Research Items

Boat Construction in Ancient Scandinavia and Oceania

MR. JAMES HORNELL, following up previous studies of similarities in the methods of boat construction in ancient Scandinavia and Oceania, directs attention in *Man* of September to the character of a boat from Botel Tobago, a small island off the coast of Formosa, now in the Hamburg Museum of Ethnology. This bears out a statement made in general terms by J. W. Davidson that the Botel Tobago boats were almost an exact counterpart of the boats constructed in the Solomon Islands as to form, method of construction and ornamentation. They are, in fact, of the Solomon Island *mon* type, and with the Moluccan *orembai* belong to the same class of naval design. The greater crudity of the *mon* and the *orembai* is probably due to degradation. The boat is equal ended, each end being sharp and rising in a gracefully abrupt fashion, and terminating in an acuminate point. The greatest beam is amidship, and the gunwale assumes a broadly lanceolate shape. The base of the hull consists of a narrow salient keel spliced to a narrow curved stern post. On each side of the keel are three wide strakes. The two lower run horizontally, and are shorter than the third, of which the terminal sections form the up-curved end-pieces. Each half end-piece is cut from the solid. The planks are held together initially by means of wooden dowel pins inserted into opposed edges. The dowel attachment is reinforced by lashings. Three sets of cleats, shaped out in the planking, give attachments for a transverse frame, a triangular bulkhead board, and the tie of the converging sides at each end. Probably there were paddling thwarts, though none is now present. The method of lashing the hull planking is more nearly related to that of the Scandinavian type than in either the *mon* or the *orembai*; and the presence of keel and stem posts is another approximation to the later Viking boats, which is not present in the round-bottomed *orembai* and *mon*. The striking resemblances to the Scandinavian boats raises interesting questions as to distribution and diffusion of design.

Yavapai Indians

A FURTHER study of Yuman peoples has been added to the series which is now nearing completion in Mr. E. W. Gifford's investigation of the culture of the north-eastern and western Yavapai (*Univ. California Pub. Amer. Archæol. and Ethnol*, **34**, 4). The Yavapai were unique among the Yuman groups in inhabiting a vast territory, embracing some 20,000 square miles and roughly 200 miles in east-west dimensions and 100 miles in north-south dimensions. This country afforded a wide variety of territory, ranging from the low country of the confluence of the Gila and Colorado Rivers to the high ground of central Arizona; and therefore affords an exceptional opportunity for studying the adaptability of a hunting and gathering people to various environments. These adaptations must have been made within a few centuries, as the country is dotted with the settlements of an earlier Puebloid population. Evidently they adopted little of the cultural habits of their agricultural predecessors. They were nomadic; and their country was sparsely occupied, each group wandering over its territory in search of the ripening plants and the animals on which it subsisted. This is indicated by the table of seasonal occupations given by one of the informants. The Yavapai have much in common linguistically and culturally with their northern neighbours, possibly owing to a not very distant origin from a common stock, as they themselves assert. The Western Yavapai appear to have absorbed certain elements of Yuma-Mohave culture and rejected others. The Navaho traded with the North-eastern Yavapai, bringing woven blankets, shell-beads and turquoise on donkeys. Occasionally the Yavapai visited the Navaho country with buckskin, mountain lion skins, and mescal, sometimes speaking Navaho themselves, sometimes using Tonto Apache as interpreters. The Yavapai afford an unusual opportunity for appraising the influence of two environments, one geographical and one social.

Prehistoric Relics in Malta

A STRIKING feature of the annual report of the Museum Department of Malta for 1935–36 is the number of discoveries of prehistoric relics of human beings and animals made on the island. Twelve rock-tomb burials were accidentally met with, and are described briefly, and prehistoric cave-dwellings and a neolithic site (at Kalet Marku) were excavated. The remains of prehistoric animals are equally interesting and impressive: elephants, tortoises, a frog or toad, extinct birds, and a new species of otter and others from one Pleistocene fissure, and from another, *Elephas falconeri*, *E. melitensis* and *Hippopotamus pentlandi*. These represent only a small part of the remains discovered and described during the year.

