

Research Items

Boats of Victoria Nyanza

THE question of the origin of the boats of Victoria Nyanza is raised by Mr. G. W. B. Huntingford (*Man*, September) in reference to a suggestion by Mr. J. Hornell that they were due to a possible Indonesian migration to the highlands of Kenya or a long-continued contact with Indonesia along the east coast of Africa. Mr. Hornell pointed out that the peculiar features of these boats, a bifid bow and penetration of the thwarts through the side planks, are features of Javanese and Maduran construction. Mr. Huntingford argues that there are no other traces of Indonesian influence in the Lake region. The Nyanza boats have nothing in common with the coast boats, and there is no sign of Indonesian influence in the Kenya highlands. The enlarged false prow of the Nyanza boats may be an African adaptation without understanding of the branch found on drawings of early Egyptian boats. The Bantu may have taken it over from the Nilotes. Further, both the Egyptian and the Scandinavian types may have originated in Crete. A clay model (Early Minoan I) has something that looks remarkably like a bifid prow. In the same issue of *Man*, Mr. Hornell replies. Against the Egyptian origin, the Egyptians always pegged, and never sewed, the planking of their boats; and the beak of the bifid prow has been much exaggerated in representation. It is not structural but ornamental. Against the argument for an indigenous origin is the lack of skill in boat-construction of the Bantu. As regards the argument against Mr. Hornell's hypothesis of an Indonesian origin, there are cultural features suggesting Indonesian influence in Tanganyika; and there are resemblances to the present-day coast boats in, for example, the sewn planks which characterize Nyanza boats. The absence of outrigger is not vital.

Ethnology of Wallis Island

UVEA (Wallis Island) was visited by Mr. Edwin G. Burrows in 1932 for the purpose of furnishing a report on the ethnological relations of the inhabitants (*Bernice P. Bishop Museum, Bull.*, 145). The nearest islands are Futuna (112 miles), Samoa (186 miles), Fiji (240 miles) and Tonga (332 miles). Uvea has an area of 23 sq. miles. It has been known to Europeans since 1767; and since 1837 there has been a French Catholic Mission in the island, which has strongly affected the culture of the inhabitants, especially in such matters as marriage. The population is increasing. In 1837 it was estimated at not more than three thousand. In 1923 it numbered 4,878. In physical appearance the inhabitants are described as tall, light brown to copper, robust and well proportioned. The cranium is brachycephalic, but occipital flattening is practised. The language is a dialect of Polynesian. Kinship governs social and economic groupings, but politically is important only as limiting succession to titles, the political unit following territorial lines regardless of kin. Yet there are indications that the names of certain villages indicate clusters of kinsfolk. Exogamy has been supplemented by church regulation of marriage.

Brother and sister avoidance formerly was very strict. Polygyny was formerly permitted to certain chiefs. There is no term in the language for the biological family, and the recognized kinship group is the lineage, tracing descent from a common ancestor through the father. The mother-line is recognized secondarily. The nucleus of the kin is the group sharing a homestead. The culture relation is Western Polynesian with elements from Tonga and other islands.

Linkage Relations of Parallel Mutations in *Drosophila*

A COMPARISON of the known genes in *Drosophila melanogaster* and *D. pseudo-obscura* is made by Dr. A. H. Sturtevant and Dr. C. C. Tan (*J. Genetics*, 34, No. 3). Some 25 new mutations of *D. pseudo-obscura* are pointed out as parallel or homologous to those of the other species, in addition to 29 already known; but their arrangement in the chromosomes is different in the two species. *D. pseudo-obscura* has 5 pairs of chromosomes whereas *D. melanogaster* has 4 pairs. The right arm of the X-chromosome in *D. pseudo-obscura* is also known to be homologous with the left arm of chromosome III in *D. melanogaster*. Four or five other species appear to agree in having a two-armed X-chromosome like that of *D. pseudo-obscura*. Chromosomes III and IV of *D. pseudo-obscura* are joined to form II of *D. melanogaster*. The mechanism by which such exchanges of chromosome arms can have happened is discussed. The linkage relationships show that many rearrangements of genes within the arms have taken place, and that since these two species diverged from a common ancestor, at least nineteen such inversions have occurred and become established. By similar methods it is hoped to work out the phylogenetic relationships of other species in the genus, such as *willistoni*, *virilis*, *hydei* and *funeris*.

