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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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 intebted 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.[1] 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[1]

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

[1] E. W. Galliher, *Geol. Soc. Amer. Bull.*, 46: 1356, 1939.

[1] Contribution No. 402, Department of Botany and Plant Pathology, Kansas State College, Manhattan, Kansas and U. of Mich. Biological Sta.