

## RECENT ADVANCES IN MARINE BIOLOGY

BY DR. N. B. EALES

THE recently published Journal of the Marine Biological Association contains nineteen papers on biological subjects, and the report of the Council for the year 1938.\* The report records the bequest to the Association of £6,500, instruments, books and apparatus under the will of the late E. T. Browne. A research room has been named the Browne Memorial Room, and will contain furniture from Mr. Browne's laboratory and his valuable reference library on Coelenterata. The new constant temperature rooms are in use and other improvements have been made in the buildings, especially in accommodation for research workers.

Six papers record ecological investigations. P. Hartley gives an account of the tuck-net fishery on the fine mud of the Tamar and Lynher estuaries. The net was used at monthly intervals for two years in the Saltash area, and the estuarine fishes, their food, migration and frequency distribution are described. Most of the fish go to the sea to spawn. Collateral invasions of cormorants, jellyfish and cephalopods seriously impair the value of the fishing.

A. Milne, in the fourth of his studies on the ecology of the Tamar estuary, deals with the fauna and flora of floating buoys. Weeds attach themselves in considerable numbers and compete with mussels for a site. Sessile animals are to be expected, but isopods, amphipods, crabs, worms and echinoderms live in the crevices. As the result of permanent submergence, however, some littoral species cannot survive, for example, *Littorina littorea*. The extent of estuarine penetration was studied.

J. Colman surveyed the well-known collecting area known as Church Reef, Wembury Bay, and examined the invertebrate fauna in relation to eight species of seaweed. He records 35 animal species new to the Plymouth Fauna List, out of a total of 177. There are surprising omissions, for example, *Obelia geniculata*, Tectibranchs and Nudibranchs, and the compound Tunicates *Didemnum asperum* and *D. maculosum* on the Laminaria holdfasts. A large number of Polychaetes was found. A comparison of terrestrial and marine faunas elicits the fact that the marine fauna is the denser of the two. *Ascophyllum nodosum*, with its epiphyte *Polysiphonia lanosa*, houses the greatest number of individuals.

C. Rees studied the ecology of a mud flat in the Cardiff area, by means of horizontal and vertical samples. The microfauna and the chemical and physical factors of the water were investigated and a quantitative survey of the macro- and micro-fauna were attempted. The interactions of the observed phenomena are discussed.

H. B. Moore, in his second paper on the biology of *Littorina littorea*, made a survey of the zonation of this species in five localities in the Plymouth area and one on the island of Skye. Unable to endure constant immersion, this species has a definite lower limit; it does not extend below low-water springs and is most abundant at mean low water of the neap tides. The upper limit varies with the locality and

algal growth, but the molluscs require wetting by the sea every tide, and do not reach above high water neaps. Young individuals occur near the upper limit, the largest near the lowest levels. G. Spooner and H. B. Moore, in their sixth paper on the intertidal muds of the Tamar estuary, record the macrofauna. Quantitative samples were taken and provided data regarding population density, up-river penetration and vertical distribution. The effects of water currents at low tide levels on population and the zonation of certain species were also studied. This fauna supplies food for fishes brought in by the flood tide and for wading and shore birds during the ebb tide period. The paper is profusely illustrated with graphs and distribution charts.

There are three papers dealing with life-histories. E. H. Myers worked on the life-cycle of four species of the foraminiferan *Discorbis*. Since the flagellate stage occurs within the test, it is possible to demonstrate the production of 'zoospores' by crushing. In *D. patelliformis* 250-300 tririflagellate zoospores—more correctly gametes—are formed within one shell. At this period, however, two or more individuals unite to form multiple tests, each participant being a mononucleate megalosphere. After fertilization of the gametes multinucleate microspheric individuals with two or three chambers are formed within the megalospheric test, and each undergoes a sexual reproduction to form mononucleate megalospheric individuals again. The complete life-cycle can be completed in just over 64 days.

Marie Lebour adds to her valuable researches on the larval stages of Crustacea an account of the larvæ of the Pandalidæ. F. Gross has two papers dealing with the life-history and osmotic relations of the diatom *Ditylum brightwelli*.

Contributions of a biochemical and physiological nature include a study of the nitrogenous and phosphorus requirements of phytoplankton, and the intensification of their growth rate by chemical means by H. Harvey, of the phosphorus and iron requirements of two species of *Sagitta* by R. J. Harrison, and on the average obliquity of illumination under water by W. Atkins and H. Poole. They describe a cubical photometer for obtaining their results.

The variation in the type of inheritance shown by echinoid hybrids in different years led S. Hörstadius to study crosses between *Psammechinus miliaris* ♀ (*Z* type from the shore and *S* type from the Eddy-stone) and *Echinus esculentus* ♂. It is remarkable that during 1909-11 the inheritance was maternal, in 1912 it was paternal, while in 1932 it was mixed. The effects of temperature, pH and salinity are discussed, but no definite cause for the difference was established.

