

Research Items.

CLAY FIGURES OF PALÆOLITHIC AGE.—In *Nature* for March 8, M. P. Barrau de Lorde records the discovery by M. Norbert Casteret of some remarkable examples of palæolithic art from the neighbourhood of Saint-Martory (Haute Garonne). In the hitherto unexplored parts of a cavern through which a subterranean stream runs for a distance of 1200 metres, M. Casteret found in a side gallery, not only rock carvings of bison, deer, horses, and a human head, but also clay models in the round and in bas-relief. A number were nearly destroyed by the action of the water, but some fine figures of horses were fairly well preserved. A natural head had evidently been employed to complete the figure of a crouching bear, as the skull lay between its fore-paws. Three lions, or tigers, which were attached to the wall, measured 1.70 metres in height and 1 metre in length. The bear and the tigers were covered with holes representing javelin thrusts. Geological evidence indicates that these figures and carvings date from a cold and very dry period, when the subterranean stream was dry or very low, and permitted ingress to the parts of the cave now inaccessible except by diving. The find is notable in that the only previous discovery of clay figures of palæolithic age is that made by M. le Comte Bégouen at the Tuc d'Audoubert in 1912.

CEREMONIAL OBJECTS IN STONE AND ALGONKIN SYMBOLISM.—Mr. H. Newell Wardle has published in the Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lxxv., an attempted correlation of the obscure "ceremonial stones" of North America with the mythology and pictographic symbols of the Algonkin stock. Broadly speaking, the distribution of these ceremonial stones coincides with that of this stock. The cone, it is suggested, represents the domed back of the turtle, which in the creation legends of the Delaware appears as the earth and in the pictographs supports the hero-god or the people. The so-called boat-stones represent the "stone canoe" of the culture hero Michabo, the visible sign of his power. Birds were peculiarly sacred to Michabo among the Algonkin, and names of birds were favourites as personal designations, hence the ceremonial use of bird forms in stone. The "banner-stones," the most discussed of all the forms, it is suggested were ceremonial objects primarily intended to be mounted on a staff and representing in their forms not the thunder bird alone, but also other superhuman powers. For the stone tablets with one or two holes, various symbolic meanings are suggested, such as the tortoise, the world—a four-lobed form—the heart as the source or centre of life and the emotions, the beaver, the wolf's foot, the turkey, and, again, the thunder bird.

ZOOLOGICAL NOMENCLATURE.—The following Opinions (78-81) have been rendered by the International Commission on Zoological Nomenclature. Opinion 78: On the basis of the premises presented, *Dermacentor venustus* dates from Marx in Neumann, 1897, type specimen Collection Marx No. 122 (U.S. National Museum), from *Ovis aries*, Texas, and that *Dermacentor andersoni* dates from Stiles, 1908, holotype U.S. P. H. & M. H. S. 9467, from Woodman, Montana. Opinion 79: "Rigidly construed," Lamarck's (1801a) *Système des Animaux sans Vertèbres* is not to be accepted as designation of type species. Opinion 80: The Echinoderm genus *Holothuria* Linn., 1767, restr. Bruguière, 1791, type *H. termula* 1767 = *H. tubulosa* 1790, and the Siphonophora genus *Physalia* Lamarck, 1801, type *P. pelagica* 1801 = *Holothuria physalis* 1758, are hereby placed in the Official List of Generic Names. Opinion

81: On the basis of the premises before the Commission, the common bedbug of Europe, *Cimex lectularius*, is the genotype for *Cimex* 1758, *Acanthia* 1775, *Clinocoris* 1829, and *Klinophilus* 1899 (*Clinophilus* 1903), and its proper technical designation under the Rules is *Cimex lectularius*. *Cimex* Linn., 1758, type *C. lectularius* is hereby placed in the Official List of Generic Names.

MALAYAN BLATTIDÆ.—Dr. R. Hanitsch, who has been carrying on his work on the Malayan Blattidæ in the Hope Department of the Oxford Museum, has lately published a second part of his treatise, thus completing his monograph of the group. The value of a work of this kind depends on the care with which the literature of the subject is searched, and the accuracy with which the descriptions of new species are drawn up and the synonymy of known forms is determined. These requirements are well met in the present treatise, which will accordingly not only be indispensable to those interested in the systematic study of the group, but will supply good material for the use of workers in questions of general biology. Problems of especial importance are those arising from the facts of geographical distribution, and on these studies such faunistic data as are supplied by Dr. Hanitsch's treatise are of undoubted value. It is interesting, for example, to gather from the distributional tables on pages 462 to 468, that while 44 species of Blattidæ are recorded from Java and not from Borneo, and 82 from Borneo and not from Java, only 27 appear to be found in both islands. A conspicuous example of sexual dimorphism occurs in *Cabara rugosicollis*, where the male is slender, delicate, and long-winged, while the female is short, stout, and entirely apterous, with a dense brush on the anterior tibiæ. This structure may be of use, as has been suggested by Mr. Hamm, to the female for cleaning itself, the insect being of a burrowing habit, and the work of burrowing being probably undertaken by the female alone. The monograph is well illustrated by the author's text-figures and two coloured plates by Mr. Valentine Knight.

