



it, though many of them seem considerably smaller than ours. But this may simply be on account of the fact that we cannot see them well enough. Recent studies of the one in Andromeda, which is among the closest, indicate that it is much bigger than we used to think, nearly as big as our own. So perhaps the others too, are bigger than we now believe, and are true "island universes," each made up, like our galaxy, of hundreds of thousands of millions of stars.

Celestial Time Table for May

Saturday, May 3, 2:59 a.m., Algol at minimum. Sunday, May 4, 7:49 a.m.,

Moon in first quarter. Eta Aquarid meteor shower. Monday, May 5, 11:48 p.m., Algol at minimum; 12:00 p.m., Mercury in line with sun. Thursday, May 8, 8:00 p.m., Saturn in line with sun; 8:37 p.m., Algol at minimum. Saturday, May 10, 2:00 p.m., Moon nearest, distance 222,000 miles. Sunday, May 11, 12:15 a.m., Full Moon; 5:26 p.m., Algol at minimum. Saturday, May 17, 8:17 p.m., Moon in last quarter. Sunday, May 18, 8:51 a.m., Moon passes Mars. Monday, May 19, 3:00 p.m., Jupiter in line with sun. Friday, May 23, 1:00 p.m., Moon farthest, distance 252,400 miles. Monday, May 26, 12:18 a.m., New Moon.

Eastern standard time throughout.

Science News Letter, April 26, 1941

CHEMISTRY

\$2,500,000,000 Declared Yearly Cash Cost of Smoke

Worst Effect, However, Believed To Be on Health;
Pneumonia Incidence Highest Where Smoke Is Thick

ACTUAL cost each year to people in the United States on account of smoke is \$2,500,000,000. In addition there is incalculable cost to health, W. L. Jones and Dr. F. E. Vandever told members of the American Chemical Society meeting in St. Louis. Dr. Vandever is connected with the American Gas Association Testing Laboratories at Cleveland, while Mr. Jones is with the St. Louis County Gas Company.

The wastage of coal, gas and oil fuels, due to the incomplete combustion which causes smoke amounts to \$200,000,000, they said. In addition, the extra cleaning of buildings, and laundering or dry cleaning of wearing apparel and house furnishings and their shortened life, account for the remainder of the staggering total.

"Probably the worst aspect of smoke is its effect on health," they declared, "While this relationship is difficult to evaluate, correlation of smoke and high incidence of pneumonia seems to have been clearly established. Much evidence exists that death rates from pneumonia and other respiratory ailments are greater in smoky industrial centers than in small urban communities. The effect of smoke in depriving people of sunlight is another broad aspect of the smoke problem, and one which probably has an important bearing on health."

They advocated wider use of gas as a fuel to overcome smoke troubles, because it can be burned more efficiently and completely than some other fuels.

Science News Letter, April 26, 1941

Should Synthesize Hormone

COMMERCIAL preparation and clinical use of certain highly important chemicals produced in the adrenal cortex need improvement as a national defense measure, Dr. E. C. Kendall, of the Mayo Clinic, indicated.

One of these chemicals, known as compound E, has a "remarkable influence on the resistance to shock and toxic substances," Dr. Kendall pointed out. It also has an effect on the capacity of muscle for work.

Any use it might have in treating shock due to war wounds, however, or for other medical purposes is limited by the fact that the total annual supply of this and another important adrenal gland chemical in the United States, derived from animal glands, could not be greater than about one pound.

The other chemical is called compound F for short. These two should not be confused with vitamins bearing the same letters for names. Both these adrenal gland chemicals have "a striking effect upon the enzymes involved in the conversion of proteins of glucose."

The effects achieved by compounds E and F are not achieved by another chemical from adrenal gland cortex, desoxycorticosterone acetate, which has been used in recent years to keep alive patients suffering from Addison's disease, the once-fatal ailment characterized by a strange bronze discoloration of the skin. To make these other compounds available for the many uses they may have in war and peace time medicine, chemists must produce them synthetically. Dr. Kendall said synthetic production is the only possible solution to the problem of the shortage of compound E.

Science News Letter, April 26, 1941

Poison Gas Hazard Increases

INDUSTRIAL workers may be increasingly exposed to the poison gas, hydrogen selenide, because of the increasing use of selenium in industry. Guinea pig tests showing the marked effect of exposure to this gas in varying concentrations were reported by H. C. Dudley and John W. Miller, of the National Institute of Health, U. S. Public Health Service.

Protective measures to reduce the hazard of hydrogen selenide poisoning to a minimum should be taken, the scientists suggested, when the odor of the gas can be detected.

The gas tires the sense of smell quickly so that after several minutes exposure

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.

Science News Letter, April 26, 1941

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.

Science News Letter, April 26, 1941

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.

Science News Letter, April 26, 1941

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.