

chance and calls for no other explanation. Only two localities are involved, samples 22 and 23 being from Broken Hill, N.S.W., and sample 25 from Great Bear Lake, Canada, and there would be nothing remarkable in the granitic rocks of two such areas having nearly the same uranium, thorium and lead contents. The objection raised by Jeffreys to an age near 4,000 m.y. would be valid only if Group *D* were represented by samples from many localities and still showed a small scatter. As it is, the objection has no weight. Indeed, Jeffreys himself in his final paragraph says it is quite probable "that the small scatter . . . is an accidental agreement". These reasons against the use of Group *D* in this particular method do not apply to my original treatment, because there the data for the Group *D* samples were combined, not with each other, but with those for the samples belonging to groups *E*, *F* and *G*. The method I devised is admittedly a long and tedious one, but it has the advantage of giving a most probable solution, based on all the relevant data, not only for  $t_0$ , but also for  $x_0$  and  $y_0$ . Meanwhile, I can at least agree with Jeffreys that many more isotopic analyses of old leads would be necessary to improve the estimate appreciably.

- <sup>1</sup> Jeffreys, H., *Nature*, **162**, 822 (1948).  
<sup>2</sup> Nier, A. O., *J. Amer. Chem. Soc.*, **60**, 1571 (1938). Nier, A. O., Thompson, R. W., and Murphey, B. F., *Phys. Rev.*, **60**, 112 (1941).  
<sup>3</sup> Holmes, A., *Nature*, **157**, 680 (1946).  
<sup>4</sup> Holmes, A., *Nature*, **159**, 127 (1947).  
<sup>5</sup> Holmes, A., *Geol. Mag.*, **84**, 123 (1947).  
<sup>6</sup> Holmes, A., *Endeavour*, **6**, 99 (1947).  
<sup>7</sup> Houtermans, F. G., *Z. Naturforsch.*, **2a**, 322 (1947).  
<sup>8</sup> Report of the Committee on the Measurement of Geologic Time for 1940-41, N.R.C., Washington, 59 (1941).  
<sup>9</sup> Senftle, F. E., and Keevil, N. P., *Trans. Amer. Geophys. Union*, **28**, 732 (1947).

## MARINE BIOLOGY AT PLYMOUTH

THE latest issue (vol. 27, No. 3) of the *Journal of the Marine Biological Association of the United Kingdom*, again a large publication, provides articles of interest for many tastes in marine biology. There are two papers on fisheries, five on worms, two on molluscs, one on tunicates and one on seaweeds.

Mr. G. A. Steven, writing on mackerel migrations, continues the work published by Mr. P. G. Corbin in 1947. He states the case for depth spawning in this fish, which explains the apparent anomaly that English Channel mackerel migrate *offshore* to an area west of the Scillies in spring, but North Sea mackerel move *inshore* to the deep waters off Norway. The spawning grounds are in both cases near the 100-fathom contour. After the spring spawning the shoals disperse, appear inshore round the southern coasts of Great Britain in the surface waters, and, as winter approaches, congregate on the sea floor in scattered localized areas where there are banks and gulleys.

Mr. P. G. Corbin contributes the ninth in the series "Seasonal Abundance of Young Fish" for the year 1947, and reports that the total of all species of young fish was the lowest yet recorded, "thus fully bearing out the observations of the incomplete year of 1946 and the deductions from the 1939-46 winter phosphate data".

Mr. D. P. Wilson describes the development of *Ophelia bicornis* after artificial fertilization, the first time that the larval development of any member of the family Opheliidae has been observed. Of interest is the fact that a secretion from the four anal papillae

and the parapodial lobes enables the metamorphosing larva to adhere to solid objects, such as grains of sand. Mr. Wilson considers that the development of *Ophelia* is a typical one among polychaetes; it is simple and unspecialized. In a second paper he describes experiments on the metamorphosing larva which indicate that the larva can spend several weeks searching for a suitable substratum on which to metamorphose. It prefers smooth, rounded grains of quartz, uniform in size, and will die if it cannot find conditions as near as possible to its natural habitat when adult. The stimulus to metamorphose is probably tactile, not chemical.

