

000, conducts 30 institutions, cares for approximately 700,000 patients a year and commands a personnel numbering 28,000 professional and non-professional workers, paid and unpaid. The deputy commissioner is exempt under the charter from competitive Civil Service; citizenship and three years' residence in New York are required.

For the first time in the history of the American Society of Mechanical Engineers, the 1940 semi-annual meeting will be held in three cities, with simultaneous meetings taking place in Milwaukee, at the Hotel Pfister from June 17 to 20; at the University of Michigan from June 20 to 21, and at Asbury Park, N. J., at the Berkeley-Carteret Hotel from June 19 to 22. Erik Oberg is chairman of the meetings and of the program committee. At the main meeting in Milwaukee there will be thirteen technical sessions with thirty papers covering hydraulics, steam power, education and training, management, fuels, machine-shop practice, process industries and railroads, several plant trips, luncheons, a business meeting and a banquet. The meeting at Ann Arbor, under the sponsorship of the Division of Applied Mechanics, will present four technical sessions, devoted to elasticity, dynamics, fluid mechanics and thermodynamics, with thirteen papers by some of the outstanding engineering theorists of the country. Besides an exhibit of Diesel engines and accessories, the Division of Oil and Gas Power, in Asbury Park, will include six sessions with twelve technical papers on the subjects of Diesel-engine fuels, shaft couplings, marine Diesels, and engine design, operation and maintenance.

A SPECIAL committee of the Research Council on Problems of Alcohol, of which Dr. Merrill Moore, of the Washington Hospital, Boston, is chairman, is preparing a three-day program for a symposium on alcoholism to be conducted at Philadelphia in connection with the annual meeting in December, 1940, of the American Association for the Advancement of Science. This symposium, if approved by the Executive Committee of the association, will be held under the auspices of the medical section. There will be six sessions. The Surgeon General of the U. S. Public Health Service will be among the speakers.

THE annual meeting of the members and trustees of the National Parks Association was held in the Cos-

mos Club, Washington, D. C., on May 9. There was an anniversary dinner in the evening at which, according to the program, William P. Wharton, presided, and Dr. Henry Baldwin Ward, vice-president, acted as toastmaster. The speakers and their subjects were Dr. Wallace W. Atwood, president of Clark University, "Protection of Nature in the Americas"; Dr. John C. Merriam, president emeritus, of the Carnegie Institution of Washington, "The Human Values of Parks," and Newton B. Drury, secretary of Save-the-Redwoods League, "Preservation of the Natural Landscape." Motion pictures in natural color on "Wildlife of the Arctic Wilderness," Mount McKinley National Park, were presented by Victor H. Cahalane, of the Section on National Park Wildlife of the U. S. Biological Survey.

THE trustees of Oberlin College at a special meeting on April 27 "appropriated \$100,000 from free current assets for the making of necessary repairs, and set aside \$900,000 from the same source as a building fund." The committee on location, plans and construction of college buildings was directed to have plans prepared for an addition to the Carnegie Library and for a new heating plant, and to take steps preliminary to the preparation of plans for a physics building and a biology building, to be units of the proposed science quadrangle, and a residence for men.

By the will of Mrs. William R. Shepherd, wife of the late Professor Shepherd of Columbia University, who died on January 22, Dr. Stephen P. Duggan, director of the Institute of International Education, is appointed as one of the executors of the estate. This is estimated to be of the value of \$140,000, the interest on which is to be given to a sister during her lifetime. At her decease the fund is to be inherited by the Institute of International Education, the interest to provide fellowships for European students in the colleges and universities of the United States.

DR. ALBERT R. MANN, formerly provost of Cornell University, now vice-president of the Rockefeller Foundation, and Mrs. Mann have given their former residence at Dryden Road, Ithaca, to the university. Net rentals will be added to the proceeds of the sale of the property and the resulting capital fund will be permitted to accumulate interest until it reaches \$15,000. The income from this fund will be devoted to the purchase of books of biological interest.

## DISCUSSION

### PACIFIC SALMON NOT ESTABLISHED IN ATLANTIC WATERS

THE great variety (five species) of salmon of the genus *Oncorhynchus* in the streams of the Pacific coast of this continent, has from the early days of fish culture stimulated the desire to establish at least some of

them in the streams of the Atlantic coast, and various attempts have been made, beginning as far back as 1872. Davidson and Hutchinson<sup>1</sup> in reviewing attempts to transplant Pacific salmon to other than their

<sup>1</sup> F. A. Davidson and S. J. Hutchinson, *Bull. U. S. Bur. Fisheries*, 48: 671, 1938.

native waters consider that pink salmon (*O. gorbuscha*) were established in Maine waters and chinook salmon (*O. tshawytscha*) in waters in New Brunswick and Ontario, and this is being quoted, as by Needham.<sup>2</sup>

