

## Research Items

### Demography of Easter Island

No trustworthy statistics of the population of Easter Island exist before those of the census of 1886 taken by A. A. Salmon, when 155 natives were grouped as follows: less than 15 years—males, 17, females, 27; adults—male, 68, female, 43. In a demographic survey made by Dr. I. Drapkin in 1934 (*Occasional Papers*, Bernice P. Bishop Museum, Honolulu, 11, No. 12) the total is given as 456, of whom 228 are male and 228 are female. Of these, 216 are less than thirteen years of age. Two interesting facts are noted: the perfect equilibrium between male and female not only in the total, but also in each age group, and the large number of old women as compared with the old men, there being only four men and eighteen women more than fifty years of age. One old woman is almost ninety-five years. Owing to the amount of land taken by the Products Company and for Government purposes, the amount available for natives is extremely restricted, and gives a density of population of four persons to the hectare. The population, however, is increasing rapidly, and has tripled in less than half a century. Hence the establishment of future families is becoming a problem. It is impossible to distinguish between pure and mixed blood in the population, but taking personal information which shows no trace of foreign admixture for three generations back, only 159 islanders, or 34.86 per cent, can be reckoned pure blooded. The remainder show admixture in various degrees, Tahitian blood being largely predominant. As a rule, the natives marry young, and a celibate more than thirty years of age is rare. Nevertheless, even after certain allowances are made, the number of illegitimates is high—96, or 21 per cent of the total population. Adequate vital statistics cannot be given, but in a period of seventeen years the percentage of births each year has been 10 male and 8 female, while the mortality has averaged 4 children and 6 adults.

### Molar Teeth of Ungulates

Two weighty and elaborate monographs dealing with different aspects of the history of the molar teeth of Ungulates have appeared recently. The first forms vol. 14 of the collected works of Florentino Ameghino, published under the editorship of Alfredo J. Torcelli ("Investigaciones de Morfología filogenética en los Molares superiores de los Ungulados". Pp. 619. La Plata: Gobierno de la Provincia de Buenos Aires, 1933, received by NATURE in 1935). This work, printed page for page in Spanish and French, does not present a unified plan of Ameghino's researches, but contains a series of papers describing the molar teeth mainly of members of the rich Ungulate fauna of South America. But throughout, the author has had in view an examination of the theory of trituberculy, or of the derivation of quadrangular molars from triangular predecessors. The conclusion reached in these papers, as in his earlier works on the same subject, is the reverse of that generally accepted, for Ameghino's reading of the succession in fossil Ungulates is that the triangular type of

molar is derived from the quadrangular. The second monograph, by Max Küpfer, is more limited in its field, but more intensive in its method. It is a very thorough investigation of the premolars and molars of the domestic ox (*Bos taurus*), following two main lines of exploration (*Mem. Soc. Helvétique Sci. Nat.*, 70, Mem. 1, 1935, pp. ix+218). The first elucidates the development of the teeth, as shown by X-ray photographs, by histological sections, and by the study of the morphological development of single teeth. The second line of study deals thoroughly and in a most interesting manner with the relative movements and interlocking of upper and lower molars in the bite of an ox, and shows the progressive changes which take place in the growing animal from three weeks to sixteen months of age. The monograph is copiously and beautifully illustrated.

