

NATURAL RESOURCES

Natural Gas Big Business

The natural gas industry has grown in the past few years into a nation-wide business, extending its pipe-lines into about forty states to deliver gas from oilfields of Texas region.

By A. C. MONAHAN

► NATURAL GAS, in America, is now big business. It has had a remarkable growth in the past ten years, but particularly since World War II.

It is in these postwar years that it has extended its giant pipe-lines from the Texas-Oklahoma-Kansas-Louisiana area to New York and New England in the East and California in the West. About 40 states of the Union are now served with natural gas.

For many years, the little natural gas that was used found applications only in the immediate neighborhood of the gas well. The development of pipe-lines able to transport gas under pressure came in the present century.

Three decades ago there were no long-distance pipe-lines as the term is used today. Now the only American states without natural gas service are Maine and Vermont in New England and several in the Pacific Northwest. All will be served soon, the supply for the Northwest perhaps coming from Canada.

The enormous growth of the natural gas industry has escaped the public eye perhaps because it is an "underground" development. The supply is underground. Gathering, transmission and delivery pipes are buried in the soil. Even the great storage facilities near consumption areas to hold summer production for winter use are beneath the surface of the earth. Only pumping stations, local storage tanks and offices of the business are visible to the public.

First Well in 1821

Natural gas is not a new discovery in America. Even George Washington knew of its existence. But it was long after the days of Washington when it came into use. The first natural gas well drilled in this country was at Fredonia, N. Y., in 1821. This 27-foot well supplied the town with fuel for lighting and, to a small extent, for cooking.

During the next decade a few other centers in the same general area began to use gas. Distribution was local, however, because methods of transmitting gas long distances had not been developed. Following the example of the Chinese, who are said to have used natural gas a thousand years before the Christian era and to have used hollow bamboo for piping, these early developments made use of logs with holes drilled lengthwise through them. This is unsatisfactory piping for gas. It has to be

delivered under pressure for satisfactory transmission and burning.

However, a half-mile wooden pipe-line was used successfully for 25 years to bring natural gas from a well near Westfield, N. Y., to a lighthouse on Lake Erie. But a 25-mile wooden pipe-line laid in 1870 to supply Rochester, N. Y., with natural gas remained in operation only a few years. Iron pipe proved more satisfactory. The first installation was made in 1872, but as late as 1890 natural gas lines were relatively small in diameter and suitable for short-distance transmission only.

The forefather of America's present successful method of transmitting gas may be said to be a 120-mile iron pipe-line that was laid in 1891 to bring gas to Chicago from fields in Indiana. The first high-pressure line in the nation, it carried gas at a pressure of 525 pounds per square inch.

Leak-proof joints in iron piping are essential, it is easily understood. Not so evident is the necessity that the joints be relatively smooth on the inside so that they do not interfere with the smooth passage of the gas. Oxygen-acetylene welding, first

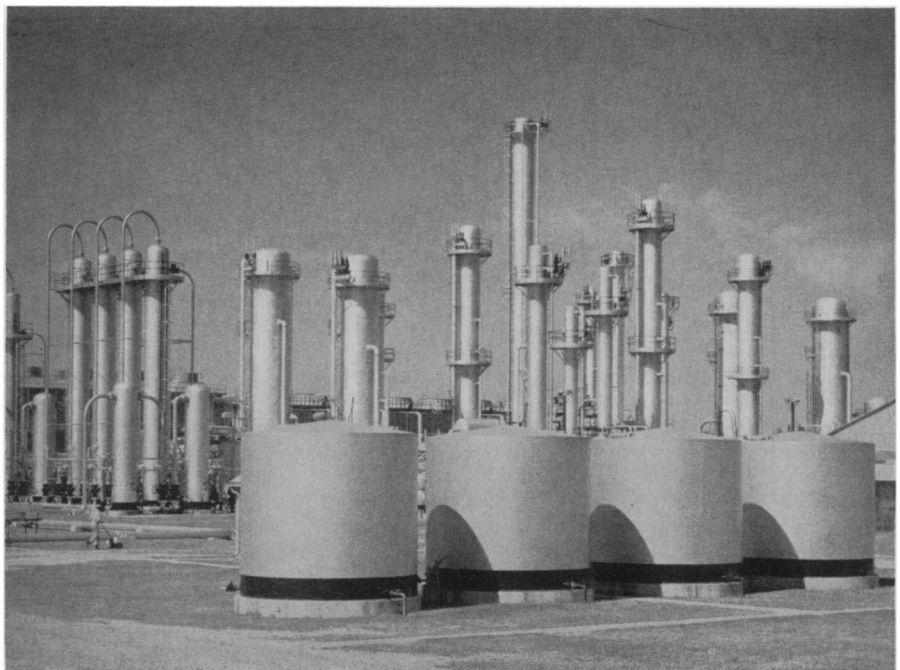
used on pipe-lines in 1911, gave an improved pipe. But long-distance natural gas lines, as the term is used today, got their real start in 1925 when seamless electrically-welded pipe became available. This pipe made the gathering and transmission of natural gas profitable, and the great extension of natural gas pipe-lines began.

By 1931, Chicago was receiving gas from the Panhandle of Texas through a 24-inch welded steel line over 1,000 miles long. In the same year Washington, D. C., began to get natural gas to mix with the artificial product that it had long been using. By 1946, natural gas began to replace the manufactured gas entirely in the nation's capital.

Great Postwar Expansion

It is the postwar years that started in 1946 that will stand in history as the period of outstanding expansion of the American natural gas industry. It is in this period that it stretched out to reach New York City and into New England and also to bring Texas gas to California. New England was already a heavy user of gas, but it was made locally mostly from coal. California had been using its own natural gas for 85 years, but demands were outgrowing the supply.

