

Research Items.

AUSTRALIAN STONE IMPLEMENTS.—A paper on stone implements found on the camping grounds formerly used by Australian aborigines, by Mr. A. S. Kenyon, in *The Victorian Naturalist*, vol. 43, No. 10, which describes the character of these implements and their uses, suggests certain general considerations which are not without interest to students of the use of stone in prehistoric times in other parts of the world. The Australian camping grounds are of three types—those of a purely temporary character, where the remains are of food entirely; those where good shelter and varieties of food were obtainable, but here implements are sparse and of a crude nature; and thirdly, those that were permanent and at which aborigines were always to be found, and where the old men and women stayed and practised their arts and crafts. The first evidence of a camping ground is the presence of foreign stones, which may be either implements or fire stones; and the second the presence of food remains, often large quantities of shell of an edible kind. Raised beaches, especially around Port Phillip, have often been mistaken for kitchen middens. Examination reveals that the foreign stones fall into the following groups, apart from fire-stones: (a) small but definite shapes, mostly retouched; (b) larger shapes, much less definite, with secondary working of a much coarser nature; (c) similar flakes without retouching; (d) large pieces with coarse chippings; (e) cores. By far the greater number show no sign of working, but cannot be classed as 'wasters.' The aboriginal did not spend time on the elaboration of an implement when once he had obtained the edge he required, and it was thrown away perhaps after a few strokes, when once the edge showed the effect of use.

MAN'S PLACE OF ORIGIN.—In the issue of the *Scientific Monthly* for May, Dr. William K. Gregory surveys the evidence bearing upon the antiquity of man in its relation to the question of his place of origin, inclining strongly to the conclusion that it must be sought in Asia. He naturally attaches considerable importance to the discovery in 1921 in a cave at Chou Kou Tien, south-west of Peking, of the two human teeth (pre-molar and molar) of Upper Pliocene or Lower Pleistocene age. The close relation in structure between, say, man and the chimpanzee points, in view of the high estimate of geologic time accepted by some authorities, and the slow and unequal rate of evolution apparent when the palæontological data are studied comparatively, to a separation at a period far later than the Lower Eocene. It also supports Darwin's view that man is an offshoot of the primates of the Old World rather than the New. In the Old World, notwithstanding the close approach to human conditions of *Dryopithecus rhenanus* of the European Pliocene, and the provenance of the most primitive known skulls (Pittdown, Heidelberg, etc.), Europe is not a likely place of origin. Notwithstanding the occurrence of members of the man-anthropoid series in the Lower Oligocene of Egypt, central Asia affords the most likely geological evidence of suitable avenues of distribution—this conforming with the peripheral distribution of Pithecanthropus and the Wadjak and Australian skulls, while the Nebraska tooth probably represents a migrant from eastern Asia. The geological, palæontological, and anthropological data from central Asia have suggested the hypothesis that a gradual uplift of this area afforded the cause and the conditions of a gradual evolution of man in group after group of higher types, the lower migrating continuously on the receding lines of the changing environment.

MEDIEVAL ANATOMICAL TEXTS.—The subject of medieval anatomy to which we directed attention some time ago (*NATURE*, Dec. 5, 1925, p. 811) has recently been brought before us again by Dr. George W. Corner, professor of anatomy in the University of Rochester, U.S.A., in a scholarly treatise which contains a commentary and translation of the more important anatomical texts as well as a bibliography and facsimiles of some of the manuscripts. Dr. Corner has skillfully disentangled the historical facts from the legendary matter connected with the school of Salerno and Constantine the African, whom, like Sudhoff, he regards as one of the founders of modern medicine and indeed of all modern biology. Dr. Corner emphasises the fact, which does not appear to be sufficiently realised, that the translations of Constantine and the school of Salerno gave the Occident some of the fruits of Oriental medicine a hundred years before the later Arabic philosophers and physicians were translated at Toledo. The anatomical texts of the twelfth century consisted partly of three documents known as the two Salernitan demonstrations, one of which was called "Anatomia Cophonis," and "Anatomia Mauri," which were used as practical manuals for teachers and students, and partly of systematic descriptive anatomical works, in which the subject is handled in a highly organised style in accordance with the fashion of medieval scholasticism. Dr. Corner also gives an interesting account of a thirteenth-century text of a work named "Anatomia Vivorum" or "Anatomia Ricardi Anglici," which he regards as one of the very-first books of the Middle Ages to show the influence of Aristotelian biology.

