The action on aviation gasolines is threefold: (a) Branched-chain hydrocarbons which have the highest anti-knock characteristic are preferentially attacked with the liberation of some methane, (b) microbially produced sulfides precipitate tetraethyl lead, and (c) peroxides produced by the bacteria catalyze the deterioration of tetraethyl lead.

(8) There is a report in the literature which ascribes an explosion of a kerosene tank to the production of a mixture of methane and hydrogen from the bacterial decomposition of kerosene in water storage.

(9) The growth of hydrocarbon-oxidizing bacteria in medicinal and pharmaceutical preparations having hydrocarbon bases has resulted in discolored and otherwise altered products. Allergies have been traced to the use of such products. Cooling oils have also been unfavorably affected by the profuse growth of hydrocarbon-oxidizing bacteria.

Little is known regarding the end-products which result from the bacterial utilization of hydrocarbons, except that carbon dioxide and bacterial protoplasm are always produced. There are reports in the literature on the production of methane, hydrogen, ketones, aldehydes, alcohols and organic acids. The products of metabolism will depend upon the bacterial species, the hydrocarbons and the experimental conditions. The observation that fatty acids result from the bacterial oxidation of petroleum hydrocarbons suggests exploring the possibilities of using microbial catalysts to convert hydrocarbons into much needed edible fatty acids. More extensive and intensive studies on the products of hydrocarbon utilization can be expected to yield interesting information on bacterial physiology.

In conclusion and to clarify my own views on the subject, it should be emphasized that while bacteria probably play an important role in the formation and transformation of petroleum, geological, geophysical and geochemical factors are also believed to be of importance in the origin of oil. The bacterial synthesis of certain petroleum hydrocarbons has been demonstrated, but it seems doubtful if it will ever be practical to produce by bacteria any hydrocarbons except methane on a commercial scale. The fondest hope for the future now entertained is that intensified microbiological studies coupled with other investigations on the origin of oil may eventually provide information which will aid in the discovery of existing pools of petroleum. Geomicrobiological prospecting and refined methods of "soil analysis" may prove to be a step in this direction. Microbiological processes may find practical applications in the petroleum industry, the most promising of which appears to be the use of bacteria in the recovery of petroleum from oil-bearing materials, in certain refinery processes and in the disposal of various waste products. Wherever petroleum or its products are stored in contact with water, the possible effects of hydrocarbon-oxidizing microorganisms must be taken into account. The multiple effects of bacteria on the formation and transformation of petroleum hydrocarbons is a new frontier of learning which presents a challenge to the petroleum industry and to the microbiologist.

OBITUARY

EDMUND BURKE DELABARRE

EDMUND BURKE DELABARRE, one of the pioneers of American psychology in the days when it was transforming itself into an experimental science, died in Providence on March 16, 1945. He was born in Maine in 1863. His influential teachers were Garman at Amherst, James at Harvard and Münsterberg at Freiburg, where he obtained the Ph.D. in 1891. He established the psychological laboratory of Brown University in 1892 and remained there as active professor for forty years and as emeritus (but still active) for the remaining years of his long life. His investigations were principally concerned with vision and with muscular movement and the sensations of such movement. An ingenious apparatus man, he designed pieces for continuous registration of respiratory and circulatory movements (as in emotion) and of automatic hand movements. He was the first, in 1898, to obtain an objective record of eye movements, and his method of mechanical registration, though soon superseded by photographic methods, gave accurate and important results. He attacked the difficult problem of explaining how the visual field can be transformed from a mere aggregate of color patches into a well-organized field of objects in space, and showed that a fairly comprehensive theory could be based on sensations of tension in the eyeball muscles. His work on this problem and others has not been fully published. As an avocation he did much intensive work in New England archeology and is especially noted for his decipherment of the famous "Dighton Rock." Dr. Delabarre was a man of sparkling eyes and cheerful disposition and of wide interests, a man whom it was always a pleasure to encounter.

R. S. WOODWORTH

FRANK W. COLLIER

DR. FRANK W. COLLIER, formerly dean and professor of philosophy at the Graduate School, American