

AVIATION

# Oil, Fuel of Aviation

Although oil is not the only essential, nations having this raw material are a step ahead in aviation. In air service there is no real substitute for petroleum products.

By A. C. MONAHAN

See Front Cover

► NATIONS with oil are a step ahead in the aviation game. Planes must have fuel to fly. The principal fuel now and for some time to come is taken from natural petroleum.

This does not mean that gasoline made from coal, oil-shale and natural gas is unimportant. It will undoubtedly play an increasingly important role as natural oil supplies become harder to get. Atomic energy some day may replace power from fuel, but not in the immediate future. Oil is a number one essential.

It takes more than oil, of course, to put a nation in aviation's front ranks. Brains must be available to design, construct and fly planes. Then, many raw materials are needed for construction. A country without a domestic supply of these has a severe handicap, particularly in wartime.

The United States has all the essentials to put it in the lead in aviation except certain minor metals for necessary steel alloys. The situation in Russia is similar. England and Western Europe have the brains and facilities for developing planes and for flying them, but have little domestic oil. They lack many of the raw materials needed for construction.

## Lack of Materials

Except for America and Russia, few of the nations that have the ability to nations that have the oil lack the materials required to build or fly them. The nations that have the oil lack the materials and facilities for constructing planes.

An aviation gasoline re-cycling unit at the Standard Oil Company's Baytown refinery is pictured on the cover of this SCIENCE NEWS LETTER. Horton Spheroid storage tanks are shown in the background.

Petroleum products have many uses other than in aviation, of course, but for many of them substitutes can be used.

Air service, however, now depends largely on motor fuels derived from crude oil. All conventional aircraft engines operate on a gasoline fuel. Jet-propulsion planes use gasoline or kerosene. Rockets use other chemical fuels, but rocket power now has limited applications only.

Among the oil-producing nations, the United States ranks first. This does not mean that we have the largest oil deposits. It merely means that we have developed uses for oil, and met the demand by draining our reserves. We are now frantically searching for more.

Our explorations have extended outside the continental United States. Drilling is underway in the Point Barrow area in northern Alaska. The continental shelf in the Bahama seas is being studied under water by scientists working in diving bells. A test well is reported being drilled off America's east coast. Vast underwater areas are being explored with airborne magnetometers,

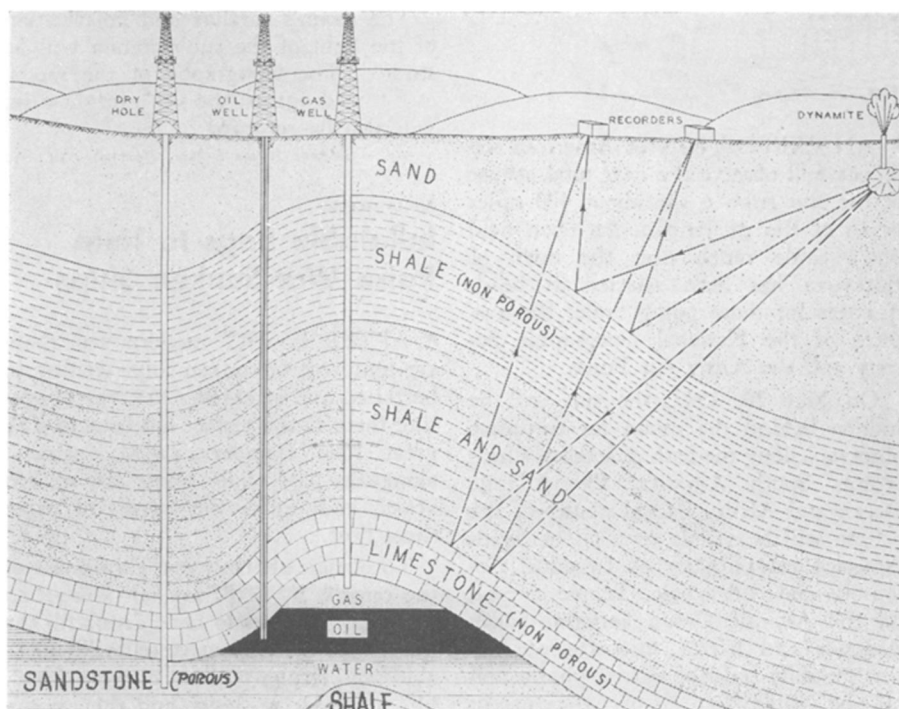
the "doodlebug" that during the war located enemy submerged U-boats.

Up-to-date reliable figures on world production of oil are not available for comparative studies. Figures for 1940, however, show normal prewar production. During that year, the United States produced approximately 63% of the total world supply of crude oil. We exported much, but we used more here at home in our planes, our millions of automobiles, and in our power and heating plants.

## U. S. Leads Production

Nearly 1,352,000,000 barrels were produced in the United States. The Soviet Union was second with 213,000,000 barrels. Venezuela came next with 185,000,000 barrels. Then came the Arabian sea region, which many believe to be the richest field in the world, with 110,000,000 barrels mined in Iraq, Iran and Arabia.

The Netherlands East Indies followed in line with 61,000,000 barrels, and then Romania with some 43,000,000 barrels, only two-thirds of its production before the European war started. The amount



**TRAPPED OIL**—Typical manner in which oil is trapped in a rock and one way of identifying the rock formations are shown in this diagram.



**LOOKING UP**—The worker is looking up the inside of an oil well derrick. Pictures and diagram by courtesy of the Standard Oil Co. (N. J.)

of oil produced in other countries in Europe is of minor importance.

