If the value of oral administration can be demonstrated, it will be a distinct advantage over the hypodermic method, which is dreaded by many people, in spite of the trivial pain caused. As typhoid fever is contracted through the digestive tract, there seems to be good reason to believe that vaccine may be administered in the same way. We have heard so much, however, of the administration of vaccine against smallpox by the mouth, and other absurdities of a similar character, that one is naturally cautious about adopting this new method. It should have the backing of impartial observation carried out on a large scale before general acceptance can be recommended.

1. *Bulletin de l'Académie de Médecine*, XLI, 1924.

ETHYL GASOLINE AND LEAD POISONING

New uses for many substances, in this instance lead, are continually being discovered. Lead is now apparently about to enjoy a very extensive application in the matter of motor fuels where it is to be added to gasoline for the purpose of increasing the efficiency of the engine. This of course at once raises the health question of lead poisoning.

Midgley and Boyd[1] have published the essentials of the new use for lead. These investigators point out that the automobile represents the first great advance in individual transportation since man began to use the horse. This transportation is obviously dependent upon an adequate supply of liquid fuel which for a number of obvious reasons means *petroleum*. In 1921 the production of gasoline in the United States was over five billion gallons, or the equivalent of filling a standard tank car every minute of the year. The fear is that the supply of this fuel may not keep up with the demand for it. Our supply of petroleum is being rapidly depleted. While other fuels, as from shale, coal and alcohol, may offer a reserve for the future, it will be many years before sufficient material can be obtained from these sources to supply any considerable percentage of the motor fuel requirements of the country. These workers therefore investigated the problem of increasing the efficiency with which the energy of gasoline is utilized and therefore of obtaining "more miles per gallon." To do this and still maintain acceleration and hill-climbing ability, it has been found necessary to discover a substance which will permit increased pressure of explosion while using gasoline. Here the chief difficulty has been the "knock." It is well known that if substantial percentages (40-60%) of benzene or alcohol are mixed with gasoline, fairly high compression can be obtained without the objectionable "knock" with its attendant loss of power.

The authors claim to have found that the "knock" in internal combustion engines is a chemical rather than a mechanical phenomenon; hence their investigation of various "anti-knock" chemicals. These include such substances as iodine, nitrogen, silenium, tellurium, tin and lead, all of which retard the knock.

Lead tetraethyl appears to surpass all the others. As an "anti-knock" compound when compared with benzene in 25 per cent concentration in kerosene, 1 volume of it is said to be equivalent to about 625 volumes of benzene. These "anti-knock" materials have been quite widely used in airplane engines, and their great effectiveness demonstrated.

1. Chemical Control of Gaseous Detonation, etc., and The Application of Chemistry to the Conservation of Motor Fuels. *Jr. Ind. & Eng. Chem.*, Vol. 14, No. 9, p. 849 (Sept., 1922), and No. 10 (Oct., 1922).

Benzene exerts its influence as a fuel; therefore requiring large quantities for admixture, whereas, the substances named are effective in fractions of a per cent. Lead tetraethyl is a compound in which a molecule of Pb is combined with four molecules of C_2H_5. The preparation has been put upon the market under the name of "Ethyl Gas" by the General Motors Chemical Company or, more recently, the Ethyl Gasoline Corporation.

Midgley and Boyd feel that it will be only a matter of time when all gasoline will be treated with an "anti-knock" material and that automobile engines having higher compression and giving considerably greater mileage per gallon will be used.

Foreseeing the possibility of health hazard to garage and motor workers, as well as to users and the general public, the Corporation arranged with the United States Bureau of Mines in the autumn of 1923 to begin at its Experiment Station in Pittsburgh, a series of extensive investigations on the pharmacology and toxic effects, if any, of *ethyl gasoline* when used as a motor fuel, and particularly as to the resulting exhaust fumes from motors. Reports on this work are expected within a few weeks, in which the results of animal experimentations, human exposures, the analysis of air, of street drippings, etc., are to be covered. While it is probable that the full safety of the public and others will be demonstrated as the result of these investigations, this method of procedure also illustrates a somewhat new idea in connection with the exploiting of new discoveries to the public, viz., the primary investigation of the public health aspect. As we know, there are now many substances and appliances upon the market which are dangerous to users as well as to the public which unfortunately have not been given this preliminary study.

MEASURING PERSONAL COMFORT WITH THE KATA THERMOMETER

Personal comfort depends largely upon the rate of cooling of the human body. In other words, the temperature, humidity, and velocity of the surrounding air should be within reasonable limits to permit the heat generated within the body to be removed at the same rate. Persons working under uncomfortable conditions are necessarily inefficient, although through no fault of their own. Modern industry, to produce the best results from workers, now realizes the importance of personal comfort and is installing equipment to control these three factors pertaining to human comfort.

It has been shown lately that there is no single index of comfort in atmospheric conditions. The mercury thermometer, which until recently was the only instrument used for measuring the physiological effects of atmosphere, is very inadequate for the purpose, as it merely accounts for that part of the body heat lost by radiation and convection, while a great part of the body heat resulting from the metabolic processes within the body is eliminated by means of evaporation from the surface of the body. This lack of a suitable measuring instrument was partly overcome in 1916, when Dr. Leonard Hill, of England, who introduced the kata-thermometer, brought out an improved type. This instrument measures its own rate of cooling when its temperature approximates that of the human body, and thus, under favorable conditions of the environment, serves as an index of the rate of cooling of the body itself.

The kata-thermometer is a specially constructed alcohol thermometer having a stem 20 cm. long, and a cylindrical bulb 1.8 cm. in diameter and 2.2 cm. in