

New Knockless Fuel Promised

Chemistry

Motor fuel that will prevent engine knocking and reduce the fire risk in automobile and airplane accidents is promised as the result of experiments reported by Dr. C. F. Kettering, director of the General Motors research laboratories, who spoke before the recent meeting of the National Academy of Sciences.

Not how light or volatile the fuel is, but what it is chemically determines its explosive properties in internal combustion engines, Dr. Kettering declared. The way in which the molecules of the fuel are put together controls the way in which it will burn within the cylinders.

Ordinary gasoline produces a "knock" in the automobile engine laboring under stress or operated under high compression. The propelling explosive mixture detonates with a bang instead of burning more

slowly, smoothly and evenly. Anti-knock preparations, such as tetraethyl lead developed some years ago by Dr. Kettering, are added to gasoline to make it usable in the motors of higher compression and more efficiency.

Not satisfied with having developed the anti-knock fuel industry, Dr. Kettering now promises to supersede it by showing the petroleum producers how to make motor fuel that will not need anti-knock agents added to it. His researches demonstrated that the molecular structure of the fuel, which can be changed during refining, controls its knocking qualities. Only a fifth of the ordinary gasoline sold today need be reformed to make all motor fuel nonknocking. And that is a mere juggling of the molecules.

Once this is generally accomplished

automobile manufacturers can equip their cars with more scientific engines that will get the most out of the fuel.

Dr. Kettering's discovery may make unnecessary the development of Diesel type engines for automobiles, airplanes and airships. Because Diesel engines use heavy oil that does not catch fire easily in case of accident they are considered by some engineers to be the logical method of removing the fire risk now present in gasoline propelled cars and aircraft. Since Dr. Kettering demonstrated that an effective motor fuel can be low in boiling point and therefore not easily exploded except under proper conditions in the engine, his research promises to banish the fire danger and the necessity of Diesel engine development on that account.

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Quanta and Proton Fragments

Physics

The new physics that has captured this branch of science in the course of a peaceful revolution begun by Einstein and his famous theory of relativity received more support at the recent meeting of the National Academy of Sciences. To a young scientist in the Bell Telephone Laboratories in New York, Dr. Clinton Joseph Davisson, the Academy awarded a prize conferred only once in five years for "the most important discovery or investigation in electricity or magnetism or radiant energy."

Dr. Davisson is the man who showed about a year ago that streams of electrons shot against certain surfaces will be reflected like light from a mirror. Before his work electrons had been looked upon as matter rather than radiation. This research, coupled with the idea that light and other radiation travels in gobs or chunks, called "quanta," leaves the scientists wondering where radiation begins and matter ends.

The new ideas of mechanics have also thrown new light on the mystery of atomic disintegration that causes radium and a few other elements to break down slowly but surely uninfluenced by any power in the command of man. Profs. Edward U. Condon and Ronald W. Gurney of Princeton reported to the Academy a theory of atomic disintegration that does not require for the heart of the

atom a violation of the laws that govern matter in the other parts of the universe. A fragment of the atomic nucleus is able to leak out and fly away at high velocity, whereas former conceptions showed the atom exploding under the influence of strange forces. Even this work does not tell us how to tap atomic energy and harness it.

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Exploration Limited

Geography

Arctic explorers have been getting too numerous in Norway's far northern island possession of Spitsbergen, and henceforward proposed expeditions will have to satisfy the governing body of that region of the seriousness of their intentions and of their competence to take care of themselves in the field, says *Nature*, a leading British scientific journal. The Norwegian government has been forced to this step by the troubles of several expeditions which went in without adequate equipment and had to be rescued at considerable expense.

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Players on many Hawaiian football teams wear no shoes, but stars in the barefoot league can punt 50 or 60 yards and are taught to place kick and drop kick accurately with their bare toes.

Finds Year's Third Comet

Astronomy

The year's third comet has been discovered by David Lamont Forbes, an astronomer at Capetown, South Africa, according to an announcement by Dr. Harlow Shapley, director of the Harvard College Observatory. This observatory acts as a clearing house for news of astronomical discoveries. In accordance with the usual practice, the new celestial visitor will be known after the discoverer as Forbes' Comet.

When first observed, on November 21, Forbes' comet was in the constellation of Corvus, the crow. This is a group that can now be seen from the United States low in the southern sky before sunrise. When discovered, the comet was going in a southeasterly direction, towards the nearby constellation of the centaur, so that it will soon be entirely out of the skies visible from northern countries. At the time of discovery it was of the sixth magnitude, just on the verge of naked-eye visibility on a dark night.

Later observations made by Dr. Berman of the Lick Observatory in California, on November 23, and by Dr. George Van Biesbroeck on November 25, showed that the comet is getting fainter, so that it is probably moving away from the earth.

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New Zealand has a suicide rate considerably higher than that in Great Britain.