### Flora of South-eastern Polynesia

THE publication by F. B. H. Brown (Bernice P. Bishop Museum, *Bulletin* 130 (1935)) of the third and concluding part of his survey of the flora of the Marquesas, Tuamotu, Society and Austral Archipelagos, together with Rapa, Pitcairn, Henderson and Mangareva Islands, deals with the dicotyledons. The total indigenous vascular flora is made up of 453 species and varieties, of which 251 are dicotyledons. These belong to 62 families, the best represented being the Rubiaceae, Euphorbiaceae and Compositae with twenty or more species, whilst of the other families only the Piperaceae and Urticaceae number more than ten species. Eighty-seven per cent of the indigenous dicotyledons are confined to Polynesia, whilst 153 species are confined to a single island or archipelago, representing a local endemism of 61 per cent. There is a general similarity of the dicotyledonous flora to that of Hawaii, where, however, the degree of endemism is considerably higher (85 per cent). It is suggested that not less than 82 per cent of the species are of American affinity, whilst 12 per cent and 6 per cent respectively show an Indo-Malayan and Australian affinity. The greatest number of species—approximately 50 per cent of the total—is found in the Marquesas Islands, whilst the Tuamotu Archipelago has a very meagre flora containing only 36 dicotyledons. Three new genera and many new species are described and well figured. It is improbable that further work will add many more plants.

### The Hainaut Aerolite

A METEORIC stone, which is named and described as the Hainaut aerolite by Dr. M. Lecompte of the Brussels Museum (*Mém. Mus. Roy. Hist. Nat. Belgique*, No. 66, 1935), fell between 8 and 9 p.m. on November 26, 1934, near Roisin, fifteen miles south-west of Mons in Hainaut. It is claimed as a Belgian meteorite, but actually it reached the ground in French territory, only 60 metres east of the frontier line, in the commune of Bettrechies, Dep. Nord. The ancient country of Hainaut is now divided between Belgium and France, and meteorites have no respect for political boundaries. A fireball was



seen passing over Belgium, probably in a direction from E.N.E. to W.S.W., but it finally landed just in France, making a hole 60 cm. in depth and 80 cm. in diameter. Only five fragments with a total weight of 922 gm. were recovered; the whole mass weighed perhaps 15–20 kgm. The material of the stone is of the common type of grey chondrite showing a brecciated structure of lighter grey angular fragments in a darker grey ground. A chemical analysis shows 16.62 per cent of metallic nickel-iron and 7.02 per cent of troilite (FeS), the stony portion consisting mainly of olivine and enstatite. A second paper by Prof. R. Breckpot and Dr. M. Lecompte (*ibid.*, No. 69, 1935) gives the results of spectroscopic analysis made on different portions of the stone. Germanium (0.02 per cent) is present in the metallic portion, and traces of platinum, palladium, ruthenium, gold, tin, etc., were found. Belgium, with its relatively small area, has only three meteorites to its credit, these being all stones observed to fall: St. Denis-Westrem, near Ghent, fell June 7, 1855; Tourinnes-la-Grosse, near Tirelmont, fell December 7, 1863; and Lesves, near Namur, fell April 13, 1896. In the larger area of the British Isles the record is only sixteen genuine meteorites since 1795, but the number of odd-shaped objects often incorrectly thought to be meteorites is vastly greater.

#### Theory of Radio Communications

MR. R. A. WATSON WATT, in his address as chairman of the Wireless Section of the Institution of Electrical Engineers (*J. Inst. Elec. Eng.*, Jan.), entitled "A Pathologist Looks at Radio Communications", gives a rapid survey of the theory, looking at it from the point of view of a radio 'pathologist'. It is wrong for the pathologist to lecture on the anatomy of the ionosphere as if it were the simple 'Kennelly-Heaviside' layer. Not only must he take into account the Appleton region, but also a complex region of varying ionisation densities controlled by ultra-violet radiation from the sun. It is known that the Appleton region has two important subdivisions:  $F_2$  is about 250 km. high, with a high ionisation density which attains its maximum late in the day and in the year;  $F_1$  is a kind of undershelf at about 180 km. existing only during the day-time, and its maxima occur about noon and in midsummer. The Kennelly-Heaviside layer has been found to be no less complicated, with its  $E_2$  subdivision at about 130 km. and its  $E_1$  at 100 km.  $E_1$  and  $F_1$  are satisfactorily explained by ultra-violet light from the sun. Appleton has shown that the behaviour of  $F_2$  requires the intervention of large thermal expansions in the atmosphere. The detailed structure and the variations in behaviour of  $E_1$  show great complexities. For example, the base of the ionosphere is at a lower height during a magnetic storm. There is reason to hope that continued application of radio methods to the study of the ionosphere will elucidate the still obscure mechanism of the solar control of terrestrial magnetic storms.

