

Research Items.

THE VALUE OF TRADITION.—In the course of a discussion of the value of tradition in Polynesian research, which appears in the *Journal of the Polynesian Society*, vol. 35, No. 3, Dr. P. H. Buck (Te Rāngi Hiroa) gives some remarkable examples of the manner in which Maori traditions are corroborated from outside sources, legendary and other. The Maori tradition states that their ancestors made voyages between the Sandwich Islands and their own Hawaiiki or Tahiti of the Society group. The traditional sailing directions from Ahuahu (Oahu, Sandwich Islands) to Aotearoa (North Island, N.Z.) give a bearing south from Maui-tahu and Maui-pae to Hawaiiki and from Hawaiiki to New Zealand a little to the right of the setting sun. In Hawaiian tradition in the directions for the voyage to Tahiti, the North Star is left directly astern. Further, Maui-tahu and Maui-pae are probably the twin islands of Lanai and Kahoolawe; Hawaiian tradition makes Ko-ola-i Kahiki the point of departure for Hawaiian voyagers to Tahiti, and this has been identified as a point on Kahoolawe. Even more striking is the evidence of the magic calabash. Hawaiian voyagers to Tahiti on passing the equator lost the North Star and picked up the Southern Star. On their return they picked up the Northern Star and sailed in a north-easterly direction (owing to the prevailing wind) until they judged the star was the same height as in Hawaii. They then turned and sailed due west, checking the height of the star each night, in the early days no doubt by eye, but later by the magic calabash. This calabash was fashioned into a primitive form of sextant with which the star was sighted on an elevation determined in Hawaii. An examination of one of these calabashes has shown that it is mathematically accurate, the angle being 19° , and Hawaii being in lat. 19° N.

DEFORESTATION AT PUEBLO BONITO.—After six seasons' excavations on the important site of Pueblo Bonito in New Mexico, it is now possible to arrive at some definite conclusions as to the causes which led to the gradual decline and final abandonment of this once populous centre of prehistoric Pueblo culture. The population, some twelve hundred in number, was agricultural, living on the produce of the fields, once fertile, but now barren. According to a Bulletin of the Smithsonian Institution, the expedition of the National Geographic Society, under the leadership of Mr. Neil M. Judd, archaeologist of the Smithsonian Institution, in the course of its excavations has found an ancient arroyo completely filled up which has been traced for a considerable distance. Its original bed was found at a depth of 18 feet, and on it were fragments of pottery made during the third and greatest building period of the Pueblo. Further, it appears that the inhabitants used pine logs to roof the 800 rooms of their great dwelling. The nearest pine woods are at present forty miles away; but evidence was discovered that pine had at one time grown in the canyon. It may therefore be concluded that the present sterility of the soil was brought about by the destruction of the pine forests which once surrounded the site, barring the soil to wind and water and allowing the spring rains essential for the crops to drain off into the arroyo, which then became wider and deeper. The fertility of the fields then became less, and the population decreased owing to migration as the food supply diminished, until the twelve hundred inhabitants had dwindled to a few families. The increase in the number of defensive works in each successive

building period suggests that marauding raids helped to drive the inhabitants from their homes. The excavations of 1926 show that there were four main periods of construction covering a period of about a thousand years. Differences in architecture and pottery indicate that two distinct populations in friendly relation inhabited the site at one time. Later arrivals of a more advanced culture made Pueblo Bonito the most famous and important settlement of the south-west, but they were the first to abandon the site.

DETERMINING THE SEX OF CARRIER PIGEONS.—I. Iwata (*Jour. Coll. Agr., Imp. Univ. Tokyo*, vol. 73, No. 4, 1926) points out differences, which enable the sex of carrier pigeons to be distinguished at various stages of growth. In very young birds (from the time of hatching to the 24th day) the dorsal rim of the cloacal opening is more developed than the ventral in the male, while in the female the reverse is the case. In older birds, after they have left the nest to the time of pairing, the wall of the cloaca of the male exhibits six internal elevations, whereas in the female five elevations are present and the anus is seen close to the postero-medial elevation. In general, too, the opening of the male cloaca is more tightly closed than that of the female. In adult birds (more than six months old) the cloacal opening of the male is usually pentagonal in outline, and at its centre is the anal opening, also usually pentagonal. The adult female cloaca presents a more or less triangular opening, the external skin at the posterior border of the cloaca projecting into the cloacal space along the short base of the triangle. By this time, however, the general appearance and behaviour of the birds is usually sufficient to indicate their sex. Another point of difference is that in birds more than 120 days old the male presents a whitish line along the median portion of the dorsal side of the beak, between the nasal protuberances, which is wanting in the female.

