

are mostly widely distributed species, chiefly tropical and cosmopolitan, boreal species being only scantily represented.

The interesting little barnacle *Heteralepas (Paralepas) minuta* (Philippi) described by Darwin (1851) and Broch (1927) from the Mediterranean and by Weltner (1922) from West Africa was reported as doubtful from the Java Sea by the last-named worker. It is now recorded from the Japan Sea from five stations; all the specimens but one were attached to the spines of sea-urchins (*Cidaris*). The peduncle is very short and strongly contracted towards the basal part of the capitulum and the base is usually divided into two "finger-like projections" clasped around the spine of the sea-urchin.

University and Educational Intelligence

THE Commonwealth Fund of New York is offering in 1934 twenty-five Commonwealth Fund Fellowships for research, tenable by British subjects at certain American universities. A fellowship is awarded for two years, but may be extended for a third year. Further information can be obtained from the Secretary to the Committee, Commonwealth Fund Fellowships, 35 Portman Square, London, W.1.

THE Royal Technical College, Glasgow, publishes in its report on the session 1932-33 a valedictory notice of the thirty-four years' service of its retiring director, Dr. H. F. Stockdale. Among the developments that have taken place under his direction are the merging in the College of the former Weaving College of Glasgow, the inception of the Schools of Navigation, Pharmacy and Bakery, and the formation of the Glasgow School of Architecture conducted jointly by the College and the Glasgow School of Art. During this time the number of full-time members of the teaching staff has increased from 29 to 83. Dr. Stockdale's successor is Sir Arthur J. C. Huddleston, who recently retired from the Sudan Government Service. The report shows that in spite of the serious industrial depression that prevailed in Glasgow in the year 1932-33, the decrease in the number of students was slight (from 3,625 to 3,427), while the number of student-hours worked actually increased. Classes for unemployed youths were inaugurated by the College this year in co-operation with the Education Department and the Labour Exchanges and are reported to have been justified by results. The instructors gave their services gratuitously.

THE International Federation of University Women has been interesting itself in the plight of members of its affiliated German federation who have recently been discharged from their posts either on account of Jewish ancestry, for their political opinions or on the ground that they are women. In Bulletin No. 15, the International Federation directs attention to their needs and to the fact that it is working on their behalf in co-operation with the international committee for securing employment for refugee professional workers, which has its headquarters at 4 rue de Monthoux, Geneva. At the same time, it is pointed out that discrimination against women is increasing in other countries besides Germany. The bulletin records a heavy falling off in the number of exchanges of teachers between Great Britain and the United States from eleven in 1931-32, to three in 1932-33, and one in the current year. Among publications promoted by the Federation, the bulletin makes

announcements regarding a comparative study (in French) of secondary education for girls in many countries by Dr. A. Arato, a study by Mrs. Skonhoff of types of university training in different countries and a report by her on the standards in those countries of the degree of doctor. The Federation is considering the compilation of a dictionary of the academic terms which are current in various countries.

Calendar of Nature Topics

Frost on the Farm

The rather early incidence of heavy frosts this winter affects the farm in several ways. There is of course little anxiety about potatoes and mangolds in store, for it is only in exceptionally cold weather, when frost is accompanied by wind, that clamped roots suffer damage. Roots in the field are not free from danger at these times, although swedes and sugar beet standing undisturbed in the ground can resist quite heavy frost, the latter in particular with their heavy covering of leaves and high concentration of sugar in the sap being relatively immune from damage while still unpuled. Kales on the other hand, being quite exposed to the weather, lose much leaf in severe frost, and in this way the loss falls on the part of the plant of highest nutritive value. Moreover, if frozen roots or kale are fed off by stock, a considerable amount of energy is required to raise the food to body temperature, so that more supplementary food is required than would otherwise be the case. Sugar beet standing uncovered in the field or in heaps by the roadside is in most danger at these times. The roots at the outside of the heaps are liable to be frozen, and on thawing out the roots fall to a pulp and decomposition sets in. Roots that have been touched by frost should be worked up at the earliest opportunity; in any case they tend to complicate the process of extraction in the factory.

Even grass is not immune from the effects of frost. Young, short grass keeps very green, but the older leaves become tipped and winter burnt, and form a sort of 'froggage' which, although useful as coarse fodder for hungry stock, does not approach succulent herbage in feeding value and must be helped out by better food. In one respect, however, frost works for the farmer, mellowing down the plough furrows into a fine natural tilth that should at all costs be preserved for the spring seed beds.

Winter Stores of Food

The device of storing food against the hardships of winter is favoured by a number of temperate zone mammals, but seldom by birds, perhaps because they find it more convenient to seek food in other regions where it abounds. The storing of the Californian woodpecker (*Melanerpes formicivorus bairdi*) is as exceptional as it is remarkable. In the trunks of pine trees, less frequently of oaks, the woodpeckers drive thimble-shaped hollows during the autumn when acorns are ripening, and into these hollows, which are of two sizes, they place, according to their size, the acorns of the black and the live oak. As many as 31,800 holes have been estimated to occur on fifty feet of a pine tree; as many as 13,200 acorns have been counted on a bole twenty feet high and eleven feet in girth. The acorns are generally

gathered from the ground just after they have fallen and are almost invariably placed in the holes with their basal end outermost. The storing affords a useful supply of food during a period of scarcity, and, according to Dr. William E. Ritter, who has made a careful field study of the subject, two vital results have been that the California woodpecker has been able to extend the range of its favourable environment, compared with neighbouring species, and that it has been able to reduce its rate of mortality relative to neighbouring species as shown by its increased ratio of adult population to reproductive capacity.

