

## Research Items

### Essex Periwinkles

MR. F. S. WRIGHT has carried on an investigation of the periwinkle *Littorina littorea* in the River Black-water estuary ("Report on the Maldon (Essex) Periwinkle Fishery". *Fish. Invest.*, Series 11, 14, No. 6, 1936. Ministry of Agriculture and Fisheries). The main point in question was to ascertain whether dredging was likely to affect the yield seriously if permitted at certain seasons. The conclusions are that, provided a sufficient number of breeding adults are left on the grounds, it is probable that no harm will be done by the dredging, especially as the periwinkles are not collected from April until August, which apparently includes the main spawning period. Small specimens should, however, not be taken and sieving is recommended, also transplantation; but in their own interests the fishermen usually return undersized specimens, thus themselves contributing to the restocking of the beds. The number of specimens used for the experiments on which the curves and tables are based is exceedingly small and the observations on breeding scanty. Seeing that the veligers and very young crawling stages are quite easily recognised, it is surprising that so few were seen. It is stated that both large and small *Littorina littorea* migrate from the mud flats into the tidal pools on the approach of cold weather.

### Herdmania: a Monascidian of the Indian Seas

DR. S. M. DAS has chosen the simple ascidian *Herdmania* as a typical subject for one of the Indian zoological memoirs ("Indian Zoological Memoirs on Indian Animal Types". (5). Lucknow Publishing House, Lucknow, 1936. Rs. 2). In this useful series of publications common animals from India are substituted for those formerly imported from Europe for dissection in the zoological laboratories. The genus *Herdmania* has a world-wide distribution. Only in the Arctic seas is it absent. It possesses calcareous spicules in the tissues, and is the commonest simple ascidian of Indian seas. Two species are recorded from the coastal waters and a third in greater depths. The two coastal species investigated, *H. pallida* and *H. ceylonica*, occur in the Gulf of Mannar at 5-12 fathoms, extending as far as ten miles from the seashore where they inhabit a rocky bed with numerous polychaetes and chanks. *H. pallida* is the species specially selected for description, the average size being about 9.5 cm. in length and thus well adapted for laboratory work. The author is to be congratulated on this clearly written and well-illustrated monograph. It is hoped that more volumes in this series will soon appear.

### Oysters of the Limfjord

DR. R. SPÄRCK, in a recent paper ("Investigations on the Biology of the Oyster (11). On the size and age composition of the stock of Native Oyster in 1935." *Rep. Danish. Biol. Stat.*, 40; 1935), continues work he has been doing for a number of years. In former papers (*Rep. Danish Biol. Stat.*, 31, 33, 34 and 37) he has shown that during a long series of years the size of the native oyster in the Limfjord

constantly decreased, the population consisting almost entirely of old individuals, and that the stock has constantly grown less. From 1919, and even from 1914, the annual renewal of the stock has been quite insignificant; but in 1932 and after, there appeared to be an increase of existing stock of several hundreds per cent, the present age-composition of the stock being absolutely different from those former years. In the summer of 1934 the spat-fall, which in some cases showed two or three size groups, covered large areas of the Limfjord. This very satisfactory state of things is most hopeful and, if no extraordinary mortality sets in, a rise in stock of Limfjord native oysters may be expected so that in four or five years some fishing may be allowed. It is suggested that the cause of the extensive spat-falls in 1932 and 1934 may have been the high summer temperatures, which were favourable for a considerable renewal of the oysters. In the same report Dr. Spärck records the presence in the Limfjord in 1934 of *Crepidula fornicata*, the unwelcome mollusc which in 1880 was carried to England with American oysters, and has since spread widely along the southern and eastern coasts and latterly into Holland and Belgium.