Miss Jean Hanson illustrates specific differences in the genera *Apomatus* and *Protula* by a study of the pattern of the superficial blood vessels on the ventral surface of the thorax, and as a result puts forward the view that *Apomatus* and *Protula* should be combined in one genus, and similarly *Salmacina* and *Filograna*; but she does not suggest which names should be retained.

A new Enchytraeid from the beaches of North Wales is described by Helge O. Backlund of Sweden. It has been named *Lumbricillus reynoldsoni* after its discoverer, Dr. T. B. Reynoldson, of Bangor.

Another little-known life-history, that of *Arenicola marina*, has been ably demonstrated by Dr. G. E. Newell. Working on the Whitstable Flats, he collected worms at weekly intervals throughout the year, and found that spawning occurred between the new and full moon in the second half of October, the maximum being at the first quarter, or neap tide. Eggs and sperms were deposited on the surface of the sand at extreme low-water as thin films and milky puddles respectively. The trochophore is demersal, hatching in four or five days after fertilization. It inhabits the *Fucus* zone, and is therefore carried inshore on the tide. Next spring, after metamorphosis, it moves down the beach, and spawns for the first time when two years old. Many worms die after spawning. Discovery of the egg film and autumn spawning settle two questions that have worried marine zoologists for many years.

Prof. C. M. Yonge continues his studies on the structure and function of the mantle cavity in the Mollusca by an account of a shallow burrowing lamellibranch, *Spisula subtruncata*, and a deep-burrowing one, *Lutraria lutraria*. In the former, which inhabits silty sand, the fourth pallial opening for the removal of waste matter from the pallial cavity, just anterior to the inhalant siphon, is provided by slight divergence mid-ventrally of the otherwise closely apposed mantle folds. Long frontal cilia on the gills and a siphonal valve on the inhalant aperture assist in the cleansing operation. In *Lutraria*, a member of the same family, there is a similar waste canal, but the long frontal cilia and siphonal valve are absent.

Dr. Vera Fretter has investigated some of the minute prosobranchs of rock pools, *Skeneopsis planorbis*, *Omalogyra atomus*, *Rissoella diaphana* and *R. opalina*. In their adaptation to a rock-pool habitat these four molluscs have become highly specialized. The ctenidium and osphradium are reduced in *Skeneopsis* and absent in the other genera, the gut is simple, and the reproductive organs are complex. *Omalogyra* and *Rissoella* are hermaphrodite. The young, hatched from egg capsules in two weeks, crawl about, become mature in six weeks, and reproduce in the same season. All are herbivorous, but assimilate only the cell contents of the plants they

consume. They anchor themselves by a mucous rope paid out from the posterior pedal gland. This is an interesting paper with handsome illustrations.

Prof. N. J. Berrill has studied two colonial ascidians, *Stolonica socialis* and *Distomus variolosus*, and as a result considers that the botryllids and the polystelid section of the Styelidæ "exhibiting palleal budding, comprise a natural group". These also are the only ascidians with a photolith, responsive both to light and gravity, in the tadpole phase. He suggests, therefore, a family Styelidæ, with sub-families Botryllinæ and Styelinæ. But the position of *Polycarpa* and other simple Styelids is still obscure.

A welcome new feature is the first of a promised series on algæ. Dr. Mary Parke, commencing with the family Laminariaceæ, writes on the growth of *Laminaria saccharina* from the Devon and Argyll coasts. Her investigations prove that the minute gametophyte is capable of reproduction throughout the year, although the bathymetric level and habitat control its fertility. Sporophytes develop at low levels in spring, summer and autumn, but at higher levels in winter, early spring, late summer and autumn. They can live three years under suitable conditions, with more rapid growth-periods in the first half of each year. The distal frond tissue is cast continuously. Sporophytes first reach maturity at the end of their first year. Dr. Parke is making a type collection of seaweeds from the Plymouth area.