FORAMINIFERA FROM THE SUEZ CANAL.—The Cambridge Expedition to the Suez Canal in 1924 collected Foraminifera at nine stations, lying between the Great Bitter Lake and Gulf of Suez, and they are discussed by E. Heron-Allen and A. Earland in *Trans. Zool. Soc. London*, vol. 22, Part I., No. 9, Dec. 1926. The gatherings were not large and yielded few species, most of which belonged to the 'porcellanous' group. There is no evidence of movement of any species from north to south (e.g. from the Mediterranean through the Red Sea), but there is thought to be positive evidence of one Indo-Malay and South African species—*Polystomella Millei* H.A. and E., also found at Suez—migrating northwards, although only represented from the Bitter Lake by one specimen. A single specimen of *Polystomella craticulata* (Fichtel and Moll) occurring in the Bitter Lake is regarded as almost equally strong evidence of northward migration of that species. It is, however, hazardous to draw conclusions from single specimens, and under the heading 'Known Distribution,' P for Palermo is given (perhaps a misprint), although in the text it is stated that *P. craticulata* has not, so far as the authors are aware, been recorded from the Mediterranean. It is interesting that nearly all the Suez Canal specimens of Orbitolithes are abnormal in some way, a peculiarity attributed to the variations in salinity which are apparently productive of deformed and monstrous growth. Three species are recorded, but all differ somewhat from the types, the usual specific characters being more or less obliterated. There is a list of the species of Foraminifera collected comprising 50 in all, 38 being taken in the Bitter Lakes and the remainder at the southern entrance of the Canal. Of the 38, 5 are known from the Indo-Pacific and not from the Mediterranean, and the remainder are from both areas.

A NEW MUTANT IN DATURA.—In the experiments of Drs. C. S. Gager and A. F. Blakeslee (*Proc. U.S. Nat. Acad. Sci.*, vol. 13, p. 75) mutations appear to have been produced by the action of radium emanations on the ovary of the plant *Datura Stramonium*. In the successful case an exposure of 10 minutes, probably just after the reduction divisions in the ovules, resulted in 17.7 per cent. of mutations among 113 plants, whereas the normal rate of mutation is about 0.47 per cent., and an untreated capsule of the same plant gave 36 offspring, all normal. The mutants were mostly forms with an extra chromosome, but included two new gene mutants (found in the offspring of 18 plants tested) and a peculiar type called 'nubbin.' The latter has an extra chromosome, but from various lines of evidence Blakeslee concludes that its composition probably includes two chromosomes each made up of the halves of different chromosomes. Unlike the other trisomic mutants, 'nubbin' gives rise to five different types in its offspring. The radium treatment is held to be 'largely responsible' for all three types of mutation obtained.

PLANT ECOLOGY OF PORTO RICO.—Volume 7, parts 1 and 2, of the "Scientific Survey of Porto Rico and the Virgin Islands," published by the New York Academy of Sciences, is devoted to an account of the ecology of Porto Rico by H. A. Gleason and Mel I. Cook. This work of 173 pages and 50 excellent photographic plates is the result of a few months' field work on the island. All the principal types of vegetation over some 3400 square miles of country were examined, and the results are given as purely those of a field survey, but as such form a good basis for more intensive work of a statistical or experimental nature. Works on island floras (e.g. Cooper's "Climax Forest of Isle Royale") are of a special interest from a successional point of view, as factors can be delimited in a manner scarcely possible in the case of continental floras. The authors distinguish three distinct vegetation regions, that of the Northern Coastal Plain, that of the Central Mountain Region, and that of the Southern Coastal Plain. Most of the first region is covered with limestone deposits, which develop a mesophytic upland forest, now nearly destroyed by settlers. Besides these mesarch associations, xerarch, hydrarch, and halarch series are found, the latter in the form of mangrove swamps, and all of those tend towards the development of a Playa Land Climax Forest. The Central Mountain Region was originally entirely covered by forest, except for minor areas of rock outcrops. The forest comprises five ecological types, in which the causal factors seem to be altitude, rainfall, and exposure. Only fragments of lower level forest now remain, but the vestiges show strong floristic relationship to the xerophytic forest of the Southern Coastal Plain. Between 2000 ft. and 3000 ft., the forest is mesophytic in character, consisting of a moist tropical forest and a tropical rain forest. The higher peaks are clothed by the Sierra palm forest and the mossy forest, the two types being differentiated chiefly by their exposure to wind. Each of these five ecological types is associated with a definite set of climatic conditions, which are not subject to modification by the vegetation, and each may thus be regarded as a climatic climax formation. A vegetation map would have been an acquisition to the work.