A New Blow-fly Repellent

FOR the prevention in sheep of myiasis, which exacts a heavy toll in most sheep-rearing countries, many tests have been carried out with a multitude of chemicals, without revealing any thoroughly satisfactory repellent for blow-flies. In Great Britain the most promising recent dip is W. Moore's oil emulsion dip containing paradichlorobenzene used by the team of workers at Aberdeen under Prof. James Ritchie, but every new suggestion should be thoroughly tested. H. O. Mönning has been experimenting with some oils of common South African plants and shows that steam-distilled oil of *Tagetes minima* has strong repellent properties for blow-flies and that it is suitable for use in a blow-fly dressing. (*Onderstepoort J. Vet. Sci. Anim. Ind.*, 7, 419; 1936). As larvicides, carbon tetrachloride and tetrachlorethylene were found to be effective against the maggots, but the latter had a harmful effect upon wounds. The materials were used as a dressing in an emulsion, the emulsifier which acted most satisfactorily being wool-grease. The author gives particulars for the preparation of a suitable emulsion.

Enzymes of Wood-Rotting Polypores

THE study of fungi which induce the rotting of wood is of great importance, from both practical and theoretical points of view. Polyporaceous fungi often bring about such rotting, and their enzyme equipment has been the subject of study by Dr. S. R. Bose and S. N. Sarkar (*Proc. Roy. Soc.*, B, 123, 193-213; July 1937). Eight species of polypore fungi were examined, and an imposing array of enzymes has been found. Invertase, raffinase, maltase, amylase, emulsin, hemicellulase, cellulase, pectinase and ligninase seem to furnish the possibility of destroying, extra-cellularly, almost any common carbohydrate. Lipolytic and proteolytic enzymes were present in small quantities, catalase appeared as an intracellular enzyme, whilst laccase was found in *Polystictus sanguineus*, *Daedalia flavida* and *Trametes lactinea*. Extra-cellular enzymes were more abundant than those inside the cell, and their activity appeared to be greater in the vegetative fungus than in the fruiting organism.

Hybrids of the Rhododendron

A PAPER by Mr. F. C. Puddle (*J. Roy. Hort. Soc.*, 62, 9, 393-398, Sept. 1937) gives some useful information about the possibilities of hybridizing the numerous species of *Rhododendron* now available to horticulturists. The activities of plant collectors have added the beauties of the eastern kinds to the better-known European species. Taxonomists have recognized two sections, the Lepidote and the Elepidote, in the genus *Rhododendron*. It is usually difficult, and frequently impossible, to hybridize between these sections. The Elepidote species of *Rhododendron*, however, interbreed readily with the Luteum series of *Azalea*, although they are plants with more remote taxonomic relationship. Practical considerations for the prosecution of experiments in hybridization are given, and breeders are invited to consult the Stud Book of the Rhododendron Association, which shows the results of more than four hundred crosses the offspring of which have possessed horticultural value.

Antarctic Structure

SOME further evidence in favour of the probable structural relationship of New Zealand to King Edward Land in the Ross Sea is adduced in certain of the bathymetrical work of the Byrd Antarctic Expedition 1933-35. Mr. S. E. Roos, in a paper on the Ross Sea in the *Geographical Review* of October, notes the discovery at the entrance to the Ross Sea, some two hundred miles south of Scott Island, of the Iselin Bank, with a minimum depth of 700 metres and a length of about 200 miles and separated by a deep gully from the continental shelf. Further to the south-east lies the Pennell Bank. The course of the Antarcandes may possibly run from New Zealand via Macquarie and Scott Islands and these two banks into King Edward Land. Thus the Pacific Basin appears to be separated from the deep water farther west. King Edward Land turns out to be peninsular in character, extending south-east from Cape Colbeck, and there is considerable evidence that the line of folds is continuous with the Edsel Ford Range farther east. Mr. F. A. Wade, writing on the borderlands of the Ross Sea in the same review, points out the resemblances of this range of folded sedimentaries and intrusive igneous rocks to the

Graham Land region, in spite of the igneous rocks being of the Atlantic rather than the basic Pacific type. It is noteworthy that many indications of former more extensive glaciation were found in this range.

