Oil Company has been installing Burton stills in all of its refineries, largely increasing its output of gasoline. The Midwest Refining Co. has more than doubled its capacity in Wyoming. New plants have been built at Baltimore. One is projected for Philadelphia. Sinclair & Co. are to build at St. Louis and Chicago. The Doheny interests are planning a large refinery in Kansas. Some of these are going to scratch gravel; they can't all get Cushing crude; those that have to use low gravity crude will find it impossible to compete. There will come bad sledding. There will not be enough high grade crude to go around. A year ago the independents in the Mid-Continent field were using 86,000 bbls. of crude a day; now they are using 150,000 bbls. per diem.

This is going to mean a tremendous increase in gasoline production in 1917. It is going to mean a large proportionate increase in gasoline than the same still capacity would have meant two years ago, owing to the ability of the refiner to reduce a greater percentage of motor fuel than formerly. It would seem certain that many additional refineries at this time must mean a great overproduction of gasoline next year, for, as stated, unquestionably vast quantities of the product will be placed in storage during the coming winter months. Three Mid-Continent refineries still hold in tanks several million gallons made during the lull of last winter.

The question is whether the trade can absorb the increase. That depends. If price remains high, it is very doubtful; if the retail price recedes, prodigality of use will follow, and consumption will increase accordingly. There is no question but the consumption per car this year is less than it was last year. Wasteful and lavish use are important factors in demand. These do not obtain in periods of exceptionally high prices; they do obtain in times of excessively low prices.

Percentages of Gasoline Content.

There is a marked difference in gasoline content of various crudes. Crude from different parts of the same pool may vary several degrees. The gasoline content of crude in a new pool may decrease 10 per cent as the production of such pool becomes settled. For instance, some refiners are getting as high as 30 per cent gasoline at the present time from Cushing crude, while other refiners, securing their crude from another part of the same pool, are getting as low as 22 per cent. The average yield of gasoline from Kansas crude last year was about 12 per cent. This year, by reason of the deeper sand oil produced in Butler county embracing Augusta and El Dorado, the average yield in Kansas will be approximately 18 per cent.

The following table shows the percentage of gasoline contained in crude produced in the various districts in the Mid-Continent field:

Kansas.	
Per Cent of Gasoline	
Northern districts	8 to 13
Montgomery county	12
Chautauqua county	15
Augusta	15½
El Dorado	22½
Oklahoma.	
Dewey deep	5½
Dewey shallow	12
Bartlesville	10
Osage	20
Ponca	22
Cleveland	14
Cushing	22 to 32
Boynton	13
Nowata	15
Heraldton	10
Blackwell	18 to 20

In the table below appears the total production of crude in the various fields in 1915 as represented by the most conservative estimate at hand. In the second column is the estimated gasoline content in these various fields, and in the third column is the total amount of gasoline on this percentage content.

District.	Crude Bbls.	Percent of Gasoline	Gasoline Gallons.
New York and Penn	7,114,570	20	59,762,388
West Virginia	9,150,866	20	76,867,266
Southeastern Ohio ..	4,068,047	20	34,171,594
Kentucky and Tenn ..	479,366	15	3,020,005
Lima and Indiana..	3,679,467	18	30,074,768
Illinois	15,538,493	20	130,945,316
Kansas	4,115,800	12	20,743,612
Gulf Coast	17,833,115	20	990,213,032
Oklahoma	22,906,779	10	95,908,471
Texas Panhandle ..	5,591,422	18	42,271,150
Caddo fields	15,940,393	15	100,424,475
California	89,768,298	2.5	94,256,712
Wyoming	5,164,737	20	43,383,790
Colorado	200,000	15	1,260,000
Total	301,872,208		1,723,305,629

According to the foregoing table, the crude production of the United States in 1915 was 301,872,208 bbls. This, according to the estimated percentage of gasoline content, should have produced 1,723,305,629 gallons of gasoline. It is believed these figures are approximately correct.

It is stated the total number of automobiles registered in the United States in 1915 was 2,400,000. If the estimated consumption of 500 gallons of gasoline per car per year is correct, the total consumption of gasoline by automobiles alone in 1915 was 1,200,000 gallons.

A table issued by the Federal Trade Commission early this year showed that refineries reporting to the Commission for 1915 showed a total gasoline gallonage production last year of 1,075,393,150 gallons. Assuming that all of the crude produced in the United States was not refined and that all of the refineries in the United States did not report to the Commission, and further that the estimate of 500 gallons per car is approximately correct, then the percentage of gasoline content, as indicated in the table above, is approximately correct.

In this connection the following figures, showing the production of gasoline by months and by both the Standard and Independent refineries reporting to the Federal Trade Commission, is illuminating and of special interest:

1915.	Standard Companies		Refiners Other Companies		Total Gallons.
	Gallons.	Gallons.	Gallons.	Gallons.	
January	49,500,619	27,162,918			76,663,537
February	46,053,843	24,531,091			70,584,934
March	52,079,421	28,324,590			80,904,011
April	61,039,714	30,124,059			91,163,773
May	61,048,885	32,936,152			93,985,037
June	53,117,943	35,660,139			88,778,082
July	60,074,304	35,844,836			95,919,140
August	58,546,829	34,366,594			92,913,423
September	62,337,332	35,078,242			97,415,574
October	62,275,051	36,785,348			99,060,399
November	54,406,103	36,093,920			90,500,023
December	61,242,672	36,263,545			97,506,217
Totals	681,721,716	393,671,434			1,075,393,150

In the table below will be found the estimated amount of gasoline produced in the United States in the years indicated, according to the census report, the amount exported and the amount marketed in this country, measured in barrels of 42 gallons each:

Year.	Total Prod.	Amount Exp'ted.	Differ. or Domestic Cons'p't'n.
1899	6,680,000	297,000	6,383,000
1904	6,920,000	594,000	6,326,000
1909	12,900,000	1,640,000	11,260,000
1914	33,800,000	4,750,000	29,050,000
*1915	36,800,000	6,500,000	29,800,000

There was a large amount of gasoline in storage on January 1, 1915, and practically none on January 1, 1916.

In 1915, 892,618 cars were manufactured and sold in the United States. Manufacturers estimate there will be from 1,000,000 to 1,500,000 cars made and sold in this country in 1916. Presuming that the net increase, allowing for elimination of old cars, is 600,000 and also assuming that the published registration of cars is actually 2,400,000, there ought to be in commission at the end of 1916, 3,000,000 motor vehicles in the United States. Three million cars consuming an average of 500 gallons each per year means a consumption of gasoline of 1,500,000,000 gallons a year. Adding to this other consumption of gasoline, the production must amount at least to 2,000,000,000 gallons to equal the demand. It is believed these figures are conservative.

The estimated crude production for the first half of 1916 was placed at 148,000,000 bbls. In other words, the output for 1916 so far has been practically the same as 1915. There is a probability that the second half of 1916 will show a larger output than the first half. In 1915 the big production was during the first half of the year. But a very large amount of crude in 1915 was placed in storage. This year so far all the oil produced is being consumed. This fact, together with the additional fact that larger percentages of gasoline are being obtained by reason of lower gravity motor fuel, indicates clearly that there will be sufficient gasoline to fully, or more than, equal the demand.

It is safe to state that had it not been for increased output of gasoline by virtue of the Burton process and the lowering of gravities for a large amount of motor fuel by the old process of distillation, prices of gasoline would have gone much higher last winter. The sur-

prise is, that, under existing conditions, even, they did not go higher. Notwithstanding the close inquiry of the Federal Trade Commission, no evidence of unnatural manipulation of price was produced. The Commission's desire was to ascertain why prices were so high, but its efforts finally seemed to sift down to an investigation of why prices were not higher in the Middle States.

Cracking Plants and Fuel Oil.

Probably no other one feature of the refining industry has received more attention from within and without the petroleum industry than what has come to be known as "cracking." Almost every refiner, especially in the middle west, the past two years has worked upon some process of greater precipitation of gasoline from crude petroleum or some one of its products.

The Burton process, patented by the Standard Oil Company, is so well known as to require no detailed explanation in this story. It is sufficient to say that since the last story on refineries from this source was printed, the Burton process has undergone extensive changes. The mechanical equipment of a Burton plant is not at all like the original installation. Every refinery owned by the group known as Standard Oil refineries is now operating under the Burton patent or is being so equipped. While definite information is lacking, it is understood there are altogether upwards of 2,000 Burton stills in use in this country. The Standard Oil Company of Kansas at its Neodesha refinery has this year installed 27 additional Burton stills, giving it a total of 60 Burton stills. Forty Burton stills are being installed in the refinery of the Continental Oil Co. at Casper, Wyo., a branch of the Standard Oil Company of Indiana. The Bayway plant of the Standard Oil Company of New Jersey is putting in 200 Burton stills. The Solar Refining Co. at Lima, Ohio, has added 90 Burton stills. The Tidewater Oil Co. at Bayonne, N. J., this year is adding 40 Burton stills to its equipment. The Standard Oil Company at its Sugar Creek station in Kansas City is increasing its battery of Burton stills and is also adding a lubricating plant with special view to making waxes. The Whiting and Wood River refineries are also largely increasing their Burton still capacities. The Standard Oil Company of Ohio is adding a large number of Burton stills. It is expected the Standard Oil Company will almost double its gasoline output before the end of the present year. While the Burton process is not as satisfactory a method of extracting gasoline from petroleum as is desired, yet it makes possible a very much larger percentage of gasoline than the old skimming system. At first the Standard Oil Company treated only fuel oil and residuums by its Burton process. It is understood it now handles not only these but kerosene distillates, and averages about 34 per cent of 55 to 58 gravity gasoline. This is in addition to the 18 to 25 per cent taken from the crude in the old straight-run processes. The Standard has offered the use of this process to other refiners, but

it is understood no other concern, outside the Standard Oil group, has taken advantage of the offer, owing to the fact that one of the restrictions is that the lessee shall not market any of the products by this process in competition with the Standard Oil Company of Indiana. It is interesting to observe that notwithstanding its investment in the Burton process, the Standard promptly and fully investigates all new processes that appear.

Numerous other processes have been tried, but none of them has been, so far as the writer is informed, wholly successful. Much has been claimed for different methods and expensive plants have been constructed, but always with the same result. If there are exceptions to this statement, information concerning such plants has not been made public to the best knowledge of the writer.

Professor Kelsey constructed quite an expensive plant in connection with the Great Western refinery at Erie, Kan., and for awhile it looked as if this experiment was going to prove a pronounced success, but it went the way of all others and is now standing idle. This process embraced the use of molten metal which cokified the product rather than produced the desired results.

At the present time the Wells Process Co. is putting in a plant in connection with the Constantin refinery at Tulsa, Okla. It is an imposing looking structure.

The Milliken Refining Co., Cosden & Co., Emery Manufacturing Co., Bradford, Pa., Glade Refining Co., Warren, Pa., and a number of other refineries have at different times installed so-called cracking plants and these are now out of commission according to the best information obtainable.

The Consolidated Oil Refining Co., of St. Louis, Mo., which took over the refineries of the old Leschen concern known as the Cleveland Petroleum Refining Co. is operating what is known as the Greenstreet process. This is a treatment by which cracking is accomplished by the use of two-inch coils. Carbonization is prevented, it is claimed, by the introduction of steam. A section of coil was recently exposed showing the interior to be as smooth as glass and no evidence of carbon whatever. This company has a plant at Cleveland, Okla., with a daily crude capacity of 650 bbls. and is alleged to be turning out 30,000 gallons a day of what is termed "greaseless naphtha." It runs from 49 to 52 gravity. At East St. Louis, Ill., plant No. 2 has a daily crude capacity of 1,000 bbls. and is being equipped for producing 45,000 gallons by the Greenstreet cracking method. Plant No. 3, also located at East St. Louis and which was formerly known as the Seeger plant erected for the purpose of employing the so-called Washburn-Seeger patents of cracking, is now equipped with the Greenstreet coils and is capable of turning out about 30,000 gallons of greaseless naphtha per day. There seems to be little doubt but actual cracking takes place in this process, but it is not claimed for the product that it is gasoline. It is, however, claimed

to be a first-class motor fuel and has been giving splendid satisfaction wherever used. It is believed a higher gravity product, coming under the head of gasoline, can be made by this method, but whether economically and satisfactorily or not has not been demonstrated. The trade is quite skeptical concerning the efficiency of this process.

At the present time Dr. W. M. Cross, municipal chemist for Kansas City, Mo., is erecting a plant under his own patent in connection with the Rosedale refinery at Kansas City.

The North American Refining Co. at Pemeta, Okla., in the Cushing field, installed a Parker process plant several months ago, but up to the present time it has not operated as satisfactorily as had been anticipated.

A Kansas refiner, who wishes his name withheld, reports that he has devised a method of refining which is going to prove of vast importance at least to his company. "The only trouble with it," he says, "is that it is so simple nobody will believe in it until shown conclusively." By this operation fuel oil is treated without pressure or excessive heat and a yield of 20 per cent of gasoline is secured having an end point of 330 and initial below 100. This makes a fine quality of motor fuel. At the same time this procedure turns out 20 per cent of lubricating oil of 200 viscosity, and 50 per cent of 38 gravity gas oil. A very peculiar and unexplainable result is obtained in handling Mexican crude by this action. The lubricating oil has a cold test of zero and does not require pressing. The rights for the use of this process have already been contracted to at least one other refinery which proposes to start the installation of a plant September 1.

The Sapulpa Refining Co., at Sapulpa, Okla., has installed a Wilkins tone in connection with its refinery, but no statement concerning its operation has yet been given.

It is quite impossible to enumerate all of the efforts put forth to solve this problem. Many, many "processes" by aspiring chemists have been reported. Over in St. Joseph, Mo., a gentleman has a new scheme which involves a revolving retort by which he promises to revolutionize the trade. If some enthusiast came along with a proposition to turn his still, retort or whatever he wished to call it, over and over, end for end, I would not dare to laugh at it. Somebody is going to "discover the way" and it may look like a joke when it comes.

Outside of the Burton process no other cracking system has received so much attention as the Rittman theory of breaking up the molecules of petroleum products to produce a larger volume of gasoline from fixed quantities of crude, and yet no Rittman plant has yet been placed on a completely satisfactory and commercial basis. Experiments are being constantly made, however, and the future of the Rittman patent is very promising. Nothing seems more convincing of this than the numerous attacks that are being made upon it. At least one completely equipped Rittman plant

is now being erected by a going refinery. There are numerous other experimental plants in course of construction which may result in enlarged installation.

It is safe to say that at no other time in the history of the oil business has there been such pronounced expansion of refining capacity as during the past 18 months. This has been caused by the tremendous increase in the consumption of motor fuel. At the same time there has been a large increase in the consumption of kerosene and fuel oil. The expectation is that the time is not far distant when, by reason of cracking processes and improved carburetors, kerosene will command as high a price as gasoline. This is already noticeable in some districts. The price of kerosene has averaged a little better the last year than the year previous and is now commanding in this field three cents or more per gallon. A carburetor has been patented which, by the use of electricity, heats kerosene to a degree that it is readily gasefied and acts as an exceptionally good motor fuel, the effect of the heat apparently disposing of the carbon, or at any rate preventing carbon from gathering in the engine and preventing satisfactory combustion. It is understood that one of the Standard subsidiaries has secured control of this patent and is preparing to push it on the market. If this is true, it practically guarantees the success of this new branch of outlet for kerosene. When there is a firm market and an adequate price for kerosene, the oil refining business will assume an entirely different aspect.

