CHEMISTRY

Experimental Plant Making Gasoline From Coal Shown

A SPECTACLE that would have thrilled the ancient alchemists who tried to make gold from lead was shown to chemists meeting in Pittsburgh during the past week.

The U. S. Bureau of Mines' new plant for making oil and gasoline from coal by the Bergius process was on display during the meeting of the American Chemical Society. It is the first and only one of its kind in the United States.

Continental European nations—lacking the vast oil resources of the United States—have many coal hydrogenation plants in operation. Germany, for example, expects to be able to produce 450,000 tons of this synthetic gasoline yearly by the end of 1936. The Bureau of Mines experimental plant, by contrast, is a small "preparedness" plant looking forward to the time when and if the United States will need to use its vast coal resources as a potential source of oil and gasoline and their by-products.

Discoverer of the process for making coal into oil was Dr. Friedrich Bergius, the noted German chemist, who won the Nobel prize in chemistry for his work plus his equally important discovery of the way to make sugar out of wood. Both researches were outgrowths of Germany's drastic World War needs. Dr. Bergius attended the Pittsburgh meeting of the American Chemical Society and saw the hydrogenation plant.

The coal-gasoline Pittsburgh plant was constructed under the direction of Dr. Arno C. Fieldner, chief of the U. S. Bureau of Mines technologic branch.

In charge of the Pittsburgh experiment station and the hydrogenation program is Dr. H. H. Storch, physical chemist of the Mines Bureau. He explains the process as simple on paper but complex and costly in operation. Coal is powdered; mixed with some oil previously prepared in the process to form a paste; further mixed with a catalyst to speed the reaction; pumped into a compression chamber; and hydrogen is passed through. The reaction is under high temperature and pressure.

By choice, either gasoline, heavy oil or intermediates can be obtained as the principal end product.

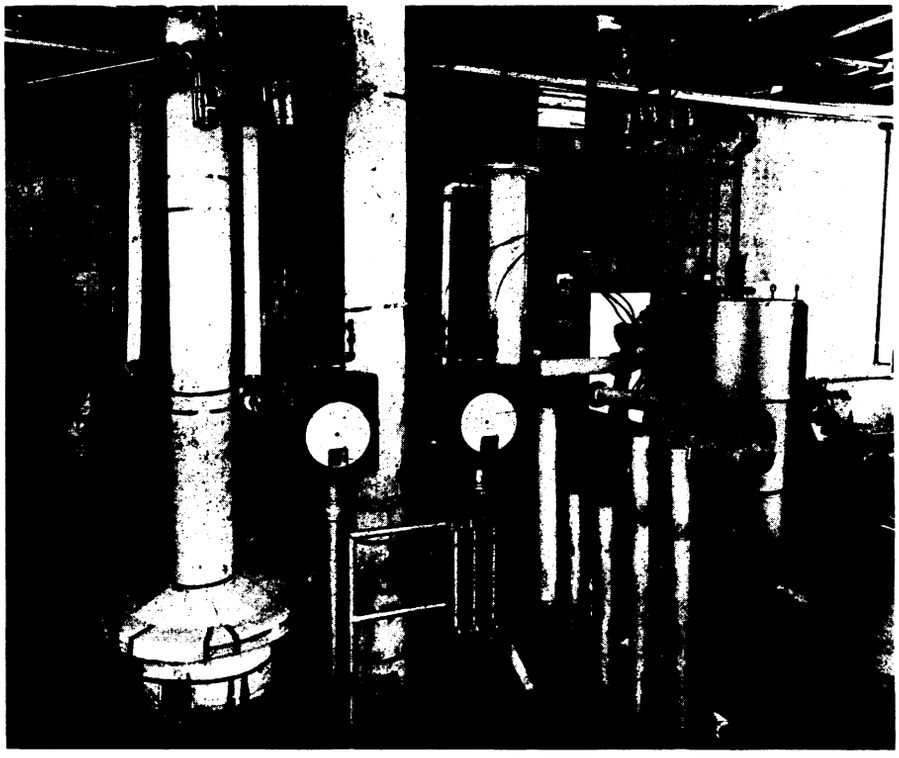
The future of the process, as has already been demonstrated abroad, is in the production of gasoline, of which the world consumes about ten times as much as it does oil. The drawback to the process in a nation like the United States—with cheap oil—is in the expense. Dr. Fieldner estimates that the cost of producing a gallon of gasoline by coal hydrogenation is about three times that of producing a gallon by refining crude oil. The initial cost of a hydrogenation plant, too, is great.