PLANKTON OF THE SARGASSO AND MEDITERRANEAN.—No. 7 of the Reports of the Danish Oceanographical Expeditions of 1908-10 in the Mediterranean and adjacent seas (Copenhagen, 1923) contains several papers on the biological results and some miscellaneous papers of particular interest. The limits of the Sargasso Sea have been determined for the first time by observations of the density of the floating weed, and there are also good descriptions of the systematic forms of Sargassum. A number of collections of the macroplankton of this region were also made by using surface nets in a standardised way and counts of the organisms so obtained were made. The result is to confirm the estimates made by Victor Hensen: the Sargasso Sea and its margins are characterised by a relative paucity of macroplanktonic life when compared with the North Atlantic south from Greenland, round Iceland, north and west from Great Britain, the North Sea and the Bay of Biscay. The Mediterranean also shows this paucity of planktonic life. It is pointed out that the same general results were also obtained by Lohmann in a study of the microplanktonic life. The report in question contains an account of drift bottle experiments made in the Sargasso Sea and a further account of the elvers of North and South Europe.

COTTON DUSTING FROM AEROPLANES.—Bulletin 1204 of the U.S. Dept. of Agriculture (published January 1924) is of exceptional interest. It is

written by Mr. B. R. Coad, entomologist, Mr. E. Johnson, agricultural engineer, and by Lieut. C. L. McNeil of the U.S. Air Service, who have worked in collaboration on cotton dusting from aeroplanes. The possibility of applying insecticides by means of aeroplanes was first brought to public notice in August 1921 by the State Experiment Station of Ohio, in co-operation with the U.S. Air Service. In this test lead arsenate was distributed from an aeroplane over a grove of catalpa trees attacked by larvæ of the catalpa sphinx (*Ceratonia catalpæ*). The experiment proved successful, and suggested the need for further tests of a similar nature. The possibility of using the aeroplane to combat the cotton-boll weevil immediately suggested itself. An opportunity, however, was afforded to test this method of insecticide distribution in combating an outbreak of the cotton leafworm (*Alabama argillacea*). Arrangements were accordingly made with the Air Service of the U.S. army for detailing aeroplanes for the purpose. The result of the experiment, using calcium arsenate, was quite satisfactory, and, as nearly as could be determined, about 2 lb. of this compound per acre delivered from an aeroplane proved as effective as 5 lb. per acre delivered from a ground machine. Somewhere about 400-500 acres can be dusted per hour, but only a smaller portion of this time is devoted to the actual process: much time, on the other hand, is occupied in going backwards and forwards for fresh supplies of arsenate, as the containers were only adapted to hold about 125 lb. of the poison. The same terrain was infested with the boll weevil, but the extent to which this pest was controlled as the result of the operation was uncertain, and only casual observations were made. The practicability of effective dusting from an aeroplane seems well established, but whether it will prove equally successful against insects other than openly-feeding lepidopterous larvæ further trials can alone decide.

THE "ROSS DEEP" OF THE SOUTHERN OCEAN.—A single sounding of "4000 fathoms, no bottom," which Sir J. C. Ross took in 1843 in lat. 68° 34' S., long 12° 49' W., led to a belief in a great area of very deep water in that part of the Southern Ocean, and the probable high southern latitude of the coast-line of Antarctica. In 1904 the *Scotia*, under W. S. Bruce, re-sounded within a mile of Ross's position and found 2660 fathoms. The explanation of Ross's mistake is that his hepen sounding rope was carried northwards by a strong undercurrent which certainly exists in that area. Lt.-Com. R. T. Gould has found in the Hydrographic Department a report by Ross on this sounding, which is published in the *Geographical Journal* for March. It is of considerable interest, since the time taken for each successive 100 fathoms to pass out of the boat are recorded. These data show a steady retardation in the speed of the line until 2200 fm. had been run out. Then occurred a sudden and well-marked retardation which remained constant for a long time. Lt.-Com. Gould rightly suggests that this change at 2200 fathoms was due to the sinking striking the bottom: beyond that the line was lying on the floor of the ocean. A depth of 2200 fathoms within a mile or so of the *Scotia's* 2660 fathoms is not improbable.