It has been thought for the last five years that the refining industry was being overdone. Yet every year has witnessed a greater increase in capacity of established refineries and a larger number of new refineries than any succeeding year. The difficulty is that the business is becoming an industry very largely of seasons. In summer there is a tremendous demand. In the winter the refinery is unable to dispose of its products and unless a concern is strong financially, it cannot weather the dull season. In other words, a refinery can make so much more gasoline during the months of restricted consumption than it can possibly afford to store or carry over, that the business at once becomes precarious. In this day it is impossible to buy crude on deferred payments. Thus the refiner who engages in the refining business with a capital of \$200,000, expecting to put the entire amount into a refining plant, finds he is in a serious position when he attempts to operate his plant. He must have an equal amount or more as working capital, and he will find that he always has on his books a good sized fortune of outstanding accounts.

Another difficulty that is facing the refiner, with more and more threatening proportions as he grows in capacity, is the fuel oil question. It is only possible to dispose of fuel oil so long as it comes in attractive competition with coal. The wonderful increase in the production of fuel oil has overstocked the market, and the result has been that most of the

time for the past two or three years the price of fuel oil has actually been below cost. All during the recent period of \$1.55 crude, millions of barrels of fuel oil were delivered in the Mid-Continent field at 30 cents a bbl. This is something for the man about to embark on the business to think over.

Thus with fuel oil and kerosene drugs on the market, the question of handling a sufficient amount of gasoline at a particular season of the year to keep a plant in healthy financial condition the whole of the year, is one to tax the ingenuity of even a clever business manipulator. The man who is most adroit in this direction is the man who makes the most conspicuous success.

In this connection it might be said that there is hope that the Government will take action to provide for large storage of fuel oil in its program of preparedness. It is quite alarming to contemplate what the result would be if this country should become engaged in war with some foreign nation, our coastwise transportation facilities put out of commission, and present stores of naval fuel oil made inaccessible. There are not enough tank cars in the United States to take care of the business under such conditions. War would naturally interfere with the easy operation of oil fields and refineries. Practically all of the war vessels of this country are oil burning. It is really shocking to contemplate the embarrassment of the country in the way of fuel in case of war. Recently a naval fuel oil board was appointed with Admiral John A. Edwards, retired, as chairman. This board is making an exhaustive study of the question of providing the navy with an ample supply of fuel. If this board acts promptly, it may be that the fuel oil problem will be solved. Buying fuel oil and storing it when the market was glutted and the price low, ought to appeal to governmental officials as good business procedure. At the same time it would be a step along conservation lines and would also aid a great industry. On the other hand, there is the possibility of some cracking process becoming so pronouncedly successful that the fuel oil difficulty will solve itself in another direction, and the Government will be up against it more seriously for an oleaginous fuel than the refiner is today for a market.

A Business Peculiar to Itself.

The petroleum refining business in the United States is growing with such rapidity it is practically impossible to keep record of its development. While it may be a striking commentary, this is illustrated in the fact that there is no complete record at hand of the oil refining industry in this country. Even the Government, with all its alertness where industrial interests are concerned, has no complete data touching this business that is of such vital importance to almost every other commercial concern and to every business office and home in the country.

Recently when prices of gasoline began to soar a hue and cry went up over the country against what was said to be

undue manipulation of the industry. The Government turned to its various departments for information only to find that there was no information worthy of the name touching the progress of petroleum after it left the producers' tank. Then was witnessed the remarkable spectacle of the accuser going to the accused for information to indict himself. Since then there has been a demand for a department at Washington whose duty it shall be to gather and disseminate prompt, accurate and intelligent information concerning the petroleum industry in all its branches. The need of this is no more forcibly illustrated than the knowledge of the fact that at the present time the meager information which is obtainable through Washington comes from various departments antagonistic to each other, to such an extent that no information is given out until it is hoary with age and even then with such fear of treading on each other's toes that it is shorn of much of its intrinsic value; all of which goes to prove the real need of Congress asserting its authority and creating a single department with ample authority and sufficient financial support to make its work both comprehensive and effective.

During the recent investigation of gasoline prices by the Federal Trade Commission a suggestion was made that the Government should make or dictate the price of petroleum products. The fallacy of such procedure is aptly illustrated in the slow movement of Government action and the rapid movement of affairs in oildom. The resolution to have the oil business investigated first passed Congress about two years ago and was instigated by operators in Oklahoma whose chief complaint was that prices were entirely too low. Actual investigation was undertaken a few months later, because prices of both crude and refined products were declared to be too high, and now before the Federal Trade Commission has announced its findings and informed the people why prices of gasoline were too high, prices are receding. In other words, when this investigation was first ordered, there was a tremendous overproduction in the Mid-Continent field. Then came one of the most pronounced shortages of crude the Mid-Continent region has ever known, resulting in prices of crude jumping from 40 cents a bbl. to \$1.55 a bbl., with an added premium of from 30 cents to 70 cents a bbl. At the same time gasoline prices reached their highest record in this field. And now, before the investigation is completed, another overproduction and depression has overtaken the field. If the Commission does not speed up, it will soon be required to change about face and tell the people why prices are again so low, rather than why they are so high. Supposing the Federal Government were to fix the prices of petroleum products, what would become of the petroleum industry while Government officials were ascertaining whether prices should advance or recede?

The oil industry is peculiar to itself. There is nothing else like it in the un-

iverse. It requires quick action. The man of indecision and the man of slow action never get very far in petroleum. But even though a man makes mistakes, if he is quick, half way intelligent, and plays the game all the time, he is almost dead sure to come out a winner.

In most other lines of business conditions do not change so rapidly. Most products of the earth come either in seasons or in fixed periods or quantities, but this is not true of oil. A well that is making 10,000 bbls. today may not make 1,000 bbls. next week, and a well which may be regarded as almost a failure today, or a big gasser, may be drilled deeper tomorrow and become a gusher. But this one thing is true of oil—that the very day a lease begins producing, that very day it begins to depreciate, and when once its production is gone, it is gone forever.

Another feature of the oil business is that it is impossible to tell by general conditions the possibilities of a field. Authorities may figure weeks and months ahead of the approximate yield of wheat, or corn, or gold, or silver for a particular year, but it is practically impossible to tell the probable output of an oil field. Eight months ago there was practically no production in Butler county, Kansas. Today Butler county, Kansas, is one of the prominent oil fields of the country, able to produce 50,000 to 60,000 bbls. of high grade oil a day. The writer testified before the Federal Trade Commission in June that in his opinion the Mid-Continent field was facing an overproduction of crude. A prominent pipe line official afterward said he thought the situation was overdrawn in the statement. Yet in July, less than six weeks later, that same company had reduced the price of crude because there was an overproduction, going to show how rapidly conditions change and how difficult it is to forecast them.

The Government is Interested.

The remarkable increase in the demand for gasoline the past two or three years has brought the refining business into prominence not only in the financial world, but in the political world as well, and also has commanded the attention of business interests everywhere. Formerly a variation in the price of gasoline affected the general public only indifferently. Today a change in the price of motor fuel is felt in all lines of business and pleasure throughout the entire country. Thus we find the Federal Trade Commission at Washington investigating the price of gasoline, and Congress interesting itself in legislation affecting the administration of the petroleum business. A great interest all over the country has been taken in the development of the Rittman process by the Interior Department. Refiners, through their associations, have been calling upon officials at Washington to create a bureau of petroleum for the purpose of gathering statistical information and supplying those interested with data that is now unobtainable and that is considered important in the manipulation of a great

industry. Recently Congress authorized the Interior Department, through the Bureau of Mines, to establish a number of mining experimental stations for the purpose of aiding in the greater development of natural resources. Director Manning, of the Bureau of Mines, has planned to have one of these experimental stations in connection with the oil industry and to be located somewhere in the middle west. It will probably be a year before a location is decided upon, but, when it is, work on the construction of the same will be pushed as rapidly as possible for the attainment of early results. The Government has found that by concentrating the efforts of the ablest men obtainable along certain lines and with the aid of representatives in the industry throughout the country, it has been able to bring about beneficial results, and Director Manning has been so successful that it has been deemed wise to largely increase the appropriations of his departments. It will be the intention of Mr. Manning to exploit petroleum to its greatest possibilities, and it is believed that an experimental station will prove of vast importance to the industry. For a year or two there has been considerable discussion among independents of establishing such a plant and maintaining it themselves, and it is highly gratifying to them to know that the Government is going to take up this work on a much broader and comprehensive basis than they could hope to do in a limited co-operative way. At the present time Dr. Manning is in the northwest deciding upon the location of a mining experimental station. Four of the largest cities in the northwest are contestants for the station. One city has offered a site and a building. Another has offered \$150,000 cash in addition to a site. This gives a suggestion of the importance attached to the location. It is the intention of the department to locate the oil experimental station where it is thought it can produce the best results.

In this connection it may be noted that the producers of Oklahoma have recently discussed the question of establishing a bureau of information. From the writer's knowledge of the work being done by Director Manning, he believes that the producers, refiners, pipe line men and marketers of petroleum products can well afford to center their efforts in support of the Bureau of Mines. They can well afford to insist upon their representatives at Washington demanding that all petroleum matters be centered in the Bureau of Mines, and that the Bureau of Mines be held responsible. At the present time the Bureau of Mines is carrying on experimental work and is probably better informed than any other department in Washington on petroleum matters, and yet the only statistics pertaining to petroleum are furnished by the Geological Survey, while investigation of petroleum matters is being carried on by the Federal Trade Commission, and the other day \$60,000 was appropriated by Congress for still another department to duplicate work already being done for

petroleum. The fact is all of these matters could be handled more economically, more intelligently and more satisfactorily to those most concerned if they were centered in the Bureau of Mines. There is great danger of departmental jealousies if work of this character is not concentrated under the supervision of one department. The work itself will suffer because of indecision and fear of overlapping. No one appreciates more than the oil men themselves the need of unprejudiced information concerning the oil industry for the public. Probably there is no other industry in which the men interested are at so much variance with each other because of a lack of information concerning the thing in which they have invested. In the past the industry has been compelled to depend upon the data gathered and furnished by those directly interested. There has been no disinterested information obtainable. The time has come when the public demands accurate and disinterested information pertaining to the oil industry. When this information is obtainable through proper governmental agencies, there will be no need of local information boards.

It is the purpose of Director Manning and Superintendent Williams to make future petroleum statistics of real commercial value. The intrinsic worth of different oils will be investigated; the gasoline and other contents of crude of one year's production as compared with other years' will be made known; progress in refining processes, etc., will be set forth. In other words, the bureau will make its annual statistical report cover every phase of the petroleum business and make its figures "talk profit" to those who study them. In addition to this, the department will issue regular monthly and quarterly reports on general petroleum conditions.

The refining branch of the oil industry has been seriously affected by the periods of flood and famine of crude. He has been a shrewd refiner who could anticipate the sudden turns of the market; he has been a fortunate refiner who could foresee the changes of conditions, so that a low crude market would not find him with high priced contracts and a high refined market would not catch him with a lot of time contracts at low prices. He has had no reliable data to guide him. It has been an unfortunate commentary that oil men have rarely, if ever, profited by their experiences. There has never been an overproduction in the Mid-Continent field that producers were willing to admit that the same was general. Statistics and information were conflicting as they are now. Producers have never witnessed the gathering of threatening clouds that they could not convince themselves that there was not going to be a storm. It would mean millions of dollars to the industry if those who are responsible for its development could simply profit by their experiences or have some reliable source of unprejudiced information for guidance. Three years ago they refused to believe that the world was not prepared to absorb every barrel of oil that Cushing could possibly produce, and Cush-

ing was developed with such rapidity that oil interests everywhere were affected by the output of Cushing. Then Cushing suddenly receded and the price of oil in the Mid-Continent shot up to the highest record in the history of this field. Then Kansas began to develop what has the ear-marks of being a great pool. Another flood seems to have arrived. Already there has been a decline of 50 cents in the crude market. If the producers of Butler county, Kansas, and at South Cushing, Oklahoma, would discontinue drilling for two months and permit the oil to remain in its natural reservoir, there would be no further decline in the market, but rather, it is safe to say, there would be a decided advance. It might be pertinently asked: Why should these men be permitted to ruin an industry simply to gratify the spirit of greed?

At the present time representatives of another big industry are endeavoring to prevail upon the powers that be at Washington that they should be permitted to unite and prevent, in the spirit of conservation, an overproduction of their commodity. There is plenty of argument in support of the contention. In England, Germany and other countries in Europe the output of certain commodities is limited to the needs of the country and the natural supply is conserved to this extent. In this country it seems to be the policy of the Government to deny the right to limit resources to the needs of the country. It has been considered a crime for two or three to get together and say that they will not produce more coal, or more oil, or more copper than the nation needs. Yet we have the remarkable spectacle of the entire country becoming excited because, for a single season, the cotton market is overstocked. If it is proper for the Government to turn itself inside out to save the raisers of cotton, then the Government should loan its good offices to limit the amount of oil to the needs of the people, for it must be patent to all that the time is not far distant when there will cease to be enough oil to meet the requirements of the people.

A Wise Policy.

To this end it is interesting to note that the Prairie Oil & Gas Co. has taken very intelligent action to produce the same result. Heretofore the Prairie has followed the policy of extending its lines to new pools and proration runs from new wells on old properties, so that there was no reason why operators should not proceed with drilling in new pools in times of depression. The Prairie's new policy is to connect to no new pools and extend its connections to no new wells on old leases while there is a flood of oil. It is believed that the company is not violating any law and that it is not acting in restraint of trade in such a course. There is no law that will require any consumer to buy beyond his needs, and so long as the Prairie Oil & Gas Co. has arrangements for all the oil that it needs, it is claimed that it could not be justly charged with restraint of trade. The expectation is

that this policy will cause operators to curtail their drilling operations until such time as there is a market for their product; and it will steady prices and hold them on a legitimate and natural basis; that it will conserve the supply of crude oil and prevent unwarranted waste; that it will teach the consumers of petroleum products to abstain from prodigality and shorten periods of depression. There seems to be every argument in favor of the Prairie's new policy and nothing against it. It is going to mean in the future steadier conditions.

A bill has been prepared and submitted to the United States Senate of vast and far reaching importance. It will mean as much to other branches of industry as to oil interests. The conviction has been growing that manufacturers ought to be privileged before the law to agree among themselves, approved by some competent federal board, to curtail output when there is overproduction, and otherwise to confer regarding business policies. But they have been afraid to do so in face of the fanatical opposition to business development. It must, however, be evident to all that wasteful overproduction of a valuable national resource is against public interest.

This bill provides for the creation of an interstate trade commission whose duty it shall be to investigate contracts and agreements in big interstate business, and ascertain if the same are actually in violation of the anti-trust act and whether it is really an unlawful restraint or monopoly; that any concern wishing to enter into an agreement or contract may submit its proposition to the commission for approval, and if approved such determination shall be final and conclusive that such undertaking is not in violation of the anti-trust law and is not an unlawful restraint of trade. Upon the finding by the commission that any agreement is unlawful, the commission shall serve notice on such corporation, individual, etc., that such agreement is unlawful and that all or any acts or things being so done shall cease and terminate and on failure to cease same, the commission shall certify its findings to the attorney general of the United States. This is what was expected of the Federal Trade Commission and what would have vitalized it. There is great need of a trade advisory board. Business needs protection in behalf of the consuming public. The prosperity of the country demands it.