Possible Origin of Woodpecker's Storing Habit

That the storing habit is not yet perfected is shown by several curious features to which Ritter directs attention. Such are the making of holes at seasons when there are no acorns to store, the making of hundreds of holes which are left unfilled though acorns and birds are abundant, the occasional storing of small pebbles instead of acorns, the neglecting of stored acorns until they are unfit for food.

Perhaps the English great spotted woodpecker gives a hint as to the origin of the storing habit. In *British Birds* (117, Oct., 1933), N. Tracy describes this woodpecker as cutting off fresh cones and fixing them in clefts so that they could be more easily split open, and Edmund Selous in his "Evolution of Habit in Birds" (1933) records careful observations of the storing of spruce cones in Scots pine trees by the Continental great spotted woodpecker in Sweden and Germany. There was no trace here of the deliberate making of storage holes, but the smoothness of the sides of the natural crack in the tree trunk suggested that the crevice had been used over and over again as a receptacle.

Hibernation and Heart-Beat

The cold weather of December must have driven the most dilatory of our hibernating mammals to their winter retreats, there to exist upon the lowest metabolism consistent with continued survival. In most of these small mammals the pulse-rate during normal activity is very high; in the dormouse, Dr. Frances Buchanan found it to reach 700 beats a minute, in the long-eared bat 600-900, in the pipistrelle varying from 100 to 800 and from 230 to 972 on different occasions, in a hedgehog 280-320 a minute. Constant features of the state of hibernation are loss of warmth and reduction of heart-beat, and under such conditions electrocardiograms of the four species mentioned recorded for the dormouse 12-30, long-eared bat 76-77, hedgehog 48, and a pipistrelle exposed to artificial cold and cold itself to the touch, though extremely active, had a pulse frequency of only 30 a minute.

A curious feature of deep hibernation, in some if not all species, appears to be a dissociation of auricle and ventricle. Thus when a dormouse was very torpid, showing no sign of respiratory movements for several consecutive minutes and having a pulse-frequency of 12-30 a minute, the records showed nothing but ventricle effects. But when auricular effects became more frequent, at about 40 a minute, well-marked auricular effects appear at quite irregular intervals. Dr. Buchanan concluded that when the dormouse is in its deepest sleep the ventricles only are beating.

In sese vertitur annus.

Societies and Academies

PARIS

Academy of Sciences, November 13 (*C.R.*, 197, 1073-1160). E. GOURSAT: A problem of the theory of congruences of straight lines. L. CAYEUX: The submarine alteration of the phosphatic nodules of the Albanian of the Paris basin. A. BIGOT and RAOUL FORTIN: The boring at Incarville, near Louviers (Eure). A summary of the geological results obtained by a trial boring for petroleum. E. J. GUMBEL: The limiting distribution of the smallest value amongst the greatest. PAUL DIENES: The deformation of spaces with general linear connexion. ARNAUD DENJOY: Integration along rectifiable cyclic continua. C. KURATOWSKI: The prolongation of homeomorphy. ANDRÉ CHARRUEAU: Remarks on certain movements of a viscous fluid mass, isotropic and heterogeneous. P. DUMANOIS: Concerning detonation in internal combustion motors. Reply to some criticisms by Dufraisse and Chaux. MLE. F. BLOCH, J. ELLSWORTH and S. P. LIAU: Photometric observations of the star *RS Ophiuchi*. Results of visual and photographic determinations are given. The oscillations found are characteristic of the light curves of novæ. CH. BERTAUD: The correlation between the velocity of ensemble of the *A* stars and their distance to the galactic plane, and on the rotation of the galaxy. FRANCIS PERRIN: The possibility of the materialisation by interaction of a photon and an electron. TH. V. IONESCU: The working of a Crookes radiometer in the high-frequency discharge. The Crookes radiometer is as sensitive to electric waves as to light waves. This has been applied to the study of the energy consumed in an ionised gas. JEAN GENARD: The magnetic extinction of the fluorescence of iodine vapour. Photometric measurements in magnetic fields varying from 0 to 42,600 gauss gave a curve in good agreement with the theoretical formula of Van Vleck. ALBERT TURPAIN: Remarks on the discovery of the molecular diffusion of light by pure liquids. Historical. Directing attention to the early work of A. Lallemand in this field. He established a reflection by the molecules of a pure liquid and predicted a part of the Raman effect. GEORGES ZIELINSKI: The polarisation of the fluorescence bands of mercury vapour. W. GENTNER: The absorption of the penetrating γ -rays. Criticism of recent work by C. Y. Chao. GEORGES I. COSTEANU: Batteries with liquid ammonia and with ammoniacal solutions. Studies of the effect produced by the gradual addition of water on the E.M.F. of batteries made up with dry liquid ammonia. The changes in E.M.F. are small. N. THON: The electrolysis of solutions of metallic salts with a cathode of rarefied gas. Discharge through a gaseous cathode does not lead to a deposit of metal except in the case of the three metals silver, platinum and gold. R. ETEENNE: The displacement of equilibrium. H. MURAOUR and G. AUNIS: Verification of the law of combustion of colloidal (explosive) powders. E. DARMOIS: The Lambert-Beer law and the nature of absorbing particles in solution. JEAN SAVARD: The ionisation potentials and energies of formation of non-polar molecules. ANTONIO DE PEREIRA FORJAZ: Modifications of chemical reactions under the influence of oscillating circuits. E. ELCHARDUS and P. LAFFITTE: The constitution of the magnesium-zinc-silicon alloys rich in magnesium. CHARLES DUFRAISSE and PAUL CHOVIN: Research on substances related to the