Lhuys's Maps of England and Wales

THE Ortelius atlas published in Antwerp in 1573 included maps of England and Wales and of Wales prepared by Humphrey Lhuys. In "Humphrey Lhuys's Maps of England and of Wales" (National Museum of Wales, 1937. 1s.), Dr. F. J. North discusses these maps, particularly that of Wales, as regards means of preparation and sources of information. The outline of Wales is reasonably good and many rivers and places are shown. Mountains are indicated by conventional hummocks. The scale is about 8 miles to an inch. The manuscript of the map is unknown and probably does not exist. Dr. North gives reasons for his belief that Lhuys's map was not based on angular measurement but that it was founded on one of the editions of the Ptolemy map of Great Britain, or some other maps which was based on Ptolemy. In his compilation Lhuys probably owed some details to Lily's map of the British Isles (1546), Mercator's map (1564) and Nowell's manuscript maps. The basis of the English part of Lhuys's map appears also to be Nowell's, Mercator's and an unknown map related to both.

Coal Measure Rocks

THE Safety in Mines Research Board has published as Paper No. 98 a report by H. M. Hudspeth and D. W. Phillips entitled "Coal Measure Rocks: Part I.—Classification, Nomenclature and Relative Strengths" (London: H.M. Stationery Office. 1s. net). The more important rock structures bearing on the strengths of rocks and on roof control are discussed with special reference to the programme of research on rock falls in mines which was initiated some years ago. The strata are classified into five standard groups—sandstones, siltstones, mudstones, shales and clays—according to grain size and constitution. The general petrological characters of the chief rock types are summarized and also their relative strengths and bending capacities. The varied nomenclature used to describe the rocks in the different coalfields of Britain is listed with a brief description of each term. A scheme of strata notation is suggested which is sufficiently comprehensive to illustrate the rocks met with during coal mining. The report will in due course be supplemented by others dealing with Coal Measure rocks in relation to roof control.

Meteorology of Lower Egypt

IN a paper entitled "Temperature and Relative Humidity in the Atmosphere over Lower Egypt" (Prof. Note 75. M.O. 3360. London: H.M. Stationery Office. 2d. net.) Mr. W. D. Flower gives tables of monthly mean values of these quantities from the results of observations made in aeroplanes in the early morning from 1922 until 1930 at three inland stations in Lower Egypt—Helwan, Heliopolis and Ismailia—covering roughly the range 30°-32° north latitude. The observations were made while the aeroplanes were ascending, the time taken to reach the height where pressure was only 650 millibars being about an hour, and the ascents generally began

between 7 a.m. and 8 a.m. local time. Temperature means are for 500-metre intervals, and are based on a good number of observations up to 4,000 m. They show little lag with height in the time of the maximum and minimum of the annual march. There is a gradual increase of temperature from January until August and a rapid decrease in the last three months of the year, but the rate of rise between April and May is retarded above 1,000 m., owing doubtless to a tendency for short periods of very high temperature in April at such levels that has been noted by earlier writers. The mean lapse rate is not very different from that observed in England in the early morning, but observations made in the early afternoon show that it then exceeds the dry adiabatic rate from January until August up to 1,000 m. and exceeds it at times in all months, while in May and June this is often the case up to 2,000 m. The observations of relative humidity show that the mean is so low as 24 per cent at 4,000 m. in August; the mean vapour pressure, however, is higher than that in England at all levels, in spite of the occurrence of such extremely low values as 0.1 millibars at 2,500 m. on one occasion in March and at 3,000 m. once in October. The paper concludes with a discussion of the formation of early-morning clouds in summer, which are attributed to the greater radiation from layers of moist air; they sometimes develop downwards from the top of the moist layer so as to reach the ground and cause fog.

