Research Items

Early Records of Californian Indians. Mr. J. P. Harrington, of the Bureau of American Ethnology, has recently discovered the manuscript, which had long been missing, of the earliest, and indeed the only, account of the Indians of California dating from the period of the Spanish occupation, which is worthy of the name of an ethnological treatise. The author, Fr. Jerónimo Boscano, was a Franciscan missionary, born in the island of Mallorca in 1776, who worked at San Juan Capistrano from 1812 until 1826 and died in 1831. The Indians of San Juan Capistrano whom he described are a north-western sub-division of the San Luiseño Indians of the San Luis Rey Mission, who speak a dialect of the Aztecan family of languages. They had almost disappeared before they came under modern scientific observation. A version of Boscano's account was published in 1846; but the manuscript proves to be far more valuable than was expected, as it contains data not in the published version, and, indeed, the two supplement one another in important particulars. The treatise centres around the cult of Chinigchinix, who had once lived among the people as a prophet. On his death, it was believed, he was translated to heaven, leaving no visible remains behind. From heaven he continued to watch his people, and to judge and punish them for wrong-doing. In addition to his account of their cult the author describes the relation of the people to their chiefs, their marriages, their principal feasts and their calendar together with some miscellaneous customs. The temple of Chinigchinix was so sacred that no boy or girl was allowed to approach it, and it was an effectual sanctuary for anyone guilty of any crime. Mr. Harrington has published a translation of the manuscript (*Smithsonian Miscellaneous Collect.*, **92**, No. 4) and is also preparing a full commentary on the material it records.

Petroglyphs in the Society Islands. A study of stone remains in the Society Islands (*Bull.* 116, Bernice P. Bishop Museum, Honolulu) by Mr. Kenneth P. Emory, based partly on material collected by Dr. E. S. C. Handy in 1923 and partly on that collected by the author as a member of the Bernice P. Bishop Museum's Expedition to the Tuamotu Archipelago on various occasions between 1925 and 1931, describes, among other matters, a number of petroglyphs which have been discovered on Tahiti, Huahine, Raiatea, Borabora and Maupiti. In Tahiti the petroglyphs are on large boulders, but in the Leeward Islands on slabs of maraes as well. Their uniformity and conventionality prove that the making of petroglyphs was a well-established practice. The motives are the turtle, which predominates, the human figure, concentric circles, circles and dots, and the canoe. They fall within the period of the historical inhabitants, but there is no means of dating them. Human figures at Tipaeni, Tahiti, are traditionally said to commemorate the wife and twin children of one Tatauri, who took refuge there, but this has the appearance of a local legend rationalised to fit the carving. Most petroglyphs are wrought by pecking. None of the groups is organised to portray an event or to form a decorative ensemble. The figures are added one after the other by the same or different artists without regard to preceding figures. The turtle, the predominating figure, was the food of the gods, eaten only by chiefs and keepers of the marae. The figures are sacred symbols and not drawn in the spirit of decorative art, though some idea of embellishment may be present. The petroglyphs discovered in various localities indicate that incising or pecking of figures on stone is almost universal in Polynesia, Samoa being a notable exception.

Siamese Fishes. Mr. Henry W. Fowler describes many new fishes from Siam collected by Mr. Rodolphe Meyer de Schauensee (Zoological Results of the De Schauensee Third Siamese Expedition, Part I.—Fishes. *Proc. Acad. Nat. Sci. Philadelphia*, **86**, 1934). Most of the material is from the northern regions, and the results are of much value as a contribution to the ichthyology of Siam. Some fishes from Bali, Dutch East Indies, are also included, obtained from the markets, at the seashore and in fresh waters. In Lake Bratan, Central Bali, which is a small body of fresh water in the crater of an extinct volcano, without visible communication with other waters (elevation 4,040 ft.) fishes were angled with a hook baited with rice, dressed with a sauce, which formed an effective bait. Three handsome new gobies were obtained from south-east and southern Bali. The Siamese collection contains upwards of 4,500 specimens, of which more than half are cyprinoids. There are 50 new species represented by 9 new genera or sub-genera. All these are carefully recorded and described, and the colours noted whenever possible; the whole work is beautifully illustrated.