The Big Inch and the Little Big Inch, wartime-built pipe-lines to supply the east-



CONDENSABLE LIQUIDS—Natural gas as it comes from the ground must be removed before the gas is sent through pipe-lines to consumer areas. High pressure equipment is used for the purpose, equipment that to a layman might seem to be that of a refinery.

ern area with crude oil and gasoline respectively, played a big part in the natural gas extension. The Big Inch, a 24-inch pipe-line started in 1942, brought petroleum to New Jersey refineries from East Texas oil fields. It was originally 1,340 miles long. The Little Big Inch was 12 inches in diameter and brought gasoline from Beaumont, Texas, to Linden, N. J., a distance of 1,475 miles. These government-built lines were sold to a private company in 1947 to be used for gas.

Another wartime-built pipe-line is playing an important part in supplying the east with natural gas. It is the 1,265-mile natural gas line built by a private company to bring this important fuel from Texas to West Virginia for later distribution to the many industrial plants in the Appalachian area, including giant steel mills in Ohio and Pennsylvania.

Natural gas for the city of New York is delivered by neither the Big Inch nor the Little Big Inch, but by a 1,840-mile pipe-line from Hidalgo County, Texas, which went into operation in January, 1951. New England began to get natural gas about a year ago. Part was used as delivered, but much was mixed with the artificial gas manufactured for years. Connecticut, Massachusetts and Rhode Island got the first deliveries. All New England states will have it in the near future.

"Super-Inch" for California

Texas gas for California travels by the "Biggest Inch" and the "Super-Inch." The first was laid in 1947, extends 1,200 miles and, for a 213-mile section, is 30 inches in diameter. The Super-Inch is 34 inches in diameter, and is probably the largest gas line in the world. The name is applied to a 500-mile section of the pipe, on which construction was started in 1949, which brings natural gas from Texas and New Mexico to central and northern California.

A total of approximately 342,500 miles of pipe is included in America's present natural gas pipe-line system. This includes gathering lines in the gas fields, long-distance and other transmission lines, and installations to deliver gas to the users. Some 10,000 additional miles were laid last year, it is estimated, and many further extensions are planned for the near future.

In 1942, there were about 8,200,000 natural gas customers. Now there is over twice that number. Early use of natural gas was largely for lighting. The discovery of the incandescent electric lamp forced gas lighting into the background. Gas ranges, however, became popular and the cooking field became its greatest market. During the past decade American householders have learned the advantages of gas for house heating. The number of houses in this country heated with gas is over 10,000,000. For the 1951-52 heating season alone there were over 1,500,000 new househeating customers.

To provide America with natural gas at distances far away from gas fields, the industry had many problems to solve. The

pipe-line system requires more than merely great stretches of smooth-jointed pipe. Pumping stations are needed to forward the gas along its route and to supply the necessary pressure required for transmission and delivery. These pumping stations are located at proper intervals along the line, often about 100 miles apart. Also liquids in the gas as it comes from the ground have to be removed near the wells.

Storage Facilities Required

Then storage facilities relatively near consumption areas are necessary. Otherwise summer production and transmission would be low and great difficulty would be encountered in meeting the winter-time peak load. Coal mined in summer can be delivered to consumer areas and held in great dump piles for winter use. Heating oil can also be stored at reasonable expense. But the storage of gas is a different problem.

Giant tanks to hold gas are familiar sights near many cities, but the amount they hold in spite of their size is only a relatively short-time supply. Gigantic underground tanks have been constructed at great expense for gas storage, but today's principal underground storage space is in depleted gas and oil wells in the Appalachian and other regions.

The amount of gas they can hold is enormous. Southwestern natural gas is pumped into them during the light-load summer season and held for winter use in the Northeast during the heavy-load winter months. These depleted wells are not close to the larger eastern cities, but they are near enough to assure gas users a supply when needed. They are being used in increasing numbers. They will play a big part in plans of the gas industry which will require some \$82,000,000 during the next five years in expanding underground storage of natural gas.

Exhaustion Foreseen

How long America's supply of natural gas will last is of course a question. New reserves are being discovered every year. The present generation, however, need not worry about the exhaustion of the natural gas. Estimates made by men who should know indicate that there is enough gas in proved reserves to last from 50 to 70 years.

When the natural gas supply approaches exhaustion, the industry can turn to the manufacture of artificial gas from coal. Very large quantities of gas manufactured from coal have been used in the past. Most of it was made in local areas to which long hauls of coal were necessary. But with pipe-lines available, much in the future could be made at the coal mines, saving coal transportation costs. Again, more efficient methods of making gas from coal are now known as a result of work done in the past few years in the program of making synthetic liquid fuels, including heating oils and gasoline, from coal.

Steps also might be taken by the gas industry to save the natural gas supply for

essential uses such as for cooking and house-heating. Other fuels are available for electric power plants, blast furnaces in the iron and steel industry, and other industrial applications. Also the use of natural gas as raw material for the manufacture of liquid fuels might be curtailed. Of course, not much is yet used for this purpose. America has plenty of coal and oil shale as a source of liquid fuels when the petroleum supply becomes depleted. There are better uses for natural gas than converting it into fuel for automobiles and aircraft.

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ICHTHYOLOGY

\$8,000,000 House for Fishes on Coney Island

► FISHES WILL join the parade on Coney Island as they used to do at Battery Park on Manhattan's tip.

The New York Zoological Society has begun a campaign for funds to build the world's largest aquarium, architecturally different from any in the world, on 12 acres of city land at Seaside Park, Coney Island.

The aquarium will cost an estimated \$8,000,000.

Science News Letter, January 3, 1953

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