#### Colouring Matter of Ebony

HITHERTO the black colour of ebony has been attributed to the presence of finely-divided carbon, since it is insoluble in all the usual solvents and could not be further characterised. Prof. E. Wedekind describes experiments in the December issue of the *Berichte der deutschen chemischen Gesellschaft* in which a wood-disintegration process, patented by himself

and Schicke in 1933, has been successfully applied to ebony. An insoluble black pigment, resembling carbon in appearance, but containing only 66.6 per cent of carbon along with 3.8 per cent of hydrogen, has now been isolated. This composition corresponds with the empirical formula  $C_9H_6O_3$ , which differs from that assigned to lignin by six atoms of hydrogen. Attempts to convert lignin to the black pigment by direct oxidation with sulphur or selenium have so far been inconclusive, although black products were certainly obtained. The formation of hydrogen sulphide in these experiments was extraordinarily slow, and the reaction with selenium required a temperature high enough to produce carbonisation. The disintegration of the wood was effected by extracting at 100° C. a quantity of West African ebony sawdust with dioxan (diethylene dioxide), containing 1–2 per cent of concentrated hydrochloric acid. In this way the lignin is almost completely dissolved together with resins, hemicelluloses, etc., the residue consisting of a mixture of cellulose and pigment. As the latter appears to be particularly resistant to acids, its complete separation from the cellulose was brought about by hydrolysing the latter with 72 per cent sulphuric acid to soluble sugar. The residue contained only 64.6 per cent of carbon, but was found to contain some lignin held so firmly by sorption that it would not dissolve in dioxan. This lignin was ultimately removed by phenol, with which it combines very readily, and the pigment was then pure. Its amorphous character was confirmed by X-ray analysis.

#### Effect of Deuterium Oxide on Action of Some Enzymes

At a recent meeting of the American Physical Society, a communication was made by David I. Macht and Hilah F. Bryan summarising a series of experiments in which they claim a considerable effect of very small concentrations of deuterium oxide on enzymatic action. Two kinds of oxidases and two kinds of catalases showed increased activity in dilute  $D_2O$  solutions, the greatest sensitivity to  $D_2O$  being observed in the case of the oxidative enzyme of fresh blood-free brain tissue from the cat. This enzyme decolorised a standard buffered solution of methylene blue *in vacuo* at a noticeably increased speed when 1:2,000  $D_2O$  was added to the saline solution used for preparing the suspension. An oxidase from rat muscle showed an effect of the same order caused by the presence of 1 per cent of  $D_2O$ . Of the two catalases examined, one was from fresh rat muscle and another from *Lupinus albus* seeds. Two pairs of experiments with the latter enzyme were carried out in the following way: 1 c.c. of  $H_2O$ , 3 c.c. of  $H_2O_2$  (3 per cent), 1 c.c. of  $KH_2PO_4$  (0.2 molar) and 1 c.c. of  $Na_2HPO_4$  (0.2 molar) were placed in a tube, and 0.5 c.c. of bean extract prepared with  $H_2O$ , or alternatively, 0.5 c.c. of bean extract prepared with 1:100  $D_2O$  were added. The two experiments made in the presence of  $D_2O$  yielded an average of 5.55 c.c. of oxygen in fifteen minutes as against 3.3 c.c. of oxygen in the average of the experiments made in ordinary water. From the above data, the overall excess concentration of  $D_2O$  which proved to be effective in these experiments was 1:1,200. In some experiments, especially in concentrated  $D_2O$  solutions, the enzymes, compared with the controls, exhibited a diphasic activity. There was a primary retardation which was followed by a secondary and more marked acceleration.