

concentrations of .001 milligram per liter cannot be noted. At this concentration the gas can be tolerated but at higher concentrations it causes irritation of eyes and nose and a metallic taste which persists for several days, it was found from cases of accidental exposure to the gas.

Livers and spleens of experimental animals were damaged in single exposures to the gas in low concentrations for two, four and eight hours. One-half the animals died after the eight-hour exposure.

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Freeze Gases to Find Oil

BY FREEZING gases sucked out of samples of soils, to detect hydrocarbons present in the proportion of a few parts in a billion, it is possible to locate accurately underground deposits of oil and gas.

Leo Horvitz, of "Subterrex by Geophysics and Geochemistry," Houston, Texas, described these new methods to the American Chemical Society at St. Louis. Geophysical prospecting, in use for the past twenty years, he said, can detect salt domes and other subterranean structures which are often associated with oil and gas, but the geochemical process detects the presence of the petroleum itself.

Minute quantities of hydrocarbons migrate from oil and gas deposits to the surface of the earth and the formations encountered retain some of these leading hydrocarbons.

Soil samples are collected from a 12-foot depth over the area to be studied. They are heated under reduced air pressure. This drives out the gases, which are passed through traps cooled to very low temperatures. For instance, at 204 degrees below zero Fahrenheit, pentane and the heavier hydrocarbons are frozen, but the lighter ones get through. Then the gases are subjected to temperatures as low as 278 degrees below zero Fahrenheit and the ethane, butane and propane will be frozen out. Then a still lower temperature, 300 degrees below zero Fahrenheit, will freeze out the methane.

In this way, the concentration of the gases, in parts per billion by weight are determined, and plotted on a map of the region.

"Considerable investigation," said Mr. Horvitz, "indicates that the hydrocarbons leak principally from the edges of the deposit rather than from the center. As a result, it has been found that the significant hydrocarbon distribution pattern is that in which a zone of low hydrocarbon values is surrounded by a band of

higher concentrations. This area of low concentration usually coincides closely with the areal extent of the oil field. The order of magnitude of the values in the band of higher concentrations is usually

above 10 parts per billion and the average of these high values is usually more than three times that of the values in the low zone.

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RESOURCES

Gasoline Shortage in East Seen as War Possibility

Lack of Tanker Tonnage Is Worst Bottle-Neck, OPM Chemical Division Chief Tells Colleagues

A SHORTAGE of gasoline and other petroleum products along the Atlantic Coast is foreseen by experts if there is naval warfare in the Atlantic. A shortage of tankers to bring the crude or refined oil around Florida from the Gulf coast would be the cause.

This possible lack of auto fuel was made known by Dr. E. R. Weidlein, chief of the OPM's chemical division, when he surveyed the chemical situation for the American Chemical Society. Dr. Weidlein is director of Pittsburgh's Mellon Institute.

Distribution, not production, will be the cause of any shortages. Dr. Weidlein emphasized the adequacy of American production by explaining that "The entire military activities of Germany and Italy, plus the industrial and other activities of these countries and of the occupied areas of western Europe, are being carried on with an amount of petroleum plus synthetic products which is only about 5% of our present domestic production."

The petroleum movement from the Gulf coast alone amounts to about 1,350,000 barrels per day and requires the services of a fleet of 260 domestic tankers.

This large tanker fleet normally has some excess capacity, but a combination of circumstances has resulted in a rather tight situation at present, Dr. Weidlein said.

A large percentage of our tanker fleet was built during and shortly after the last war, and hence is nearing the end of its useful life. During the past two years a considerable number of ships have been transferred into foreign service to replace ships which have been sunk and to make up for the longer hauls and less efficient use of tankers brought about by war conditions. Eight large, high-speed tankers have already been requisitioned by the Navy and several more are likely to be

requisitioned, especially in the event of war.

Dr. Weidlein declared that "there are a lot of back-seat drivers for the defense program," and admitted that "the car is not yet running in high speed."

Part of this, he said, is because "the chemical industries have been as far away from the munitions industries as it was possible for them to get. World War I plants were dismantled. For future warfare therefore martial machinery must be built from the ground up."

Problems confronting the OPM, Dr. Weidlein said, are minor compared with the conditions faced in 1917. Development of the chemical industry in this country since the first World War has made the difference.

Difficulties in furnishing nitrogen to non-defense uses are foreseen as a possibility.

"Throughout 1941 we will be able to meet all the nitrogen demands of the defense program together with the needs of the industries and agriculture," Dr. Weidlein explained. "The Government through the industries has constructed three new synthetic nitrogen plants and, as a form of additional insurance, imports of sodium nitrate have been increased substantially from Chile."

It requires from 18 months to two years to build a synthetic ammonia plant, while munitions plants can be constructed in a period of eight or nine months. If conditions become serious, it may be necessary to curtail the use of nitrogen for industrial and certain agricultural uses in order to meet the demands.

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California used to supply about 2% of the United States' olive oil, but with foreign importations cut to 10%, California now is the mainstay source.