Japan has only a small quantity of domestic petroleum. That is one reason why the Nips grabbed Borneo, Java, Sumatra and Burma, and also potential oil country in the Philippines and New Guinea. The amount of petroleum in the Netherlands East Indies is unknown, but is believed by many to be large. Tropical conditions make development difficult, but these will be overcome soon. Australia, which mines no oil, is a growing nearby market.

In the world-wide search for oil deposits, geologists now have reached a point where they are able to plot roughly the regions that are favorable for the occurrence of petroleum. They know the underlying strata well enough to identify the types favorable to oil formation. Instruments such as gravity meters, magnetometers and seismographs help them in their explorations.

Geologists believe that the thick series of sediments which accumulated on the floors of former "land-locked" seas are the most likely places for the generation of the valuable fluid. Land that was permanent during the geological ages, and deep ocean bottoms, are not regarded as likely areas. Continental shelves, the rel-

atively shallow ocean bed extending offshore for many miles on a number of coasts, are regarded as good hunting grounds. Most of them are sediment deposits and were once high and dry.

Geologists call regions with underlying formations favorable for petroleum "petroliferous." The United States has only one-eighth of the world's petroliferous area. Russia probably has nearly five times as much.

Soviet petroliferous areas include the producing regions of the Black and Caspian seas, and areas extending to the north from the Caspian two-thirds of the way to the Arctic ocean. They include also great tracks in Siberia and along the fringe of the Arctic ocean.

#### Northwest Area

In North America, a petroliferous area, much of which is undeveloped, extends northwest from the Texas panhandle. Passing just east of Denver, it includes the Wyoming and Montana fields. Extending onward into Canada surrounding Calgary, Alberta, it reaches about the northern boundary of this province. After a break, it goes on to the Arctic, nearly adjoining the Navy petroleum reserve area in the Point Barrow region of north Alaska.

A petroliferous region extends westward from the present Ohio and West Virginia fields to the Mississippi and cov-

ers lower Michigan. Less promising geological formation exists in southwest Alaska, Florida, the southern coastal area of Hudson Bay, and far to the north of the continent itself to cover Victoria and many other little-known islands in the Arctic.

#### Andes Superior Area

In South America, an undeveloped petroliferous region, called by geologists a superior area, stretches along the east slopes of the Andes perhaps 1,500 miles, from Colombia through western Brazil to Argentina.

Paraguay, Uruguay, southern Brazil and all Argentina lie in an inferior petroliferous area.

The hopes for oil in Africa are not so promising. The most likely area is a relatively small Mediterranean section in Egypt. There's a possibility of petroleum on the Indian ocean coastal area, and on Madagascar.

For Australia, a domestic supply of natural oil is not very hopeful. The most promising area is a region just south of the Gulf of Carpentaria, extending southward near the western border of Queensland.

While Russia has large potential oil reserves, many of these deposits can not be developed in the immediate future because they lie north of the Arctic Circle, far from existing railroads. Oil pro-

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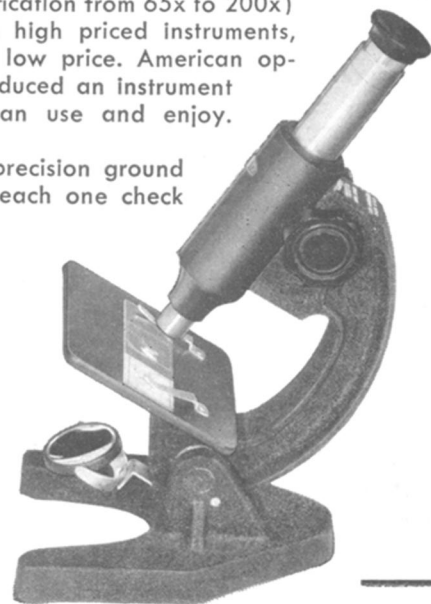
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duction on Kamchatka peninsula or on Sakhalin island would be significant, since petroleum from these locations could be shipped by tankers to refineries near eastern terminals of the Trans-Siberian railway.

There is an odor of oil in the present world political situation, and behind happenings of the past decade. Gasoline-short Japan's covetous eyes for years were focussed on the petroleum derricks of the Netherlands East Indies and on Burma. Hitler's hopes were first for the Romanian oil, then for the vast deposits in the Russian Caspian sea area.

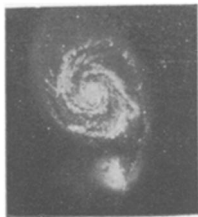
England's hopes are for an abundant supply of oil from Iraq and Iran. English interests developed and operate in these fields, and maintain nearly a thousand miles of pipeline to get petroleum across Iraq, Trans-Jordan and Palestine to ports on the eastern Mediterranean for shipment by tankers to the British Isles. This oil is an important factor in England's interest in Asia Minor.

America is also interested in this great potential oil-producing area which some day may be the most productive in the world. American oil companies hold concessions covering most of Saudi Arabia. During the war there was agitation for the United States government to build a 1,500-mile pipeline to the Mediterranean from the producing portion of Arabia near the Gulf of Persia.

While Russia has plenty of oil possibilities both in Europe and Asia, control of Iraq and Iran would give her a priority position in Eastern Hemisphere political affairs. Stoppage of the supply of Asiatic oil would leave all Western Europe dependent largely on the United States and Latin America for the fuel vital to aviation and transportation.

Science News Letter, December 7, 1946

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The enterprising Soviet Union is reported to have sent a group of experts to Kamchatka peninsula, in the north Pacific, to determine if the *hot springs* there can be put to work to heat greenhouses to grow vegetables.

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