### Biology of Staphylinid Beetles

THE prevalent idea that beetles of the extensive family Staphylinidae are scavengers apparently has relatively few observations in support of the contention. According to Mr. Ralph Voris (*Trans. Acad. Sci. St. Louis*, 28, No. 8, 233-261, Dec. 1934), in most cases the food of Staphylinidae has been confused with the habitat in which they are found. He finds that the prevailing type of feeding behaviour is predatism. In fourteen species belonging to eight genera, his observations were that either the larvae or adults, or both, feed upon living insects. The reported cases of parasitism in the group Aleocharinae are typical examples of parasitoid behaviour and support the contention that the family as a whole is primarily predaceous. The feeding behaviour of those forms found in the nests of social insects clearly points to the same conclusion. The border-line behaviour of Staphylinidae supports Wheeler's view that parasitism among insects is a kind of refined predatism, and has its origin in the latter habit. The role of scavengers is only occasionally evidenced, while phytophagous behaviour is apparently rare, and so imperfectly studied, that generalisations in this respect cannot be made. A useful bibliography relating to the feeding and other habits in the family is appended to the paper.

### Biennial Bearing in Apple Trees

SOME observations on the above subject have recently been published by Hoblyn *et al.* (*J. Pom. and Hort. Sci.*, 14, 1, 39; 1936). The degree to which bearing is biennial, and the average intensity of annual fluctuations in cropping over a period of years, are expressed arithmetically by constants *B* and *I* respectively for trees subject to various treatments. Drastic pruning of previously unpruned trees tended to even up the annual crops, and the 'intensity'



was reduced more by pruning in the 'off-year' than the 'on-year'. The cropping of Newton Wonder became more regular after grassing down, but no significant results were obtained with any other variety. Potash manuring also was without effect. There are indications that rootstock may be a relevant factor over a long period, though no marked differences were observed. Stripping of blossom from trees of Early Victoria completely changed the year of cropping and increased the intensity of subsequent fluctuations, but no results were obtained by blossom thinning. Fruit thinning also had very little effect, but complete removal of fruits in June every year eliminated the biennial habit. It seems that no workable method of dealing with biennial bearing is yet available for application in commercial practice.

#### An Insect Pest of Orchids

A SHORT paper by Mr. W. H. Nicholls (*Victorian Nat.*, 52, No. 11, March 1936) describes the appearance of numerous viscid blotches upon leek-orchid plants belonging to several species of the genus *Prasophyllum*. It was known that thrip-like insects were often found embedded in the viscid mass, but they were not recognised as a cause. Indeed, one infected plant of *P. australe* had been previously described as a new variety—*viscidum*. The causal relation between thrips and the viscid mass has now been established, and the insect is *Thrips imaginis*, a species indigenous to Victoria.

#### Molasses and Nitrogen Fixation in Indian Soils

PROF. N. R. DHAR, of the University of Allahabad, writing on April 29 with reference to the article on "Molasses, Nitrogen Fixation and Land Reclamation" which appeared in NATURE of April 11, says: "I am glad to inform you molasses is being utilised in many parts of India for reclamation of alkaline land. The Mysore Government has been able to obtain 1,200–1,800 lb. of rice grains per acre of alkaline land using one ton of molasses per acre on plots where crops failed previously. The normal production of rice in India is 1,250 lb. of grain per acre in ordinary fields. In recent publications, we have shown that the ammoniacal and total nitrogen of ordinary soils mixed with cane sugar or glucose or any other energy-rich compound and exposed to sunlight increase considerably although the *Azotobacter* counts do not change appreciably. In the dark, however, the *Azotobacter* counts are enormously increased, although the ammoniacal and total nitrogen are less than in light. Moreover, we have obtained results showing the accelerating influence of light on ammonification, nitrification and denitrification under aerobic conditions. Hence we have come to the conclusion that sunlight plays an important role in the nitrogen cycle in the soil."

#### Drought Resistance in Wheat

MESSRS. O. S. AAMODT and W. H. Johnston are analysing the nature of drought resistance in wheats by a comparison of the Russian varieties Milturum and Cæsium with commonly grown Canadian types which are susceptible to drought (*Canadian J. Res.*, 14, March 1936). The Russian varieties seem equally susceptible when shooting and heading, but during the process of stooling they are much more resistant. This becomes the more significant when it is realised that Milturum has a stooling period some 8–10 days longer, Cæsium 4–5 days longer, than Marquis. In

this stooling period the Russian varieties survive periods of drought that ordinarily cause great damage to other varieties. Milturum and Cæsium varieties also develop their root systems comparatively early, a characteristic which enables them to weather early periods of drought more successfully. Finally, these Russian varieties were found to possess a superior capacity to endure drought without permanent injury.