Food Production and Nutrition

"STATISTICS of Food Production, Consumption and Prices" is the title of the fourth volume dealing with food and nutrition issued by the League of Nations (The Problem of Nutrition, vol. 4. London: Allen and Unwin. 3*s*.). It is a preliminary study by the International Institute of Agriculture, Rome, of the available statistical material on the production, consumption and prices of the chief protective and other foodstuffs, for example, milk and dairy products, meat, eggs and poultry, fruit and vegetables, cereals and sugar. Half the volume is devoted to an analytical examination of the situation in the limited number of countries for which data exist. The remainder of the volume gives statistical tables relating to production and consumption, with wholesale and retail price indexes. The financial assistance rendered to agriculture in some of the principal agricultural countries is also dealt with. The information collected illustrates the incompleteness of the data available in respect of most of the foodstuffs considered.

Geckos of Japan

THE first of a series of papers to be published upon the lizards of Japan deals with the geckos (Yaichiro Okada, *Sci. Rep. Tokyo Bunrika Daigaku*, **2**, 233; 1936). Fourteen species are here recorded, described and illustrated. They belong to seven genera, all

found in tropical and subtropical regions. But of the fourteen species, only seven are regarded as endemic, the remainder having a wide distribution embracing South China, the Malay Peninsula, and the Philippines. Such distribution is easily accounted for by the ease with which the species, attached to vegetation or some object, are transported by Nature or by man. Yet in spite of the possibilities none has succeeded in establishing itself in the Arctic region.

Environment of Marquesan Insects

THE insect fauna of the Marquesas Islands has been extensively investigated under the auspices of the Pacific Entomological Survey, the central organization of which is at Honolulu. In Bulletin 139 (1936) of the Bernice P. Bishop Museum (forming Pacific Entomological Survey, Publication 9), Mr. A. M. Adamson gives an interesting account of the topography, geology, flora, etc., of the islands, which serves as a background, or basis, for the discussion of their faunistic relations. The islands are the most remote from a 'continental' region of any archipelago in the world, the coast of Mexico being nearly 3,000 miles away and Fiji about 2,700 miles. Their total area is only about 400 square miles; their general altitude is but little more than 4,000 ft. and the coasts are almost entirely unprotected by coral reefs. The greater part of the endemic fauna is now restricted to the higher altitudes, where the climate is very moist and the temperature temperate, rather than tropical. The specific endemism of the flora is much lower than that of Hawaii, with which it has affinities: on the whole, the flora is most nearly related to that of the Society Islands. Three vertical zones of plant distribution can be distinguished, the uppermost, or rain forest, containing the chief food plants of the indigenous insects. The native flora below 1,000 ft. has been replaced in large measure by immigrants and to a certain extent up to 2,500 ft. also. It is evident that the changes being brought out by colonization, either directly or indirectly, are already very marked, and the present survey is a timely one. Probably many species of insects have been already lost, and many more will disappear in the not-distant future.

Hormones and Horticulture

A USEFUL resume of present-day knowledge of plant hormones, or growth-regulating substances, is given by Dr. M. A. H. Tincker (*J. Roy. Hort. Soc.*, 61, Pt. 9; Sept. 1936). The history of investigation in this subject goes back to Darwin, and the work of Rothert and Fitting, of Boysen-Jensen, and later of Loeb and Went, established the idea of chemical 'messengers' or regulators, as a feature of plant physiology. Much of the earlier work dealt with the bending of coleoptiles of cereal seedlings, but the findings of Went, that a root-forming substance was produced by leaves, initiated a new line of horticultural inquiry. Later investigations showed that the growth-promoting substance was an organic acid. It was produced by a wide variety of plants, and was even found in such products as rice polishings, wheat-germ oil and pollen. The active substance is β-indolylacetic acid, and it can be synthesized *in vitro*. Perhaps the most valuable line of future horticultural work is that suggested by Hitchcock and Zimmerman, who have used root-producing hormones in the propagation of difficult cuttings such as maple and apple.

