



SYNTHETIC FUELS—Radioactive atoms are used by Gulf Oil scientists in probing the still mysterious reaction by which gasoline is produced from coal.

characteristics and is better for production of diesel and other fuel oils than it is for gasoline and aviation fuel at the present time. New methods of refining may change this situation later.

Coal may be rapidly losing its right to be called the king of fuels, but it gives promise of being the father of fuels in the form of liquids. Coal for years has been the chief source of mechanical energy, but it took second place to oil and natural gas in 1946. Even for locomotives, coal is becoming secondary; over 90% of the locomotives now under construction are diesels, and one new diesel appears on the tracks every week to ten days.

Two Methods

There are two methods of producing synthetic liquid fuels from coal; the hydrogenation method and the Fischer-Tropsch process. Both have been used in Germany for several decades. Both are experimentally used in America, and developments already made are improvements on the German processes. The product is at least equal in quality to that being made from well oil, but the cost is still relatively high.

Laboratory work on the synthesis from coal is being done by the U. S. Bureau of Mines and by at least two coal and oil company combinations. The Bureau of Mines is building a large-scale demon-

stration plant at Louisiana, Mo., and a commercial plant is under construction near Pittsburgh.

Blending one gallon of ethyl alcohol with nine gallons of low-grade gasoline will make ten gallons of premium grade anti-knock motor fuel, Dr. G. E. Hilbert, of the U. S. Department of Agriculture, recently said. He is director of the department's regional laboratory at Peoria, Ill., where work is being done to develop liquid fuels from vegetable matter, particularly farm wastes. The advantage of a mixture of alcohol in gasoline for motor fuel has long been known but used relatively little because of the cost of the alcohol.

The process of making alcohol from grains for beverages and other purposes is well known and highly developed. Ordinarily there is not enough surplus grain to make alcohol from it for automobiles. But there are great quantities of corncocks and other farm wastes from which ethyl alcohol can now be successfully made.

The cost is still too high, however, to use the alcohol as a motor fuel, but the outlook for a cheaper process is promising. One factor in cost is the transportation of the farm wastes to the alcohol-making factory. They are bulky to ship. Then to make a profitable business, uses for byproducts must be developed. Some could be used for making wallboard and

plastics, or even briquetted for household heating. Corncocks, for example, yield such valuable byproducts as xylose, butanol, acetone and furfural. Among many uses for the last is in the making of nylon.

Despite the fact that the per capita consumption of petroleum products has risen from 367 to 608 gallons during the past nine years, that there are now a million more passenger cars on the road than in 1941, and that about 4,500,000 families are using liquefied petroleum gases for fuel, there is actually little danger that America will be without liquid fuels for centuries to come.

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ENTOMOLOGY

World's Food Crisis Made Worse by Insect Pests

► WORLD food shortages are being made worse by insect pests, which make hungry humanity eat at second table. With the world's population increasing at its present rate, our present tolerance of these thievings and spoilages must end, declared Dr. Fred C. Bishopp, assistant chief of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture.

Dr. Bishopp spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Much of the insect loss that used to be regarded as inevitable can now be prevented, thanks to DDT and some of the other new insecticides, Dr. Bishopp stated. Notable instances of successes already achieved which he cited are reductions in the hundred-million-dollar losses to the meat and dairy industries caused by tormenting flies, elimination of tick-borne cattle fever in the South, increase in the potato yield in Maine from 253 bushels per acre to 358, and the virtual elimination of houseflies from many cities and large areas in the country as well.

Although cotton is commonly thought of as a textile crop it is an important food crop as well, Dr. Bishopp pointed out, because of the oil from its seed and the seed meal that is fed to livestock. Cotton-attacking insects in one year cut the seed yield by 613,000 tons, worth \$44,000,000. This would have provided enough refined oil to make 200,000,000 pounds of margarine, meeting the minimum needs of 8,000,000 people. Cotton insects alone, therefore, are worth the

Do You Know?

The term *saran* applies to a series of resins chemically known as vinylidene chloride copolymers from which many plastic articles are made.