#### Crustal Deformations in Japan

DURING the year 1935, new lines of precise levelling were carried across several earthquake districts in Japan. One of the most interesting series is that studied by Prof. A. Imamura (*Proc. Tokyo Imp. Acad.*, 12, 7–9; 1936). The route lies near the west coast of northern Japan and crosses the meizoseismal areas of two important earthquakes in 1694 and 1704. No definite change occurred during the last thirty-five years in the central area of the earlier earthquake, but there were undoubted movements in that of the latter. Here, the changes of level between 1903 and 1935 revealed the existence of several crust-blocks, each of which was tilted towards the north, the maximum elevation in the area being a little more than an inch. Messrs. T. Terada and N. Miyabe (*Proc. Tokyo Imp. Acad.*, 12, 4–6; 1936; and *Earthq. Res. Inst. Bull.*, 14, 146–147; 1936) describe the results of the series of levellings made in the Sanriku district (north-east Japan) from Miyako to Aomori, the general mode of deformation between 1933 and 1935 being an upwarping of the crust between Kamaisi and Hatinohe and a downwarping near Aomori Bay. Mr. R. Takahasi (*Earthq. Res. Inst. Bull.*, 14, 18–25; 1936) describes the precise levelling made for the first time up the west slope of the Asama volcano, around the southern rim of the crater, and down the east slope. Comparing the heights obtained with those given in the topographic map of 1912, it is shown that the principal vertical deformation was a rise of nearly 60 ft. in the eastern rim of the crater, a rise that must be due in part to the accumulation of volcanic material since the eruption of 1912.

#### Canadian Crude Oils

DURING recent years a wealth of information has been accumulated at fuel research laboratories on crude oils from the various producing fields of Canada. In view of the increasing importance of petroleum developments in that country and of advancement in refining technology, it has been deemed advisable to publish the data collected in the form of a comprehensive report. The document bears the title "Analyses of Canadian Crude Oils, Naphthas, Shale Oil and Bitumen" and is published by the Canadian Department of Mines (Bulletin 765), the joint authors being P. V. Rosewarne, H. McD. Chantler and A. A. Swinnerton. One hundred and forty-three samples of crude oil were collected over a period of some five years from Canadian fields, and detailed analyses of these, together with notes on methods of examination, form the main part of the report. In addition, results are interpreted, distillates classified, and comparisons made of typical crude oils. The report also includes a brief description of each of the main producing fields, supplemented by an outline map on which these fields are clearly marked and positions of individual samples indicated; a summary of production from each field during recent years; and statistics of the petroleum industry



for the whole country. At the present time, only three per cent of the annual consumption of crude oil in Canada is supplied from home fields, the rest being imported. The remedy for this unsatisfactory position lies first in discovery of new producing fields and secondly in commercial development of bituminous sands in Alberta and oil shale in the Maritime Provinces. This latter course would provide an alternative raw material to crude petroleum from wells for the production of motor spirit and oil products. When crude oil prices stand at a higher level, this should prove a useful resource.

#### History of the Dines' Anemometer

In his presidential address delivered last January to the Royal Meteorological Society and entitled "Wind in Britain: The Dines Anemometer and Some Notable Records during the last Forty Years", Colonel E. Gold traced the historical development of the instrument devised by the late W. H. Dines, from various attempts by earlier workers to make use of the pressure exerted by the wind down a tube directed towards it as a measure of wind velocity (*Quart. J. Roy. Met. Soc.*, 62, No. 264). In these early instruments, which were generally of the water-filled U-tube pattern, the fallacious assumption was made that the pressure on the arm open to the air, but not exposed to the wind, is constant. Dines arranged for the pressure of the wind down an open tube to act on the underside of a float in water, and for the lower pressure caused by the wind blowing past holes in a vertical tube to act on the upper side of the float. These effects, for a given air density, vary as the square of the wind speed, which necessitated a specially shaped float to make the vertical movement of the float, and the recording pen supported by it, proportional to the increase of wind speed. The required shape of float was worked out from first principles. Accuracy in this instrument was limited by the fact that variations in the density of the air, which affect the pressure of the wind, could not be allowed for. In the British Isles, however, the error due to this cause scarcely ever reaches five per cent, and the instrument, after gradual improvements suggested by experience, has come to occupy a unique position and to achieve a world-wide distribution. In the discussion of notable records, a very remarkable case of disturbance caused by a row of cottages 100 feet away from an anemometer at the Lizard is illustrated; when the vane was 15 feet higher than the ridge of the cottages the wind constantly 'boxed the compass' during the violent fluctuations caused by the obstruction, although very steady when the direction was two or three points off that of the obstruction, the speed dropping frequently to nil; raising the vane 35 feet caused the disturbance to disappear altogether.