A New Disease of Stocks

A PAPER by Mr. W. M. Ware (*Gard. Chron.*, Sept. 26, 1936) announces the appearance of a new disease of cultivated Stock plants (*Matthiola* spp.). It is caused by a fungus belonging to the genus *Alternaria*, but its exact specific relations have not yet been determined. The fungus can flourish when conditions are good for the growth of Stocks, and it appeared first in a greenhouse where a crop was being raised through the winter. Extensive spots, either somewhat dry, or bearing a copious fructification of spores, appear on the lower leaves of hybrid strains, the Ten Weeks Stocks being apparently immune or highly resistant. Control by removal of diseased leaves proved laborious and only partly effective, whilst fructifications actually appear amongst sulphur dust. The problem of eradication is still further complicated, for it is imperative that the fungus be controlled in its early stages, before the leaves which must be included with the marketable bloom are infected.

A Catalogue of Earthquake Epicentres

IN the University Observatory at Oxford, two card catalogues of epicentres are kept, one arranged in order of latitude, the other in that of longitude, with the dates on which the corresponding foci have been in action since the year 1913. Both catalogues are in constant use at the Observatory, and Miss Ethel F. Bellamy has done good service to seismology by reproducing the former in her "Index Catalogue of Epicentres for 1913–1930" (Isle of Wight: County Press, Newport, 40 pp.; 1936). Miss Bellamy's "Catalogue of Earthquakes 1925–1930", an abbreviation of the "International Seismological Summary", was published a year ago, and all who have worked with it must have appreciated its accuracy. Her new work, which must have been equally laborious, she regards as a geographical index to the Summary. It is divided into four parts. In the first, the epicentres in north latitude and east longitude are arranged in increasing order of latitude, and, when several epicentres lie on the same parallel, in increasing order of longitude. The other parts are similarly arranged for the remaining quadrants. The dates on which earthquakes have occurred beneath each epicentre are entered according to the year, month and day, those in which earthquakes possessed deep foci being printed in italics. The positions of the epicentres are plotted on an equal area projection map of the world, a map that shows very clearly the concentration of activity in the Mediterranean area, the East Indian Archipelago and the margins of the Pacific Ocean. A similar map represents the distribution of seismological stations throughout the world, their clustering in Europe and Japan and their sparseness in Africa, Central Asia and the East Indies and neighbouring islands. This distribution may be in part responsible for the much greater number of earthquakes recorded in the north-east quadrant and in the zone between the parallels of 35° and 45° of north latitude.

Railway Signals for Fogs

IN the October issue of the *Journal of Scientific Instruments*, Mr. A. E. Tattersall describes two forms of signal lamps which, while not so effective as those he described in the same journal a year ago, require less power and will do something towards securing greater safety in running during fogs. Both are operated by wires from the signal box placing the

necessary coloured glasses before the lamp, which is about 11 ft. above the rails. Both secure a parallel beam of light by reflecting the light of an electic lamp with a concentrated source of 5–10 watts at a spherical mirror the spherical aberration of which is compensated by a glass lining. Any special form of distribution of the issuing light beam is secured by the form of the glass front of the box in which the lamp is housed.

X-Ray Method for determining Electronic Charge

THE absolute wave-length of X-rays is now known from ruled grating measurements with a high degree of accuracy. A precise determination of the angle of diffraction from a crystal leads to a value for the crystal spacing, and by using the crystal density, to a value for the absolute atomic masses and for the electronic charge. A new measurement by J. W. M. Du Mond and V. L. Bollman (*Phys. Rev.*, **50**, 524) overcomes the objection which has been made to this method that the density is determined for a large crystal while the X-ray reflection involves only the surface layers. The crystals used in the work were very finely powdered calcite in which the depth of penetration of the rays embraces the whole fragment. The density was determined on the same powder specimen. The value obtained for e was $4{\cdot}799 \pm 0{\cdot}007$ E.S.U.

Excitation of Nuclei by Proton Bombardment

L. R. HAFSTAD, N. P. Heydenburg and M. A. Tuve (*Phys. Rev.*, **50**, 504) have been able to study in detail the yield of alpha- and gamma-rays from fluorine and lithium as a function of the energy of the bombarding protons. The tube and the Van de Graaff type generator are improved versions of those used in former experiments, and the voltage was measured by a galvanometer and high resistance. The alpha-particle emission from lithium had to be studied with a thick lithium target, and unambiguous results on the excitation function were not obtained. In the gamma-ray excitation of lithium, a resonance-voltage at 440 kv. was observed, and the half-width of this resonance was estimated as 11 kv. In the excitation of fluorine, resonance levels were found at 328 kv., 892 kv. and 942 kv., with half-widths of 4, 10, 15 kv. respectively. The width of the lithium excitation region is probably connected with the time of relaxation of an excited level in ^{8}Be, and a discussion of the probable mechanism of this relaxation is given.

