The amylase thus produced served as a substitute for the malt commonly used. This, he said, would lower the cost of ethyl alcohol about three cents a gallon.

A process developed at the laboratory for making alcohol from corncobs was presented by Dr. Hilbert. It is the work of Drs. E. C. Lathrop and John W. Dunning. These studies are now being made on a semi-commercial scale. It will be at least another year before full evaluation will be complete. It is not a question of being able to turn cobs into alcohol, he stated, but that of producing the alcohol at a reasonable cost. One of the largest cost factors is the transportation of the raw material. Another item is to find a profitable use for the by-products.

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ENGINEERING

Efficient Engines Needed

They need to be designed for better operation on the fuel produced. Closer cooperation is necessary between the automobile and the petroleum industries.

➤ ECONOMY in the use of gasoline demands full cooperation between the automobile industry and the petroleum industry so that engines will be designed to operate most efficiently on the fuels produced, the Society of Automotive Engineers was told at a meeting in New York by William M. Holaday, director of Socony-Vacuum Laboratories.

It is generally agreed that the refining industry must be expanded to handle another 1,000,000 barrels of crude oil per day in order to meet anticipated demands, he said. For fullest cooperation, the automotive industry must be fully acquainted with the fuel-production situation and steps that must be taken to satisfy expanded requirements.

The current domestic consumption is over 5,000,000 barrels of crude a day. Known reserves are larger now than at any other time, he declared. In addition, a potential productive capacity based upon the utilization of natural gas and coal gives added assurance of continued supplies of liquid hydrocarbon products.

The fact that significant increases in the octane number of motor fuels may be several years off, because of the necessary expensive construction, should not in any way impede the progress that the automotive industry can make in designing and producing engines and cars with improved performance and economy, he stated.

A critical examination of the manner in which antiknock quality is now utilized, and of the effect that various design changes may have on antiknock requirements will point the way to the goal desired by both the petroleum and the automotive industries, as well as the passenger car operator.

As a result of tests with cars, he suggested significant changes in engine design which would be effective in decreasing peak octane number requirements. They include a momentary decrease in spark advance at low speeds as the car is accelerated, improvement in intake manifolding to improve mixture distribution to the cylinders, the use of rich mixtures during high power operation, improved combustion chamber cooling, and use of water injection.

Mr. Holaday suggested a dual fuel system on autos, which would meter two fuels according to demand. One would be fuel high enough in octane quality to satisfy peak requirements during full-throttle operation, and the other a fuel of lower quality for normal cruising operations.

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PHYSICS

Supersonic Air Pressure Measured by Light Waves

➤ LIGHT waves have been harnessed for a new job. They are being used to measure the pressure and temperature of air moving at supersonic speeds through a glass-walled wind tunnel, Dr. Rudolf Ladenburg of Princeton University has revealed.

In these tunnels, tiny models of airplanes, wing sections or missiles are suspended and air forced through at high speeds simulating conditions encountered in flight. Light is passed through the tunnel from one side to the other, and also over the outside of the tunnel.

An instrument called a Mach interferometer, a new development in wind tunnel optics, is used to measure the air conditions. The device splits a beam of light into two coherent wave trains, one of which passes through the wind tunnel and the other around it through a control chamber by means of mirrors. The two wave trains are recorded photographically, giving measurable optical effect.

In showing the action of a wing model on the air movement within a supersonic tunnel, what is called the "schlieren effect" has been used for several years. Dr. Ladenburg likened the schlieren effect to the glimmering above a pavement heated by strong sunlight due to air density changes.

The air movement, if traveling fast enough, builds up what are known as shock waves which seem to grasp the plane and hold it back. The shock waves can be photographed by schlieren photography. These are made by sending parallel rays of light crosswise through the tunnel above and below the model, and then into a camera.

The air in the shock wave is of a different density from that in other portions of the air flow and therefore refracts the light passing through it. When the light encounters the sensitized plate in the camera the refracted rays, no longer parallel to the others, make a record which is either a light or a dark spot.

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CHEMISTRY

Huge Metal Crystals Open New Field of Research

➤ "SUPER CRYSTALS" of metal created by University of Virginia chemists in Charlottesville, Va., are aiding research on surface chemistry which may help industry speed production or slow down corrosion.

Measuring up to one inch in diameter, the crystals are huge compared with millions of tiny crystals on the surface of ordinary metal. Because the sides of any crystal react differently to the same chemical process, the new, giant crystals are opening up a new field of research on metals.

From this study may come crystal faces on metals which are suited to special uses in industry. Thus, crystal faces with low reactivity might be used to reduce corrosion. Highly reactive surfaces might be developed to speed up reactions in the production of many products.

Dr. Allen T. Gwathmey, research associate in chemistry at the University, developed the "super-crystals" with the assistance of advanced students.

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