

Research Items.

THE GHOST DANCE RELIGION AMONG THE POMO OF CALIFORNIA.—In the course of a study entitled "Pomo Folkways," by Edwin M. Loeb, which is published as vol. 19, No. 2, of the *University of California Publications in American Archaeology and Ethnology*, reference is made to the effect of the introduction of the modern ghost dance among the Pomo on their own religious esoteric cult and ghost dance. The Pomo are a typical central Californian Indian people, sedentary, living in small villages in a coastal and an inland group, among whom the arts, excepting basketry, were slightly developed. They depended on the chase and fruits and roots for food. It may be noted in passing as an interesting fact that the greater part of the information concerning them has been obtained from a Pomo who had devoted himself to ethnographical studies and made a living by passing on the information thus obtained. The native Pomo ghost dance had as its essentials the use of the bull-roarer, the impersonation of ghosts and clowns, the use of semi-masks, the "death and resurrection" initiation, and mutilation by cutting. The modern ghost dance religion arose among the northern Pai Ute of Nevada about 1870, travelled west and entered California from the north. It reached the Pomo from the Patwin in 1872, when it extinguished the Pomo ghost dance and Kuksu religion, though both supplied material for the new cult. The desire for the return of the dead which underlay Pomo culture now became an essential of the new cult. The new religion supplied a "big head" dance and a pole ceremony. The old secret society also died away. The priests of the new cult, instead of acquiring office by inheritance or long instruction, as in the old, were summoned by some unknown person or some one recently deceased, who appeared to them in a dream and instructed them in the ceremonial. All the ceremonial was supposed to have been received in this way instead of having been installed in the beginning of the world, as was held in the old ghost dance ceremony.

THE AURIGNACIAN HUMAN FIGURE FROM THE CAVERNE DAVID, CABRARET.—An interesting example of the application of technical knowledge to the interpretation of a palæolithic engraving is furnished by a criticism of M. H. Breuil's description of the male human figure of Aurignacian Age found in the Caverne David at Cabraret (Lot) which is contributed by Prof. R. Anthony of Paris to the *Bull. Société d'Anthropologie de Paris*, 7^e Sér. T. 5, Fasc. 1-3. The figure in question lies on its back and, as described by M. Breuil, apart from certain adjuncts which need not be mentioned, the chief characteristics are the indefinite character of the head, the extraordinary outline of chest and abdomen, which are abnormally expanded, although in the case of the latter a second outline is shown which is nearly flat and terminates in the genitalia, and a sharply defined slender waist-line between chest and abdomen. Three women are shown near as if approaching the body. M. Boule interprets the drawing either as a representation of a man who has been killed, and the women approaching as mourners, or an initiation scene. Prof. Anthony, regarding the engraving from the point of view of a medical man, offers a different interpretation. The most important element is the phallus, but so far from being the representation of the complete genitalia, the drawing represents three successive morphological states. Viewed in the light of this conclusion, it is suggested that the drawing is a representation of a coitus in which the abnormal curves are feminine. The peculiar and apparently

ill-drawn lines of the man's haunch and leg are due to muscular contraction natural in such conditions. If Prof. Anthony's interpretation be correct, it is an addition to a type not without importance for the interpretation of representation of the human figure in palæolithic art, and serves further to emphasise the artist's accurate representation of detail in the attention given to the muscular curves.

SCOTTISH MARINE BIOLOGY.—The annual report for the Scottish Marine Biological Association gives a short account of its activities for the year 1925-26. It opens with a note of regret on the death of Prof. J. F. Gemmill, and we welcome the suggestion that some useful form of memorial should be raised to facilitate the carrying out of research in the laboratory to which he was so attached. The lines of research followed by the Association during 1925-26 are noteworthy for the co-operation between the two permanent workers, Mr. A. P. Orr, who has worked on the seasonal chemical and physical changes of the water in the Clyde sea area, and Miss S. Marshall, who has studied the seasonal variations in the phytoplankton in the same region. The changes in the amounts of phosphate in solution in the sea-water of Loch Striven, which has been visited at weekly and fortnightly intervals this year, show striking correlations with the seasonal fluctuations in the abundance of phytoplankton in the different water layers. Their work has, in fact, produced a confirmation of the generalised theories put forward by Atkins as a result of his researches at Plymouth, direct correlative evidence of phytoplankton changes not having been obtained in that locality. The Millport Station has accommodated seventeen research workers from other parts of Great Britain in the period under review, as a result of which two important papers by Mr. G. S. Carter on "The Control of the Velar Cilia of the Nudibranch Veliger" and by Mr. J. Gray on the mechanism of cell division, have already been published. Mr. R. Macdonald has worked for a year at the laboratory on the life-history of *Meganocythanes norvegica*, an important constituent of the food of many fish. The superintendent, Mr. R. Elmhirst, is to be congratulated on a successful year.

