gained 1.29 grams daily on a food intake of 5.81 grams per day. Finally, in a thirty-five-day period in which it received nor-leucine as a supplement, its average daily gain was .07 gram and its daily food consumption 4.94 grams. While it may be quite probable that the increased rate of growth in the second period, as well as the increased food consumption, was due to the fact that lysine, but not nor-leucine, supplemented the gliadin in metabolism, this can not be considered a demonstration until the rates of growth on 5.81 grams (or some equivalent amount) daily of the basal ration and of the basal ration plus nor-leucine have been determined. With Rat 6, the difference in supplementing value of lysine and nor-leucine is more clearly shown, because with lysine an average daily gain of 1.19 grams was secured and with nor-leucine one of only .06 grams on food intakes practically identical, *i.e.*, 5.90 and 5.86 grams daily. In the case of comparing the results on the same animal in successive periods, it is undoubtedly better to equate the food intakes not absolutely, but in proportion to body weight, and, as Lewis and Root observe, such an equating of food intakes in the lysine and nor-leucine periods actually resulted in most cases without deliberate control. As a general plan, however, how much better it would be to assure by deliberate control, rather than to leave to chance, such an essential requisite of effective experimentation!

H. H. MITCHELL

DIVISION OF ANIMAL NUTRITION,
UNIVERSITY OF ILLINOIS

AMOEBA DOFLEINI (NERESHEIMER) VS. MAYORELLA BIGEMMA (SCHAEFFER) A CASE OF SYNONYMY

E. NERESHEIMER (05)[1] described and fully illustrated a rhizopod to which he gave the name Amoeba dofleini. This description agrees in all the essential details with the diagnostic characteristics of a rhizopod described by Schaeffer (18),[2] as a new species under the name of *Amoeba bigemma,* which was afterwards changed by him (26)[3] to Mayorella bigemma.

[1] Neresheimer, E., 1905, "Über vegetative Kernveränderungen bei *Amoeba Dofleini* nov. sp. Arch. fur Protist," Bd. 6, S. 147–165.

[2] Schaeffer, A. A., 1918, "Three New Species of Amebas: *Amoeba bigemma* nov. spec., *Pelomyxa lentissima* nov. spec., and *P. schiedti* nov. spec.," Trans. Am. Mic. Soc., Vol. 37, pp. 1–18.

[3] Schaeffer, A. A., 1926, "Taxonomy of the Amebas," Carneg. Inst. of Washington, Vol. 24, pp. 1–116.

Schaeffer, of course, before publishing his description, made a survey of the literature and for sufficiently good reasons was unable to reconcile the descriptions of Mereschkowsky (79), Parona (83), Fromentel (74) and others with the rhizopods he described, although with respect to Doflein (07), he says, (26), p. 56, "Doflein's figures as to the character of the pseudopods, the size, etc., of the body, agree closely with the amoeba I described, Schaeffer (18), under the name *bigemma.* . . . Consequently I incline to think that Doflein worked with *bigemma.* . . ." Since Schaeffer does not quote Neresheimer I presume he has merely overlooked his work. As stated above Neresheimer published his work in 1905, and, as the name of his animal signifies, it was named after Doflein, with whom Neresheimer worked. Doflein published his investigation on *Amoeba verspertilio* (Penard), the animal Schaeffer thinks is his *bigemma,* in 1907, two years later. This means that Doflein regarded the rhizopod that he worked on as distinct from the one that Neresheimer dealt with, for he must certainly have been familiar with Neresheimer's animals. If this is correct, then it seems that Schaeffer is possibly at error in thinking that his animals are the same as those of Doflein, provided the evidence given below is sufficient.

Neresheimer's description of the outstanding characteristics of Amoeba dofleini follows in roman type and Schaeffer's diagnosis of *Mayorella bigemma* in italics.

Size: 80–150 microns (the larger size more prevalent).
100–300 microns in locomotion.

Form: Assumed wide changeability of form.
Very changeable.

Pseudopods: Broad, short, broken sac-like pseudopods barely extended from the body.
Numerous, tapering, blunt, never with sharp points.

Surface: Without the characteristic ectosarc folds of *A. verucosa.*
Smooth, no fine folds or ridges.

Endoplasm: Contains bar and rarely dumb-bell-shaped crystals from which hang little spheres.
Usually containing numerous small twin crystals: crystals attached to "excretion spheres."

Movement: Lively, brisk.
Rapid, about 125 microns per minute.

Nucleus: A round or oval vesicle, 20 microns in diameter, firm bodies in the form of little masses gathered together around the periphery of the karyosome.
Single, round or slightly oval, about 12 microns in diameter (sometimes as large as 28 microns), chromatin in small masses clumped loosely together in the center of the nucleus in a nearly spherical mass about 6.5 microns in diameter.