#### Acoustical Terms

THREE years ago the British Standards Institution set up a committee to prepare a "Glossary of Acoustical Terms and Definitions" which has now been issued. It extends to 48 pages and is published by the Institution at 3s. 6d. In general, the definitions are on established lines but are given in more precise forms. Pulsatance is introduced for  $2\pi$  times the frequency, logarithmic decrement is in terms of deflections on the same side, stationary used instead of standing wave system, the logarithm to base 10 of the ratio of the rates at which energy is emitted

by two sources is the number of bels of power separating them. A new unit—the phon—is introduced to express the loudness of a sound in terms of the intensity of one of standard pitch. Unit area impedance is the quotient of the pressure by the particle velocity and is generally a complex quantity. Other electrical terms—resistance, reactance, transducer, microphone, filter—are adopted and defined, and musical terms are interpreted on a physical basis.

#### Deflection of Fast Electrons in Magnetised Iron

A NUMBER of experiments have been performed in which cosmic ray electrons (or in one case  $\beta$ -rays) are passed through magnetised iron, and there is some interest in trying to find what is the effective magnetic vector deflecting the particles. The experiments seem to show that this vector is less than the induction  $B$ . W. F. G. Swann (*Phys. Rev.*, April 15) considers the iron as containing a number of very small magnetic entities (for example, spinning electrons) and shows that, while  $B = H + 4\pi I$  does give the true average force deflecting the particles, this average is made up in a peculiar way. A very small number of particles receive large deflections as a result of penetration of the magnetic entities, while for most of the electrons the effective deflecting vector is  $H + 2\pi I$ . An experimental paper by W. E. Danforth and W. F. G. Swann follows, in which cosmic ray electrons were detected by counters after passing through several centimetres of an iron magnetic circuit. Using Anderson's and Kunze's data on the energy statistics of cosmic ray electrons, the results are found to agree in order of magnitude with the theory.

#### Deuterium and Molecular Asymmetry

IN order to test whether the replacement of one hydrogen atom in a methylene group by deuterium is sufficient to produce a measurable degree of molecular asymmetry, E. Biilmann, K. A. Jensen and E. Knuth have carried out some interesting experiments (*Ber. deutsch. chem. Gesells.*, May). The replacement of one hydrogen atom by deuterium is likely to have so small an effect on the symmetry of the molecule that optical resolution of a synthetic racemic compound could scarcely be expected to yield convincing results. Accordingly they adopted the method of replacing chlorine in an optically active compound by deuterium, where ordinary hydrogen was bound to produce inactivity. For this purpose *l*-bornylchloride was converted in parallel experiments to camphane,  $C_{10}H_{18}$ , and 2-deutero-camphane,  $C_{10}H_{17}D$ , by decomposing the magnesium derivative with light and heavy water respectively. In both cases, the final product had to be freed by distillation from the high-boiling *d*-hydrodicamphene and by fractional recrystallisation from *l*-camphene. The two final products melt sharply at a temperature ( $153^\circ C.$ ), which is unaffected by mixing the compounds, but whereas camphene is symmetrical and therefore optically inactive, 2-deutero-camphane is slightly active and indeed shows reversal of sign for sodium light. Thus from observations with a ten per cent solution in ether, the specific rotation  $[\alpha]_D$  at  $20^\circ C.$  was calculated to be  $+0.40 \pm 0.05^\circ$ . The effect is certainly slight, but appears to be unmistakable. The heavy water used was from the Norsk Hydro-Elektrisk Kvaestofaktieselskab, and contained 99.2 per cent of deuterium oxide.