ORGANIC MATTER IN LAKE WATER.—For a number of years investigations have been prosecuted by Prof. Birge and several co-workers concerning both the organic life and the physical and chemical conditions in American Lakes. Among the most interesting studies have been the various reports dealing with annual variations in the amount of organic matter, including that organised into plants and animals or existing as organic debris, and the substances in solution. Observations concerning the latter are dealt with in the latest report on these investigations ("The Organic Matter in Lake Water." By E. A. Birge and C. Juday. *Proc. U. S. Nat. Acad. Sci.*, vol. 12, pp. 515-519, August 1926). The water of Lake Mendota contains a standing crop of nearly 15 milligrams per litre of organic matter in solution, an amount considerably in excess of that found in the plankton and higher aquatic plants. Besides carbohydrates and fats, it consists of nitrogenous compounds which yield the amino acids indispensable in food, such as tryptophane, cystine, tyrosine, histidine, and arginine. The dissolved organic matter of lake water, if it is to be judged by amount and chemical composition, constitutes a potential food supply for aquatic animal life several times as large as that offered by the plankton. Whether such food substances in solution can be utilised directly by

aquatic animals is controversial and awaits further investigation. Indirectly, it doubtless nourishes bacteria which are the food of protozoa, and these, in turn, nourish higher animals.

BRITISH BARK-BEETLES.—*Forestry Commission Bulletin* No. 8 deals with British bark-beetles, which form a group of insects closely associated with forestry practice. It is the outcome of several years' work and first-hand study of these insects by Dr. J. W. Munro, the author of this bulletin. Much that is known concerning bark-beetles is to be found in German periodicals and text-books and for this reason is not readily accessible to those concerned with forestry problems in Great Britain. Dr. Munro has made copious use of this information and, by adding personal observations of his own, has produced an illustrated brochure of great value to foresters and also to the general entomologist. In addition to providing an account of the chief facts of the biology of bark-beetles, he also gives useful keys to their identification and accounts of each individual species. In Britain, all the bark-beetles prefer suppressed, less vigorous, and felled trees to healthy trees for breeding. The majority of such insects are secondary enemies the attacks of which are associated with adverse influences. The inter-relations between the bark-beetles and influences inimical to the proper growth of trees is the prime feature of bark-beetle economy. In modern forestry practice the most important factors contributing to the increase of bark-beetles are the systems of pure, that is, unmixed, forest planting and of clear-felling. In forests composed of several species of conifers, or of conifers and broad-leaved trees intermixed, such beetle outbreaks seldom become severe. Under the shelter-wood systems the danger of increase of these beetles is rare, but in clear-felling of pure woods in large areas, bark-beetle attacks supervene unless adequate precautions are taken.

SEX-LINKED INHERITANCE IN FOWLS.—The fact of sex-linked inheritance in poultry is being put to practical use in the determination of the sex of young chicks. A recent bulletin by Prof. Punnett (*Miscellaneous Publications*, No. 55, Ministry of Agriculture and Fisheries) explains the method in simple language. Three pairs of easily distinguishable sex-linked characters may be used: (1) silver or gold ground colour of plumage; (2) barred or unbarred plumage; (3) light or dark yellow shank colour. A hen, for example, of any silver breed, such as Light Sussex, transmits silver (which is dominant) to her sons and gold to her daughters, whereas a silver cock transmits silver to all his offspring. Hence in a cross between a Light Sussex hen and a Red Sussex cock the sex of the chicks can be determined by the down colour at the time of hatching. The same applies to all crosses between a hen of silver breed such as Silver Campines, Wyandottes, and Hamburgs as well as Dorkings and Salmon Faverolles and a cock of any gold breed such as Brown Leghorn, Indian Game, Buff Orpington, etc. But when a breed, e.g. Campines, with heavy dark markings is used, the down colour of the chicks is more difficult to distinguish. Similarly when a Plymouth Rock hen is mated with a Minorca cock, the male chicks will be barred and the females black. When a White Leghorn hen is mated with a dark-shanked breed the cockerels have light shanks and the pullets dark, but this distinction is not always clear in other crosses.