Dymond, Hart and Pritchard,<sup>3</sup> whom Davidson and Hutchinson cite as their authority for the chinook salmon, do not mention New Brunswick, and for Ontario report lack of knowledge of any individuals of a second generation, although there was unquestionable survival of some of the planted fish to the adult state. The plantings were made in streams of Lake Ontario, the last in 1925, and recent inquiry reveals that the species is now unknown in these waters. Davidson and Hutchinson's reference to chinook salmon in the St. John River of New Brunswick evidently refers to plantings made in 1881 and 1882. The reports of their success<sup>4</sup> were by hatchery officers who failed to furnish specimens for examination and circumstances that need not be detailed here, seem to justify the inference that the fish seen were merely the native Atlantic salmon. There has been no knowledge of any other salmon in this river or in the Bay of Fundy outside its mouth than the native species until 1939, when a peculiar salmon was reported as taken (July 22) in the bay about eight miles from the river mouth. This was carefully examined and proved to be a chinook salmon. Two other specimens were reported later, but were not available for examination. These records have no validity as proof of the establishment of the species, since numerous plantings of chinook salmon have been made in recent years in the neighboring states of Maine and New Hampshire, as I am informed by G. H. Stobie, commissioner, and Prof. H. E. Warfel, State Biologist, respectively. For the plantings in the waters of Maine, Mr. Stobie states (letter of December 27, 1939), "we do not have clear evidence that the second generation of chinook salmon has resulted." Scales of individuals taken in Lake Ontario and in the Bay of Fundy, which have been available to us for examination, show abrupt change from slow to rapid growth in the latter, but not in the former, justifying the conclusion for the former that these salmon did not descend to the ocean, but remained in Lake Ontario, as seems to have been true for the native Atlantic salmon,<sup>5</sup> which disappeared from the lake many years ago.

The United States Bureau of Fisheries planted thousands of pink salmon fry annually in streams in Maine from 1906 to 1908,<sup>6</sup> but apparently without result. Then from 1914 to 1918 it planted millions of fry annually. Runs of adults appeared in certain rivers

beginning with those from the planting of 1914, and they were largest in the Dennys and Pembroke Rivers (in 1917 at least 2000 fish in the former and 500 in the latter),<sup>7</sup> which empty into Cobscook Bay. The reason may be that the best feeding of the whole coast is to be found in that bay, as shown by the small herring (sardines) being fatter there than elsewhere.<sup>8</sup> The species has a life history of exactly two years from spawning to spawning and it is usual in its native streams for runs to occur only every other year, either even or odd, as if one successful year class eliminates the following one, and so leaves the field clear for its own offspring. In spite of increasingly larger numbers of fry being planted in Dennys River (from 225,000 in 1914 to 1,050,000 in 1917), the reports are only of runs every other year beginning with that in 1915, the outcome of the planting of 1914.<sup>9</sup> Similarly, a thorough attempt (1931 and 1935) to establish a run of this salmon in the "off" year in a stream in British Columbia, in which it occurred naturally, utterly failed.<sup>10</sup> Beginning in 1919, the transfer of eggs from the Pacific coast was stopped and eggs, taken from the fish ascending the Dennys and Pembroke Rivers, were hatched and the fry planted the next year. The runs and the artificial handling of the eggs continued every other year until 1925.<sup>11</sup> The Bureau of Fisheries states (letter from Mr. John R. Gardner, acting commissioner, February 1, 1940) that for 1927 "run of fish reported—no eggs taken" and that "no adequate information available relative to succeeding runs but the species is now reported as non-existent in the Dennys River or other Maine waters." The Bureau of Fisheries also states (letter from Chas. E. Jackson, acting commissioner, October 24, 1939) that the disappearance of the fish has been "due to the absence of any attempt to conserve the run and the presence of dams which apparently eliminated natural reproduction." The facts show that the pink salmon will pass successfully through its sea stage on certain parts of the Maine coast, but evidence fails of there having been a second generation produced by natural spawning.

The available facts are consistent with the view that wherever Pacific salmon have been planted in waters of the Atlantic coast they persisted no longer than would be expected from the known length of life for individual fish. Without natural completion of the life cycle there can not properly be said to be any establishment of Pacific salmon in Atlantic waters. To

<sup>7</sup> Report Comm. Fisheries, 1918: 16.

<sup>8</sup> H. I. Battle, et al., *Jour. Fisheries Res. Board Can.*, 2: 403, 1936.

<sup>9</sup> Report Comm. Fisher., 1916: 30; 1917; 1918: 16; 1919; 1920: 49.

<sup>10</sup> A. L. Pritchard, *Jour. Fisheries Res. Board Can.*, 4: 149, 1938.

<sup>11</sup> Prop. Dist. Food Fishes, App. Report Comm. Fisher., 1922: 56; 1924: 409; 1926: 359.

<sup>2</sup> P. R. Needham, "Trout Streams," p. 15. 1938.