THE LIAS OF THE MEDIAN PRÉ-ALPS.—The nappe of the Median Pré-Alps has been referred by different authors in turn to each of the three zones of sedimentation—Helvetian, Pennine, and Austro-Alpine—which have contributed to the great recumbent folds of the western Alps. A very careful study of the

stratigraphy and fauna of the Lias of the difficult region south of Lake Geneva has been made by E. Peterhans, and his results are published in the *Mémoires de la Soc. Helvétique des Sci. Nat.*, vol. 62, 1926, Mem. 2. It is clearly shown that the Liassic fauna of the "Medianes" is definitely different from those of the Helvetian and Austro-Alpine regions, and that it probably belongs to the Pennine region. The latter deduction, however, cannot be directly proved, for the corresponding rocks of the Monte Rosa nappe are thoroughly metamorphosed. The provisional assumption by some of the Swiss geologists that the "Medianes" represented an extreme north-westerly thrust of the Austro-Alpine nappes, had to face the difficulty that the folding of the "Medianes" is of a type that implies the former presence of a heavy cover. It is now possible to regard this vanished cover as an Austro-Alpine nappe, part of which still remains in the inner belt of the Pré-Alps. The most puzzling feature of Alpine architecture thus still remains, for the push of the Austro-Alpine nappes far to the north-west of their roots still awaits a mechanical explanation.

CLIMATE AND ANIMAL EVOLUTION.—In the memoir entitled "The Environment of Tetrapod Life in the Late Paleozoic of Regions other than North America," published by the Carnegie Institution of Washington, Prof. E. C. Case continues that study of the land animals of Permian time and of the environment in which they lived which has occupied him for some twenty years and formed the subject of those well-known works on the American Permian fauna to which the present volume forms a supplement. Prof. Case holds that, within any restricted period of time, correlation of beds by conditions of environment is a more satisfactory method of understanding the relationships of faunas than is an attempt to establish correlations on the basis of an equivalence with marine deposits. In his former work, Prof. Case was able to show that the animals which form part of the 'Texas' Permian fauna are constantly associated with definite conditions of the environment in which the rocks containing their remains were laid down. He has now added to his very great experience of the American Upper Palaeozoic an acquaintance with rocks of similar age in many other parts of the world, founded not only on the literature, but also on a personal examination. The resulting work is most valuable because it brings together in a well-arranged form a vast mass of information on the geology and palaeontology of the continental Permian deposits of the rest of the world and discusses the conditions under which they have been laid down. The most interesting general conclusion is that the evolution which takes place in the members of a fauna must be associated in some way with the concurrent climatic changes in the area in which they are living.

MISSISSIPPI FLOODS.—The slow sinking of the lower Mississippi valley was suggested as a cause of the floods by Dr. D. E. White at the recent meeting of the American Shore and Beach Preservation Association. According to a report issued by Science Service of Washington, Dr. White pointed out that while there is no certainty that the gulf coast is sinking, the undoubted downward movement of the Atlantic coast is significant. The region to the north of the great lakes is being tilted upward, which suggests that farther south there may well be an area of depression probably with some warping or twisting of the earth's crust. He cites the well-known occurrence of earthquakes in the Mississippi valley between Cairo and Memphis as probable confirmation of this movement. The rate of sinking,

if it occurs, is no doubt very slow, but it will cause an increasing liability to floods, and furthermore, by reducing the speed of the currents, will render it more difficult for the lower river to keep its bed clear of sediments. Dr. White raised another problem with regard to the silting up of river channels. The levee system is based on the assumption that streams so confined will scour their own channels, but this, he maintains, has not been proved. If the river really drops its load of silt in the bed instead of carrying it out to sea, eventually the bottoms will be higher than the banks, and the raising of the levees to keep pace with this growth will cause increasing peril to the lowlands. Dr. White advocates the national importance of a study of these problems.

GEOPHYSICS IN THE UNITED STATES.—The report of the seventh annual meeting, on April 29–30, 1926, of the American Geophysical Union, has recently been issued as Bulletin No. 56 of the National Research Council. More than a hundred of its 134 pages are devoted to reports and summaries of papers read in the six sections and the general meeting. They afford a valuable and interesting record of American views on the problems of geophysics as a whole, and of their activities and observations within their own large and important field of work. At the general meeting the constitution of the earth was discussed, in the light of cosmical theory, gravity measurements, seismic and magnetic data, and chemical investigation. The section of volcanology also instituted a symposium, not confined to its own special viewpoint, on co-operation in the scientific investigation of the Aleutian Islands. Many papers in the remaining sections dealt with recent instrumental advances and programmes of observation completed or in progress.