Contractile vacuoles: One for the most part occurs, sometimes two or three which flow together before systole.

Small, about 15 microns in diameter; numerous, no coalescence among them; systole slow.

Endoplasm: Permeated with a large number of larger and smaller vacuoles.

Filled with small vacuoles.

Food: Alga filaments, flagellates, nematodes, rotifers and small amoeba.

Flagellates, ciliates, diatoms, rhizopods, nematodes, vegetal tissue, etc.

The only difference of considerable value between the two descriptions lies in Neresheimer's assertion that the contractile vacuoles coalesce before systole, whereas Schaeffer maintains that he has observed vacuoles remain in contact for a minute or more with no coalescence. The descriptions agree so closely that it seems that the two men were describing the same species. This contention is supported by the fact that both Schaeffer and Neresheimer found optically active crystals attached to spheres, and further Schaeffer (18), p. 10, says, "Altogether, the crystals form the most definite specific character of this amoeba, and the presence of such crystals attached to spheres in an amoeba may be regarded as definitely proving its specific identity."

If it is actually true that these authors did describe the same species, as appears to be the case, then according to the recent amendments to the International Rules of Zoological Nomenclature,[4] adopted in 1927, the name of the rhizopod should be *Amoeba dofleini.*

PERCY L. JOHNSON
THE JOHNS HOPKINS UNIVERSITY

DEVONIAN CONCRETIONS OF WESTERN AND CENTRAL NEW YORK

IN studying the stratigraphy of the Devonian, one is impressed with the common occurring concretion.

These peculiar formations, invariably built around a nucleus, may be composed of mud, limestone and even marcasite. The last is of diagenetic origin and is by far the most interesting, from the standpoint of the flora and fauna around which it has formed. As to size, Devonian concretions may range from a few feet in diameter to mere nodules. Their structure usually varies with their composition. Certain upper Devonian concretions possessing the peculiar cone-in-cone structure, for which no explanation has as yet been offered, to the characteristic radial form of marcasite. Again, the larger concretions may be grooved, these cracks being filled with extraneous material, thus giving the appearance of a turtle's shell. Other nodules, as those from the Genundewa limestone, are of even texture, composed entirely of *Styliolina fissurella,* surrounding the nucleus.

To the paleontologist, the flora and fauna that form the basis of most concretions, especially marcasite, offer a fascinating study. In the marcasite nodules, the iron pyrite has replaced the organic, as the case may be, by its silver-white metal. When broken open, the metal quickly tarnishes upon exposure to air, and in a short space of a few weeks will disintegrate. The nuclei can be preserved by immersion in kerosene or by covering with balsam.

The following invertebrate forms have been found in Devonian marcasite: *Phacops rana,* trilobite. Goniatites are quite common, especially *Manticoceras intumescens.* An orthoceras, plus many gastropods and pelecypods, have been found. The latter forms can not very well be identified, owing to the peculiar metallic replacement. As to plant remains, only one specimen has been found in marcasite, probably of the genus *Callixylon.*

The larger mud concretions and "turtle backs" are invariably duds. Though goniatites are frequently found in these freaks of nature, they are not as well defined as their much reduced relative in marcasite.

The type locality for Devonian concretions is the already famous Eighteen Mile Creek, Erie County, New York.

A. EMIL ALEXANDER
CORNELL UNIVERSITY

DIVING EXPERIMENT AT THE UNIVERSITY OF MIAMI

STUDENTS of the general zoology and field zoology classes of the University of Miami were recently introduced to what the writer believes is an entirely new feature in university teaching, when they were given the opportunity to enter the waters of the Atlantic Ocean clad in bathing suits and diving helmets to study the animals living there.

Thirty-three students were taken on the "See-Bottom-Boat," with a movable glass window, making regular trips to the marine gardens beyond Biscayne Bay near Soldier Key, about fifteen miles southeast of Miami. Mr. W. F. Miller, of Miller-Dunn Company, manufacturers of the Miller-Dunn "Divinhood," loaned four helmets for the occasion and following the regular trip over the gardens, the boat was anchored and the students entered the water with the writer in groups of three. The helmet is so easily handled and so simple to operate that thirteen students were enabled to descend to the ocean floor in twenty feet of water and walk about, studying corals, sponges, echinoderms and fishes. No student had used these helmets before and several were unable to

[4] Stiles, C. W., 1928, "Amendments to the International Rules of Zoological Nomenclature," SCIENCE, Vol. 67, pp. 17–18.