Phosphatase of Cows' Milk

THERE is already strong evidence that the phosphatase of cows' milk arises directly from the secretory cells of the mammary gland. This is confirmed by S. J. Folley and H. D. Kay (*Enzymologia*, **1**, 48; 1936) as the result of the study of the phosphomono-esterase content of the milk of sixty-six Dairy Shorthorn cows in relation to the progress of lactation. They find that the advance of lactation is accompanied by regular changes in the concentration of the phosphomono-esterase, the output of the enzyme in the milk rising to a maximum at about 180 days post-partum, whereas no such regular changes in enzyme content occur in the blood serum as lactation progresses. The results suggest that the rate of secretion, or it may be unavoidable loss of phosphatase in the milk, is in general inversely related to the functional efficiency of the mammary gland. It is therefore considered highly probable that the enzyme comes from and is continually being synthesized by the secreting cells of this gland.

Absolute Activity of Choline Esterase

THE enzyme choline esterase arouses interest not only because of its function in the body of destroying the acetylcholine by means of which so many nerves produce their effect; it is reversibly and specifically poisoned by a group of synthetic urethanes allied to eserine. L. H. Easson and E. Stedman (*Proc. Roy. Soc.*, B, **121**, 142; 1936) have reached various interesting conclusions as the result of a quantitative study of the activity of this enzyme under different conditions. They assume that the substances which inhibit the enzyme act by combining with it in the same way as the choline esters, and thus blocking the active groups. They assume that the combination between enzyme and inhibitor is governed by the laws of mass action. The experimental data agree well with these assumptions. The authors have thus calculated the number of active groups in their enzyme preparations and have come to the conclusion that each active group hydrolyses about 3,500 molecules of butyryl choline per second, or 1,490 molecules of acetylcholine. This conclusion may be compared with various calculations of the rate of working of each molecule of an enzyme. The new method of reasoning gives results that refer to active groups rather than molecules, but they are of the same order of magnitude as those obtained for molecules of invertase. Some enzymes work more quickly than this, others work more slowly. The calculations are complicated by the fact that the inhibitor substances are themselves slowly destroyed by the enzyme.

A Catalogue of Stellar Proper Motions

A KNOWLEDGE of stellar proper motions—the small progressive angular changes of the relative positions of stars—is of basic importance to astronomy. In the first place, proper motions provide data for the study of the spatial movement of individual stars, for 'star-streaming', and for the motion of the solar system; secondly, they enter into any work involving the reduction of measures for star places on photographic plates, such as astrographic chart work and the determination of the parallaxes of stars. Proper motions may be derived from a comparison, after a sufficient lapse of time, of the positions of stars as given in various catalogues, based on meridian observations, or from photographs taken with a fairly long time-interval (say, thirty years) between them. In 1923, Dr. Richard Schorr, director of the Hamburg Observatory at Bergedorf, published a catalogue of proper motions including more than 21,000 stars, compiled from various sources. He has now published a new edition of this work (*Bergedorfer Eigenbewegungs-Lexikon*, 1 and 2) in which all proper motions available up to the end of the year 1935 are collected together from every available source. The new catalogue, which is conveniently arranged for reference in one degree zones of declination, contains no fewer than 94,731 stars, of which 60,642 are in the northern hemisphere. These tabulations, together with footnote references to the large number of proper motions published in the *Greenwich Astrographic Catalogue* (**4**, **5** and **6**) and in the five catalogues by Schlesinger (*Yale Transactions*, **4**, **5**, **7**, **9** and **10**) provide a complete means of ascertaining in a few minutes whether a star has any measurable proper motion. The value of such a catalogue is obvious, and Dr. Schorr will deserve the thanks of astronomers for the compilation of this extensive work.