pedition received much courteous help from the administration of the Dutch East Indies. It was accompanied by two Dutch biologists, Dr. Siebers, ornithologist of the Buitenzorg Museum, and Dr. Boschma, who paid special attention to corals. The rich collections made by the expedition are being sent to the Copenhagen Museum.

IN connection with its studies of the distribution and movements of larval fishes and other pelagic marine organisms, the Bureau of Fisheries recently has undertaken the investigation of ocean currents of the north Atlantic coast and for that purpose has deposited about 1,500 drift bottles. These have been dropped on three lines, running, respectively, for a distance about 75 miles off Cape Elizabeth, 150 miles seaward from Chatham, Mass., and 150 miles seaward from Sandy Hook. The stations are at intervals of about one half mile, two bottles being dropped at each, with drags at different depths, the bottles being weighted so as to float with but a small part of the neck exposed. Each bottle contains a card offering a reward of 25 cents if sent to the bureau with information concerning the date and location at which it was found. Upwards of 200 of these cards have been received already. This work is being conducted in cooperation with the International Committee on Marine Fisheries Investigations, on which, in addition to the United States, the Canadian and Newfoundland governments are represented.

THE *Fisheries Service Bulletin* reports that after a period of scarcity for about twenty years menhaden have reappeared in the Gulf of Maine in considerable abundance. On the Maine coast this fishery attained its greatest importance about thirty-five years ago, with factories at various points along the coast; that is, Boothbay Harbor, Pemaquid and Round Pond. According to the bureau's local agent at Portland, the main body of fish this year were found between Portland, Me., and Massachusetts Bay, and it is doubtful whether many large schools appeared farther east than Boothbay Harbor, where about 2,500 barrels were frozen. There were landed at Portland during the month of July 1,564,800 pounds by fishing vessels and many more by smaller craft. The landings at Portland would have been much larger had not the freezers refused to accept more. A report from Boston early in August states that about 18 menhaden steamers from southern factories were operating in Massachusetts Bay. As the herring fishery this season has been a comparative failure, the stocks of menhaden were welcome to the freezers for bait, bringing nearly as much as the herring for this purpose. For bait purposes the menhaden will be used chiefly by the halibut fleet and to a lesser degree by line trawlers, cod and haddock fishermen. Reports of the presence of schools of menhaden in these waters caused the bureau to send the steamer *Halcyon* to conduct an investigation under the direction of Dr. H. B. Bigelow. Preliminary reports indicate the presence of larger quantities of diatoms, on which the menhaden feeds, than are normally found in Massachusetts Bay at this season, and it is probable that the unusually good food supply has controlled the movements of the fish into those waters.

UNIVERSITY AND EDUCATIONAL NOTES

THE will of the late Winthrop Cowdin, of Mount Kisco, N. Y., disposes of an estate estimated at more than $1,000,000. After providing for Winthrop Cowdin memorials at Harvard University and at the St. Paul's School, Concord, N. H., Harvard University receives $50,000 and the entire residuary estate, the income to be used for general purposes.

PROFESSOR HENRY GORDON GALE, of the department of physics of the University of Chicago and for ten years dean of the College of Science, has been appointed dean of the Ogden Graduate School of Science, to succeed the late Dean Rollin D. Salisbury, who occupied the position for over twenty years.

PROFESSOR MILO S. KETCHUM, professor of civil engineering in the University of Pennsylvania, has resigned to become dean of the College of Engineering and director of the Engineering Experiment Station of the University of Illinois. He will be succeeded at Pennsylvania by Professor H. C. Berry.

DR. A. M. GREENE, formerly of the Rensselaer Polytechnic Institute, has been elected dean of the Engineering School of Princeton University.

DR. G. R. LYMAN has been appointed dean of the College of Agriculture of West Virginia University. Dr. Lyman is at present in charge of the Plant Disease Survey of the United States Department of Agriculture and will assume his new position on January 1. Dr. N. J. Giddings has been acting dean of the West Virginia College of Agriculture since the resignation of Dr. John Lee Coulter on September 15, 1921.

PROFESSOR ALFRED TENNYSON DELURY, head of the department of mathematics, University of Toronto, has been appointed dean of the faculty of arts. Sir Robert Falconer called a meeting of the council of the faculty of arts and announced that, while the appointment of a dean was by statute in his hands, he would like to receive nominations from the council. Nominations were then made and balloting was carried on by mail during the next week. The result was that Professor DeLury was the choice of the council and he was appointed by the president.

DR. BOWMAN C. CROWELL, formerly connected with the Oswaldo Cruz Institute of Rio de Janeiro, and with the Bureau of Science of the Philippine Islands, has been appointed professor of pathology at the medical college of the University of South Carolina.

DISCUSSION AND CORRESPONDENCE

SOME SEISMOLOGICAL EVIDENCE THAT IS NOT EVIDENT

IN the June number of the *American Journal of Science* an article appeared under the title "A Critical Review of Chamberlin's Groundwork for the Study of Megadiastrophism."[1] In it a number of statements are made in regard to seismological facts which would seem to require experimental proof.

In the early part of the article the author sums up what he considers the evidence of seismic transmission for a viscous liquid state of the core of the earth at depths below 0.6 of the earth's radius. Describing the types of waves sent out by an earthquake, he says: "Seismic disturbances send out vibrations of two types, compressional and distortional. These are called the primary and secondary waves respectively. The former waves are dependent on the elasticity or compressibility of the transmitting medium, while the latter waves are dependent both on the rigidity and the elasticity of the transmitting medium for their propagation." In the first place, it is not clear what the author means by elasticity. He would seem to use it as synonymous with compressibility, whereas it is usually taken as a generic term including both volume elasticity and rigidity as species. But, passing over that point, does not the author's statement require both mathematical and experimental proof, since it is in direct opposition to the accepted theory of elasticity,[2] borne out as the latter is to a great extent by observations on earthquake records? As is well known, the theory of elasticity teaches that compressional, or dilatational, or longitudinal waves involve not only the modulus of compression or bulk modulus of the medium but also its shear modulus or coefficient of rigidity; and on the other hand, that the distortional, or shear, or transverse elastic waves involve the modulus of rigidity of the medium but not its modulus of compression. Thus the formula for the velocity of the longitudinal waves is

$$V_1 = \sqrt{\frac{\lambda + 2\mu}{\rho}}$$

ρ being the density of the medium, λ Lamé's compression constant, and μ the modulus of rigidity. In the case of transverse waves, the formula for the velocity is

$$V_2 = \sqrt{\frac{\mu}{\rho}}$$

Another statement that would seem to be far from evident is the following: "The two types of waves travel at different velocities but can only become distinctly separated out in a

[1] Art. XXXVII, "A Critical Review of Chamberlin's Groundwork for the Study of Megadiastrophism" by William F. Jones. *Amer. Journ. Sci.*, Fifth Ser., Vol. III, No. 18, June, 1922.

[2] *Cfr. e. g.* A. E. H. Love: "A Treatise on the Mathematical Theory of Elasticity," Rev. Ed., 1920, Cambr. U. Press.