ly resembles in form, it is at once distinguished by the very heavy columellar callus and the small umbilical chink, depressus having only a thin wash of callus and being distinctly umbilicated.

BOSTON MALACOLOGICAL CLUB

The Boston Malacological Club has held its regular meetings during the past season, on the first Tuesday evening of each month, from October to May, inclusive. These have been held in the Library of the Boston Society of Natural History, with the exception of the Annual Meeting, on May 3rd, when the members of the Club were the guests of the retiring president, Mr. Arthur F. Gray and Mrs. Gray, at their home in Watertown, Mass.

The meetings have been well attended; the membership list, now numbering forty-two, has been increased by the addition of four new names; and at the April meeting it was voted to create a class of Honorary Membership, the number to be limited to five.

Dr. Henry A. Pilsbry of Philadelphia, Pa., Dr. Bryant Walker of Detroit, Michigan, and Mr. J. W. Taylor of Leeds, England, were elected to Honorary membership.

The Club this year decided to take up a family of shells, at each meeting, for discussion and examination, the evenings assuming the character of a Symposium, with short talks by several of the members, covering the nomenclature, classification, geographical distribution, habits and characteristics of the family, with a comparison of fossil and living forms.

Much interest was added by the large number of species from the Natural History Society's study collections, shown at the meetings through the kindness of Mr. Charles W. Johnson, and by specimens from the private collections of the members.

The families discussed were the Strombidae, Cypraeidae,

Conidae, Muricidae, Cardiidae and on one evening "Sinistral Shells". At the January meeting, the Club listened to a talk by Mr. William J. Clench, of the University Museum at Harvard, on "Collecting in the Southeastern States", in which he told of collecting-trips undertaken in the interest of the University of Michigan, in the summers of 1923, 1924 and 1925.

The first of the trips covered 3700 miles by motor, and lasted twelve weeks, the other two being shorter. The ground visited included parts of Michigan, Ohio, Indiana, Arkansas, Tennessee, Missouri, Alabama, Mississippi, and Florida, the sea-coast being touched at one point in the last-named state. The collecting proved excellent, an enormous number of both species and specimens being gathered, including varieties of *Io,* and one specimen of the rare *Polygyra chilhoweensis* (Lewis), which was found by Mr. Remington, who was Mr. Clench's companion on the trips.

A set of lantern slides showed many of the southern lakes and rivers, including the famous Suwanee River. Pictures of the expedition buried to the hubs in sand or mud, or showing the joys of piloting a motor heavily laden with camping and collecting equipment, where often the only "road" is the bed of a creek, and the only "bridge" a ford where the motor must plunge into the stream, to splash across as best it may, made Mr. Clench's audience realize that such trips call for much patience and resourcefulness, in addition to an enthusiasm for mollusks.

A paper of especial interest was read before the Club at its March meeting, by Mr. Francis N. Balch, on "Symbiosis in an Undescribed Bermuda Nudibranch."

Mr. Balch began by saying that he had various unrelated questions to bring up, concerning nudibranchs in general, and this one in particular, and that we might imagine ourselves gathered together in a laboratory, where, having run across this interesting creature, we could discuss the questions which it suggested.

He defined the term symbiosis, in its restricted sense, as the living together, in one organism, of vegetable cells

(usually algae) and cells which are either animal or else fungus cells, which in their physiology resemble animal cells, saying that the nudibranch is one of the highest forms of animal life in which true symbiosis occurs, as far as is now known.

On the blackboard was a series of beautiful outline drawings—the work of Mrs. Balch—showing the varying types of breathing-apparatus of different species of molluscs, including nudibranchs, and on colored lantern-slides were enlarged figures of the special form in question, which, only seven millimeters in length, was found by Mr. Balch under the roots of a gorgonian.

The alga, or vegetable denizen of this tiny creature, appeared as a sort of intricate border along each side, somewhat resembling the borings of a worm: in places, near the surface, and at others going deeper in, one part crossing another at a different level, while above waved a row of frond-like cerata, through which the animal is commonly supposed to breathe, although upon this, the speaker cast some doubt.

The algal growth was found, under the microscope, to be formed of masses of minute spherical cells, containing oil-globules, and the question was discussed as to its use in the animal, it being thought that it might possibly act as a reserve supply of food in case of need. The commonly received explanation, however, is that since the vegetable cell gives off oxygen, and utilizes carbon dioxide, while the animal or fungus cell does exactly the reverse, the two benefit mutually by an exchange of these gases. If this is the true explanation, the vegetable cell may be said to perform for the animal organization, in some sort, the function of an auxiliary breathing apparatus.

The speaker mentioned, as of special interest, that, at the time this Bermuda symbiotic nudibranch was found, symbiosis had nowhere been discovered in the mollusca, but that at about the same time, Sir Charles Eliot found a very similar symbiosis in another nudibranch.

Mr. Balch emphasized the fact that both these symbiotic

nudibranchs belonged to a very ancient group, in which the typical molluscan breathing apparatus, the ctenidium, had been lost, and not as yet replaced by any stable or apparently efficient new breathing apparatus; and he suggested that it might be more than a coincidence that algal cells, producing oxygen, were found symbiotic among the mollusca only in these two forms belonging to a group which perhaps lacks effective oxygenating apparatus of its own.

The genus to which the Bermuda form belongs (Tritoniella) was believed to be undescribed at the time it was discovered by Mr. Balch, but it afterward appeared that Sir Charles Eliot had found the same genus at Gough's Island, a lonely islet lying south and slightly east of the Cape of Good Hope; hence the other side of the Equator, and the other side of the Atlantic from Bermuda.

This genus also belongs to the ancient and primitive group before referred to, which has many representatives in the Old World and in the Pacific; but which hitherto has been unknown in the Western Atlantic, excepting for one representative in the Falkland Islands and one somewhat doubtful form from Brazil. In closing, the speaker touched upon the problems of zoö-geographical distribution suggested by these facts.

The Club brought its present season of activities to a close on May 28th, when its Annual Field Day was held; Scituate, Mass., being the spot selected, the members convening early in the afternoon, when the tide served for collecting on the beach, the rocks and the flats. Living specimens of *Zirfaea crispata* L. were found in large numbers.

The present officers are: President Mr. Wm. J. Clench, Vice-president Rev. Oliver P. Emerson, Secretary-Treasurer Miss Theodora Willard, Executive committee Mrs. Franklin D. Williams and Dr. Austin W. Cheever.

THEODORA WILLARD, *Secretary.*