Marine Fauna of the West Indies. Recent reports of the collections obtained by the first Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep (*Smithsonian Miscellaneous Collections*, **91**, Johnson Fund, 1934) are "Three New Deep-water Fishes from the West Indies" by George S. Myers, "New Brachiopods" by G. Arthur Cooper, "Two New Nematodes" by B. G. Chitwood (Nos. 9, 10, 11, Pub. 3238, 3241 and 3243, April) and "Three New Amphipods" by Clarence R. Shoemaker, "New Mollusks of the Family Turritidæ" by Paul Bartsch (Nos. 2, 12, Pub. 3229 and 3246, May, June). In the first, the family Triacanthidæ is revised, Mr. Myers including in it the new genus and species *Johnsonina eriomma*, closely related to *Hollardia hollardi* described by Poey in 1861 from near Havana, but peculiar in having a large eye-like spot under the origin of the dorsal fin. Several rare and interesting brachiopods were collected and a new nematode of special interest was taken from the lizard *Anolis cristatellus*, which appears to belong to a group composed as a rule of parasites of arthropods (*Parathelandros*). Many of the mollusks belong to the Turritidæ, which are very difficult to classify, and it was found that the nuclear characters here, as elsewhere, are useful for systematic purposes. A large number of new species are described and several new genera.

Immature Stages of Scolytidæ. For some years Mr. J. C. M. Gardner of the Forest Research Institute at Dehra Dun, India, has been making a study of immature stages of Indian Coleoptera. Amongst other families his work on the Cerambycidæ has proved of considerable value. In his latest paper ("Immature Stages of Indian Coleoptera" (15), (Scolytidæ), *Ind.*

For. Rec., **20**, Pt. 8, Delhi: Manager of Publications, Aug. 15, 1934) he deals with the destructive family the Scolytidæ or so-called bark beetles. As Mr. Gardner says, "the morphology of adult Scolytidæ has been intensively studied but with the exception of studies of a few species, notably by Hopkins (1909), Russo (1926) and Schedl (1931) very little is known of larval and pupal structure". Coleopterists are not yet unanimous on the subject as to whether the description of the adult, however complete, requires to be supplemented by descriptions of the immature stages. Mr. Gardner is, as his work well shows, an advocate of the latter. The grouping of the Scolytidæ, or certain genera in the Scolytidæ, is by no means an agreed matter, and here the assistance of the immature stages might lead to a settlement of certain contested points. The paper in question is an attempt to make a beginning in the classification of Scolytid larvæ. It is restricted to some 17 genera, the larvæ of 25 species being described. The author states that he has not succeeded in finding characters to separate Scolytid larvæ as a whole from those of the Curculionidæ.

Spermatogenesis of the Phasmidæ. Very little has been known of the spermatogenesis of the Phasmidæ. A comparative account by Maurice Favrelle of seven species belonging to as many genera has recently been published ("Recherches sur la Spermatogenèse des Phasmes mâles d'origine bisexuée". Suppt. 17, *Bull. Biol. de France et de Belgique*, 1934). An unpaired *X*-chromosome is present in each case, the number of chromosomes ranging from 21 to 53 in the different genera. The size of the chromosomes varies inversely with the number, so that the total amount of chromatin remains approximately constant. In *Carausius juvenilis* the *X*-chromosome frequently divides precociously in the first maturation division, and non-disjunction of the *X*-chromosomes occasionally takes place in the second division. The spermiogenesis of the group is also described.

A New Parasite in the Blood of Birds. A new protozoan parasite found in the blood of *Leptocoma zeylanica* is described by I. Froilano de Mello and Macario Raimundo (*Proc. Indian Acad. Sciences*, **1**, No. 2, 97; 1934). This new species, *Hæmoproteus raymundi*, exhibits a particularly simple schizogonic cycle. Merozoites arise as a result of the nuclear division of free trophozoites, and the former remain free among the cells of the host tissue. They finally attack the red blood corpuscles as schizonts, but no intracellular stage has been detected at any phase of the schizogonic cycle.