Dr. Fieldner explains that the Bureau of Mines is "looking ahead." Experts disagree on exact figures, but the Bureau of Mines points to a compromise estimate of 15 years as the life of this nation's proved oil supply—an increasing consumption balancing the greater output of gasoline from better refining and cracking processes.

The role that plentiful coal may play is explained graphically by Dr. Fieldner. The total supply of coal in the United States, if spread over Ohio's 41,000 square miles, would cover the state with a layer 76 feet deep.

The nation's present oil supply would cover Ohio with a pond only three quarters of an inch deep.

Science News Letter, September 19, 1936



WHERE COAL IS TURNED TO OIL

Here in the hydrogen mixing room of the Bureau of Mines' experimental plant, hydrogen atoms are added to coal dust paste to make the larger petroleum molecules.

CHEMISTRY

Food From Waste Wood is Problem of German Chemist

By DR. FRIEDRICH BERGIUS
As Told to Robert Potter

SO YOU want to learn how German industrial chemistry differs from the comparable American chemistry? Over here in America as I make this all too brief visit to the meeting of the American Chemical Society in Pittsburgh and then rush on to Cambridge for the Tercentenary Celebration of Harvard University, I hear much talk on the most interesting problem of finding new uses for industry in the products of agriculture; how you are turning soy beans into lacquers for your automobiles, making paper from your southern pines and trying to find uses for your great food crops. (*Turn to page* 191)

● RADIO

September 22, 2:15 p.m., E.S.T.
NEW FACTS ABOUT FEET—Dr. Dudley J. Morton of Columbia University.

September 29, 2:15 p.m., E.S.T.
A DOG'S WORLD—Dr. Carl J. Warden, psychologist, of Columbia University.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

ASTRONOMY

Largest Gaseous Nebula "Found" By New Telescope

See Front Cover

THE photograph of the great celestial cloud known to astronomers as the Eta Carinae nebula taken with the Harvard College Observatory's new 60-inch reflecting telescope at Bloemfontein, South Africa, is for scientific purposes practically a new discovery. This photograph appears on the front cover of this week's SCIENCE NEWS LETTER.

Eta Carinae is the largest gaseous object in the sky that shines with its own rather than reflected light. (See SNL, Sept. 12, for account and pictures of red nebula which reflects light of Antares.) Astronomers have known it for some time, but the powerful new telescope shows so many new details that the new photographs amount to an introduction.

This nebula is famous as the home of a great nova of many years ago, now gone back to its former middle-class astronomical obscurity. In this region also are many exceptionally hot stars.

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From Page 180

German chemists in the main have little to do with this problem. What food we can grow we find a ready market for—as food.

Whereas American chemists are trying to turn food into industrial products we are trying to turn waste products of industry into food. The problem, as you can realize, is almost a complete opposite of yours.

For example, the chemical process which I know best is the method of utilizing waste wood 100 per cent. The chemistry of the problem has been simple, but the application on a mass-production, economical wide scale has been achieved only with difficulty.

We are now able to turn, however, waste wood into digestible carbohydrates of the sugar-type to the extent of from 60 to 66 per cent. On the way through the process we obtain 5 per cent acetic acid which is about the same amount as obtained directly by the distillation of hardwood. And finally we obtain some 30 per cent of lignin which can either be converted into charcoal or pressed into wall board, as you call it, which requires no binding to hold it together.

The problem, you see, is related to the changed commercial trading of the world today over what it was some years ago. The high trade barriers of the world's nations today may have vast implications in international relations. But I am hardly competent to discuss that phase of the subject. What I can say is that many nations are now too poor to buy their raw materials and have turned to the chemist to make them in his laboratory. The accompanying spur and encouragement to chemical research in continental Europe is obvious.

Is the day of the individual inventor passed? No, decidedly not. The growth of the great research laboratories of industry throughout the world may seem to indicate that the lone inventor has no longer an important role. But this is not the case. The lone inventor still can, and does, conceive basic processes and ideas. The function of the large laboratory is, of course, to think of these ideas if it can but if some new thing comes along, to take it and aid it.

Through the very difficult trying days when it is turning from an "infant" to adult "manhood" and goes out into the world to compete with other inventions, the resources of a large laboratory appear, now, to be quite essential.

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Swarming bees sometimes choose queer homes, such as squirrel dens, church belfries, or empty barrels.

A bee farm in southern Germany raises bees in order to extract their poison, which is used in treating rheumatism.

A library of Oriental documents now being assembled at the University of California is expected to become an outstanding collection in this field.