FACTORS OF THE SEX CHROMOSOMES IN FOWLS.—A recent paper by Serebrovsky and Wassina (*Journ.*

of Genetics, vol. 17, No. 2) carries further the knowledge of sex-linked characters in fowls. Crossing-over between sex-linked factors has been observed in various cases, and the various percentages of cross-overs between the different pairs of sex-linked factors are used to construct a chromosome map of the sex chromosomes. In addition to the three pairs of factors mentioned in the note above on sex-linked inheritance in fowls, a fourth has been studied which inhibits the rate of feathering in chicks, and a fifth—spangling—is receiving attention. It is suggested that the order of the genes in the sex chromosome is barring yellow legs, silver and late feathering, but the percentages of cross-overs are not all consistent with this conclusion, and other sex-linked characters are being sought to test these results.

EFFECT OF X-RAYS ON *VICIA FABAE*.—H. Komuro, in *Jour. Coll. Agric. Imp. Univ. Tokyo*, vol. 8, No. 2, gives a historical résumé of earlier work with X-rays on plant growth, and details his own experiments on *Vicia faba*. He concludes that irradiation is harmful in all circumstances, the degree of injury being correlated with the water content of the seeds, checking of growth being caused by the dose of rays in inverse proportion to the water content. With high doses, development is not stopped immediately but germination occurs and the growth below ground reaches the same stage as with seeds of the same initial water content exposed to lower irradiation. It was noticeable that when the dose of X-rays exceeds a certain limit, varying with the water content of the seed at the time of irradiation, it does not induce a visible difference in the degree of injury proportional to the dose. No acceleration of germination was obtained by treating air-dried seeds with rays of 7H-15H, and retardation occurred with increasing doses both with air-dried (14 per cent. water content) and steeped seeds (57 per cent. water content). Germination is not affected if the seed coat is removed, the plumule and radicle being equally influenced by the rays whether the seed coat is present or not. The sprouting of air-dried irradiated seeds is delayed more than that of steeped irradiated ones for the same doses, probably because the latter, with a large water content, are more stimulated than the former containing less water. No anatomical differences were observed in the mesophyll of leaves of plants with different treatments of rays, but there was less chlorophyll in the plant treated with high doses (80H and 120H), so that they appeared yellowish in comparison with the controls.

PLEISTOCENE AND TERTIARY MOLLUSCA OF JAPAN.—A few months ago we had the pleasure of recording the publication by Prof. Matajiro Yokoyama of six papers on the Tertiary mollusca of Japan (*NATURE*, Sept. 11, 1926, pp. 389-90). Six further papers by the same eminent palaeontologist are now before us (*Jour. Coll. Sci. Univ. Tokyo*, vols. 44 and 45). These treat of the Pleistocene "Mollusca from the Coral-bed of Awa"; "On some [Upper Pliocene] fossil Shells from the Island of Saishū in the Strait of Tsushima"; "Tertiary [Pliocene] Mollusca from Dainichi in Tōtōmi"; and three papers on the "Molluscan remains [Pliocene and Miocene] from the . . . Jō-Ban Coal-field." Each paper is preceded by a brief but very clear introduction discussing the topography and geology of the area in question, with a list of the fossils, while the main part contains the descriptions of the species, very many of which are regarded as new, followed by plates of figures.

FLOW PAST A ROTATING CYLINDER.—The Flettner rotor ship has brought before the public one practical

method of utilising the special properties of a rotating cylinder in a wind. The aerodynamic efficiency of the cylinder has been studied in various laboratories. In a short paper by Relf and Lavender (Aeronautical Research Committee: R. and M. 1009. London: H.M. Stationery Office, *gd.* net) a visual study of the flow of water past a rotating cylinder is made. While the results are purely qualitative, the photographs bring out clearly the extent to which the circulation of the fluid increases with rotational speed of the cylinder. While the proximity of the water channel walls interfere with the free flow of the liquid, the photographs make it appear that at high rotational speeds an unsteady state of flow maintains.

SOFT X-RAYS.—Various improvements in the technique of the measurement of soft X-rays are described in a paper by K. T. Compton and C. H. Thomas (*Phys. Rev.*, October 1926). The soft X-rays generated were detected by their photoelectric action. A system of gauges was used to prevent ions from reaching the detecting plate, and the range of voltage applied to these gauges was carefully studied. The thermionic and photoelectric currents, I and E , were measured by balanced methods in which the full scales of the instruments were employed to determine the current increments resulting from small changes in the voltage applied to the tube. The latter changes were also measured by a similar balanced method. The experimental observations thus made were so precise that the critical potentials were determined from curves in which the second differences in the ratio E/I were plotted against the voltage. In this manner any discontinuities were rendered much more marked than in previous methods. The operation of the tube was tested by examining the critical potentials for an iron target which had been used in previous experiments. The new methods of plotting were used in the examination of the critical potentials of carbon and copper, 62 critical potentials being found for carbon in the range 0 to 160 volts, and 31 critical potentials for copper in the range from 65 to 280 volts, which had not been previously investigated for fine structure. The authors indicate the need for direct spectroscopic work on the spectra from solid targets in this low voltage region.