POLYGONAL SURFACE MARKINGS.—The polygonal surface markings of Spitsbergen and some other parts of Arctic regions are well known and have been studied by Wulff, Högbom, Nansen and others, but are not yet fully explained. In the *Geographical Journal* for March, Messrs. J. S. Huxley and N. E. Odell record their observations on these markings in Spitsbergen and throw some new light on their

formation. Of the two kinds, the fissure polygons, which are separated from one another by cracks and show no differential distribution of fine and coarse material, arise in damp fine-ground soil, in the first instance, either by drying or by contraction at thawing. Repeated frost action helps to reinforce this process. The stone polygon, with a characteristic border of large stones and a centre of sticky mud, is much more difficult to explain. Högbom explains their origin by repeated acts of freezing causing differential movement in mixed soil of various sizes. This leads to the materials being sorted according to size. Nansen believes, on the other hand, that this kind of polygon originates round the edge of snow patches when the splitting action of the frost is operative throughout the summer owing to the supply of moisture from the snow. Thus differential weathering occurs. The authors think that the true explanation is to be found in a combination or extension of the two theories, and they discuss the evidence in considerable detail. The paper is an important contribution to the study of polygonal markings even if it does not solve all the puzzling aspects of the subject.

PLANORBIDÆ IN THE INDIAN MUSEUM, CALCUTTA.—In 1921 the first part was issued of a "Catalogue of the Planorbidæ in the Indian Museum (Natural History), Calcutta," by Dr. Louis Germain (Rec. Ind. Mus., xxi.). The final, fourth, part has now come to hand containing the plates and index. The whole will be a valuable reference work, though not a trustworthy guide, for students of this group. Dr. Germain has adopted Dall's classification as originally published in 1905 (Harriman Alaska Exped., xiii.), errors and all, but has apparently overlooked that writer's important modifications which appeared in 1908 (Proc. Malac. Soc. Lond., viii.). Where Dr. Germain has added to Dall it has not always been successfully done. Thus in the synonymy of the genus he includes Cornu of Schumacher, which, as a matter of fact, does not contain any form approaching Planorbis. The plates are mostly phototype and good of their kind, while there are excellent text illustrations.

CLOUD-HEIGHTS AT MELBOURNE OBSERVATORY.—The report of the Australasian Association for the Advancement of Science, vol. 16, 1923, contains a discussion on the above by Capt. E. Kidson. Observations were made by means of photographs for the absolute determination of the height and velocity of clouds at the Melbourne Observatory under the direction of Mr. P. Baracchi, the Government Astronomer, during the years 1897-1901. The observations were part of a scheme agreed upon in 1894 at the Upsala meeting of the International Meteorological Committee. In all 430 pairs of photographs were taken and measured, but the final reductions were not made. The author became attached to the Central Weather Bureau at Melbourne in 1921, and shortly afterwards undertook the discussion of the observations. In the scheme for obtaining the observations, two cameras, as nearly as possible identical, were mounted with their axes vertical at two stations 6820 feet apart. Precise details are given of taking and dealing with the observations, which may be helpful to others carrying out similar work. The individual observations of the several clouds and the general meteorological conditions are given in tabular form. A summary of the results shows that *true cirrus* ranged in height from 20,000 ft. to 42,000 ft., most frequently at 36,000 ft. to 38,000 ft., and 32,000 ft. to 34,000 ft. *Cirro-stratus* ranged from 20,000 ft. to 39,000 ft., the great bulk being between 26,000 ft. and 36,000 ft., with a pronounced maximum

at 29,000 ft. *Cirro-cumulus* ranged from 18,000 ft. to 34,000 ft., the maximum frequency being between 24,000 ft. and 26,000 ft. *Cumulus*, greatest height recorded, 14,000 ft. *Strato-cumulus* was recorded up to 12,000 feet. *Cirrus* is the most rapidly moving cloud, averaging more than 70 miles per hour. In the great majority of cases the centres of depressions pass to the south of Melbourne.

POWDERED COAL IN FURNACES.—The use of powdered coal in furnaces has raised the question of the rate of fall of the powder through the furnace gases and its bearing on the problem of the speed of combustion. A discussion of the laws of fall of such a particle by means of the theory of dimensions was undertaken by Mr. J. Blizard of the United States Bureau of Mines, and his paper is contained in the issue of the *Journal of the Franklin Institute* for February. He shows that the measurements of the terminal velocities of dust particles of various densities falling in different gases made recently by M. E. Audibert (*Annales des Mines*, vol. 1, p. 153) can all be expressed by the equation $3.4v = (\rho/\rho_0)^{0.44} (1/v)^{0.27}$, where v is the terminal velocity, r the radius, and ρ the density of the particle, ρ_0 the density and ν the kinematical viscosity of the gas. For practical furnace calculations the gas may be taken as air.

