

surface of the dish in which the eggs were fertilized. The larvæ thus collected are placed in an aquarium of fresh sea water. At the same time there are also added a dozen or more pipettefuls of the *surface* sand from an aquarium containing a culture of diatoms. (Prepared by putting a liter or more of sand, dredged from the ocean bottom, in an aquarium of sea water and allowing to stand several days.) The jar thus stocked is now covered and set before a window, where it is well, but indirectly, lighted.

The diatoms keep the water *pure* and furnish an abundant supply of the *natural food* of the larvæ, and, because of the balance established in the aquarium between animal and vegetable life, the supply of *oxygen* is kept constant and there is no need for frequent changes of water. The larvæ are thus protected from the destructive effects of *rapid changes in temperature* produced when fresh ocean water is added to that which has stood in the house.

A number of spatangoids and sand-dollars, which had just completed their metamorphosis on September 22, have been kept in a healthy and growing condition to the present time (January 1) in such a diatom-stocked aquarium holding one liter. The water has been changed twice during the three months in order to replace the salts used by the diatoms and echinoderms.

*Abnormalities in Development of Hybrid Fishes:* W. J. MONKHAUS. (Read by title only.)

*On the Genera of the Hydracarina:* ROBT. H. WOLCOTT.

However much we may pride ourselves on the naturalness of our present classification, it nevertheless must be admitted that it is a purely artificial device. Thus it seems legitimate to make use of every modification, however artificial it may be,

which increases its serviceability without at the same time doing violence to any of our accepted ideas concerning phylogenetic relationships. In the characterization of various groups, of higher or lower rank, authors have made use frequently of characters so dissimilar as to make it difficult to compare the descriptions or to reduce them to such form as to make them serviceable in a general treatment of the subject. If, in any group, characters can be found which are of family value, others which are generic, and still others clearly specific, while all other variations can be recognized as within the limits of specific variation, systematic work in the group will be greatly facilitated by the recognition of the fact and a clear definition of the value of each factor. It is evident that for each collection of forms that may be treated together in this manner, however many may be thus included, characters will be found which are peculiar to those forms and other characters must be found for any other similar collection. It is also evident that any character which would otherwise be of a given value may, if greatly developed, have its value so increased as to become a character of the rank next above, especially if accompanied by other characters of the higher rank. If this development stand alone it is better to consider it in the line of aberrancy within the lower group. It is further desirable, as soon as these characters may be determined upon for any group, that for the subdivisions of that group diagnoses be formulated which shall bring these characters sharply into contrast; and in the interest of accuracy it is desirable that each of these diagnoses should contain in the briefest possible form a statement concerning all the characters belonging to a subdivision of that rank. Furthermore, for each group a type should be selected in accordance with

the recognized rules of priority. When for any group such diagnoses of the different subdivisions shall have been published, and, after discussion, so modified as to be acceptable to the majority of students of the group, forms subsequently described should be accompanied by similar diagnoses and similar designations of a type which will render them strictly comparable to forms already known.

The Hydracarina form a sharply limited and very homogeneous group in which the application of such a scheme as proposed above seems practicable. Accordingly, it is suggested here, and in the complete paper it is expected that there will be given for each family and genus: first, the name having priority; second the author of the same, together with the date and exact reference; third, a diagnosis in Latin and English; fourth, the type, with reference to the author and exact date, together with the reasons for selection of the same.

*Southeastern United States as a Center of Geographical Distribution of Fauna and Flora:* CHARLES C. ADAMS. (Read by title only.)

In general the geographical relationship of the fauna and flora of the northern United States, east of the Great Plains, is with that of the Southeast, and points to an origin in that direction, except in the case of the distinctly boreal forms. The abundance and diversity of life in the Southeast indicate that it has been, and now is, a center of dispersal. The relicts indicate that it has been a center of preservation of ancient types, and the endemism shows that it has been a center of origin of types. There are two distinct southern centers of dispersal in temperate United States, one in the moist Southeast and the other in the arid Southwest. Nine criteria, aside from fossil evidence, are recognized for determining the

center of origin or the locality of dispersal: (1) Location of the greatest differentiation of a type; (2) location of dominance or great abundance of individuals; (3) location of synthetic or closely related forms; (4) location of maximum size of individuals; (5) location of greatest productiveness and its stability, in crops; (6) continuity and convergence of lines of dispersal; (7) location of least dependence upon a restricted habitat; (8) continuity and directness of individual variations or modifications radiating from the center of origin along the highways of dispersal; (9) direction indicated by biogeographical affinities and (10) annual migration routes in birds. There are three primary outlets of dispersal from the Southeast: (1) The Mississippi Valley and its tributaries; (2) the Coastal Plain, and (3) the Appalachian Mountains and adjacent plateaus. The first two have also functioned for tropical types and the third for boreal forms. Dispersal is both forward and backward along these highways. It is desirable to study individual variation of animals and plants along their lines of dispersal and divergence from the center of origin, in such characters as size, productiveness, continuity of variation, color variation, and changes of habit and habitats. Life areas should be studied as centers of dispersal and origin and hence dynamically and genetically.

*Description of Cephalogonimus vesicaudus, sp. nov.:* W. S. NICKERSON. (Read by title only.)

*Fresh Water Polychæta:* H. P. JOHNSON.

*The Lateral Line System of Polyodon spathula:* HENRY F. NACHTRIEB.

The paper considered only the general anatomical features of the lateral line of *Polyodon*. In general the systems of the