We are surely coming to the place where the welfare of the nation and the general commonwealth will require that business interests be safeguarded against hurtful attack as well as being regulated against public misuse. Foreign governments assume a protectorate over the business interests of subjects. We have assumed that all our big industrial were outlaws and objects of prey. The corporate institutions within a State are the creatures of the State. They ought to be both regulated and protected within sane and reasonable bounds, leaving enough latitude to whet personal ambition.

There was a time not long ago when there was little public interest in oil refining. Now everybody is concerned in the subject. Prophets assert that the day is near at hand when every fifteenth or sixteenth family will own an automobile. Every automobile uses gasoline for fuel and oil for lubrication. Every man who rides in these cars, or has his groceries or milk or garments delivered in one, is interested in the price of petroleum products. More than this every farmer these days dreams bright dreams of the future when oil shall be found on his land to make him independent. The number of bankers, lawyers, preachers, clerks, women domestics, etc., who own oil stocks is amazing. Oil has become IT. It is an alluring and seductive thing. The very smell of it sets the fancy at play with conjured millions. The more one studies the subject, the more one is amazed over the very many things made from oil and the great number of ways it affects every citizen. We doubt if any other one article works its way so far into man's everyday life. This explains why anything on oil is of interest today to newspaper readers.

Oil has had its greatest growth since the discovery of the Mid-Continent field. This is why this field has witnessed so many spectacular events in oil. Millionaires are made while you wait. Refineries spring up like mushrooms.

Yesterday's impossibilities are the trifling routine of today. The struggling debtor this morning sits down to sumptuous feasts tonight. These are not fairy tales; they are the experiences of your neighbor. You know they are true. You saw Josh Cosden blinking at a tea pot, which he called a refinery, and which the wind wrecked. You saw him out there on the plains at Bigheart gazing at the wreckage, bereft of all save opportunity and determination. That was yesterday. Today you see him a master of industry, a millionaire, director of many gigantic enterprises, living in a mansion, surrounded by everything that makes a charm of life. And Josh Cosden has life all before him—a magnificent success at 35.

Then there is Harry Sinclair. It seems only the other day he was a drug clerk in a small Kansas town. But Sinclair saw the possibilities in oil. He recognized what thousands of others failed to recognize—that he who uses good, horse-sense and judgment and acts quickly and often cannot help winning large stakes in oil. Thus fixing this firmly in his mind, he struck out. When it was necessary he chartered a special train and rode all night to secure an oil lease—while others slept and waited till the morrow.

At 37 Harry F. Sinclair is a shining example of "all things come to him who dares and hustles." Head of a \$70,000,000 refinery merger, projecting a pipeline enterprise that makes even the men of big affairs dizzy, and acting with such rapidity as to keep everyone guessing what will come next, he is a striking figure in these days of big finance.

Here are two young men at the head of refinery enterprises handling a com-

bined crude oil production of over 50,000 bbls. a day, or more than the daily output of oil of the entire country up to 1879.

Thousands of others have found oil profitable only in less spectacular fashion. It is no wonder then that the oil country is feverish with excitement and that millions of people are looking to it to "send in their ship."

Just now the Mid-Continent is the El Dorado of oildom. Someone has said oil will be exhausted in 27 years. That was a false alarm. The business is just starting. No one can tell where a great field may be discovered tomorrow. In the meantime interest is keen in Mid-Continent production and refining and new refineries are springing up in most unexpected places.

There are more active refineries in what is known as the Mid-Continent region than in any other one field in the United States. There are 41 refineries in Oklahoma, 21 in Kansas, three in Missouri and three on the Illinois side at St. Louis, making a total of 68 and embracing an investment of approximately \$30,000,000. If present plans materialize, several new plants will be erected during the coming year. When it is taken into consideration that there was only one small refinery in the Mid-Continent field in 1903, this is a remarkable showing. The first independent plant in the Mid-Continent territory was built by C. D. Webster at Humboldt, Kansas, in 1904, and is now being operated by the Miller Petroleum Refining Co., of Chanute, Kansas. Mr. Webster is now running a refinery at Yale, Okla. He began his oil career back in Massachusetts almost half a century ago. The Mid-Continent field has witnessed the most remarkable development of the independent movement in the history of the business and most of this development has taken place in the last three years. The growth of the Cosden company has been so rapid as to be almost spectacular, this company now being the largest independent concern operated by a single individual in the world. The Sinclair merger promises to be one of the biggest things of its kind in the country. Mr. Sinclair has started the oil world by the announcement that he is going to build an 8-inch pipe line from Cushing, Okla., field to Fort Madison, Iowa, and Chicago, Ill., and erect refineries at both of these points. This simply shows the great confidence in the future of the oil business and the reward of shrewdness and activity in this great field of endeavor.

Refineries now projected will give the Mid-Continent field an added daily capacity of approximately 100,000 bbls. Several of these are already in course of construction.

It is interesting to note that as refineries grow they prefer to have their own stations for distribution. There are a great many concerns which style themselves refining companies throughout the country which are not, in the close sense of the word, refining plants. They blend lubricating oils and manufacture various grades of greases.

The Pierce Oil Corporation owns and operates three large refineries. Its refining plant at Vera Cruz, Mexico, was erected in 1891 at a cost of approximately \$300,000. Its refinery at Tampico, Mexico, was built in 1898 and cost over \$2,000,000. In 1913 it built a refinery at Sand Springs, a suburb of Tulsa, Okla., at a cost of about \$875,000. The Pierce Oil Corporation is a retail marketer in the southwest, having over 400 distributing stations and owning some 500 tank cars. Oil is supplied its refinery at Sand Springs, Okla., through about 40 miles of pipe line.

The Thwing-Evans-Todd refineries, known as the Ponca Refining Co., Cushing Refining Co. and Producers Refining Co., distill about 20,000 bbls. of crude a day. All their output is marketed through jobbers or exported.

The dazzling feature of Mid-Continent oildom is the immensity of everything. Everything is figured in millions. A refinery handling only 2,000 bbls. of crude a day is a very modest institution. In a little while the field will have 10 separate refineries using 10,000 bbls. of crude each a day. The American Refining Co. at Okmulgee, the Phoenix at Tulsa, the Muskogee, the Constantine at Tulsa, the Oklahoma City, Sapulpa, Cosden, Lesh, Wichita Independent and a number of others are adding new stills and growing rapidly. Jack Ryan was a salesman a few months ago. He decided to be a refiner. It was hard sledding getting started. Now he has a plant at Boynton, is operating the Uncle Sam works at Tulsa under a contract and is getting ready to start up a leased plant at Kansas City, which had never been operated.

Just now there is a lull in oil affairs. But the depression will be of short duration. This story of refineries will be out of date almost before it is in type. Such is the rapidity with which the industry is developing.

But it is not all rosy. All along the way there are wrecks. Some men even get into the oil business who never have visions and who move so slowly they will be too late for their own funeral in that day. They fail. But the live wires!—they win; and their history is written in bright letters in oil.

Louisiana and Texas.

Louisiana is forging rapidly to the front as an oil manufacturing and shipping State as well as a petroleum producing district. It already has 16 refineries.

The Louisiana Oil Refining Co. operates a 1,250 bbl. plant at Gas Center, La. It was established in 1913. It owns about 40 miles of pipe line, has its own distributing stations and owns its own tank cars, but does not have a lubricating plant.

The figures showing the number of refineries in Texas and the approximate amount of crude handled by them daily will probably be surprising to many readers of oil data. There are 23 refineries in Texas using approximately 200,000 bbls. of crude a day. The figures as indicated in this report are 196,800 bbls. per day, but there is reason to believe that at least one or two of the refin-

eries are handling more crude than this report indicates. In addition to these figures there are 16 refineries in Louisiana handling about 42,000 bbls. a day. The total investment in refineries in Texas and Louisiana is approximately \$55,000,000.

The Gulf Refining Co.'s main plant is located at Port Arthur and has a charging capacity of approximately 60,000 bbls. a day. It is stated this refinery is running full capacity. The Gulf also has a plant at Fort Worth with a daily capacity of 7,500 bbls. and is running full blast.

The Texas Co. is operating refineries at Port Arthur, 28,000 bbls. a day; Port Neches, 5,000 bbls. a day; and at Dallas, 12,000 bbls. a day; a total approximately 47,000 bbls. a day. The Port Neches plant is essentially an asphaltic products plant. The Texas Co. also operates refineries at West Tulsa, Okla., and Lockport, Ill. The total investment amounts to approximately \$37,800,000. The company retails through 475 distributing stations, and operates 2,000 tank cars. It owns over 1,400 miles of pipe line and manufactures lubricating oils.

The Magnolia Petroleum Co. is treating about 25,000 bbls. a day at its Beaumont refinery. It is understood this is being increased to 35,000 bbls. a day. At Fort Worth it is handling 12,000 bbls. a day, and at Corsicana 3,000 bbls. a day. This company has been increasing its water shipments rapidly of late. The Magnolia took over the refinery at Corsicana, Texas, erected in 1898, and the plant at Beaumont, Texas, erected in 1902. It has become one of the leading factors in Texas oil affairs. In 1914 it erected a refinery at Fort Worth, Texas. The three plants in 1915 had a daily capacity of 22,000 bbls. The company operates about 450 distributing stations, has about 800 tank cars, owns nearly 900 miles of pipe line to which are connected almost 2,000 producing wells, and manufactures its own lubricants. The company is largely interested in the southern part of Oklahoma and has a pipe line from the Healdton, Okla., pool to Fort Worth, Texas.

The Pierce-Fordyce Oil Association has a refinery at Fort Worth, Texas, refining about 6,000 bbls. a day and another at Texas City on the Gulf handling about 3,000 bbls. a day, the capacity of the latter plant is being increased at the present time.

The Producers Refining Co. at Gainesville, Texas, owned by Messers. Thwing, Evans, Todd and associates in connection with the Ponca Refining Co. at Ponca City, Okla., and the Cushing Refining Co. at Cushing, Okla., is handling about 12,000 bbls. a day, although at times its runs have approximated 15,000 bbls. a day. All of the oil treated by this refinery comes from the Healdton pool in Oklahoma.

Part of the crude handled by the Gulf Refining Co., the Texas Co. and the Magnolia Petroleum Co. comes from Oklahoma.

The Panhandle Refining Co. at Wichita Falls, Texas, recently built by Brown and Jones of Independence, Kansas, has a capacity of 2,000 bbls. a day. This

company reports it is getting a very large percentage of gasoline from its crude.

The Wichita Valley Refining Co. at Iowa Park, Tex., near Wichita Falls, has a capacity of about 1,000 bbls. a day. It is planning on enlargement.

The Dixie Oil & Refining Co. at San Antonio, Tex., is running 1,000 bbls. a day steadily and expects to increase this to 2,000 bbls. a day before the end of the year.

The Avis-Wood Refining Co. near Jacksboro, Tex., is a Wells process plant making crude products from crude produced at Sour Lake. It is also using a small quantity of oil from shallow wells in the immediate vicinity of the refinery. Another still or two will be added to the plant in the near future.

The Pure Oil Refining Co. at Houston, Tex., began operations August 1 and is working up approximately 200 bbls. a day of Oklahoma crude.

The United Refining Co. at Beaumont, the Orange Refining Co. at Orange, and the Houston Oil Co. at Houston have been idle for some time, the latter plant having a capacity of 3,000 bbls. a day and being complete in every particular. It is understood the United Refining Co.'s plant at Beaumont, Tex., is being rehabilitated.

The Oriental Oil Co., operating a refinery at Dallas, Texas, handles about 1,000 bbls. of crude oil a day and manufactures lubricating oils. It has its own cars and 12 or 15 distributing stations.

The 23,000 bbls. a day of crude produced in northern and central Texas are all handled by Texas refineries. From 45,000 to 60,000 bbls. a day of crude is piped from Oklahoma fields to Texas refineries. A large amount of crude comes to these refineries from Louisiana. The Magnolia Petroleum Co. has just begun using about 10,000 bbls. a day of crude from Goose Creek.

The Rocky Mountains and the Pacific Coast.

There are 76 refineries in California handling, it is estimated, 210,000 bbls. of crude oil daily. The estimated gross investment in these refineries is \$81,000,000. There are 19 idle plants in California. Fifty per cent of the crude oil produced in California reduces about five per cent of gasoline. The other 50 per cent does not produce gasoline at all and is manufactured into fuel oil and asphaltic products. A number of the California refineries manufacturing gasoline have their own distributing stations and also a number of them have lubricating plants.

The Easterner who thinks California Petroleum does not come into competition with him is fooling himself. In the first place, California has robbed Eastern refiners of a tremendous volume of far-west business, and more lately Wyoming has cut deep inroads into the marketing arrangements of Mid-Continent refiners. It has been said many times that California crude was valueless for the manufacture of gasoline, and yet during the past few months millions of gallons of this product has been shipped as far

east as New York in competition with Eastern gasoline in its own markets. No oil has yet been found that has not by some process yielded to the needs of the hour. California is a mighty petroleum factor and will be for generations to come.

It will probably be surprising to many Eastern readers to know that so many California refineries also manufacture lubricants and operate distributing stations.

The Associated Oil Co. operates two refineries, one at Avon, Contra Costa county, and the other at Gaviota, Santa Barbara county, Cal. The Associated Oil Co.'s refineries are operated more on the same basis as the Mid-Continent refineries than most of the so-called refineries on the Pacific coast. It has an investment of approximately \$2,000,000, handles a daily average of about 12,500 bbls. of crude, owns approximately 350 tank cars, has 140 miles of pipe line to which are connected approximately 425 wells. It supplies its own distributing stations, and is one of the big factors on the Pacific coast.

The General Petroleum Co. of Los Angeles, Cal., owns three plants, one located at Kerto, where road oil and asphalt are manufactured, another at Vernon which has a capacity of 14,000 bbls. a day, but is actually using 8,000 bbls. a day, and one at Mojave, which is not operating at the present time. This company owns and controls 200 miles of pipe line, to which are connected approximately 250 wells. It cuts the "tops" and sells to independent refineries by tank car or pipe line. California refineries depend very largely upon the railroads for their tank car equipment.

The Pinal-Dome Refining Co., with a refinery at Betteravia, Cal., erected in 1911, has nine distributing stations and receives its crude from 60 wells connected to its own pipe line.

The Producers Refining Co. at Kern River (Bakersfield, Cal.) operates a refinery using about 500 bbls. of crude a day, and manufactures lubricants. This plant was built in 1904 and is connected to producing wells by its own pipe line.

The Shell Co. of California last year built a refinery at Martinez, near San Francisco. It also manufactures lubricants. The Shell Co. operates the refinery built by the American Oriental Co. and also the lubricating factory at Rodeo owned by Warren Bros. In addition to these the Shell people have leased the Trumbull Refining Co.'s plant at Los Angeles. The Shell Co. operates in California its own tank cars and is now building a refinery in Louisiana and another in Oklahoma.

The Union Oil Co. of California owns and operates seven refineries—at Oleum, Avila, Bakersfield, Brea, Santa Paula, Orcutt and Los Angeles. The first refinery was built at Oleum in 1895. The company now has more than \$3,000,000 invested in refineries and total assets of \$57,477,019. It handles 25,000 bbls. of crude oil a day, owns and operates 85 distributing stations, more than 100 tanks cars, 1,200 miles of pipe lines, a lubricating plant, and there are approximately 2,000 producing wells supplying

its refineries with crude oil. Its distributing stations are chiefly in California, Arizona and Nevada. It ships its products in its own bottoms to Europe.