That the Plymouth Laboratory is flourishing is shown by the impressive list of researches now being carried out, by the names of the distinguished visitors who come to it from all parts of the world, and, perhaps not least, by the 83,000 local visitors attracted to the aquarium. The number of members of the Association, however, shows only a slight increase, and might be augmented, with benefit both to the members and to the Laboratory.

Dr. F. S. Russell's lecture on the Plymouth Laboratory, delivered to the Royal Society in March 1947, has been reprinted in the *Journal*, and provides very interesting reading. Both it and the photographs make every marine biologist long to go down to the sea again.

N. B. EALES

## UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION\*

THE detailed report of the Director General of the United Nations Educational, Scientific and Cultural Organisation on the activities of the Organisation in 1948 could with advantage have been provided with an index, as heads under which the information is supplied—reconstruction, communications, education, cultural interchange, human and social relations, natural sciences—overlap and are not those under which information is necessarily sought. The work of the library, for example, is described under both the first two headings, while much that is of direct interest to scientific workers is scattered under other headings than that of

\* United Nations Educational, Scientific and Cultural Organisation. Report of the Director General on the Activities of the Organisation in 1948. (Unesco Publication 226.) Pp. 119. (Paris: Unesco, 1948.) 7s. net.

natural sciences. For example, the emergency action taken to deal with the needs of war-devastated countries for books, educational material, and scientific and technical equipment, including the Scientific Equipment Scheme, is described under "Reconstruction", which also records the issue of the second volume of the "Book of Needs", covering surveys mainly in South Asia and the Far East and in Malta, with an appendix including new data on needs in European countries. The international fellowship programmes are described under "Communications". Forty-eight fellowships were awarded at Mexico City in November 1947 in the following fields: science and social development; cinema and radio education; educational problems of war-affected children; librarianship; educational administration; and art and music education. Six fellowships, one in each subject, have been allocated to China, Czechoslovakia, Greece, the Netherlands, Norway, Poland, Denmark and the Philippines.

In accordance with the recommendations of a committee of nine experts from Czechoslovakia, France, the Netherlands, Sweden, the United Kingdom and the United States of America, an International Conference on Scientific Abstracting is projected for June 1949, and the International Federation for Documentation is making a survey of scientific abstracting services on behalf of Unesco. Publications exchange has also been considered, and an approach made to the delicate and complex problems of copyright. Besides the preparatory conference of representatives of universities at Utrecht last August, an interim committee has been set up to develop plans for an international association of universities and like institutions, including an International Universities Bureau. Under the museums programme, advice is being given to museums in member States on exhibitions available for international distribution and on those for which there would be an international demand if they were formed. Questions of methods in political science, the popularization of science and the social implications of science are also receiving attention, while the work of the Field Science Co-operation Offices in Rio de Janeiro, Cairo and Nanking is already proving very successful. Further reference is made to the work of the International Institute of the Hylean Amazon, and an International Conference on High Altitude Research Stations at Interlaken held during August 31–September 3 recommended the establishment by the International Council of Scientific Unions of a mixed commission to facilitate the exchange of information, and that existing high-altitude stations should be organised into a network with additional stations to be established. Besides participating in the preparations for the Scientific Conference on the Conservation and Utilization of Resources in 1949, the Organisation is convening a Technical Conference on the Protection of Nature to be held in June 1949 and has organised a European and African Technical Symposium for the preparatory study of certain regional problems.

Elsewhere, in his general survey, Dr. Huxley refers to the experimental scheme for book coupons covering six countries, to the international summer school for librarians, the creation of the Mass Communications Projects Division, to the need for careful thought on the policy of publications and sponsorship of international publishing activities, and to the importance of the population problem for the tasks of the Organisation.