

showed the value of inferences drawn from homology.

The writer now desires to make one other prediction concerning a possible relationship, and the character of a form yet to be discovered, in which both analogy and homology have been employed.

In his paper on "Cultures of Uredinæ" in 1908 Dr. J. C. Arthur reports the establishment of a relationship between *Æcidium Blasdaleanum* and *Gymnosporangium Libocedri*. As explained there *A. Blasdaleanum* is morphologically unlike the other *Ræstelii*, having instead, characters like the ordinary æcial forms of *Puccinia* and *Uromyces*. However, it inhabits hosts belonging to the apple family, the hawthorn and service-berry, and these cultures show that it is undoubtedly genetically connected with a cedar-rust. There is, in the Pacific coast region, another æcial form of the same type, on members of the apple family, *Æcidium Sorbi* on the mountain ash and crab-apple. Although *Æcidium Sorbi* is of the same general type as *A. Blasdaleanum*, it has some very pronounced characters which show that it is specifically different. There is in the whole Pacific slope region at present no known *Gymnosporangium* except *G. Libocedri* and it is at once apparent that the telial stage of *A. Sorbi* is still to be discovered. There is, however, within this range a cedar-rust in the form of *Uredo Nootkatensis* on *Chamæcyparis Nootkatensis*, the yellow cedar, from Alaska. That *Uredo Nootkatensis* is the uredinial stage of a *Gymnosporangium*, which has in its life-cycle an æcial stage on hosts belonging to the apple family, has been previously suggested.⁴ The basis for such an argument has been furnished by the elucidating researches of Dr. Arthur of which his new classification⁵ of the Uredinales is the result. From this work it appears justifiable to assume that the pro-

duction of all four spore-forms, pycnia, æcia, uredinia and telia, was doubtless the early condition in evolution, and that the suppression of one or more of these forms is a result of later influences. In most of the groups or tribes this four-spored condition not only still persists but usually the larger number of species belong in that class. Arguing from this point of view Dr. Arthur has predicted that sooner or later a *Gymnosporangium* ought to be discovered which would possess uredinia, *i. e.*, have all four spore-forms. Since the uredinial stage is unknown in any of the true *Gymnosporangium-Ræstelia* combinations it seems probable that if it exists at all it is likely to be in a species which has an æcial form like that of the species of *Puccinia* which ordinarily possess uredinia. With the above ideas as a basis the writer suggests the possibility of a relationship between the cedar-rust, *Uredo Nootkatensis* and *Æcidium Sorbi* on the mountain ash and crab-apple. Baranoff Island, Alaska, is the type locality of the *Uredo*; *Æcidium Sorbi* has also been collected on the same island, an item from geographical distribution which lends further support to the supposition. Arguing from a comparison with *G. Libocedri*, the only cedar-rust known to have the puccinia-type of æcia, the new telial stage should be foliicolous and have spores two or three times septate. If the above contention is true it may well be asked why *G. Libocedri* should not have a uredinial stage if there is anything in analogy. The answer is that it probably does but that it is unknown because no well-directed attempt has yet been made to collect it.

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THE MIOCENE HORIZONS AT PORTERS LANDING,
GEORGIA¹

THE following section of the exposure at Porters Landing is adapted from the description of it given by Mr. Earle Sloan in his "Catalogue of the Mineral Localities of South Carolina," page 273.

¹ Published by permission of the Director of the United States Geological Survey.

⁴ *Bull. Torrey Botan. Club*, 35: 501-502, 1908.

⁵ "Eine auf die Structur und Entwicklungsgeschichte begründete Klassifikation der Uredineen," *Résult. Sci. Congr. Bot. Vienne*, 331-348, 1906, and "Reasons for Desiring a better Classification of the Uredinales," *Jour. Myc.*, 12: 149-154, 1906.

	Feet
6. Pleistocene—white, red and yellow sands, with phosphatic pebbles and vertebrate fragments at the base	64
5. Miocene—compact, yellow, fossiliferous marl (Duplin horizon)	6
4. Miocene—grayish, fossiliferous marl (Marks Head marl)	29
3. Fine-grained, laminated shale with sandy partings, a line of rounded pebbles at the base	14
2. Oligocene—fossiliferous marl (Alum Bluff formation)	½
1. Laminated, drab shale with arenaceous partings	8
Total	111½

Recent collections made at Porters Landing have rendered possible definite correlation of the two Miocene horizons with those of the areas further north. From bed no. 5 of the section 34 identified species were obtained, 30 of which also occur in the Duplin marl of North Carolina. The four species which have not as yet been reported from there occur in other localities in horizons the stratigraphic equivalent of the Duplin, or in deposits of later age. Bed no. 5, therefore, can be definitely correlated with the Duplin marl of North Carolina and the fossiliferous Miocene marls of Darlington and Mayesville, South Carolina.

The Marks Head marl, which was first named by Sloan, and is represented by bed No. 4 of the section, contains specimens of the genus *Carolia* which suggests an Oligocene age, but every other identifiable species may be Miocene, and only three of them range downward into the Oligocene. Nine of the species are not known below the Miocene, and of these nine, six are confined to the Miocene. The horizon is, therefore, Miocene, while the presence of *Turritella æquistriata* Conrad, *Calliostoma aphelium* Dall, *Ostrea mauricensis* Gabb, and *Pecten marylandicus* Wagner, definitely point to a horizon low in the series, approximately equivalent to the Calvert formation of Maryland.

The recognition of the stratigraphic position of this horizon is of importance, as it is

the only low Miocene horizon known south of Virginia. Further south in Florida, along the western extension, on the Ocklockonee and Apalachicola rivers, the Miocene rests upon the eroded surface of the upper Oligocene. The Miocene deposits of these localities represent a horizon high in the series. Therefore, the Marks Head Miocene is the equivalent in part to the erosion interval between the upper Oligocene and the Miocene of western Florida.

Bed no. 2 of the section at Porters Landing contains fossils indicative of an upper Oligocene age. Bed no. 3 is very likely of Miocene age, and the line of rounded pebbles at the base suggests that the Miocene may rest upon the eroded surface of the upper Oligocene. It seems probable that along the Savannah River an erosion interval occurred between Oligocene and Miocene depositions, but the interval was of shorter duration than in western Florida.

T. WAYLAND VAUGHAN

THE AMERICAN SOCIETY OF ZOOLOGISTS CENTRAL BRANCH

THE annual meeting of the American Society of Zoologists, Central Branch, was held in the splendid new Natural Science Hall of the University of Iowa, Iowa City, on April 7, 8 and 9, 1910, Dean Edward A. Birge, of the University of Wisconsin, presiding. Thirty zoologists of the central states registered.

Resolutions relating to the International Commission on Nomenclature similar to those adopted by the Eastern Branch at the December meeting were passed, and the following zoologists were appointed as a committee to cooperate with the International Commission: C. C. Nutting, C. H. Eigenmann, C. A. Kofoid, H. B. Ward, S. W. Williston.

Officers for the ensuing year were chosen as follows:

President—C. E. McClung, University of Kansas.

Vice-president—H. F. Nachtrieb, University of Minnesota.

Secretary-Treasurer—H. V. Neal, Knox College.

Executive Committee—R. H. Walcott, University of Nebraska, W. C. Curtis, University of Missouri, Oscar Riddle, University of Chicago.

The following, having received the votes of the