RATING INCANDESCENT LAMPS.—Much attention has recently been given to methods of photo-electric colour matching, as greater sensitivity and higher accuracy are obtained in this way than by the ordinary visual methods. In the November number of the *Journal of Scientific Instruments*, N. R. Campbell and C. G. Eden, of the G.E.C. Research Laboratories at Wembley, describe a machine based on a photo-electric method for determining the voltage at which incandescent lamps will burn with a prescribed efficiency. In practice it is rarely necessary to determine this voltage with the highest accuracy, but it is of great commercial importance to be able to determine it rapidly with a maximum inaccuracy of about 2 per cent. The speed is limited by three factors: the period required to make an estimate of the photo-electric balance, the period required to introduce the lamp into the photometer, and the period required for the lamp to take up a steady state. This last period depends on whether the lamp has been aged or not previous to the test. If the lamp is burnt for the first time it may be so long as 3 minutes. The electrometer used is a Lindemann quartz needle instrument made by the Cambridge Instrument Co., Ltd., which reads very quickly and has a very stable zero. The machine is calibrated by the use

of standard lamps of which the rated voltage is known. It was found that the machine enabled lamps to be rated with a mean error in volts of about 0.1 per cent. at the rate of about 200 lamps per hour. If the machine were modified so as to make certain of the motions automatic, so that all the operator had to do was to insert and remove the lamps and watch the deflexions of the electrometer, nearly double the speed could be obtained.

DIRECT READING WAVE-LENGTH SPECTROMETERS.—Messrs. Bellingham and Stanley, Ltd., have recently added to their catalogue of spectroscopic apparatus a description of two instruments exhibiting novel features. A direct reading wave-length spectrometer is now available, mounted on a stand in such a way that it can be used in the horizontal or vertical position or tilted to any convenient angle. The prism is of the usual constant deviation form, and is rotated by a micrometer screw to which is attached a large divided drum-head on which the wave-lengths of the spectrum lines can be read. The second piece of apparatus is a visual wave-length spectrometer for ultra-violet light. The light enters by a slit, is sent by a quartz reflecting prism to a quartz mirror, and thence in a parallel beam to a reflecting quartz half-prism where the dispersion takes place. The issuing beam is then reflected by another quartz mirror to a fluorescent screen adjacent to a wave-length scale, where it is viewed by an eyepiece. The instrument is very compact, and a large screen is attached to shield the observer from the ultra-violet radiation. It is said to be of considerable use for the examination of the lamps used in actino-therapy. The Universal spectroscope constructed by this firm has recently been improved and the price considerably reduced.

IONISATION POTENTIAL AND THE PERIODIC SYSTEM.—The *Gazzetta Chimica Italiana* for August contains a paper by Rolla and Piccardi in which some relations between the ionisation potential of elements and their position in the Periodic System are discussed. It is shown that non-metals have high ionisation potentials, metals low ionisation potentials, and metalloids potentials of medium value. The ionisation potential is a periodic function of the atomic number; it is a function of the atomic structure in general and of the peripheral structure in particular, and is in quantitative relation to the chemical character of the element. A curve showing the periodic character of the ionisation potential is given, which resembles the well-known Lothar Meyer atomic volume curve.

ISOLATION OF ILLINIUM.—Since the appearance of a paper by Harris, Hopkins, and Yntema in the June issue of the *Journal of the American Chemical Society* on the isolation of illinium, a new element with atomic number 61, a preliminary note describing some independent research on this element has been published in the *Gazzetta Chimica Italiana* for July by L. Rolla and L. Fernandes. Starting in 1922, by June 1924 they had obtained strong evidence for its separation from a specimen of didymium earth from Brazilian monazite sand, but they refrained from publishing their results because of the small quantity of substance at their disposal. With a larger amount of material and using an improved method of fractionation, after about 3000 complete crystallisations they arrived at a residue rich in samarium possessing an absorption spectrum in which the peculiarities observed in 1924 were greatly accentuated. A thorough examination of the emission and absorption spectra of this fraction was in progress when the work of the American chemists appeared.