There are three investigations on subjects of economic importance. F. S. Russell continues his records of the seasonal abundance of young fish, although unfortunately, owing to the War, the record for 1939 stops at the end of August. Previous records show that the last four months of the year are negligible, since the earlier months cover fully the period of production. The 1939 results are the worst

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since the slump year of 1924, despite the fact that no change in the plankton was noted. J. H. Orton reports on the oyster beds of the Fal Estuary. On the banks the beds are in poor condition, largely owing to dirty culch. Overgrowth of sponges and Lithothamnion is a troublesome factor. In the river, conditions are better and it is suggested that clean culch from this region should be spread over the banks every June to assist in recovery. *Crepidula fornicata* has not appeared in the area. The experimental rearing of oyster larvæ over five seasons at Port Erin Biological Station provides the material for a lengthy report by J. M. Bruce, Margery Knight and Mary Parke. This important piece of work deals

chiefly with the food supply of the larvæ, and the cultivation of algal zooids acceptable to them. It is in some respects supplementary to H. A. Cole's work on the biological and physical conditions affecting oyster culture at Conway. Six flagellate organisms were eventually chosen and cultivated and were fed to the veliger larvæ under stabilized biophysical conditions, either separately or mixed. The most successful were those labelled *H* and *I*, greenish yellow or golden brown flagellates 3-6  $\mu$  in diameter. Using them as food, more than 90 per cent of the larvæ settled as spat. The adaptation of the experimental results to commercial practice is the next problem to be solved.

## LARGE-SCREEN TELEVISION PROJECTION

THE application of television has so far been restricted by the difficulty of obtaining received pictures comparable in size and brightness with those produced by the cinematograph, whether used in the home or in places of public entertainment. Consideration of the matter leads to the conclusion that this objective is unlikely to be achieved until it is practicable to apply the principles of optical projection of the pictures, using a standard form of light source of a magnitude suitable for the size of picture required.

In an article published in the February-March issue of *Electronics and Television and Short-Wave World*, Dr. A. H. Rosenthal describes a new electronic device by means of which such projection may be realized, without the disadvantages accompanying the use of an intermediate film on which the picture is first recorded photographically and then projected in the usual manner. The principle of the device is based upon the discovery by E. Goldstein in 1894, that certain materials, normally transparent to visible light, become coloured, that is, more or less opaque, when they are subjected to bombardment by cathode rays. Examples of such materials are the halides of the alkaline earth group, and potassium chloride has been used in the application of this discovery to television reception.

In the instrument developed by Dr. Rosenthal, which he terms a 'Skiatron', the screen of the cathode-ray receiving tube is replaced by a plate of potassium chloride crystals, mounted between two light-transparent electrodes. As the plate is scanned in

the normal manner by the beam of electrons, an opaque deposit is produced, the density of which is everywhere proportional to the instantaneous intensity of the beam. The screen thus carries during each frame period a complete quasi-stationary picture, which may be projected optically in a manner similar to that employed with a cinematograph film. The opaque deposit is removed by the application of a steady electric field between the electrodes placed on either side of the crystal, the speed of obliteration increasing with the field strength and also with increase of temperature of the crystal.

In the instrument under development, the magnitudes of these quantities are chosen so that the 'picture' deposits are removed in the interval between successive scanings. Owing to the fact that the picture being projected is quasi-stationary, as compared with the continuously varying one produced on the fluorescent screen of the usual cathode-ray tube, the picture repetition frequency used in the 'Skiatron' can be reduced to a value just sufficient to avoid flicker. If this advantage is substantiated in practice, the effective band of radio frequencies required by the television transmitter will be reduced.

In the article referred to, Dr. Rosenthal illustrates an arrangement of using three of these special tubes for reproduction of coloured pictures. Each cathode-ray tube with its special crystal screen and a suitable light filter operates at one of each of the three primary colours used, and the illumination is projected directly through the three screens in succession to obtain the coloured resultant picture.

## PROBLEMS OF EVACUATION

THE report of an inquiry, which has been pursued by the Department of Social Science of the University of Liverpool, financed by a grant from the Charities Fund of the Liverpool Council of Social Service, into problems of evacuation has now been published under the title "Our Wartime Guests—Opportunity or Menace" (Liverpool: University of Liverpool Press. London: Hodder and Stoughton, Ltd., 6d. net). It emphasizes the importance of a determined effort to profit as much as possible from the mistakes of what may prove to be only the first of a series of evacuation schemes. Like the interim report, which dealt with the evacuated areas, the present report is based on

house-to-house visiting, this time in the reception areas. The results of these 412 interviews lead to the reassuring conclusion that the evacuation scheme, despite its voluntary basis, has not entirely broken down. The majority of the hosts behaved splendidly and succeeded in making the children entrusted to them happy. Many of the parents co-operated to the best of their abilities.

That the scheme was not a complete success was due to faulty organization in the billeting of dirty, verminous and enuretic children; the removal of children from their billets by parents on the impulse of the moment; the unwillingness of some hosts to