The Amalgamated Oil Co. operates a topping plant at Los Angeles for the manufacture of fuel oil. It does not make kerosene or gasoline.

Utah, Colorado and Wyoming.

There is one small refinery at Salt Lake City, Utah, distilling about 500 bbls. a day. There are three in Colorado handling about 5,000 bbls. a day, representing an investment of \$825,000, and four operating plants in Wyoming handling approximately 34,000 bbls. a day.

There are three refineries in Colorado. Two of them are located at Florence and both are owned by the Standard Oil Company. The United Oil Refining Co.'s plant was built in 1887. In 1907 a lubricating and wax plant was built in connection with it.

The refining industry in Wyoming is scarcely yet in its infancy; in fact, it is only getting started.

The Midwest Refining Co. built a refinery at Casper in February, 1912, with a capacity of 1,500 bbls. a day. Today the Midwest is one of the large and important independent refining concerns in the country. The plant at present consists of three units and has a daily capacity of 17,800 bbls. and is using between 12,000 and 15,000 bbls. of crude oil a day. There is common belief that the Midwest is owned by the Standard Oil Company. It is asserted by government officials, who have investigated the company, as well as by officers of the Midwest, that not a dollar of the stock of the Midwest Refining Co. is owned by the Standard Oil Company. There is, however, a contractual relationship between the Midwest Refining Co. and the Continental Oil Co., owned by the Standard at Casper. These plants are on opposite sides of the road. The Continental Oil Co. is operating a Burton cracking process. It buys residue and certain other products from the Midwest and sells back to the Midwest certain finished products. The Midwest Refining Co. is at the present time engaged in perfecting a Rittman cracking process of its own.

The Greybull Refining Co., a branch of the Midwest Refining Co., has only recently completed a 2,000 bbl. plant at Greybull, Wyo. The capacity of this plant is now being increased. It will eventually handle about 10,000 bbls. a day. The Greybull owns 10 miles of pipe line and is connected to 50 or more wells in the Wyoming field. Nearby the Standard Oil Company of Indiana is going to erect a refinery and will engage in another contractual arrangement.

The Northwestern Oil Refining Co. built the first refinery in Wyoming in 1909. It is located at Cowley and is now handling about 300 bbls. a day and disposes of most of its products through the Mutual Oil Co., of Kansas City, Mo. It has pipe line connections to 12 or 15 wells which supply it with crude.

It is not generally known, but there is a small oil refinery located at Farmington, New Mexico.

Illinois.

The Central Refining Co. at Lawrenceville, Ill., completed its plant in 1908. It runs 3,000 bbls. of crude oil a day, operates nearly 300 tank cars and owns 192 miles of pipe lines besides operating its own wax plant.

The Consolidated Oil Refining Co., sometimes known as the Gasoline Corporation, was recently organized at St. Louis out of the former holdings of the Cleveland Petroleum Refining Co. (Leschen). The new company operates a refinery at Cleveland, Okla., having a capacity of 650 bbls. of crude oil a day, and two cracking plants at East St. Louis, Ill. No. 2 plant at East St. Louis has a capacity of 1,000 bbls. of crude a day and the company is now engaged in erecting furnaces for turning out 45,000 gallons of motor fuel a day. No. 3 plant at East St. Louis has a capacity for turning out 30,000 gallons of motor fuel a day. The crude for these plants all comes from Oklahoma.

The Leader Refining Co. owned the first refinery built in Illinois. It has a capacity of about 25,000 bbls. a month and is located on the Pennsylvania and C. I. & W. railroads at Casey.

The Indian Refining Co. at Lawrenceville, Ill., owns the largest refining plant in that State, aside from the Standard. It handles about 11,000 bbls. of crude a day, owns 176 filling stations and operates about 1,200 tank cars, owns 250 miles of pipe line, has its own lubricating plant, and is connected up to over 2,200 wells. It has a large storage station at New Orleans and one at Kearney, N. J. This company has been making remarkable progress the last years or two.

The Wabash Refining Co. is successor to the Robinson Refining Co. at Robinson, Ill. This company has been making extensive improvements during the past year and now has an investment of approximately \$250,000. It uses about 600 bbls. of crude oil a day, owns 10 miles of pipe line, to which are connected 275 producing wells, and operates its own tank car system. The refinery was built in 1907 and a wax plant was added in 1915.

Pennsylvania.

There are 56 refineries in Pennsylvania, according to the best information obtainable, handling approximately 110,000 bbls. of crude oil a day, the total valuation of which is upwards of \$40,000,000. Pennsylvania and California are almost a tie in the number of plants operating, but California exceeds Pennsylvania in the number of barrels of crude handled and in the total valuation of the investment in oil refineries, but the valuation of the products turned out by Pennsylvania refineries exceeds considerably that turned out by California refineries. Most of the refineries in Pennsylvania manufacture petroleum products, being what are known as "complete" refineries, whereas a majority of those in the Mid-Continent field and in California are merely "skimming" or "topping" plants.

The Atlantic Refining Co.'s plant at Pittsburgh, Pa., is one of the oldest re-

fineries in the United States. It was built about 1862, or less than three years after the completion of the first well ever drilled for oil. It uses about 3,500 bbls. of crude a day and has a lubricating plant in connection. The Atlantic Refining Co. also owns a plant at Point Breeze, Pa., which likewise is one of the oldest refineries in operation. It was built in 1866, or just after the close of the war. This plant handles about 35,000 bbls. of crude a day. It operates a lubricating plant in connection. The Atlantic Refining Co. also operates a plant at Franklin, Pa., known as the Eclipse Oil Works, which was built in 1872. This plant handles about 8,000 bbls. of crude a day and also has a lubricating plant. The Atlantic Refining Co. has more than \$20,000,000 invested in refineries and operates 358 distributing stations.

The Galena-Signal Oil Co.'s refinery at Franklin, Pa., was built in 1869, having been started by Miller and Sibley. It is essentially a manufacturer of lubricating oils.

A. D. Miller & Sons Co., of Pittsburgh, operates a refinery having a capacity of 700 bbls. a day, which was built in 1862. This concern owns two distributing stations and operates its own tank cars. This company also has its own lubricating plant.

The Butler County Oil Refining Co., formerly known as the High Grade Oil Refining Co., owns a refinery at Bruin, which averages 600 bbls. of crude oil a day through its stills. It also owns and operates 17½ miles of pipe line to which are connected about 700 wells.

The Clarendon Refining Co. is operating a refinery at Clarendon, Pa. The office of the company is at Warren. It owns six miles of pipe line and the capacity of the plant is being considerably enlarged.

The Cornplanter Refining Co. is one of the complete organizations of Pennsylvania. Its plant was built at Warren in 1858. It owns its own distributing station, tank cars, pipe line and has its own lubricating plant. Its gathering system consists of 65 miles of pipe line.

W. H. Daugherty & Son operate a refinery at Petrolia, Pa. The company owns about 20 miles of pipe line.

One of the best known refineries in the country is the Emery Manufacturing Co., of Bradford, Pa. This refinery handles about 1,200 bbls. of crude a day. There probably is no other refinery of this size in the United States to which are connected so many wells. The Emery Co.'s plant is connected by pipe line to over 4,000 wells. For many years it has paid one cent a bbl. above the market quotation. It has a lubricating plant.

The Empire Oil Works located at Reno, Pa., was started in 1886 and, according to the owners, it has not stopped building yet. It has a lubricating plant. A. L. Confer, president of the company, has never aspired to run one of the biggest refineries in the country, but one of the best.

The Franklin Oil Works' plant was built at Franklin, Pa., in 1877. The company handles about 300 bbls. of

crude oil a day and gets crude from a dozen wells in the Franklin natural lubricating oil district. This oil is selling for over \$4.00 a bbl. at the well.

The Germania Refining Co. at Oil City, Pa., is installing a Rittman cracking process plant, as are also the Midwest Refining Co. at Casper, Wyo., and the Indian Refining Co., at Lawrenceville, Ill.

The Kendall Refining Co., at Bradford, Pa., is operated by Otto Koch and is one of the successful, enterprising institutions of the old McKean county field. It owns its own distributing stations, tank cars and pipe line system which is connected to about 800 wells and operates a lubricating plant. This refinery has been in operation since 1882.

The Mutual Refining Co. at Warren, Pa., has a lubricating plant for filtering cylinder stocks, owns its own pipe line, operates its own tank cars and handles about 400 bbls. of crude a day.

At Eldred, Pa., the Pennsylvania Oil Products Refining Co. erected in 1913 a plant costing over \$250,000. It handles Pennsylvania oils exclusively and treats about 300 bbls. of crude a day received from wells in that vicinity through about 50 miles of pipe line owned by it. This company also operates a lubricating plant, has a number of distributing stations and owns its own line of tank cars.

The Seneca Oil Works is located at Warren, Pa. The Seneca Oil Works and George P. Brockway are synonymous. This plant was built in 1893, owns its own tank cars and runs its crude down to lubricants and greases.

Levi Smith, Ltd., built a refinery at Clarendon, Pa., the Cushing field, so far as quality goes, of Pennsylvania, about 30 years ago and is still operating the same. The company has one distributing station, a lubricating plant and operates its own tank cars.

The Tiona Refining Co.'s plant was built at Clarendon, Pa., in 1886. It handles about 12,000 bbls. of crude monthly and has a lubricating plant. The products of the Tiona Refining Co. are marketed through the Union Petroleum Co.

The United Refining Co. at Warren, Pa., and the Elk Refining Co. at Falling Rock, W. Va., are operated under the same management with H. A. Logan as president of the former and treasurer of the latter. The Warren plant was built in 1902 and has a monthly capacity of 12,000 bbls. The refinery has a filter plant and wax press and manufactures all grades of lubricating oils.

The Warren Refining Co., Warren, Pa., is so old that its proprietor gives its "date of birth" as "sometime prior to 1890." It handles about 500 bbls. of crude a day, manufactures lubricants, has two distributing stations and operates its own tank cars.

Maryland.

Even Maryland is becoming known as an oil State, without a drop of oil produced in it. Two large new refineries are now projected and will undoubtedly be built at once. Crude for the plants operated there comes principally from

Oklahoma, Illinois, the Gulf and Mexico.

The Prudential Oil Corporation, whose main office is in New York City, has recently completed the construction of a refinery at Baltimore with a capacity of nearly 5,000 bbls. a day. There is a lubricating and wax works in connection with this new enterprise and the company is operating approximately 300 tank cars.

The Inter-Ocean Oil Refining Co., whose headquarters are in New York, is becoming a dominant factor in oil in Maryland. It operates a large plant at East Brooklyn, controls the United States Asphalt Co., and is getting ready to erect another large plant.

New Jersey.

The Columbia Oil Co. of New York, operates a refinery at Bayonne, N. J., with a capacity of 1,000 bbls. a day. Its entire output is sold for export. The company has its own pipe line in the Wellsville, N. Y., field.

The Tidewater Oil Co., whose main office is in New York City, operates a refinery at Bayonne, N. J., erected in 1879, which represents an investment of almost \$26,000,000. This refinery uses from 10,000 to 11,000 bbls. of crude a day. It owns 1,005 miles of trunk pipe line and 1,570 miles of gathering lines, to which are connected 17,264 producing wells. There is a lubricating plant in connection with this refinery.

The Standard Oil Company of New Jersey has an investment of \$37,000,000 and treats 45,000 bbls. of crude a day, a great deal of it from Oklahoma. Clustered around this big plant are a number of other refineries whose oils and gasoline help lubricate, illuminate and circumnavigate the globe.

New York.

The Wellsville Refining Co. operates a plant at Wellsville, N. Y. The company is composed largely of operators in that field. It handles about 23,000 bbls. of crude oil a month from 2,200 wells. It is interested in the Union Pipe Line Co. which operates 300 miles of main and gravity lines to which 2,200 wells are connected. It has a pipe line system consisting of 170 miles of line. The company markets its products through the Union Petroleum Co. by the use of its own tank car system. It makes lubricants.

Ohio.

There are 10 refineries in the State of Ohio representing a total investment of approximately \$6,600,000 and handling in the neighborhood of 31,000 bbls. of crude oil a day.

The Canfield Oil Co., which operates a refinery both at Cleveland, Ohio, and at Coraopolis, Pa., has recently erected a wax compressing plant in connection with its Cleveland works. This company, besides doing a regular refining business, conducts a large jobbing business in petroleum products.

Tennessee.

Oil in small quantities has been produced in Tennessee for many years, but refiners have not been attracted to that State.

A small refining plant was built at Nashville, Tenn., in 1915 under the name of the Nashville Refining Co. It is now the Cumberland Refining Co., with a capacity of 400 bbls.

West Virginia.

The Elk Refining Co., of Charleston, W. Va., operates a refinery at Falling Rock, W. Va. The plant was built in 1914 and handles about 400 bbls. of crude oil a day. The company owns its own tank cars and manufactures cylinder stocks. This plant handles about 10,000 bbls. a month, but has no wax plant. This company does not market its products through its own stations.

The refinery at St. Marys, W. Va., formerly known as the High Grade Petroleum Products Co., is now operated by the Ohio Valley Refining Co. and is running about 1,000 bbls. a day. This concern has become one of the important industries of that town, having an investment of approximately \$750,000.

Production and Consumption.

Mr. W. O. Coles, New York broker, in a recent weekly review of the oil situation, stated quite emphatically, if not wisely, (1) that there is no overproduction of crude oil and (2) that there are enough refineries.

Let me answer both of his declarations in one statement:

Practically every active refinery in the country has all the crude it requires and every consumer of gasoline in the country finds his needs promptly supplied, while at the same time there is an enormous oversupply of fuel oil and kerosene. The capacity of existing refineries is greater than the crude production of the country. The same grade of crude that could scarcely be had at \$2.10 a bbl. a few months ago is now plentiful at \$1.25 or less a bbl. A producer who believed Mr. Coles' story went east to sell his production to those refiners who might need it. He has just returned. He did not sell a barrel. Every refiner was supplied. So was all the gasoline trade with motor fuel.

Crude is going into storage, with only 50 per cent of the output being taken in the Mid-Continent field. In Wyoming hundreds of big wells have never been regularly produced. In Louisiana immense wells are overproducing the market. Mr. Coles asserts that foreign fields are still tied up and the world's needs are an indication that production has not passed consumption. I would remind Mr. Coles that were it not for Europe's exceptional demands there would at this moment be a disastrous overproduction of all refined products in this country. I would further call to his attention that in spite of the fact that he insists that there is an insufficient number of refineries, and in face of the fact the demand for gasoline this year has exceeded all former years, the price of gasoline at this very period of greatest consumption, the touring season period, with extremely hot weather all over the land, has receded in the Mid-Continent field from 20 cents, plus, a gallon to 16 cents, and I know of refiners who have as much as 4,000,000 gallons of

high grade gasoline in storage, which they have been unable to move. Fuel oil is selling as low as 50 cents a barrel and kerosene at 2 3/4 cents a gallon. These are facts, not deductions and theories. It seems to me they answer conclusively Mr. Coles' interrogations:

(1) Has production passed consumption?

(2) Will gasoline prices slump?

Both of these are already matters of history so far as the Mid-Continent refiner is concerned.

