

## TEN YEARS KNOCKING THE KNOCK FROM AMERICAN "GAS"

Tetraethyl lead, the dope drops made to put into gasoline to take the cough out of the motor as it climbs a hill or pulls a heavy load, was the most perfect result of more than ten years' search on the part of American motor engineers for a means of getting more use out of gasoline.

The public is getting about 5 per cent. of the energy out of gasoline when it drives its motor cars, experts at the U. S. Bureau of Standards say. In a motor boat or airplane engine it has been possible to push up on a full load and get as much as 30 per cent., while at normal operation about 20 per cent. of the energy in gasoline is made use of.

A study of the working of the engines revealed that the greater the pressure of the gasoline and air mixture inside the cylinders where it was exploded, the greater the amount of energy obtained. But increased pressure above a certain point caused an objectionable knocking. It was possible that this might injure the motor and the driver was likely to think something was wrong with his car.

Tests with some of the heavier gasolines and alcohols showed that a high compression could be obtained without the knocking. An effort was made to modify the common gasoline used so that it would behave like these also. It was found that iodine and aniline added in small quantities of 3 and 2 per cent. stopped the knocking, and although it was out of the question to use either of these two substances because of their scarcity and high price, it gave the chemists and engineers an insight into the problem.

The problem, they said, was a molecular one. Some substances made knocking worse and some made it better. Substances of high atomic weights turned out to be the most effective anti-knocks. Following that fact, and for no other reason at all, scientists tried lead, because it was probably the heaviest common substance that could be easily obtained.

After trying out many organic preparations containing lead, a synthetic substance, tetraethyl lead, was finally hit upon and found successful. Quantities as small as one thirteenth of one per cent. took out the knock of an engine under strain, compared to the 3 and 2 per cent. of iodine or aniline required. Like all lead compounds, this substance was poisonous.

Since then, physiologists and chemists of government and industrial laboratories have been busy finding out whether this substance is dangerous to public health both in its manufacture and its use. The problem is important because America uses over a million gallons of gasoline in an hour.

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LEADED GASOLINE RENAMED TO INSURE SAFETY

"Motor fuel" instead of "gasoline" is the label which gasoline treated with tetraethyl lead, the anti-knock compound, will wear when again placed on the market.

The committee of the U. S. Public Health Service, which, after investigation decided to allow the sale of leaded gasoline, provided for this safeguard of the public.