THE PHOTO-ELECTRIC PROPERTIES OF MERCURY.—A number of troublesome effects produced in photoelectric work by impurities have been made the subject of a special study by H. K. Dunn. The experiments, carried out under the direction of Prof. Millikan and described in the May number of the *Physical Review*, were performed under conditions similar to those employed in the standard determination of the photo-electric threshold of mercury, with a continually renewed surface, and have incidentally confirmed Kazda's value of 2735 Å.U. for the limit. When the surface flow was stopped in a high vacuum, the threshold rose quickly to 2850 Å.U., and then in the course of a few days fell to 2680 Å.U. If liquid air was not kept on the traps, radiation of still higher frequency was required. The contamination seemed to be due to some relatively non-volatile substance other than water, which was given off by the tap-grease used. With pure hydrogen over the surface, the behaviour was exactly the same, but the presence of hydrogen which had been distilled with the mercury and was apparently in solution in the metal, greatly retarded the rate at which the active impurity became effective. It is suggested that in this case, as well as in other instances where the photo-sensitivity of a plate has been found to be increased by electrolytic generation of gas on the side remote from that exposed to the radiation, undesirable impurities are carried off by the gas diffusing through the substance.

MOVING MAGNET GALVANOMETERS.—Dr. C. V. Drysdale, in the May number of the *Journal of Scientific Instruments*, points out that recent improvements in the design of moving magnet galvanometers have made them for many purposes superior to moving coil galvanometers. By improving the design of the moving system and using cobalt steel magnets of very

small dimensions, A. V. Hill and A. C. Downing have succeeded in making galvanometers about 500 times as sensitive as Kelvin four-coil galvanometers. The most serious drawback to moving magnet galvanometers is their susceptibility to magnetic disturbances. This difficulty has been overcome by using a thin cylinder of the new high permeability nickel iron alloy which is generally known as mumetal or permalloy. A simple experiment is described showing the effective nature of this screening. A light cobalt steel magnet suspended by a quartz fibre was found to oscillate with a period of one second in the earth's field and was very sensitive to the motion of a bar magnet at some distance away. When it was screened by a permalloy cylinder closed by plates of the same metal, the time of oscillation was increased to more than ten seconds and the effects of the external bar magnet were negligible. The screening results obtained are far better than those got in the ordinary way by using massive soft iron bells. A notable advance has therefore been made.

CORROSION OF METAL JOINTS.—In the *Journal of the Royal Society of Arts* for April 29, Dr. U. R. Evans discusses briefly the problem of corrosion in general. After the consideration of troubles arising in welded, riveted, or soldered joints, the paper concludes with the following: The choice of materials which are to come in contact at a joint should be made with a view to minimising the E.M.F., although in some cases it may be advisable to make the metal presenting the smaller area weakly cathodic to the other. The nature of the joint itself is important, and care should be taken to avoid crannies which will be anodic to the main surface. Perhaps the most dangerous condition is a capillary crevice existing between the two dissimilar metals. Here the portion of the surface of the nobler metal near the mouth of the crevice will function as the cathodic area, whilst inside the crevice the base metal, and often the noble metal also will suffer anodic attack. It is important whenever possible to apply some coating of efficient protective paint, varnish, or plastic composition to the joints, with special reference to places where microscopic crannies may exist. The possibility of bulging due to cranny-corrosion is another matter of which account must be taken, the size and strength of the pieces being chosen to resist the stresses exerted by the volume changes involved in the corrosion process. The paper contains an interesting discussion from the electro-chemical point of view of the soldering of aluminium.

POTASSIUM NITRATE AS A FERTILISER.—For the enrichment of artificial fertilisers, potassium nitrate appears to possess so many advantages over other compounds of nitrogen that extensive field experiments have been undertaken by the *Agrikultur-chemische Versuchsanstalt der Landwirtschaftskammer* in the province of Saxony and also in Cassel. The association of potassium with nitrogen in the salt renders it more valuable for this purpose than sodium nitrate, which also possesses the disadvantage of being much more soluble at the ordinary temperature. Since, however, the proportion of potassium to nitrogen is too great, the salt must be suitably mixed with other materials. In the *Chemiker-Zeitung* for May 7 is an account of the first year's experiments upon comparisons between potassium nitrate and other nitrogenous salts. The results seem promising, but it is too soon as yet to draw any definite conclusion. Further reports will be awaited with interest. The tests were carried out with winter-corn, oats, tobacco, potatoes, beetroot, etc., partly on the land and partly in pots.