Tropical Medicine at Panama was laid on February 1 by President Porras, assisted by members of the American College of Surgeons touring in South America. The institute will be governed by a board of directors of which Rear Admiral W. C. Braisted, retired, is president and Dr. Richard P. Strong, director of the Harvard University School of Tropical Medicine, is the scientific director.

UNIVERSITY AND EDUCATIONAL NOTES

MR. JOHN HAYS HAMMOND has endowed a scholarship in engineering for a Mexican student at Yale University. The scholarship is for a four years' course and covers expenses of tuition, dormitory, meals, books, fees, etc., and transportation from and to the Mexican border.

DR. GEORGE E. POTTER has endowed a fellowship in pathology in the Detroit College of Medicine and Surgery.

THE new chemistry section of the Technical High School of Stockholm has been opened. The building, which cost 3,300,000 kroner, is said to be one of the largest chemical laboratories of the world. It has four large laboratories for inorganic, organic, technical and electro-chemistry, and a smaller for the study of fermentation. The director is Professor W. Palmaer.

MISS ADA LOUISE COMSTOCK, dean of Smith College, has been appointed president of Radcliffe College, in succession to Dr. Le Baron R. Briggs, who for twenty years has been head of Radcliffe and dean of the faculty of arts and sciences at Harvard University.

DR. IRA N. HOLLIS, for ten years president of Worcester Polytechnic Institute, and previously professor of engineering at Harvard University, has offered his resignation to the board of trustees.

DR. ARTHUR HOLLY COMPTON, head of the Department of Physics in Washington University, has been appointed professor of physics at the University of Chicago.

PROFESSOR STRAUB of Freiburg has been called to Munich to occupy the chair of pharmacology as successor to Professor von Tappeiner, who is to retire on account of his advanced age.

DISCUSSION AND CORRESPONDENCE

AN UNUSUAL OCCURRENCE OF ROCK BORING MOLLUSKS IN CONCRETE ON THE PACIFIC COAST

IT has often been supposed that concrete in sea water might be subject to attack by rock boring mollusks, especially of the family Pholadidæ, various species of which perforate rocks of a number of different kinds and often of a considerable degree of hardness. But specific instances of the occurrence of these organisms in concrete marine structures have been lacking. Hence the data here reported are of considerable interest from both the biological and engineering points of view.

In the work of widening the channel in Los Angeles harbor, about November 13, 1922, it became necessary to remove some old wooden piling which had been protected from marine borer attack by jacketing with concrete. It was discovered by Mr. D. E. Hughes, engineer in charge of dredging operations, that, of 18 such jackets examined at this location, 16 had been more or less attacked by pholad borers. About five were considered to be badly attacked, containing six or more borers per square foot of exposed surface; the others contained fewer, and some only an occasional borer. The two jackets not attacked stood in shallower water than the others. The jackets had been in place fourteen years, but had not been exposed to rock borer attack during the entire period, as the form lumber had been left about the jackets when they were constructed, and this gave protection from the rock borers until the wood was destroyed by wood boring organisms. In some cases, indeed, a thin shell of the old form lumber still remained adhering to the concrete.

Attention of the writers was called to this finding, and, with the cooperation of the Los Angeles Harbor Engineering Department and the San Francisco Bay Marine Piling Committee, collaborating with the National Research Council committee on marine piling investigations, a further investigation was made. It was found that, of concrete jacketed piles at four different locations in Los Angeles harbor, in fact, at every point in the inner harbor where such piles exist, about 50 per cent. had been more or less attacked, of which rather

more than one fifth were very considerably bored. Of those not attacked, a number stood so far inshore as to be but little exposed to the action of the borers.

These jackets were in general of a less than average grade of cement mortar, from 2 to 5 inches in thickness, some being decidedly poor, others fairly hard, as indicated by the fact that some of the jackets had given service in sea water over a period of fourteen years. Samples of the best mortar in which borers were found showed an air penetration of 1/16 inch in seven weeks when tested with phenolphthalein. Mr. A. A. M. Russell, testing engineer to the California State Harbor Board, has very kindly made a crushing test of a sample of one of these jackets, finding the crushing strength of a specimen 2½"x3½", 4" high, to be 1,726 pounds per square inch. Mr. Russell reports the grading of the aggregate to be as follows:

Screen	*Percentage*
10- 20	1.78
20- 30	.89
30- 50	4.46
50- 80	51.78
80-100	16.07
100-200	16.07
Pass 200	8.94

The species occasioning most of the damage here was found to be *Pholadidea penita* Conrad, a borer which occurs in suitable habitats from Alaska to Lower California, and possibly even to Ecuador.[1] Specimens taken from these pile jackets averaged about 4 cm. in length, with a maximum length of 7 cm. and a maximum diameter of burrow of 3.2 cm. In some cases the borers had gone entirely through the jackets until in contact with the wood within, but none had continued boring into the wood.

The nestler *Petricola carditoides* Conrad was found somewhat commonly in these jackets, but presumably only in old pholad burrows. *Platyodon cancellata* Conrad was also found sparsely, in badly disintegrated concrete.

The wide distribution of *Pholadidea penita* suggests possibilities of attack on concrete marine structures in other Pacific Coast harbors. Indeed, reports of such action by this or a similar borer at such widely separated points as Anchorage, Alaska, and Panama, have recently come to hand.

In jacketing piles, it has often occurred that the concrete has been "drowned," either by the presence of too much water in the mix, or by depositing the material in water, causing segregation and laitance, and rendering such structures especially liable to borer action. The probabilities of attack on well made precast piles and other high grade concrete structures hinge upon whether the action of the borers is mechanical or chemical, or both. If it be predominantly chemical, density of the material will probably serve only to make the boring slower. It appears, at any rate, that the use of concrete for marine construction is not as yet a final solution to the marine borer problem, at least in localities where rock boring mollusks occur.

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[1] Dall, W. H.: Proc. U. S. Natl. Museum, *37*, 276. 1910.

AN INTERESTING LIVERWORT

A SHORT time ago, one of my students, Mr. T. Domoto, brought to the laboratory a peculiar liverwort which at first I had some difficulty in identifying. The specimens were collected in a nursery in Oakland, owned by his father.

A further investigation of the plant showed that it was undoubtedly the curious *Monoselenium tenerum*, Griffith, described in detail by Goebel[1] about a dozen years ago. So far as I know, the plant has not been reported since that time.

Goebel's specimens were found growing in earth sent from Canton to Munich with specimens of tea plants. The liverworts were first noticed some time after the arrival of the material in Munich.

Goebel decided that the plant was Monoselenium, of which the only account was in the posthumous notes of Griffith.[2] No specimens are known in herbaria; but Goebel concluded from Griffith's description and figures that Griffith's *Monoselenium tenerum* from India was the same as the Canton plant.

Monoselenium closely resembles a small Du-

[1] Flora, 101: 43-97. 1910.

[2] Posthumous papers. Part II (1849)—Notulæ ad Plantas Asiaticas, p. 34.