A New Purine in Tea

THE known purines occurring in plants are caffeine $C_8H_{10}O_2N_4$, theobromine, $C_7H_8O_2N_4$, and theophylline, $C_7H_8O_2N_4$. These may be considered as end-products of purine metabolism in plants. In addition to these, some substances such as adenine and guanine, adenylic acid, vernine or guanosine, xanthine and hypoxanthine occur, the non-methylated purines being probably degradation products of plant nucleic acids. While uric acid has long been known as a characteristic oxidation product of purines in animals, it has only recently been found to exist in small quantities in plants (30–250 mgm. per kgm. dry plant). A methyl derivative of uric acid has now been detected for the first time in tea by T. B. Johnson (*J. Amer. Chem. Soc.*, 59, 1261; 1937). A residue from several million pounds of tea obtained in the commercial removal of caffeine was available and from this about 10 gm. of crystals were picked out. These were found by very careful examination, both chemical and crystallographic, to be 1,3,7,9-tetra-methyl-2,6,8-trioxypurine, derived from 2,6,8-trioxypurine (uric acid). It had been synthesized by Emil Fischer in 1884. As Prof. Johnson says: "By the discovery of this purine in tea, we not only increase the number of characteristically methylated purines occurring in the plant kingdom to four (theobromine, theophylline, caffeine and tetramethyl uric acid), but we also stimulate a new interest in the possible natural occurrence of other methyl derivatives of this series, and also in the mechanism of the plant metabolism of purines in general."

Sublimation and Condensation of Crystals

T. ALTY (*Proc. Roy. Soc., A.*, 161, 68) has investigated the interaction of vapour molecules with a crystal surface by measuring the rate of sublimation of crystals into a vacuum. When the crystal is in equilibrium with saturated vapour the number of molecules *incident* on the surface can be determined

from the vapour pressure. The number *retained* by the surface is equal to the number which leave it, and is assumed to be the same as the rate of evaporation in vacuum. The fraction of the incident molecules which condense is called the condensation coefficient. Measurements on liquids have shown that it is nearly unity for benzene and carbon tetrachloride and is of the order 0.04 for water and alcohol. Similarly, the present work shows that iodine and naphthalene have coefficients of condensation unity, while camphor and benzoic acid have much smaller coefficients. The value 0.17 was obtained for camphor. As in the case of the liquids, it seems that non-polar substances have unity values for the condensation coefficient.

A Theory of Ball Lightning

THERE exists a considerable number of descriptions of ball lightning, usually associated with thunderstorms. Th. Neugebauer (*Z. Phys.*, 106, 474) has now produced a theoretical explanation of the phenomenon. He shows that a number of charged particles—electrons and positive ions—may form a compact gaseous mass if the electron density is very high, and of the same order as the density of gas molecules. The mass of gas is held together mainly by the 'exchange forces' of quantum mechanics—the electrons form, under the assumptions made, a non-degenerate gas. The theory shows that the ball may disappear in one of two ways as the electron density falls owing to recombination—either the ball may collapse or it may explode, according to whether the radiative loss of energy keeps pace with the falling exchange forces. These modes of disappearance both occur in the descriptions of ball lightning. The electron density necessary for a coherent ball is much higher than can be attained in laboratory discharges, but it is suggested that it may be reached in lightning flashes of normal type.

Ionosphere Observations in Japan during a Solar Eclipse

THE results of observations on the ionosphere made in Japan during the total solar eclipse of June 19, 1936, are described in a paper by T. Minohara and Y. Ito published in the *Electrotechnical Journal* of October 1937. This journal is an abstract section in English of the *Journal of the Institute of Electrical Engineers of Japan*. The observing station was at Iwamizawa, Hokkaido, and this site was selected because maximum totality of the eclipse occurred in the ionosphere at a height of 260 km. above the observing station. Using the usual type of pulse emitter, the effective heights and critical frequencies of the E , F_1 and F_2 regions of the ionosphere were measured with automatic recording apparatus covering the frequency range 1.5–15 Mc./sec. The results reproduced in the paper show that the effect of the eclipse was very distinct in the case of the F_1 region, but very obscure in the other cases. The ionization density in the F_1 region was approximately proportional to the exposed area of the sun's disk, thus indicating that the ionization was due to ultra-violet light. In the case of the F_2 region, the ionization increased somewhat during the eclipse, an effect which might have been due to decrease in temperature, with consequent contraction and increase in ionization density in the region of the ionosphere concerned. Alternatively, the effects observed may be attributed to the magnetic disturbance which accompanied the eclipse.