PHOTO-ELECTRIC ACTION IN COLOURED ROCK SALT CRYSTALS.—Herr J. Bingel has recently employed W. C. Röntgen's method for measuring the "photo-electrical current in naturally and artificially coloured rock salt," *Zeitschrift für Physik*, Feb. 16, 1924. The same conditions were made use of which were employed by Gudden and Pohl with the photo-electrically conducting crystals having a refractive index greater than two, which show the simple phenomena of the photo-electric current. With the rock salt crystals it was found that the measurements are reproducible even after some weeks; there is a linear connexion between current and voltage, and no sign of saturation even at 50,000 volts/cm. The current is proportional to the amount of luminous energy employed; with partial illuminations the additive law holds. The observations made leave it undetermined whether there is real photo-electric conduction or polarisation of the dielectric. A comparison of the "output" of current with the quantum equivalent law rather suggests that there is true conduction; in any case, it appears that the phenomena cannot be due to movements of electrical charges merely through molecular distances. Quantitative determinations were made of the diminution of the photo-electric "currents" with time observed by Röntgen.

α -PARTICLES FROM POLONIUM.—In the *Zeitschrift für Physik*, February 25, 1924, Herr W. Kutzner describes an elaborate series of measurements on α -radiation from polonium, using Geiger's method of counting the α -particles, which depends on the excitation of a point discharge. A platinum point, enclosed in a small metal chamber to which the α -rays were admitted, was connected to the grid of a triode valve; the anode and cathode were connected through a battery to the primary of a transformer, the secondary being connected to a string galvanometer with photographic registration. Time divisions on the records, in which the number of particles counted lie near the mean value, occur more frequently than is to be expected according to the law of probability, and those in which this number is above and below the mean less frequently. In other words, the "cocked-hat" curve is distorted. This is the more marked the greater the activity of the preparation per square millimetre. It is suggested that there

must be some mutual action between the single polonium atoms, or between single α -particles and the atoms, to account for this. An α -particle, colliding with an atom which has approached the condition in which disintegration takes place, may break it up, just as in Rutherford's experiments the atoms of some of the lighter elements are disintegrated by α -ray bombardment.

THE HIGHER ORDER SPECTRA OF ARGON, KRYPTON, AND XENON.—Messrs. L. and E. Bloch have studied the spectrum of mercury vapour in a tube without electrodes, using an oscillating discharge, and have found that there are three different orders of spectrum, E_1 , E_2 , and E_3 , which probably belong to the ions Hg^+ , Hg^{++} , and Hg^{+++} ; in collaboration with M. G. Déjardin, they have employed the same method with argon, krypton, and xenon, and describe the results in *Comptes rendus* of the Paris Academy of Sciences of Feb. 25. With the first two gases, when the potential is gradually raised the reddish ring characteristic of the arc spectrum is first observed, then a blue ring showing the spark spectrum of the first order, and finally a white ring which accompanies the formation of the spectra of higher order. With xenon it is difficult to distinguish the first phases, and a very bright white ring is very quickly produced. In the spectroscopie the arc lines appear first as long lines, and then the first order spark lines begin to appear as short lines at the edges; they have already developed into long lines when the higher order lines begin to show as short lines. In most cases it is possible in this way to classify the lines with certainty. There are certain recognisable analogies between the corresponding spectra of the three gases. The spectrum E_1 is the most intense one and has most lines; it reaches from the extreme red to the extreme ultra-violet; E_2 has fewer lines, and starts suddenly at the end of the violet or the commencement of the ultra-violet, with no lines in the visible part of the spectrum; E_3 has lines distributed fairly regularly throughout the spectrum, but they are more numerous in the ultra-violet.

FOUR-WHEEL BRAKES FOR MOTOR CARS.—The question of fitting brakes to all the wheels of a motor car has attracted considerable attention recently, and an interesting discussion is given in a paper read before the Institution of Automobile Engineers by Mr. F. A. Stepney Acres. There are various arrangements possible, namely: (a) the front and rear wheel brakes independently operated, (b) semi-independent, (c) coupled, and in each of these there are combinations of hand-operated and foot-operated brakes. A case is made out for the independent type with hand-operated front brakes and foot-operated rear brakes on the grounds of efficiency, trustworthiness, simplicity, weight and cost. The author cannot say a good word for the coupled system, under present conditions at any rate; it is heavy, complicated, and costly as compared with independent brakes, and cannot possibly give the best holding power under all conditions, good and bad. The difficulties of fitting brakes to the front wheels are purely mechanical, and hinge chiefly on the lack of rigidity between the brake shoes and the frame, more particularly in the axle itself. The risk of fitting front brakes to a chassis not originally designed for them is also pointed out. A table giving the results of stopping tests with four-wheel brakes is given in the paper, from which it appears that the coefficient of friction between the tyres and the road may reach, or exceed, unity. One example taken from the table is that of a vehicle travelling at 30 miles per hour and pulled up in a distance of 28.4 feet; this gives a value for μ of 1.06.