

will have had opportunities for pursuing their studies hitherto unattainable. The material to be obtained at Newport is abundant. The dredging is fair and not difficult, as the depth in the immediate neighbourhood does not exceed twenty to thirty fathoms. The pelagic fauna, however, is the most abundant. During the course of each summer, by the use of the dip-net, representatives of all the more interesting marine forms are sure to be found. With my small steam launch a large space can always be traversed any evening and advantage taken of the condition of the wind and tide, the launch being amply large for easy dredging in the moderate depths of the entrance of Narragansett Bay. The laboratory is placed on a point at the entrance of Newport Harbour, past which sweeps the body of water brought by each tide into Narragansett Bay and carrying with it everything which the prevailing south-westerly winds drive before it. Newport Island and the neighbouring shores form the only rocky district in the long stretch of sandy beaches extending southward from Cape Cod—an oasis, as it were, for the abundant development of marine life along its shores.

#### BIOLOGICAL NOTES

**CASPIAN SEA ALGÆ.**—Herr A. Grunow has quite recently published a detailed catalogue of a collection of algæ, made by himself at Baku and Krasnowodsk, on the Caspian, and also of some collections made by his friend Czermak in Baku Bay and by Thieme in Krasnowodsk Gulf, in addition some specimens preserved in spirits were given him by Dr. Schneider. Excluding the diatoms only eleven species are alluded to, and but two (*Cladophora*) appear as new. Of the diatoms there is a goodly list. Many of the species of these diatoms appear to occur everywhere. Go where one will, they are to be found, and what a marvellous geographical distribution!—Baku on the Caspian, St. Paul's Island in the Southern Ocean, and then the Frith of Clyde, or the mouth of the Thames. Two beautiful plates representing the new species of diatoms accompany the paper. Many of the species are marine forms.

**NATURAL HISTORY OF THE CAUCASUS.**—A very important contribution to the natural history of this region has been made by Dr. Oscar Schneider based on collections made by himself during a summer spent there in 1875. The series of memoirs before us, edited by Dr. O. Schneider, has been reprinted from the *Journal* of the "Isis" Society of Dresden, and consists of an account of the mollusca, by the editor; the arachnoids, by Dr. L. Koch, many new species are figured; the hemiptera, by Dr. G. v. Horvath; the algæ, by Dr. A. Grunow, a memoir we have already noticed; the minerals, by Dr. A. Frenzel; the rocks, by Dr. Moehl; the fossils, by Dr. Geinitz. These reprints form a small volume of 160 pages with five plates.

**ON SPROUTING IN ISOETES.**—K. Goebel records in some detail and with illustrative figures the fact that he has found buds developed from the base of the leaves below the lingule in *Isoetes lacustris*. The specimens were collected in Longemer Lake in the Vosges, and the discovery was made during an investigation into the embryology of both *I. lacustris* and *I. echinospora*. The examples in question showed neither macro- nor micro-sporangia, but in their place were found on the leaves little *Isoetes* plants. The first appearance of the buds was under the lingule in the furrow of the still young leaves. A pretty compact swelling made its appearance on the under half of the glossopodium. This swelling was the commencement of a conical protrusion of the cellular tissue, in which a side cell did not take any leading part; later on this swelling appeared to be more rounded off; the stages between this and that in which one to two leaves were found, was not specially observed. A section through the young bud shows that the median

plane of the young leaves is precisely that of the mother leaves, and they lie so tightly packed together that the lingule of the first new leaf is parallel with the surface of the mother leaf. The root formation of these buds appears to be quite normal. Some of the leaves only gave rise to these buds. The author thinks this is an instance of De Bary's apogamy. Interesting and novel as these observations of Goebel are, they yet leave a good deal to be desired (*Bot. Zeitung*, i., 1879).

**THE BRITTLE STARS OF THE Challenger.**—In order that persons who are interested in echinoderms may get early information, and to secure a just priority of discovery to the *Challenger* expedition, Mr. Th. Lyman has just published, as No. 7, vol. v. of the *Bulletin* of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass., a Part I. of a catalogue of the new species found, which contains brief diagnoses, with figures, of the more essential parts of no less than thirteen new genera, and ninety-six new species of Ophiuroids. Part II. will contain some remaining species of the family Ophiuridæ, and those of Astrophytidæ. All matter beyond the mere necessary description is reserved for the volume to be devoted to this group, and which is to be brought out by the British government under the general superintendence of Prof. Sir Wyville Thomson.

**SPINES OF ECHINI.**—The last published part of the *Transactions* of the Royal Irish Academy (vol. xxvi., Science, part 17) contains a memoir by H. W. Mackintosh on the structure of the spines in the sub-order of the Desmosticha (Hæckel). In indicating four series into which, judging from the structure of the spines, this sub-order may be divided, the author expresses his opinion that the characters derived from the spines are just as useful as any other characters drawn from the comparison of individual parts. He finds it just as easy and as certain to recognise a Diadema, an Echinus, or an Arbacia by the structure of its spines as by the arrangement of its pores, or the disposition of its anal or genital plates. The memoir is accompanied by three plates containing twenty-seven figures, all drawn by the author with the assistance of a Wollaston's camera lucida. The figures represent transverse sections of primary inter-ambulacral spines of some twenty-six species, and have been drawn on stone by Tuffen West with great care and accuracy.

**THE FOOD OF FISHES.**—Mr. S. A. Forbes publishes a very interesting paper on the food of fishes in the *Bulletin*, No. 2, of the Illinois State Laboratory. The importance of the subject to the scientific student and to the practical fish-breeder cannot be doubted. Some valuable fishes are found dependent on food too liable to injury or destruction by man or nature to make it worth while to cultivate them, while others, equally valuable, may subsist on food absolutely indestructible. The contents of the stomachs of some fifty-four species of Illinois fish were carefully examined, and the details of the food found are in each case given. In some instances the enormous quantity of food devoured, especially in insect-feeders, is noteworthy, and much of the food consisted of land-insects which had fallen into the water, thus bringing fish and land birds into competition for food. Some of the species were herbivorous, others carnivorous, and several, such as the cat-fishes, were quite omnivorous; the dog-fish (*Amia calva*) was herbivorous, but only one small specimen was examined. The shovel-fish (*Polyodon folium*), supposed by the fishermen to live on the slime and mud of the river-bottom, was found to feed to an enormous extent on Entomostraca, and fully one-fourth of the entire food was made up of vegetable matter, algæ being largely eaten, and there was very little mud found mixed with the food. The interlacing of the gill-rakers of this species, which are very numerous and fine, and arranged in a double row on each gill arch, doubtless form a strainer which allows the passage of the fine silt of the river out with the water, but arrests everything as large as a cyclops.