But there has been little change in gasoline prices to the consumer. There have been reductions in the tank wagon price in eastern and southern States, but none in the Indiana territory up to this writing. The fact is retail prices, predicated upon f. o. b. refinery quotations, have been too low in the so-called Indiana territory and in many instances for several months consumers have been buying gasoline from local dealers at less than the local dealer could lay the same down at his distributing station. I stated, in reply to an interrogation at the recent investigation of the Federal Trade Commission, that wholesale prices would have to recede several cents a gallon before the benefit could come to the ultimate consumer, for the reason that the consumer had been receiving his consideration out of season. The explanation of this extraordinary situation is very easily and logically explained. Just at the critical moment when the tanks of jobbers and retailers were empty, a great storm swept the Gulf Coast putting out of commission for 30 to 50 days gasoline manufacturing and transporting facilities. The result was markets supplied by these damaged concerns appealed frantically to the Mid-Continent refiner for supplies and their needs were so urgent they were willing to pay almost any price. Temporarily the western jobber found it difficult to buy gasoline at a price he could pay. His actual needs were supplied at advanced prices. This circumstance made it appear there was a tremendous shortage in productive capacity. Yet in spite of this unparalleled incident and condition, certain Mid-Continent refiners have not yet moved all the gasoline they made and stored last winter, and I am willing to go on record as predicting that no matter how many more motor vehicles are put into commission this year or how great demand favorable weather creates during the balance of this year, every consumer will be able to get all the gasoline he requires. The Standard Oil Company has scores of new Burton stills to meet just such a demand. Several Mid-Continent refiners are prepared to increase their runs materially when ever it is necessary. The Mid-Continent field is referred to as the dominant factor in refining, producing as it does over 60 per cent of the country's output of gasoline.

Mr. Coles says: "What has happened is that production has caught up to and passed refining capacity."

Mr. Coles convicts himself. Every gasoline requirement is being met; re-

finery capacity is greater than production, but it is not required. Then there is an overproduction of crude.

Again Mr. Coles says: "Refiners have extended their plants as rapidly as possible and are operating at capacity without exception."

We respectfully refer Mr. Coles to the number of idle refineries in different parts of the country. It is evident there are exceptions. We would also call to Mr. Coles' attention that too many oil refineries would be just as disastrous to the petroleum industry as too much cotton was to the cotton industry. It must be evidence to any student of industrial economics that any manufactory that is sufficiently large to meet all demands in times of greatest consumption, would overproduce by enlargement or multiplication. It must be familiar knowledge that oil refineries are utterly unable to dispose of their curtailed winter output and were it not for a heavy demand in summer, financial ruin would speedily come to the industry.

Why look every which way for an excuse for present weakness in the market, rather than accept the truth of overproduction? Has it ever occurred to Mr. Coles and those of like mind that refiners have vast capital invested, that very few, if any, of them are out of debt and that the peculiarities of the business, the every changing base of supplies, etc., require never ending investment in extensions and repairs; which could not possibly be met were there not periods of prosperity and seasons of stock depletion?

It is conceded that the industry is in better condition than it ever was before. But this condition has been of brief duration. The industry for a long while was headed for the rocks. It has only been a few months that oil property in the middle west was regarded a safe security. The business is only in its infancy. Let it get out of its swaddling clothes; let it be seasoned for trials before too much is demanded of it. Because fabulous prices were recently paid for refining properties is not warrant for the conclusion that all refiners are rolling in wealth and that the public is being fleeced. It must be borne in mind that these plants have not yet paid for themselves.

Independent Oil Agency.

In connection with this story the following list of the members of the Independent Oil Producers Agency of California will prove of interest to the oil fraternity, especially in view of the close relationship of this organization to refining and marketing condition on the Pacific coast.

Amazon Oil Co., 410 Citizens Bank building, Pasadena, Cal.

American Crude Oil Co., 227 Title Insurance building, Los Angeles, Cal.

American Oilfields Co., 1012 Security building, Los Angeles, Cal.

American Petroleum Co., 1012 Security building, Los Angeles, Cal.

Amy Oil Co., Coalinga, Cal.

Alberta Midway Oil Co., Bakersfield, Cal., Kern Co. Land Co. building.

Altoona Midway Oil Co., J. H. Fiske, secretary, Altoona, Pa.

Arizona Petroleum Co., 2227 Hobart boulevard, Los Angeles, Cal.

Angelus Oil Co., 616 Union Oil building, Los Angeles, Cal.

Betta, George A., Bakersfield, Cal.

Black Jack Oil Co., Bakersfield, Cal.

B. H. C. Oil Co., Bakersfield, Cal.

Best Yet Oil Co., Coalinga, Cal.

British Consolidated Oil Corporation, Ltd., Coalinga, Cal., Box 306.

Boychester Oil Co., Coalinga, Cal.

Berry, F. C., Selma, Cal.

Berry & Keller, Federal Realty building, Oakland, Cal.

Bald Eagle Oil Co., 110 Sutter street, San Francisco, Cal.

B. & R. Oil Co., Insurance Exchange, San Francisco, care W. P. Hammon.

Boston Petroleum Co., W. R. Wardner, manager, Bakersfield, Cal.

Brad Oil Co., E. D. Taylor, secretary, 1212 Dominion Trust building, Vancouver, B. C.

Calloma Oil Co., care E. S. St. Clair, Bakersfield, Cal.

Carbo Petroleum Co., Bakersfield, Cal., box 34.

Colm, W. W., Bakersfield, Cal., R. F. D. 5.

Cosmo Oil Co., Bakersfield, Cal.

Cheney Stimson Oil Co., 860 Merchant Natural Bank building, Los Angeles, Cal.

Coalinga Security Oil Co., 924 Van Nuys building, Los Angeles, Cal.

Clampitt, E. A., 200 N. Lakeshore avenue, Los Angeles, Cal.

Cresceus Oil Co., 579 I. W. Hellman building, Los Angeles, Cal.

California Star Oil Co., 1011 Security building, Los Angeles, Cal.

Cauley Brothers, Erie, Pa., Box 773.

Combined Oil Co., 849 Phelan building, San Francisco, Cal.

Circle Oil Co., Balboa building, San Francisco, Cal.

Crene Petroleum Co., 625 Market street, San Francisco, Cal.

Coalinga Nat. Petroleum Co., 310 Sansome street, San Francisco, Cal.

Coalinga Four Oil Co., Coalinga, Cal.

Coalinga Unity Oil Co., Coalinga, Cal.

Coalinga Enterprise Oil Co., Coalinga, Cal.

Coalinga Homestake Oil Co., 106 W. F. street, Coalinga, Cal.

Call Oil Co., Fresno, Cal.

Confidence Oil Co., Fresno, Cal., Box 367.

Del Rey Oil Co., Union Savings Bank building, Pasadena, Cal.

Dominion Oil Co., 509 Postal Telegraph building, San Francisco.

Dunlop Oil Co., 1002 Crocker building, San Francisco, Cal.

De Luxe Oil Co., Empire Oil Co., Republic Oil Co., operating under name of Coalinga Empire Oil Co., 707 New Call building, San Francisco.

Equality Oil Co., 2641 Mission street, San Francisco, Cal.

Exploration Oil Co., 201 Sansome street, San Francisco, Cal.

Essex Oil Co., 332 Pine street, rm. 411, San Francisco.

Ethel D. Co., Federal Realty building, Oakland, Cal.

Eldorado Oil Co., Federal Realty building, Oakland, Cal.

- East Puente Oil Co., San Diego, Cal., box 281.
- Euclid Oil Co., 616 Union Oil building, Los Angeles, Cal.
- Empire Gas & Fuel Co., 605 Ferguson building, Los Angeles, Cal.
- Evinger, D. R., 817 T street, Fresno, Cal.
- Fox Oil Co., Lompoc, Cal.
- Fox & Garrett Oil Co., Bakersfield, Cal., R. F. D. 5.
- Fairfield Oil Co., 1113 Los Angeles Invest. building, Los Angeles, Cal.
- Federated Oil Co., care A. H. Liscomb, 38 E. Union street, Pasadena, Cal.
- G. M. B. Co., care D. S. Ewing, Fresno, Cal.
- Globe Oil Co., 616 Union Oil building, Los Angeles, Cal.
- General Petroleum Co., 1003 Higgins building, Los Angeles, Cal.
- Graham, R. E., Graham & Foster, Elk Horn Oil Co., care R. E. Graham, Taft, Cal., box 8.
- Mrs. Mary Chamberlain, 309 S. Third street, San Jose, Cal.
- Henrietta Oil Co., 824 Mills building, San Francisco, Cal.
- Hondo Oil Co., 617 Merritt building, Los Angeles, Cal.
- Illinois Crude Oil Co., 114 Moran building, Bakersfield, Cal.
- Indian & Colonial Development Co. Ltd., Taft, Cal.
- Jewett Oil Co., Bakersfield, Cal., box 205.
- Johnson Oil Co., Union Nat. Bank building, Fresno, Cal.
- Junction Oil Co., 257 Holbrook building, San Francisco, Cal.
- Johnson, S. A., T. F. Fox and Paul Fox, care T. F. Fox, Bakersfield, Cal., box 688.
- Kern Four Oil Co., 521 Consolidated Realty building, Los Angeles.
- Kern Sunset Oil Co., Bakersfield, Cal.
- Knob Hill Oil Co., 1241 I street, Fresno, Cal.
- Lakeview Oil Co., 1109 Union Oil building, Los Angeles, Cal.
- Los Angeles Kern Oil Co., 1007 Haas building, Los Angeles, Cal.
- Lucile Oil Co., Coalinga, Cal.
- March Oil Co., 714 March Strong building, Los Angeles, Cal.
- Manley & McGinn, Federal Realty building, Oakland, Cal.
- Mahaska Oil Co., 6919 Hawthorn avenue, Los Angeles, Cal.
- May Oil Co., Bakersfield, Cal. (Vesta Lease).
- Manhattan Midway Oil Co., 1100 Hibernian building, Los Angeles, Cal.
- Maricopa Natural Petro. Co., Fresno, Ca., box 411.
- Marengo Oil Co., 616 Union Oil building, Los Angeles, Cal.
- Marian Oil Co., Coalinga, Cal.
- M. P. Oil Co., care First Bank of Kern, Bakersfield, Cal.
- M. K. X T. Oil Co., 232 First National Bank building, Oakland, Cal.
- M. G. & P. Co., Bakersfield, Cal., box 34.
- McCutchen Brothers, Maricopa, Cal.
- Mt. Diablo Oil Mining & Development Co., 517 Central building, Los Angeles.
- Miocene Oil Co., Nevada Bank building, San Francisco, Cal.
- Midway Peerless Oil Co., 617 Merritt building, Los Angeles, Cal.
- Muscatine Oil Co., 809 Angeles Trust building, Los Angeles.
- Murray, M. H., Coalinga, Cal.
- Mercantile Crude Oil Co., 504 Grant building, San Francisco, Cal.
- Mecca Oil Co., Bakersfield, Cal., box 293.
- Netherlands Oil Co., Fresno, Cal.
- Nevada County Oil Co., 1201 Union Oil building, Los Angeles, Cal.
- Nevada Petroleum Co., Crocker building, San Francisco, Cal.
- New S. F. Crude Oil Co., Fresno, Cal.
- Norse Oil Co., 616 Union Oil building, Los Angeles, Cal.
- Olema Oil Co., 824 Mills building, San Francisco, Cal.
- Oil Crude Oil Co., 2827 La Salle avenue, Los Angeles, Cal.
- Ojai Valley Petroleum Co., 207 Homer Laughlin building, Los Angeles, Cal.
- Ozark Oil Co., Los Angeles, Cal., box 564.
- Pacific States Petro. Co., Coalinga, Cal.
- Patricia Oil Co., Bakersfield, Cal., Kern Co. Land Co. building.
- Paraffine Oil Co., Bakersfield, Cal., box 566.
- Parker, M. C., Bakersfield, Cal.
- Pacific Midway Oil Co., Mills building, San Francisco, Cal.
- Penn-Midway Oil Co., 1024 Baker-Detweiler building, Los Angeles.
- Perseus Oil Co., 207 S. Broadway, Los Angeles, Cal.
- Pilot Oil Co., 607 First National Bank building, San Francisco.
- Pleasant Valley Farming Co., 279 Mills building, San Francisco, Cal.
- Potomac Oil Co., care H. Myrick, International Bank building, Los Angeles.
- Premier Oil Co., 579 I. W. Hellman building, Los Angeles.
- Pricewell Oil Co., 314 Wilcox building, Los Angeles, Cal.
- Queen Oil Co., care First Nat. Bank, Los Angeles, Cal.
- Rambler Oil Co., 616 Union Oil Bldg., Los Angeles, Cal.
- Revenue Oil Co., San Gabriel Bank building, Pasadena, Cal.
- Safe Oil Co., Bakersfield, Cal.
- San Francisco McKittrick Oil Co., 609 Monadnock building, San Francisco, Cal.
- Seneca Oil Co., 561 Nielsen avenue, Fresno, Cal.
- Security Development Co., Bakersfield, Cal., box 813.
- Shandon Oil Co., care Dr. Alex Dallas, Pine Brook, Morris county, N. J.
- Shawmut Oil Co., Coalinga, Cal.
- Shear Petroleum Co., 2827 La Salle avenue, Los Angeles, Cal.
- Silver Tip Oil Co., care W. P. Hammon, Insurance Exchange, San Francisco.
- Snook, Walter, Maricopa, Cal.
- St. Clair, L. P., care E. S. St. Clair, Bakersfield, Cal.
- St. Clair & Jastro, care E. S. St. Clair, Bakersfield, Cal.
- St. Paul Consolidated Oil Co., 561 Nielsen avenue, Fresno, Cal.
- Strong Oil Co., 1015 Marsh Strong building, Los Angeles, Cal.
- Spinks Crude Oil Co., care First National Bank, Monrovia, Cal.
- S. W. & B. Oil Co., 928 Merchants Exchange building, San Francisco.

Tamalpais Oil Co., 149 California street, San Francisco, Cal.	Valley Oil Co., Coalinga, Cal.
Tejon Oil Co., 43 Redlick building, Bakersfield, Cal.	Vesta Oil Co., Bakersfield, Cal.
Traders Oil Co., 616 Union Oil building, Los Angeles, Cal.	Victor Oil Co., 605 I. N. Van Nuys building, Los Angeles.
Traffic Oil Co., 616 Union Oil building, Los Angeles, Cal.	Ward Oil Co., Fresno, Cal.
T. W. Co., Bakersfield, Cal., box 34.	W. T. & M. Co., Bakersfield, Cal., box 34.
Union Oil Co. of Cal., 114 Union Oil building, Los Angeles, Cal.	Wilbert Oil Co., Bakersfield, Cal.
United Crude Oil Co., 51 Ventura avenue, Long Beach, Cal.	Yellowstone Oil Co., 832 Van Nuys building, Los Angeles, Cal.
U. S. Oil & Mining Co., Bakersfield, Cal.	York Coalinga Oil Co., 607 First National Bank building, San Francisco.
	Zier Oil Co., 1002 Crocker building, San Francisco, Cal.

Wholesale Oil Dealers and Lubricating Oil Distributors--United States

ALABAMA.

G. T. Wofford Oil Co. 9th Ave. and 32nd St. Birmingham
Palm Oil Co. Mobile

ARIZONA.

Pratt Gilbert Co. Phoenix
Phoenix Oil Co. 127 N. 1st St. Phoenix

ARKANSAS.

Southern Oil Co. Pine Bluff
Co-operative Oil & Paint Co. 612 E. Markham St. Little Rock
Gay Oil Co. 1401 E. 9th St. Little Rock

CALIFORNIA.