Flexibility is the property of *glass fibers* which distinguishes them from other glasses; they are flexible merely because they are exceedingly thin in relation to their length.

Electrochemical processes are being used more and more in industry for the preparation of a variety of materials such as chlorine and other gases; they are increasingly used also in refining metals.

The famous *Kensington stone*, so-called because found near Kensington, Minn., is now at the Smithsonian Institution, Washington, D. C.; its runic inscriptions purport to be the last message of a lost Norwegian exploration party perhaps massacred by Indians in 1362.

ORDNANCE

Shotgun Fired By Bringing Up Against the Shoulder

► A SHOTGUN that can be fired by merely bringing it sharply against the shoulder, without touching the trigger, is the subject of patent 2,441,787, granted to Ernest Zryd of Beloit, Ohio. A movable section of the butt-plate is linked to the trigger mechanism by means of a rod running through the butt; when this is pressed it fires the piece. It is thus possible to use the weapon with mittened hands in cold weather.

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waging of a major battle.

The world's unappeasable hunger for bread gives great importance to the fight against insects that attack stored grain, the speaker continued. We have been losing about 300,000,000 bushels of stored grain every year, worth more than \$600,000,000 at present prices.

CHEMISTRY

Urge Sharing of Isotopes

American scientific group proposes that the international office of the United Nations be empowered to distribute isotopes for research abroad.

► DISTRIBUTION of "non-dangerous" isotopes, by-products of the piles which are used to make atomic bombs, by an international office of the United Nations was proposed by the Federation of American Scientists meeting in Washington.

The Federation emphasized that the isotopes are important for research in medicine, agriculture and industry but are not useful for making atomic bombs. The suggested international office would set standards for the handling and naming of the isotopes in addition to serving as a clearing house for distribution of the material.

Although the U. S. has a near monopoly of these isotopes at present, the Federation report said that small uranium piles which can produce these important by-products are now operating in Canada and Great Britain.

"In France and probably the U. S. S. R., such piles are scheduled for early construction and operation," it was reported. Other countries listed as planning production of isotopes are Sweden, Norway, and India.

Setting up an office for international distribution of isotopes would aid the international exchange of scientific information, counteract ill feeling toward this nation by some scientists abroad and advance the peaceful uses of atomic research, the report contended.

Warning of a "disturbing change" in the attitude of some scientists in non-English-speaking countries toward the U. S., the report declared, "Upon investigation we believe most of the accusations and suspicions regarding American behavior to be unwarranted, but the circumstances are such that denial is difficult or impossible."

A system of international distribution of isotopes would bring about better un-

derstanding among scientists of many nations, the Federation argued.

Losses in corn alone amount to 150,000,000 bushels a year, enough if saved to feed 8,800,000 hogs to a 225-pound market weight. By rat-tight construction, DDT spraying against insects and frequent inspection during the storage period these losses must be reduced.

Science News Letter, June 5, 1948

The report suggested that an international organization such as the United Nations Atomic Energy Commission, the World Health Organization or the United Nations Educational, Scientific and Cultural Organization call an international conference on isotopes.

"We believe that the discussions might lead to an executive agreement or charter setting up an international office within the United Nations framework to deal with the distribution of isotopes," the report said.

The Federation explained that distribution of isotopes by a UN group might not help in reaching an agreement in the control of atomic weapons, but the report said that an international institution operating in the field of atomic energy might "modify some viewpoints regarding control."

Prof. Arthur Roberts, physicist at the State University of Iowa and chairman of the Federation, said that "the proposal might well be undertaken by the United Nations Atomic Energy Commission if the General Assembly deems it advisable."

Science News Letter, June 5, 1948

SOCIOLOGY-PHYSICS

"Social Physics" Applies Laws of Gravity to Income

► A NEW science in which laws of gravity are applied to such matters as rents, land values or the national income was described to the Population Association of America meeting in Philadelphia by Dr. John Q. Stewart, associate professor of astronomical physics at Princeton University.

Although "social physics" is only in its early stages and not yet accepted as