ment will be added from time to time. In the words of *New Jersey Agriculture,* "thanks to Mr. Turner's vision and generosity, New Jersey will now have one of the largest and most complete dairy experiment stations in the world."

IT is reported in *Nature* that the Association of British Zoologists discussed at its general meeting the question of the payment of fees to zoologists for expert advice. It is well known, as Professor E. B. Poulton says in a letter on behalf of the council of the association, that a somewhat unscrupulous public takes for granted the good nature [and affluence!] of zoologists in requesting their professional help without offering payment in return. Whether it be a matter of the identification of a species or the delivering of a popular lecture, both demand the expenditure of time and energy, which the expert could have devoted profitably to his own purposes. The council's proposal is that, in the interests of their science, zoologists should demand fees for the work of identifying specimens and giving lectures. They say that such a demand would enhance the respect felt for the science, just as medical advice tends to be valued according to the size of the fee.

DISCUSSION

REDUCTION OF OXYLUCIFERIN BY ATOMIC HYDROGEN

SOME luminous animals, notably an ostracod crustacean, *Cypridina,* contain a substance, luciferin, which oxidizes to oxyluciferin in aqueous solution containing oxygen. In presence of a second substance, luciferase, luminescence appears. Luciferase acts both as a catalyst, accelerating the oxidation of luciferin, and also supplies molecules which may be excited to emit light by the energy of oxidizing luciferin. Oxyluciferin in water solution can be reduced to luciferin by various hydrogenation procedures. The mechanism has been fully discussed by Harvey.[1]

During attempts to excite luciferase to luminesce by the energy of recombination of hydrogen atoms we have observed that dry oxyluciferin can be reduced to luciferin. The apparatus was a modification of that used by Urey and Lavin.[2] Atomic hydrogen was produced in a high tension discharge tube at low pressure and drawn over the material exposed about 30 cm from the discharge tube. Dry oxyluciferin alone gives no luminescence when luciferase solution is added to it, but dry oxyluciferin first exposed to atomic hydrogen becomes reduced to luciferin, which can then be detected by luminescence on adding an aqueous solution of luciferase. No luminescence appears in the atomic hydrogen treated oxyluciferin on adding water alone but only if luciferase is present also, as is to be expected. This experiment confirms the results obtained by reducing oxyluciferin in water solution and makes it quite certain that the luciferin-oxyluciferin change is a dehydrogenation-hydrogenation reaction.

When dry luciferase and luciferin are exposed to low concentration of atomic hydrogen there may at times be observed a faint bluish glow which breaks into incandescence on raising the atomic hydrogen concentration. Dry egg albumen and dry powdered pill-bugs (*Oniscus*) exhibit a dull orange glow in low concentration of atomic hydrogen which may also pass into undoubted incandescence. The faint glow of *Cypridina* may be a luminescence or a low temperature incandescence since the containing vessel does become warm. Willemite and certain other substances show undoubted luminescence in atomic hydrogen.

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1 *Bull. Nat. Res. Council,* No. 59, p. 50, 1927.
2 *J. Amer. Chem. Soc., 51,* 3286, 1926.

"THE POSSIBLE RÔLE OF MICRO-ORGANISMS IN THE PRECIPITATION OF CALCIUM CARBONATE IN TROPICAL SEAS"

THE statement made by Dr. Werner Bavendamm, in the issue of SCIENCE for May 29, 1931, on the subject quoted above, compels me to make some critical comments. Much as I detest polemics I feel it necessary that those interested in the subject in question have the facts before them.

Dr. Bavendamm discusses at some length the observations in tropical seas with respect to calcium carbonate precipitation, and makes it appear that his findings are in conflict with mine. As a matter of fact, Dr. Bavendamm confirms practically all the results obtained in my own studies as reported elsewhere.[1] For example, (1) Dr. Bavendamm finds a very small bacterial population in the open sea. This confirms my findings and those of others. (2) Dr. Bavendamm shows that the bacterial population of muds like those off the Bahama Banks is relatively small as compared with those of soil populations. This also confirms my findings. (3) Dr. Bavendamm

1 Publication No. 340, Carnegie Institution of Washington; Publication No. 391, Carnegie Institution of Washington, 1929.