Diamond Oil Co. (not inc.) 202 Broadbury Bldg. Los Angeles
H. V. Gifford 178 N. Central Ave. "
National Oil Co. Title Ins. Bldg. "
Panama Lubricants Co. 2604 Santa Fe Ave. "
Paragon Oil & Grease Co. 909 W. Washington St. "
Pennant Oil & Grease Co. 178 Central Ave. "
Radiant Lubricants Co. 955 S. Alameda St. "
Sun Oil & Grease Co. 1618 S. Main St. "
Tarr & McComb 1025 Central Bldg. "
Union Oil Co. Union Oil Bldg. "
Samuel Wigney 505 E. Second St. "
C. A. Welch 2053 Richmond Ave. Oakland
Sacramento Oil Co. 800 "J" St. San Diego
Silver Gate Oil Co. 848 Fourth Ave. "
Southern Oil Co. 1745 "D" St. "
American Gasoline Co. Kohl Bldg. San Francisco
American Oil & Paint Co. 15th and deHare St. "
Associated Oil Co. Sharon Bldg. "
Bass Hunter Paint Co. 144 Davos St. "
Commercial Petroleum Oil Co. 268 Market St. "
W. P. Fuller & Co. 148 Stewart St. "
Independent Oil Co. 224 Potero Ave. "
J. R. McGuffick 148 Stewart St. "
Monarch Mfg. Co. 215 Ginna St. "
R. N. Nason & Co. 151 Potero Ave. "
National Oil Co. 711 Third St. "
Petroleum Products Co. 350 California St. "
Edward N. Read 208 Ninth St. "
Wolverine Oil Co. 440 Brennan St. "
Whittier Coburn Co. Howard and Beale St. "

COLORADO.

American Oil Processes, Ltd. 230 Majestic Bld. Denver
Great Western Oil Co. 3450 Fox St. "
Independent Oil Co. 3600 Klatko St. "
B. L. Jones Merc. & Mfg. Co. 1517 Aerophoie St. "
Mountain Motor Fuel Co. Temple Court Bldg. "
E. E. Rice 2255 Larimer St. "
United Oil Co. 608 First National Bank Bldg. "

CONNECTICUT.

Hubbell & Wade Co. 506 Water St. Bridgeport
Harry Rider 412 Water St. Bridgeport
Clinton Oil Co. 33 Homestead Ave. Hartford
Post & Lester Co. 112 Allyn St. Hartford
Singer Oil Co. 72 Edwards Hartford
W. H. Goodrich & Co. 31 Warwick St. New Haven
Connecticut Oil Co. 14 Myrtle Ave. Stamford
Connecticut Oil Co. 405 S. Leonard St. Waterbury
Valley Oil Co. Middletown

DELAWARE.

Penn Lubricating Oil Co. 301 Maple St. Wilmington
Richard Brewster Oil Co. 110 Orange St. Wilmington
Wilmington Oil & Refy. Co. 407 E. 13th St. Wilmington

DISTRICT OF COLUMBIA.

N. B. Falls Lubricating Co. 14th and "I" Sts., N. W. Washington
Hellman Oil Co. 210 "K" St., S. W. Washington

FLORIDA.

Bond & Boewes Co.	10 W. Broadway	Jacksonville
C. P. Hambler		St. Augustine

GEORGIA.

Georgia Oil Co.	S. Pryor St. and South Ry.	Atlanta
Huguley Oil Co.	Austell Bldg.	Atlanta
Penn Oil & Grease Co.	540 Whitehall St.	Atlanta
Peoples Oil Co.		Augusta
Southern Oil Co.	Dixon and Philet Sts.	Macon
Criterion Oil Co.	309 Peachtree St.	Atlanta

ILLINOIS.

Aurora Oil Co.	River and Elm Sts.	Aurora
C. S. McCornack		Aurora
J. A. Loos	513 E. Illinois St.	Belleville
Hanger & Maxfield		Bloomington
Murray Medberry Co.		Bloomington
Union Oil Co.		Centralia
Clinton Oil Co.		Clinton
Boldt Oil Co.		Elgin
Sherwood R. Moore	370 S. State St.	Elgin
Pennsylvania Oil Co.		Freeport
Illinois Independent Oil Co.		Havana
C. V. Chapman Oil Co.	North Dixon	Dixon
Chas. Thompson	Johnson and Centre St.	Jacksonville
T. D. Wilson Oil & Mfg. Co.	State and Wabash R. R.	Jacksonville
Bennett Oil Co.		Joliet
Bartles Sweny Oil Co. of Illinois.	101 Irving St.	Peoria
Richardson Lubricating Co.		Quincy
R. J. Bryhn	316 S. First St.	Rockford
Johnson Oil & Grease Co.		Rockford
Gibson City Oil Co.		Gibson City
Silliams' Hardware Co.		Streator
Smith Oil & Refining Co.		Rockford
Illinois Oil Co.	1517 Second Ave.	Rock Island
Tri-State Oil Co. (not inc.)	410 Best Bldg.	Rock Island
National Refining Co.		Springfield
Peoples Oil Co.	19th and Madison Sts.	Springfield
E. G. Cooper		Sycamore
Warren Oil Co.		Warren
Waukegan Oil Co.		Waukegan
E. L. Hanford		Woodstock
Elmore Oil Co.		Sycamore

CHICAGO.

Fred C. Adams Co.	224 S. LaSalle St.	
Anderson & Gustafson	608 S. Dearborn St.	
Bartell Brothers	529 Plymouth St.	
Cataract Mfg. & Ref. Co.	327 N. LaSalle St.	
Champion Oil Co.	623 W. 59th St.	
Chicago Oil Co.	140 S. Dearborn St.	
Frank C. Clark	316 W. Kinzie St.	
W. P. Collins & Co.	701 S. Dearborn St.	
Consumers' Mutual Oil Co.	5033 Kenwood Ave.	
Crystal Rock Oil Co.	3932 Emerald Ave.	
Cudahy Refining Co.	111 W. Monroe St.	
Davey & Co.	2608 Grand Ave.	
Economy Engineering Co.	415 S. Washenaw St.	
Eberhardt Oil & Compound Co.	3915 Keystone Ave.	
Economy Oil & Compound Co.	542 W. 13th St.	
J. P. Murray & Co.	222 N. Wabash Ave.	
The Moody Co.	608 S. Dearborn St.	
English Chemical Co.	2228 Cottage Grove Ave.	
P. Bakelund	3142 LaSalle St.	
Federal Lubricants Co.	125 W. 46th St.	
Frazer Lubricant Co.	3921 Normal Ave.	
A. W. Harris Oil Co.	143 N. Wabash Ave.	
E. J. Hibner Oil Co.	1322 W. Division St.	
Home Oil Co.	76 W. Adams St.	
E. F. Houghton & Co.	157 W. Lake St.	
Independent Oil & Supply Co.	140 W. Van Buren St.	
Inter-Ocean Oil Co.	600 W. Lake St.	
Geo. R. Jenkins & Co.	608 S. Dearborn St.	
Jowett & Sowers Oil Co.	20 W. Jackson Blvd.	
Jobbers Manufacturing Co.	125 W. 46th Place	
Keystone Oil & Mfg. Co.	111 N. Market St.	
Oil Marketing Co.	14 E. Jackson Blvd.	
Magie Bros., Inc.	110 S. Clinton St.	
Merchants Pure Oil Co.	1322 Kingsburg St.	
Wm. P. Miller Co.	2316 S. Wabash Ave.	
Monogram Oil Co.	1549 S. Michigan Ave.	
E. C. Mullins Co.	38 S. Dearborn St.	
National Refining Co.	122 S. Michigan Ave.	
H. M. Paddon	222 N. State St.	
Paragon Refining Co.	1801 Wentworth Ave.	

CHICAGO—Continued.

Pennsylvania Oil Co.	170 N. Halsted St.
Reliable Oil Co.	1754 Belmont Ave.
Reliance Refining Co.	W. 34th and Iron Sts.
Rex Oil Co.	431 S. Dearborn St.
Riverside Oil Co.	122 S. Michigan Ave.
Wm. C. Robinson & Son Co.	113 E. Austin Ave.
Shaffer-Smathers Oil Co.	75 W. Monroe St.
Spiegler Oil Co.	2150 Fullerton Ave.
Star Oil Co.	441 N. Halsted St.
Sterling Oil Co.	10 E. Garfield Blvd.
Sullivan Oil Co.	13 W. Division St.
Superior Oil & Supply Co.	44th St. and Western Blvd.
Union Petroleum Co.	29 S. LaSalle St.
D. A. Stuart & Co.	4103 S. LaSalle St.
Continental Oil Products Co.	111 W. Monroe St.
Midland Petroleum Co.	2428 W. 26th St.
Triangle Oil Co.	1101 W. 37th St.
Viscosity Oil Co.	161 W. Austin Ave.
Warren Lubricant Co.	Chicago Heights
Johnson Oil Refining Co.	

INDIANA.

Evansville Oil Co.	1900 Division St.	Evansville
Madison Oil Co.		Elwood
Paragon Oil Co.	1719 E. Virginia St.	Evansville
Maple Oil Co.		Greencastle
Brooks Oil Co.	1133 S. Harding St.	Indianapolis
Campbell-Zartman Oil Co.	2915 Madison Ave.	"
Crescent Oil Co.	520 W. Wyoming St.	"
Miller Oil & Supply Co.	140 S. Meridan St.	"
National Refining Co.	Oliver Bldg.	"
Paragon Oil & Supply Co.	1004 E. Vermont Ave.	"
W. C. Robinson & Son Co.	337 W. New York Ave.	"
Tiena Refining Co.	1951 Madison Ave.	"
E. A. Martins Co.		Lafayette
Independent Oil Co.		LaPorte
Independent Oil Co.		Mishawaka
Central Oil Co.		Montpelier
Muncie Lubricating Co. (not inc.)		Muncie
Harris Oil Co.		Muncie
South Bend Oil Co.	1312 Lafayette St.	Muncie
Terre Haute Oil & Coal Co.	717 E. First St.	Terre Haute

IOWA.

Alton Tank Line		Alton
Defiance Oil Co.		Alton
Audobon Oil Co.		Audobon
Penn Oil & Supply Co.		Burlington
Cedar Rapids Oil Co.		Cedar Rapids
Monarch Mfg. Co.	5th and 11th Sts.	Council Bluffs
Penn Consumers Oil Co.		Council Bluffs
Federal Oil & Supply Co.		Des Moines
Gasoline Supply Co.		Des Moines
International Oil Co.		Des Moines
Riley Penn Oil Co.		Burlington
Horring Motor Co.		Des Moines
Waterloo Chemical Co.		Waterloo
Mount Pleasant Oil Co.		Mount Pleasant
Liberty Oil Co.	Sixth and Elm Sts.	Des Moines
Manhattan Oil Co.	S. Ninth and Murphy Sts.	Des Moines
Metropolitan Oil Co.	S. and L. Bldg.	Des Moines
Iowa Oil Co.	Leaves and Charter Sts.	Dubuque
Riley Davies Oil Co.		Fairfield
United Oil Co.		Fort Dodge
Interstate Oil Co.		Sioux City
S. L. Collins Oil Co.		Knoxville
Moberly Oil Co.		Knoxville
Royal Oil Co.		Marshalltown
Marshall Oil Co.		Marshalltown
Shepley & Son		Sheldon
Stoessel Oil Works, Inc.		Ottumwa
Penn Oil & Supply Co.		Ottumwa
Independent Co-operative	223 Fourth Ave.	Sioux City
Gasoline Supply Co.		Sioux City
Bartles Sweney Oil Co.		Waterloo
Hawkeye Oil Co.		Waterloo
H. and E. Rouse		Oelwein
Penna. Consumers Oil Co.		Des Moines
Louis Kuehnle		Dubuque

KANSAS.

Lesh Oil Co.		Arkansas City
Pirottee Oil Co.		Beloit
Central Oil Co.		Beloit
Wichita Independent Oil Co.		Wichita
Miller Oil Co.		Chante
Manhattan Oil Co.		Manhattan
Howard Oil Co.		Mount Hope

KANSAS—Continued

Golden Rule Oil Co.	Sharon
Puritan Oil Co.	Stafford
Progressive Oil Co.	Hutchison
Home Oil Co.	Hawatha
Kinsley Oil Co.	Kinsley
Hutchinson Oil Co. (not inc.)	Hutchinson
Fort Scott Oil Co.	Fort Scott
Mutual Oil Co.	Lawrence
Bell Oil Co.	Sylvan Grove
Independent Oil Co. (not inc.)	Marysville
E. E. Leake Oil Co.	Almena
Wilhoit Oil Co.	Atchison
E. F. Jones Oil Co.	Beloit
C. A. Stannard	Emporia
Independent Oil Co.	Galena
American Oil & Gasoline Co.	Hutchinson
Hutchinson Oil Co.	Hutchinson
Culmer Chemical Co.	Independence
E. E. Leake Oil Co.	Kensington
W. H. Sikes	Leonardville
Blake Oil Co.	Liberal
Lesh Oil Co.	Ottawa
Roy Turst Oil Co.	Meade
Quenemo Oil Co.	Quenemo
Progressive Oil Co.	Topeka
C. L. Brown	Scammon
Topeka Oil Co.	Topeka
Peter Buser	Seneca
Pioneer Oil Co.	Solomon
Economy Oil Co.	Topeka
Buser Bros.	Wichita

KENTUCKY.

Louisville Chemical Co.	Louisville
Kentucky Consumers Oil Co.	37th and Bank Sts. Louisville
Chas. C. Stoll Oil Co.	815 Fulton St. Louisville

LOUISIANA.

Benner Oil Co.	Alexandria
Keystone Lubricating Co.	610 Chartres St. New Orleans
Liberty Oil Co., Ltd.	517 Gravier St. "
Marine Oil Co., Ltd.	760 St. Charles St. "
Star Lubricating Co.	619 Paydras St. "

MAINE.

Little & Goffin Oil Co.	243 Commercial St. Portland
Rockland Oil Co.	Rockland

MARYLAND BALTIMORE.

American Oil Co.	316 Eutaw St.
Baltimore Oil Co.	110 High St.
Columbia Oil Co.	52 South St.
Commercial Oil Co.	3222 O'Donnell St.
Crescent Oil Co.	602 W. Pratt St.
Crown Oil & Wax Co.	Pratt and Eighth Sts.
F. W. Dryden & Co.	Lancaster and Dallas Sts.
Maryland Oil Co.	Bank and Eighth Sts.
Central Oil Co.	Lombard and Ninth Sts.
Johns Hopkins Oil Co.	407 Stewart Bldg.
Patapsco Oil & Grease Co.	109 Cheapside
Red "C" Oil Mfg. Co.	410 Keyser Bldg.
National Oil Co.	Eighth near Bank Sts.
Wm. C. Robinson Sons Co.	1403 Theresa St.
Sherwood Brothers	Bank and Sixth Sts.
Tiona Oil & Grease Co.	207 Guilford Ave.
Union Oil Co.	Shot Tower Bldg.

MASSACHUSETTS.

Independent Oil Co.	Brockton
American Oil Co.	Cambridge
Fred A. Tippet & Son	119 Pearl St. Cambridge
Western Oil & Gasoline Co.	Dorchester
Independent Oil Co.	Fitchburg
E. A. Buck & Co.	Palmer
Quincy Oil Co.	Quincy
Capital Oil Co.	Salem
E. A. Buck & Co.	E. Worcester St. Worcester
Higgen Bros. & Co.	Springfield

BOSTON.

