

phosphorescence decrease as the coloration increases, and eventually zinc sulphide, which originally gave a brilliant phosphorescence in daylight, no longer responds, and it is only faintly responsive to alpha radiation. However, on heating this zinc sulphide just sufficiently to discharge the coloration, no difference in any of its properties can be detected between such revived zinc sulphide and some of the same material which has not been subjected to radiation.

This investigation is being continued and a more detailed report will be given later.

CHARLES H. VIOL.
GLENN D. KAMMER.
ARTHUR L. MILLER.

Radium Research Laboratory,
Standard Chemical Company,
Pittsburg, Pennsylvania,
April 13.

Hydra and the Tadpoles.

THE following observation was made by Mr. J. T. Wadsworth, the steward of the zoological laboratory in the University of Manchester.

On April 25 a tadpole in a small aquarium was seen to be behaving in an unusual way. It was swaying to and fro with its head down, and appeared to be attached to the side of the aquarium by its tail. Further observation showed that it had been captured by a hydra and was held securely by the tip of its tail. The movements of the tadpole became feebler and feebler, and in half an hour they ceased altogether, the tadpole being evidently dead or completely narcotised. A quarter of an hour later, as no further signs of vitality appeared in the tadpole, the hydra with its enormous prey was carefully detached from the side of the aquarium and preserved in Carnoy's fluid.

The accompanying illustration (Fig. 1) is a repro-



FIG. 1.—A tadpole 9 mm. in length, captured and killed by a hydra. The hydra is seen in a contracted condition, attached to the tip of the tadpole's tail. $\times 8$.

duction of a careful drawing to scale made by Miss M. Jepson of this preparation. As this is the first recorded case, I believe, of a tadpole of this size (9 mm. in length) being captured by a hydra, it is probably not a common occurrence. The question might, therefore, arise as to whether the tadpole was in a normal healthy condition. It may be remarked that, as the hydra was attached to the glass about half-way between the surface and the bottom of the aquarium, the tadpole must have been captured while swimming, and when first observed the movements of the tadpole were fairly vigorous. In any event, it is a very remarkable illustration of the strength of the hydra's grasp and probably also of the toxic powers of the nematocyst fluid.

SYDNEY J. HICKSON.

University of Manchester,
May 4.

Rainfall Correlations in Trinidad.

IN connexion with my communication to NATURE (February 7, p. 192) on the above subject, it may be of interest to mention that I have recently received a letter from my friend, Dr. Preston E. James, Department of Geography, University of Michigan, informing me that at the meeting of the Association of American Geographers at Washington last December, he recorded in an address on "Geographical Factors

in the Trinidad Coconut Industry" certain correlations between rainfall and coconut yield. In connexion with data obtained from a large estate in the extreme south-east of the island, he found a positive correlation between the rainfall of one six-month period and the *quality* of the nuts six months later, "quality" being a matter of the proportion of selected nuts—which will not pass through an iron ring 4 inches in diameter—and "rejects" and "culls"—or those that will. (This grading into "selects" and "culls" is the recognised commercial practice where coconuts, as nuts and not as copra, are exported to northern markets.) Dr. James claims to have found a positive correlation of 0.733 ± 0.072 . The correlation for the same six-month period, that is, without any lag, was 0.508 ± 0.109 .

In my communication to NATURE, which dealt mainly with my own investigations in regard to rainfall and cacao yields, I gave the impression that rainfall and coconut yields had not been studied, being unaware of Dr. James's work, which has not yet been fully published.

Dr. James's work evidently constitutes a useful contribution to our knowledge of Trinidad's economic geography, and I presume that it is of considerable botanical interest to learn that the size of the coconut (not the entire drupe, but the endocarp and endosperm) is closely associated with rainfall, and that the extent of the relationship has been statistically determined under certain conditions.

W. R. DUNLOP.

34 Kensington Court,
London, W.8, March 26.

On the Spark Spectrum of Tungsten in a Helium Vacuum Arc.

PROF. O. W. RICHARDSON, in a paper entitled "The Striking and Breaking Potentials for Electron Discharges in Hydrogen" (Proc. Roy. Soc. 106, p. 640, December 1924), comments on the interesting fact that when a barium coated cathode burned out in an atmosphere of hydrogen, the spark lines of barium were developed instead of the arc spectrum.

We have observed a very similar phenomenon in which a hot tungsten cathode used in the operation of an arc at low pressure in pure helium is capable of developing the spark spectrum of tungsten. The conditions necessary for the development of this spectrum do not require temperatures high enough to burn out the filament; but the lines invariably make their appearance when it is raised to dazzling incandescence either by the thermo-ionic bombardment of the helium, or by a direct heating current, or preferably, by both. The relative intensities of the lines are distinctly modified from those given in the standard tables of wave-lengths, which fact is doubtless to be attributed to the presence of helium. For this reason, one has to go to some pains to be certain that the lines are those of the tungsten spark spectrum. Mr. S. J. Metzler has recently, in this laboratory, established this fact beyond a doubt.

Because of the wide use of the spark lines of refractory metals as secondary standards in wave-length determinations, and the difficulties encountered by various workers in this important field, with respect to precision determinations of these wave-lengths, due to pole effects and pressure shifts, it may be that the production of the spark spectra of these substances in helium vacuum arc conditions will enable them to be used with much greater reliability.

HARVEY B. LEMON.

Ryerson Physical Laboratory,
The University of Chicago, April 22.