Microbiology of the Upper Air. Ever since Pasteur demonstrated the presence of micro-organisms in the atmosphere, bacteriologists have desired to know more about the forms of life which can exist in the higher layers of air. Several attempts have been made to investigate this question, and the results of a recent study appear in the *Proceedings of the American Academy of Arts and Sciences*, **69**, No. 8, 315–340 ("The Microbiology of the Upper Air" by Bernard E. Proctor, August 1934). Preliminary tests with Petri dishes exposed from the cabin of an aeroplane indicated the need for an improved collecting apparatus which would reveal the presence of dust and other particles. A current of air, collected by a Venturi tube placed above the upper wing of the aeroplane, was caused to flow through a sterilised filter of oiled paper. This was later examined microscopically and finally used as inoculum for plates of nutrient agar. Forty-five flights were made, and collections obtained at heights up to 20,600 ft. Bacteria and moulds were obtained from the greatest height, whilst yeasts and pollen grains were found above 16,000 ft. The majority of bacteria were the common spore formers of soil and water, and it is interesting, though perhaps not significant, that no pathogenic organisms were obtained. Various species of the genera *Aspergillus* and *Penicillium* were the chief moulds, and 29 species of bacteria have been identified. The results are extensive and carefully tabulated, but show that the microbiology of the atmosphere is constantly changing, and that the factors which control it are not yet fully understood.

Intracellular Inclusions in Plant Virus Diseases. Much interest has centred round the formation of peculiar vacuolate bodies in the cells of plants infected with certain virus diseases. They have been thought to be aggregations of virus particles, but Dr. F. M. L. Sheffield, of the Rothamsted Experimental Station, has shown that they should be regarded as reactions of the host cells to virus infection. In a recent paper ("Experiments Bearing on the Nature of Intracellular Inclusions in Plant Virus Diseases", *Ann. App. Biol.*, **21**, No. 3, pp. 430–453, Aug. 1934), she publishes further evidence for this conclusion. Inclusion bodies or *X*-bodies produced by three distinct diseases have been studied, namely, *Aucuba* mosaic of tomato, *Hyoscymus* III disease, and tobacco mosaic. The last-mentioned virus produces amœba-like bodies which persist for some weeks. Artificial coagulants such as salts of molybdic acid and lactic acid cause the cytoplasm of healthy cells to form small bodies similar to those produced by virus infection. Attempts to inhibit the formation of *X*-bodies were not successful.

Climatic Changes in Central Asia. A contribution to this much debated problem is made by Messrs. H. de Terra and G. E. Hutchinson in a paper in the *Geographical Journal* of October on the change shown by Tibetan highland lakes. Pangong Tso lies north of the Himalayas at an altitude of 13,915 ft. Built paths along the lake border have been impassable in places for years: the eastern outlet is now considered unfordable: recorded depths have increased: beach lines can be traced below water-level: old alluvial fans on the border have been cut by waves, and lastly, lagoons are traceable to inundation. These and earlier observations dating back fully a century give proof of changes in level. Morari Tso and other lakes in Ladakh also show evidence of recent rises. The chief water supply of these lakes is from glaciers or snow-fed rivers, and it seems obvious to associate the rise in level of the lakes with an increased amount of melting water, or in other words with evidence of glacier retreat. But of this the writers contend there is no sign in recent years and they believe that the cause is one of increased precipitation. The meteorological records at Leh show an increase in precipitation synchronous with the lake rises. This increase has been shown by Dr. C. E. P. Brooks to have been apparent throughout almost all temperate Asia for the thirty years prior to 1910.

The Texas Earthquake of August 16, 1931. Though its greatest observed intensity was not more than 8 of the Rossi-Forel scale, this earthquake affected an area, it is estimated, of 450,000 sq. miles, and was

recorded by the more sensitive instruments in Europe. Prof. Perry Byerly has made a careful study of the seismograms obtained at fifty-four stations (*Bull. Amer. Seis. Soc.*, **24**, 81–99, 303–325; 1934). From those at nine neighbouring stations, he finds that the epicentre lay in lat. 30° 53′ N., long. 104° 11′ W., that is, in the Jeff Davis Mountains and close to the continuation of the Apache Mountain fault to the south-east. The travel-time curve of *P* shows a definite break at about 16° from the epicentre, indicating a first-order discontinuity at a depth of about 300 km. Beyond a distance of 75°, the curve has two branches, the upper part of which is interpreted as indicating that the discontinuity at the depth of about 2,400 km. is of the first order, at which the speed of *P* waves drops discontinuously. From the direction of the first motion on the records, it is concluded that the earthquake may have been caused by movement along a fault directed about N. 35° W., upward on the east side and downward on the west.