<sup>3</sup> J. R. Dymond, J. L. Hart and A. L. Pritchard, *Univ. Toronto Stud. Biol. Ser.*, 33: 15, 1929.

<sup>4</sup> "Report Fish-Breed. Dom. Can.," 1885: 28, 1886; 1893: 335, 1894.

<sup>5</sup> A. A. Blair, *Copeia*, 1938 (4): 206, 1938.

<sup>6</sup> Report Comm. Fisheries, 1906; 1907; 1908.

attain success it would seem desirable (1) to study carefully the factors limiting the survival of a particular species of Pacific salmon, (2) to select an Atlantic stream furnishing the most suitable conditions and (3) to concentrate on that stream attempts at transplanation of the species, closely following the outcome.

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UNIVERSITY OF TORONTO

### GLAUCONITE PSEUDOMORPHS AFTER OPHIURAN PLATES

MUCH has been written as to the origin of glauconite and it is not the author's intention to discuss the validity of these writings or to propose a new theory, but rather to record a new form in which this mineral is found.

The material which contained this glauconite is part of a collection made through the use of a grant from the American Academy of Arts and Sciences. The material was collected by the author on December 28, 1938 in a small stream valley just south of State Route number 44 at a point 3.3 miles east of Grove Hill, Clarke Co., Ala. The exposure consisted of a hard grayish clay which contained a number of *Scutella* sp. and large shark teeth. The age is Upper Eocene, Jackson formation. The author is also indebted to the Marsh Fund of the National Academy of Sciences for a grant which was used in washing and separating this and other Tertiary samples, from the Coastal Plain. The material upon washing proved to contain a great number of disarticulated Ophiuran plates, a great deal of glauconite and some foraminifera. The glauconite was removed from the calcareous material by an electric magnet, and from the former the pseudomorphs were picked by hand.

These pseudomorphs are of a slightly lighter shade of green than the rest of the associated glauconite grains. Their surface is smooth and not foliated or botryoidal as is customary, there being, however, several instances where the surface is cracked. Only pseudomorphs after the lateral arm plates of the Ophiurans were found preserved in this condition. None of the other twenty odd different types of plates was apparently affected or if they were their original shape had been so altered as to be unrecognizable. The lateral arm plates are much thicker than the majority of other plates and also a great deal more numerous. There are 3,682 of one type of lateral arm plate from this locality, which do not show any alteration, indicating that this type of preservation is rare and confined to the most common of all the plates.

The present-day accepted theory as to the origin of glauconite is that it is an alteration of biotite under

certain conditions. Undoubtedly this is true in most cases for the foliated structure of many of the glauconite grains clearly shows this affinity. But does this theory hold for all grains of glauconite? When biotite alters to glauconite there is an expansion which takes place perpendicularly to the biotite cleavage.<sup>1</sup> If such expansion had taken place in these Ophiuran plates why were not their original shapes and proportions distorted? However, in no case was there any evidence of such distortion. This lack of foliation and accompanying distortion seems to indicate a somewhat different origin for the glauconite pseudomorphs in this individual case.

In order to see if the original reticulate structure of the Ophiuran plates had been retained after alteration several sections were ground and these sections showed that the original structure had been retained.

The material from this one locality in Alabama is the only instance which the author has observed where Ophiuran plates were replaced by glauconite. The identification of these lateral arm plates has not been worked out as yet beyond the fact that they belong to the genus *Ophiura*.

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### BOG LEVELS<sup>1</sup>

ALTHOUGH it is well known that there is fluctuation in the levels at the edge of bog mats, finding the forested bog mat riding the crest of seasonal waves appears quite intriguing to the author and seems to be worthy of notation.

For a number of years ecological work has been carried on in the Mud Lake Bog in Cheboygan County in northern lower Michigan. In 1922 this work included the determining of the profile of the bottom of the bog. Underneath the forested mat east of the lake, a considerable area of the sandy bottom was flat and equidistant (10.5 feet) from the surface. In subsequent years, determinations of the depth to the sandy bottom were made in the same part of this area. Previous to 1928 the layers to sand included the mat (*Sphagnum* and *Chamaedaphne* growing among *Picea mariana*, black spruce), below which was a layer of disintegrating plant parts, and below this a layer of brown peat, becoming firmer and blacker as the borer went lower. From 4 to 6 inches of blue clay filled with shells of Pleistocene age rested on the flat sand bottom.

Up through 1927 borings on this area gave the same depth to bottom. In 1928, however, following unprecedented heavy snow, it was discovered that it was a greater distance to the sandy layer than had previously

<sup>1</sup> E. W. Galliher, *Geol. Soc. Amer. Bull.*, 46: 1356, 1939.

<sup>2</sup> Contribution No. 402, Department of Botany and Plant Pathology, Kansas State College, Manhattan, Kansas and U. of Mich. Biological Sta.