Boston Grease Co.	133 Summer St.
Boston Oil & Gasoline Co.	143 Kingston St.
Colonial Lubricating Co.	15 Storer St.
Columbia Lubricants Co.	128 Massachusetts Ave.
Downer Kerosene Co.	113 W. First St.
Economy Lubricating Co.	54 High St.

E. F. Houghton & Co.	46	Vernhill St.
Jenny Mfg. Co.		8 India St.
Hisgen Bros. & Co.	611	Belmont Ave.
National Oil Co.		Rowes Wharf
McLean-Jones Oil & Supply Co.	40	India Wharf
Monogram Oil Co.	127	Massachusetts Ave.
Patterson Lubricating Co.		114 Broad St.
Pennsylvania Oil Co.	53	Munroe St.

MICHIGAN.

Moreland Bros. & Crane		Adrian
Deen & Co.	214 Main St.	Ann Arbor
American Oil Co.	1320 Majestic Bldg.	Detroit
Central Oil & Gasoline Co.	138 Fort St.	"
Greenslade Oil Co.	40 Jefferson Ave.	"
E. F. Houghton Co.	96 Bates St.	"
Raths Oil Co. (not inc.)	799 Scotton Ave.	"
White Star Refining Co.	Avery St. G. T. R. R.	"
The Great Western Oil Co.	Webster St. and R. R.	Flint
H. S. Goodell		Hancock
Grand Rapids Oil Co.		Flint
American Oil Co.		Jackson
Advance Grease Co.	170 S. Water St.	Jackson
Independent Oil Co.		Kalamazoo
White Lake Oil Co.		Montague
C. E. Stock Zyllite Grease & Oil Co.		Port Huron
J. M. Raths & Co.		Saginaw

MINNESOTA.

Marshall Oil Co.		Albert Lea
Northern Oil Co.		Breckenridge
Cornplanter Lubr. & Oil Co.	4706 Grand Ave.	Duluth
National Refining Co.		Mankato
Grove City Oil Co.		Grove City
W. H. Barber Agency Co.	1501 Hamline Ave.	Minneapolis
Climax Western Oil Co.	324 Tenth Ave.	"
Cornplanter Oil Co.	2828 Third Ave.	"
Crescent Oil Co.	601 Sukes Bldg.	"
Indian Refining Co.	1 Cedar Ave.	"
Interstate Oil Co.	200 Temple Court	"
Kunz Oil Co.	12 Tilder St.	"
Pure Oil Co.	First and 15th Ave.	"
Penn Oil & Supply Co.	1901 Grand St., N. E.	"
Reliance Oil & Supply Co.	218 16th Ave., S.	"
Superior Oil Co.	523 Washington Ave., N.	"
Twin City Oil Co.	210 N. First St.	"
Van Tilburg Oil Co.	2426 University Ave., S. W.	"
St. Cloud Oil Co.		St. Cloud
Bartles Oil Co.	Gilfillian Bldg.	St. Paul
Craig Oil Co.	Eaton Ave. & Morrison St.	"
Cornplanter Lub. & Oil Co.	Foot Drake St.	"
Independent Oil Co.	Eaton Ave. & Morrison St.	"
Manhattan Oil & Linseed Co.	Vandolia & Wabash Sts.	"
H. K. Stahl Co.	2314 Wycliffe St.	"
Wilhelm Oil Co.	2361 Hamdon Ave.	"
Bartles Scott Oil Co.		Wilmar
Winona Oil Co.		Winona
Hoff Oil Co.		St. Paul

MISSOURI.

Clinton Oil Co.		Clinton
Joplin Oil Co.		Joplin
E. M. Wilhoit Oil Co.	12th and Missouri Sts.	Joplin
Carthage Independent Oil Co.		Carthage
Carthage Oil & Fuel Co.		Carthage
J. C. Hildreth & Co.		Carthage
J. I. Keethley		Center
Southwest Missouri Oil Co.		Dexter
Gate City Oil Co.	214 E. 16th St.	Kansas City
Inter-Ocean Oil Co.	2009 Baltimore	"
Inter-State Oil Co.	Shawnee and Baird	"
Superior Oil Co.	Genesee and Shawnee	"
American Lubricating Co.	1906 Grand Ave.	"
Imperial Oil Co.	Genesee and Shawnee	"
Nourse Oil Co.	1317 W. Eighth St.	"
Star Lubricating Oil Co.	1118 McGee St.	"
Stevens Oil & Grease	31st and Wyoming Sts.	"
Bradley & Neal		Fayette
Auto Gasoline Co.	4065 Washington Ave.	St. Louis
Andrew Kloeppel		Freeburg
S. H. Woods		Fulton
Bell Oil Co.	51 E. Perry St.	St. Louis
Star Oil Co.		Harrisonville
Independent Oil & Mdse. Co.		St. Louis
Crowley Guibert Oil Co.		Kansas City
P. G. Anderson		Kearney
Continental Oil Co.	426 E. Theresa St.	St. Louis
Merchants Oil Co.		Kennett

MISSOURI—Continued.

Crescent Oil & Supply Co.	203 N. Main St.	St. Louis
W. C. Khans .....	.....	Knobnoster
A. D. Farmer .....	.....	Lockwood
Independent Oil Co. ....	.....	Maryville
Gibbs-Brown Oil & Gasoline Co.	500 S. Theresa St.	St. Louis
Central Oil & Gasoline Co. ....	.....	St. Joseph
St. Joseph Viscosity Oil Co. ....	.....	St. Joseph
Great Western Oil Works	823 N. Levee St.	St. Louis
Morlight Oil Co. ....	.....	Sedalia
Henseler Merc. Oil & Supply Co.	15th and Gratiot Sts.	St. Louis
Imperial Oil Co.	200 N. Commercial St.	"
International Oil Works	419 S. Theresa Ave.	"
Keystone Lubricating Co.	5010 N. Market St.	"
Northrup Lub. Oil Co.	308 N. Commercial St.	"
Pierce Oil Corporation	National Bank of Commerce Bldg.	"
St. Louis Oil Co.	3000 N. Second St.	"
Victor Lubr. Oil Co.	4274 Easton St.	"
Moberly Oil Co. ....	.....	Moberly
W. T. Havener Oil Co. ....	.....	Lebanon
St. Joseph Oil Co. ....	.....	St. Joseph
Purity Oil Co. ....	.....	Springfield
E. M. Wilhoit .....	.....	Springfield

MONTANA.

Commercial Oil Co. ....	.....	Helena
Montana Oil Co. ....	.....	Helena
Mutual Oil Co. ....	.....	Great Falls
Northern Oil Co. ....	.....	Great Falls
Pure Oil Co. ....	.....	Great Falls
Independent Oil Co. ....	.....	Missoula

NEBRASKA.

B. & L. Oil Co. ....	.....	Fairbury
Jonah Brenneman .....	.....	Levellon
State Oil Co.	Randolph and 25th Sts.	Lincoln
E. A. Bullock .....	.....	Norfolk
Norfolk Oil & Chem. Co. ....	.....	Norfolk
Norfolk Independent Oil Co. ....	.....	Norfolk
Atlas Oil Co.	First National Bank Bldg.	Omaha
Manhattan Oil Co.	1445 N. 11th St.	"
American Oil Co.	34th St.	"
Kansas City Oil & Paint Co. ....	.....	"
Missouri Valley Oil Co. ....	.....	"
Nebraska Compound Oil Co. ....	.....	"
Omaha Oil Co. ....	.....	"
U. S. Oil Co. ....	.....	"
L. V. Nicholas Oil Co.	24th and Hickory Sts.	"
Nourse Oil Co.	502 Jones St.	"
Lamphere & Loveman	York

NEW HAMPSHIRE.

Arthur W. Warren	Manchester
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NEW JERSEY.

J. A. Maintz & Co.	339 N. Mass Ave.	Atlantic City
Pittsburg & Phil. Oil & Ref. Co.	Front and Mechanic St.	Camden
Hudson Oil & Supply Co.	49 Hudson St.	Jersey City
American Oil & Supply Co.	52 Lafayette St.	Newark
Morden Oil & Supply Co.	150 Aven Ave.	"
Phoenix Belting & Oil Co.	60 Polk St.	"
Standard Lubricating Co.	35 Essex St.	"
Lawler Oil Co.	239 E. Fifth St.	Paterson

NEW YORK.

Albany Belting & Supply Co.	372 Broadway	Albany
Capital City Oil Works	2 Madison Ave.	Albany
Four Bros. Independent Oil Co.	Tivoli St.	Albany
Orleans County Oil Co. ....	.....	Albion
Binghamton Oil Refining Co. ....	.....	Binghamton
Deye Independent Oil Co. ....	.....	Binghamton
Tiona Oil Co. ....	.....	Binghamton
Acme Oil Works	5 Ainslee St.	Brooklyn
Advance Oil Works	310 Flushing Ave.	"
Nassau Oil Works	423 Greenpoint Ave.	"
Paragon Lubricating Oil Co.	602 Pacific St.	"
Royal Oil Co.	275 Lexington Ave.	"
Anderson Oil Co.	608 Swan St.	Buffalo
Buffalo Oil & Compound Co.	146 Mohican St.	"
Buffalo Specialty Co.	375 Ellicott St.	"
Cataract Refining & Mfg. Co.	913 Mutual Life Bldg.	"
Cotton & Co., Inc.	17½ W. Seneca St.	"
N. B. Fales Lub. Co.	Prudential Bldg.	"
Globe Oil & Supply Co.	14 Maurice St.	"
E. E. Harris & Co.	Maurice St.	"
Hoffman Oil Co. (not inc.)	16 Elk St.	"
Central Oil Co.	55 Alabama St.	"
Kendall Refining Co.	102 Papin Place	"

NEW YORK—Continued.

Pease Oil Co.	80 Young Ave.	Buffalo
Sterling Oil Co.	22 Goodrich St.	"
Warren Lubricant Co.	Ellicott Square	"
Whipple & Ackerly Oil Co. ....	.....	Cuba
Cortland Specialty Co. ....	.....	Cortland
C. B. Wood Oil & Paint Co. ....	.....	Evans Mills
Guardol Oil Co. ....	.....	Ithaca
J. F. Jones & Co. ....	.....	Jamestown
Little Falls Gasoline & Oil Co. ....	.....	Little Falls
W. F. Miller Sons	Hancock St.	Long Island City
D. W. Fenton & Co. ....	.....	Middletown
Acheson Oldag .....	.....	Niagara Falls
Tri-Products Co. ....	.....	Olean
Oswego Oil & Fuel Co.	1 W. Bridge St.	Oswego
Peoples Oil & Fuel Co.	300 W. 41st St.	Oswego
Union Oil Works	189 N. Water St.	Rochester
Union Lubricating Co.	37 Van Gutsberg Ave.	Schenectady
C. E. Mills Oil Co.	263 Walton St.	Syracuse
Troy Belting & Supply Co.	7 Grand St.	Troy
Emmett Lubricating Oil Co.	14 Gettys Square	Yonkers

NEW YORK CITY.

Adams Grease & Oil Co.	150 W. 51st St.
Ajax Oil & Grease Co. (not inc.)	170 W. 65th St.
American Petroleum Products Co.	136 Water St.
Binghamton Oil Co.	68 New Chambers St.
American Lubricants Co. ....	.....
Butler Oil Co. ....	.....
Cadillac Oil Co.	27 William St.
Callahan Oil Co.	218 Front St.
Champion Motor Oil Co.	125 Broad St.
Clarkson & Ford Co.	55 Water St.
Colonial Oil Co.	17 Battery Place
Columbia Lubricant Co.	115 Broad St.
Columbia Oil Co. of N. Y.	11 Williams St.
Adam Cook's Sons	708 Washington St.
N. B. Cook Oil Co.	148 Front St.
Crescent Oil Co.	50 Church St.
Eagle Lubricating Oil Co.	24 State St.
Fiske Bros. Refining Co.	24 State St.
General Petroleum Co.	52 Broadway
Elbert & Co. ....	.....
J. E. Gerrodette & Co.	17 Battery Place
A. W. Harris & Co.	400 Greenwich St.
Harlem Oil Co.	129 E. 113th St.
Geo. A. Haws & Co.	142 Front St.
E. F. Houghton & Co.	64 Dey St.
Hudson Oil Co.	25 Front St.
Inter-Ocean Oil Co.	90 West St.
Invader Oil Co.	80 Broad St.
Keystone Oil Co.	277 Broadway
Knickerbocker Oil Co.	220 E. 74th St.
N. Y. Lubricating Oil Co.	116 Broad St.
N. Y. & Brooklyn Oil Co.	304 Broome St.
Non-Fluid Oil Co.	165 Broadway
Ocean Oil Co., Ltd.	212 West St.
Oil Products Co.	17 Battery Place
Panhard Oil Co.	149 Front St.
Petroleum Products Co.	60 Water St.
Platt & Washburn Ref. Co.	11 Broadway
Wm. C. Robinson & Sons Co.	213 Front St.
Schliemann Oil & Kerosene Co.	86 Warren St.
Alden & Swan & Co.	135 Front St.
Three-in-One Oil Co.	42 Broadway
Tiena Oil & Grease Co.	395 Broadway
Wolverine Lubricants Co. of N. Y.	70 Broad St.

NORTH CAROLINA.

Chadwick & Gafain	Beaufort
Edgecombe Oil Co.	Tarboro
Cape Fear Oil Co.	Wilmington

NORTH DAKOTA.

Bartles Northern Oil Co.	Grand Forks
Martin & Jacobson	Minot

OHIO.

Factory Oil Co.	235 E. Furnace St.	Akron
Eagle Lubricant Co. ....	.....	Canton
Cincinnati Oil Works Co.	525 Excelton St.	Cincinnati
Moore Oil Co.	York and McLean Sts.	Cincinnati
Acme Grease & Oil Co.	1294 W. 70th St.	Cleveland
American Petroleum Products Co. ....	.....	"
Atlas Oil Co. (H. O.)	Rose Bldg.	"
Brooks Oil Co.	C & P. A. & Erie R. R.	"
Canfield Oil Co.	3215 E. 35th St.	"
F. G. Clark Co.	1091 W. 11th St.	"
Climax Refining Co.	Williamson Bldg.	"
Clinton Oil Co.	3216 E. 55th St.	"

OHIO—Continued.