Vowel Sound Perception. Part 3 of vol. 33 of *Archivio di Fisiologia* contains an account of the measurements made by Messrs. A. Gemelli and G. Pastori of the minimum duration of vowel sounds which allows of their proper perception. By means of an oscillograph, the vibrations produced when words of two syllables like 'nulla', 'mito', 'sasso', 'tonno', etc., were pronounced softly in the ordinary tone of voice by three subjects whose voices had mean pitches of 261, 326 and 480 per second were recorded and analysed. Both curves and analytical tables are reproduced, and include 'open' vowels like the 'a' in 'sasso' and 'close' ones like the 'o'. Although there is some difficulty in allowing for differences which determine the 'musicality' of speaking voices and for the effects of the preceding and following sounds, the authors conclude that the minimum duration of a vowel sound for its proper recognition depends principally on the number of oscillations which take place in the time and to a less extent on the time itself.

Automatic Wilson Chamber for Cosmic Rays. P. M. S. Blackett has published a detailed description of his expansion chamber, which is set off by the simultaneous discharge of two Geiger-Müller tube counters (*Proc. Roy. Soc.*, Sept.). When a fast particle in a gas leaves an ionised track, the latter broadens by diffusion, and in the cloud chamber the ions are immobilised as soon as droplets condense on them. In order to give tracks not broader than 1 mm., the expansion has to be complete within about 0·015 sec. from the passage of the ionising particle. The chamber is designed with a light piston made tight with a rubber diaphragm; the air below this diaphragm is allowed to escape by a valve operated by an electromagnet, which is controlled by the Rossi coincidence counting circuit through a thyratron. Chambers of this type have been operated in a solenoid and in the gap of a large electromagnet.

Heavy Hydrogen. A review of research on the isotopes of hydrogen and on heavy water by L. Farkas has appeared in *Die Naturwissenschaften* (**22**, 614, 640, 658; 1934). The articles deal with the possible structure of the nucleus of heavy hydrogen, the use of heavy hydrogen in the investigation of the structures of the nuclei of other elements, the spectroscopy of heavy hydrogen, chemical reactions and equilibria in which it plays a part, the ortho- and para-modifications of heavy hydrogen, its physical properties and those of heavy water, the methods of preparation, the determination of heavy hydrogen and a detailed discussion of its reactions. There are numerous literature references. These articles present the most recent data of the subject in a well-classified form.

Ignition Temperatures of Gases. Dr. H. F. Coward (*J. Chem. Soc.*, 1382; 1934) has published the results of a series of experiments made by the late Prof. H. B. Dixon on the ignition temperatures of gases, the method being that of concentric tubes. The supporting atmosphere (air or oxygen) was passed up through a wide porcelain tube, the temperature of which was slowly raised by an electrically heated external platinum spiral. The combustible gas was passed up through a narrow tube, coaxial with the other, terminating in an orifice at the centre of the wider tube. As the temperature rose, a point was reached at which inflammation occurred, and this temperature was recorded by means of a thermocouple just below the orifice of the inner tube. One important result of the work was the discovery that small amounts of nitrogen peroxide in the air or oxygen reduced the ignition points; it was also found that small amounts of iodine in the atmosphere raise the ignition points of hydrogen, carbon monoxide and methane, and that various compounds of bromine raise the ignition point of methane. Dr. Coward, who gives a careful and interesting report of the experiments, discusses the results in the light of current theories. The experiments included the effects of pressure and moisture. The results of determinations in which the effects of hydrogen and of moisture on the ignition of carbon monoxide were examined are particularly interesting.

Electrodeposition of Rubber. Electrodeposition has been proved to be a practical process for the manufacture of many articles including rubber and rubber-coated goods; for example, motor and cycle tubes and rubber-covered screens for sieving coke. A paper by Dr. D. F. Twiss describes the method in technical detail (*J. Inst. Elec. Eng.*, Oct.). Rubber latex consists normally of a suspension of minute negatively charged rubber globules in an aqueous serum. Under electrolytic stress the globules tend to migrate against the electric current. If the current enters by zinc or a porous diaphragm, electrodeposition of the rubber can be effected. Deposits obtained in this way can be dried and vulcanised, and form the basis of several commercial manufacturing processes. The use of latex in this way obviates the need for the heavy machinery used in ordinary rubber manufacture and eliminates the preliminary milling treatment of the raw rubber. This improves the ordinary mechanical properties of the product. In the production of ebonite-coated articles, the current enters the aqueous serum through the article itself, which therefore forms the anode. At present the method can only be used economically for the production of layers less than one centimetre thick. The success of this process in practice is evidence of the advantages arising from its use. On account of the low temperature of vulcanisation, bright organic colours can be used which under ordinary vulcanising conditions would suffer serious discoloration. It is very useful therefore when making upholstery goods.