Comments and Communications

Titanium and Zirconium in Bloom of *Gymnodinium brevis* Davis

In October and November, 1952, there was an outbreak of "red tide" in the neighborhood of Sanibel Island on the west coast of Florida. The M/V *Alaska*, U.S. Fish and Wildlife Service, Gulf Fishery Investigations, was dispatched to the scene of the outbreak under the direction of E. L. Arnold, Jr., with instructions to collect water samples and to make detailed hydrographic and biological observations.

Numerous water samples were taken from the dense bloom of the naked dinoflagellate *Gymnodinium brevis* Davis. In January, 1953, a sample of this water with other samples from Lake Okeechobee, Florida, surface in central Gulf of Mexico, and a tidal lagoon, Galveston Island, were sent to the Geochemistry and Petrology Branch of the Geological Survey for spectrographic analysis.

As a result of the analysis, it was found that titanium was peculiar to the red-tide water at a concentration of 0.01–0.1% of total solids (33,700 ppm), and zirconium at 0.001–0.01% total solids (33,700 ppm). These elements did not appear in the other samples.

The largest contributor to the nonoceanic component of the neritic waters of the Sanibel Island region is Lake Okeechobee and the analysis of this water showed the presence of Ca, Na, Mg, Si, Sr, K, Al, Sn, Fe, Ba, Ni, B, Pb, Cu, Mn, Cr, and Ag, but not Ti and Zr. It is likely that Ti and Zr are normally present in the sea water in traces beyond the sensitivity of the analytical method, but in this case were concentrated by the organisms of the mass bloom. The standard sensitivities given for the spectrographic method (semi-quantitative) are for zirconium 0.001%, and for titanium 0.001%.

These elements will be studied as nutritional trace elements in the cultural studies of dinoflagellates now in progress in this laboratory.

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Secondary School Education

THE letter of Anton Postl (SCIENCE, 117, 567 [1953]) gives some excellent reasons why students should take more science and mathematics in secondary schools. But we are also faced with problems other than the question of students selecting these courses or being required to take them. Too often neglected in such discussions is the teacher's ability to make the study of science and mathematics alive and worthwhile when more than half of the youngsters in the classroom plan to enter non-technical fields. Then dull courses are frequently the result except for students whose scientific aptitudes stimulate an interest which no indifferent teacher or wrong kind of text-book can diminish.

Making physics and mathematics interesting does not mean, as some specialists seem to think, diluting the material to a point where little remains but a historical and general treatment of these subjects. Two recent books (*1, 2*) on college physics for the non-technical student show that this is not the case. Texts of this kind should be written for secondary schools as well, to replace some of the books now in use and which are hardly better than catalogs of mechanical and electrical gadgets. High school seniors and college freshman wearily struggle with co-ordinates, variable velocities, derivatives and theories of light transmission without being made aware how these mathematical and physical concepts have influenced the mind of man. There must be a real meaning, even for high school students, in the famous statement of Whitehead (*3*) that "the issue of the combined labors of these four men (Galileo, Newton, Descartes and Huyghens) has some right to be considered as the greatest single intellectual success which mankind has achieved."

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2. FREEMAN, I. M. *Modern Introductory Physics.* New York: McGraw-Hill. (1949).
3. WHITEHEAD, A. N. *Science and the Modern World.* New York: Macmillan. (1951).

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Occurrence of Alkaloids in Dioscorea[1]

DURING the course of screening many plant species for steroidal sapogenins we have also applied to the samples qualitative tests for groups of other constituents, among them alkaloids. In 141 samples of Dioscorea tubers native to North, Central, and South America, and to the West Indies, no test for alkaloid was obtained. Of 42 samples native to the rest of the world, 7 contained alkaloid.

A more detailed breakdown of the samples is as follows. Tubers from the Western Hemisphere consisted of 18 identified species and 85 lots of unidentified, many of which would be different species. Those from the rest of the world consisted of 12 identified species and 26 unidentified lots. Abundant alkaloid was found

[1] This work was done as part of a cooperative arrangement between the Bureau of Plant Industry, Soils, and Agricultural Engineering, and the Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, and the National Institutes of Health, Federal Security Administration.