Columbia Lubricants Co.	1111 Superior St.	Cleveland
Commercial Oil Co.	8300 Holton St.	"
Crescent Oil & Grease Co.	2229 E. 71st St.	"
Crown Oil Co.	804 Lakeside Ave.	"
Excelsior Oil & Grease Co.	822 Champlain Ave.	"
Globe Oil Co.	Rose Bldg.	"
Great Western Oil Co.	2285 E. 37th St.	"
Lubric Oil Co.	1237 Marquette Road	"
Manufacturers Oil & Grease Co.	Century Bldg.	"
National Refining Co.	Rose Bldg.	"
Phoenix Oil Co.	2553 W. Fifth St.	"
Puritan Oil Co.	1252 W. 70th St.	"
Reliance Oil & Grease Co.	1521 Columbia Road	"
Superior Oil Co.	Wade Bldg.	"
Sterling Refining Co.	Euclid Ave. and E. Sixth St.	"
Star Lubricating Co.	3714 Broadway	"
Signet Oil Co.	1079 W. 11th St.	"
Stephens Grease & Oil Co.	1252 E. 70th St.	"
Tropical Oil Co.	1252 E. 70th St.	"
Universal Lubricating Co.	737 Schoenfield Bldg.	"
Warren Refining Co.	1137 W. 11th St.	"
Zone Oil Co.	713 Prospect Ave.	"
Central Ohio Oil Co.	547 W. First Ave.	Columbus
Gerkins Oil Co.	419 Arcade	Dayton
Indian Refining Co.	Antioch	Dayton
White Star Oil Co. ....	.....	Dayton
Lake Erie Oil Co. ....	.....	Elyria
Haydenville Oil Co. ....	.....	Haydenville
Independent Oil Co. ....	.....	Mansfield
Styren Beggs & Co. ....	.....	Newark
Motor Fuel & Lubricating Co. ....	.....	Portsmouth
Petroleum Supply Co. ....	.....	Steuenville
Craig Oil Co.	317 Gardener Bldg.	Toledo
Electric Refining Co.	1313 Clinton St.	"
Jefferson Gasoline & Supply Co.	Jefferson St.	"
Paragon Refining Co. (H. O.)	Front and W. L. E. R. R.	"

OKLAHOMA.

Goodwill Independent Oil Co. ....	.....	Enid
Lilly Oil Co. ....	.....	El Reno
Prague Oil Co. ....	.....	Prague
Allen Oil Co. ....	.....	Hinton
Appleby & Son Co. ....	.....	Cherokee
Comanche Oil Co. ....	.....	Duncan
Nance Oil Co. ....	.....	Hollis
Palacine Oil Co. ....	.....	Shawnee
Parris Oil Co. ....	.....	Frederick
Wallace Trammell Oil Co. ....	.....	Chickasha
Oklahoma Refining Co. ....	.....	Oklahoma City
A. W. Lee Oil Co. ....	.....	Oklahoma City
McPheeters Drug Co. ....	.....	Fort Cobb
Peery Oil Co. ....	.....	Cushing
Longendyke Oil Co. ....	.....	Kingsfisher
Ryan Independent Oil Co. ....	.....	Ryan
Lake Oil Co. ....	.....	Apache
McLaughlin Oil Co. ....	.....	Laverne
Lewis Independent Oil Co. ....	.....	Blair
Independent Oil Co. ....	.....	Guymon
R. W. Lewis ....	.....	Mt. View
F. G. Morgan ....	.....	Blanchard
W. H. Olmstead ....	.....	Waynoka
Smith Oil Co. ....	.....	May
Oklahoma Oil Co. ....	.....	Ringling
William Ray ....	.....	Frederick
Wildman & True ....	.....	Carnegie
Lockhart Oil Co. ....	.....	Coalgate
Western Oil Station Co. ....	.....	Sapulpa
Medlock Oil Co. ....	.....	Grandfield
Calvin Brinley ....	.....	Garber
Smith Oil Co. ....	.....	Holdenville
N. A. Graham ....	.....	Okmulgee
El Reno Oil & Supply Co. ....	.....	El Reno

OREGON.

De Force Oil Works ....	.....	Astoria
Dallas Oil Co. ....	.....	Dallas
American Gasoline Co.	St. Helen's Blvd.	Portland
Red Tank Co.	207 E. Sixth St.	Portland
Strowbridge Paint & Oil Co.	106-6 Grand St.	Portland

PENNSYLVANIA.

Boosler Oil Co. ....	.....	Allentown
Forest Oil & Grease Co. ....	.....	Clarington
Penn Oil Products Refining Co. ....	.....	Eldred
Sterling Oil Co. ....	.....	Emlenton
Bayerson Oil Works	E. 12th & R. R.	Erie
Bell Oil Co.	935 W. 12th St.	Erie
Erie Oil Co.	1510 Myrtle St.	Erie
Focco Oil Co. ....	.....	Franklin

PENNSYLVANIA—Continued.

Freedom Oil Works		Freedom
Henry Gilbert & Sons	219 Market St.	Harrisburg
Ensign Oil Co.		Morristown
James B. Berry Sons Co.	Chambers Bldg.	Oil City
Oil City Oil & Grease Co.	N. Seneca St.	"
Penn Oil & Supply Co.	N. Seneca St.	"
Phinney Bros. Co.	Center St.	"
Ellis & Cummings	Ft. Chestnut St.	Reading
R. Pauley	248 S. Eighth St.	Reading
Maloney Oil & Mfg. Co.		Scranton
American Oil Co.		Titusville
Lehigh Oil Co.	314 Coal Exchange Bldg.	Wilkes Barre

PHILADELPHIA.

C. B. Baird Co.		32nd and Grays Road
Animal Oil Co.		Ontario and Delaware River
Animal Products Co.		Trenton Ave.
Commercial Lubricating Co.		Meadow and Jackson Sts.
T. G. Cooper & Co.		27 E. Front St.
Crescent Oil Co.		31 N. 16th St.
Crew Levick Co.		Land Title Bldg.
Crusader Motor Oil Co.		Drexel Bldg.
John Hopkins Oil Co.		406 Commerce St.
E. E. Houghton & Co.		240 W. Somerset Ave.
Interocean Oil Co.		1416 S. Penn Square
Keystone Lub. Co. (H. C.)		1327 Race St.
Penn Lubricating Co.		Bard Bldg.
Pure Oil Co.		Lafayette Bldg.
Puritan Oil Co.		628 Filbert St.
Wm. C. Robinson Sons		104 N. Delaware Ave.
Chas. E. Smith & Co.		123 Arch St.
Sun Company		Morris Bldg.
Sunlight Oil & Gasoline Co.		49th and Grays Ave.
Union Petroleum Co.		Keystone Bldg.

PITTSBURGH.

Anchor Oil & Lubricating Co.		Jenkins Arcade
Butler Oil Refining Co.		Bessemer Bldg.
Canfield Oil Co.		620 Fourth St.
Crescent Oil Co.		7 West Canal St.
Duquesne Oil & Supply Co.		3300 Smallman Bldg.
Eagle Lubricating Oil Co.		426 First Ave.
Ensign Oil Co.		Jenkins Arcade
Fiske Bros. Refining Co.		Empire Bldg.
Gasoline Supply Co.		Union Bank Bldg.
Gulf Refining Co.		Frick Annex
E. F. Houghton Co.		Manufacturers Bldg.
Island Petroleum Co.		Neville Island
Liberty Lubricating Co.		Ellsworth and R. R.
A. B. Miller Sons Co.		Belt and North Sts.
Petroleum Products Co.		37th and B. & C. Ry.
Riverside Oil Co.		Benedum Trees Bldg.
Robinson Oil Co.		641 Fourth Ave.
Union Grease & Oil Co.		327 Penn Ave.
Waverly Oil Works Co.		54th and A. V. Ry.
Warden & Oxnard		800 Duquesne Way

RHODE ISLAND.

Columbia Oil & Gasoline Co.	109 Benefit St.	Pawtucket
Perry Oil Co.	372 Central Ave.	Pawtucket
W. C. Benedict & Co.	325 Grosvenor Bldg.	Providence
A. W. Harris Oil Co.	325 S. Water St.	"
Pennsylvania Petroleum Products Co.	48 S. Water St.	"
Providence Lub. Oil Co.	7 Pine St.	"
E. C. Webb	266 Cranston St.	"

SOUTH CAROLINA.

Petroleum Oil Co.		Anderson
Charleston Climax Oil Co.		Charleston

TENNESSEE.

Consumers Oil Co.	725 Broad St.	Chattanooga
Fritts & Wiehl Co.	619 Market St.	"
South Eastern Oil Co.	N. End Ave. and Main.	"
National Refining Co.	Virginia & Kentucky St.	Memphis
Purity Oil Co.	415 Monroe St.	Memphis
Cassity Oil & Grease Co.	Hamilton St. and 11th St.	Nashville
Criterion Oil Co.	1308 Broadway	"
Nashville Refining Co.		"

TEXAS.

Bonner Oil Co.	H. T. C. R. R. and Taylor.	Dallas
Dallas Oil & Refining Co.	Chestnut & Santa Fe Sts.	"
Dallas Oil Co.	Chestnut & Santa Fe Sts.	"
Oriental Oil Co.	Jackson and Lane Sts.	"
Prudential Oil Co.		Galveston
The Moran Oil Co.	627 23rd St.	Haskell

Houston Oil Co.	Scanlon Bldg.	Houston
Lone Star Oil Co.	3901 McKinney Ave.	Houston
San Antonio Oil Co.	412 Walnut St.	San Antonio
Alamo Oil & Ref. Co.	East Second St.	"
Dixie Oil Co.	460 E. Commerce St.	"
Oriental Oil Co.	413 Travis St.	"
Climax Ref. Co.		Waco

UTAH.

Ogden Paint Oil & Glass Co.		Ogden
Utah Oil Refining Co.	940 N. Fourth St.	Salt Lake City

VERMONT.

Monarch Mfg. Co.		Bellows Falls
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VIRGINIA.

National Oil Co.		Norfolk
Consumers Oil Co., Inc.	South Road	Richmond
Independent Oil Co.	Second and Stockton Sts.	"
National Oil Co.	Everett and 11th Sts.	"
Prudential Oil Co., Inc.	American National Bank Bldg.	"
Independent Oil Co.	511 S. Jefferson St.	Roanoke
Paragon Oil & Gasoline Co.		Roanoke
Columbian Oil Co.		Rosalyn

WASHINGTON.

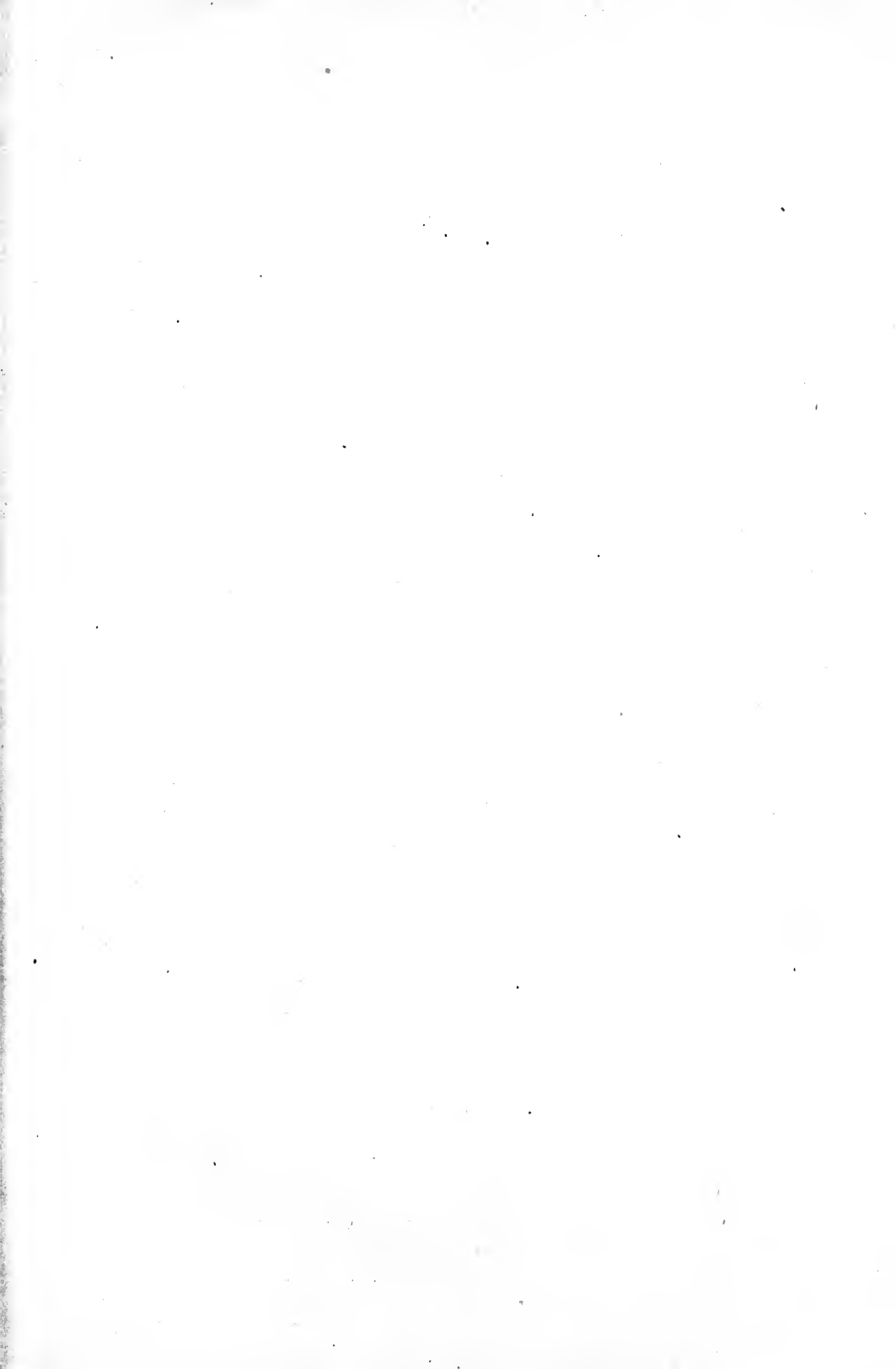
Globe Oil Co.		Bromorton
Union Oil Co.		Ellensburg
Everett Lubricating Co.		Everett
American Gasoline Co.	North Bldg.	Seattle
Colonial Oil Co.	Central Bldg.	"
Monogram Oil Co.	Virginia and R. R. Ave.	"
Olympic Oil Co.	Pacific Bldg.	"
Pacific Lubricating Co.	Pacific Bldg.	"
Wadhams Oil Co.	Washington St. and 15th St.	"
American Gasoline Co.	Riverside and Green Sts.	Spokane
Jones & Millingham	715 First St.	"
Spokane Paint & Oil Co.	Madison and R. R. tracks.	"
True's Oil Co.	118 Division St.	"
American Gasoline Co.	1404 Center St.	Tacoma
Paragon Oil Co.	Alnsworth and Center Sts.	Tacoma

WEST VIRGINIA.

A. Lemp		Beatrice
Love & Brinks & Co.		Huntington
Hershberger Oil & Gas Co.		Milton

WISCONSIN.

Yapp Oil Co.		Fon-du-Lac
Barkhausen Oil Co.		Green Bay
Inter-State Oil Co.		LaCrosse
C. V. Chapman		Madison
Bartles Maguire Oil Co.	134 Jefferson St.	Milwaukee
Delayan Oil Co.	45 Third St.	"
W. D. Halstead Oil Co.	318 E. Water St.	"
Independent Oil & Grease	291 S. Water St.	"
W. R. Krumer Oil Co.	216 Reed St.	"
E. E. Magle Spec. Mfg. Co.	263 Water St.	"
Peters Oil & Compound Co.	366 Clinton St.	"
Wadhams Oil Co.	213 National Ave.	"
Independent Oil Co.		Minnesota Jet.
Stroud & Co.		Oshkosh
Foster Lockwood Co.		Racine
Northwestern Oil & Grease Co.	Head of Tower Bldg.	Superior
Wisconsin Pennsylvania Oil Co.		Union Grove
Bartles Shepherd Oil Co.		Waukesha
O'Neil Oil & Paint Co.	297 E. Water St.	Milwaukee
Valvoline Oil Co.		Madison
National Refining Co.		LaCrosse
Siebers Oil Co.		Racine





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