NEMATODES FROM JAPANESE FROGS AND TOADS.—K. Morishita records (in vol. 1, No. 1, Section 4 (Zoology), *Jour. Fac. Sci.*, Imperial Univ. Tokyo, 1926, which is a continuation of *Jour. Coll. Sci.*, Imp. Univ. Tokyo) eight species of nematodes found during the examination of about a thousand frogs and toads. These nematodes include a new species of *Hedrunis*, the female of which adheres to the wall of the duodenum of frogs and the spiral turns of the body of the male envelop the female; a new species of *Spiroxys* also from the duodenum of frogs (the genus *Spiroxys* has hitherto been recorded from tortoises); and a new species of *Spinitectus* from the stomach of *Rana nigromaculata*, the four previously known indubitable species of *Spinitectus* having been found only in freshwater fishes of Europe and America.

GROUPING OF FORMS IN SCENERY.—In a paper in the *Geographical Journal* for November, Dr. Vaughan Cornish discusses the conditions of harmonious grouping in natural landscape and illustrates his theme from various aspects of scenery by land and sea. The reason for rearrangement, or composition, which the landscape painter adopts, arises largely from the fact that disharmonies of form occur in purely natural scenery, and the eyes find perfect satisfaction in the landscape only when there is a broad angle of outlook free from obtrusive disharmony. Dr. Cornish points out that the generally expressed opinion that purely natural surroundings are always harmonious is due to the co-operation of the senses. From descriptions of several mountain views he shows that

ranges of the Alpine type provide the finest forms of mountain skyline. The roughly pyramidal peaks are of sufficient size to appear important at the greatest distance at which atmospheric conditions allow visibility. On nearer approach, the distant view of a row of pyramids gives place, as a rule, to a pyramidal complex bending upwards to a culminating peak: yet nearer, this vanishes and is replaced by a number of visually independent pyramids. The eye always finds harmony in the pyramidal form. Other features of scenery are discussed in this interesting paper.

PLEISTOCENE PLANTS FROM NORTH CAROLINA.—The study of Pleistocene plants has not made so much progress in America as in Europe, but Dr. E. W. Berry has recently made an interesting and important contribution to the subject (*U.S. Geol. Survey Prof. Paper 140-C*, 1926, p. 97). Beautifully preserved plant remains have been found in three (Wicomico, Chowan, Pamlico) of the five terrace plains which can be traced for long distances along the Atlantic coast of North Carolina and the adjoining States. The species recognised number 48, including two conifers, the remainder being Angiosperms; 11 are classed as extinct species new to science, several of these being regarded by the author as doubtful, but he feels confident that two or three are definitely new. The most abundant forms are the bald cypress, river birch, beech, various oaks. More than half are plants living in wet habitats, and may represent elements of the vegetation of estuary streams. None of the species can be regarded as a definitely northern form, though the terrace deposits contain boulders of considerable size which may have been brought down by river ice. On the other hand, the present distribution of some of the species suggests that the climate may have been somewhat milder than at present. The author considers that the present major floristic regions of North America were already well marked at the end of the Tertiary period, and he adds a map illustrating his views on the probable directions of post-glacial plant dispersal.

UPPER WIND VARIATIONS.—A Memoir entitled "The Variance of Upper Wind and the Accumulation of Mass," by Mr. Lewis F. Richardson, Mr. Denis Proctor, and Mr. Robert C. Smith, vol. 1, No. 4, has just been issued by the Royal Meteorological Society (price 2s. 6d. to non-fellows of the Society). The memoir contains a collection of statistical facts concerning deviations of wind from its mean. The distances range from 1 km. to 100 km., deviations so large as or larger than gusts and smaller than cyclones. The effect of height on the variation is said to be very different in different circumstances, but on the average it is not much changed with height. Morning and afternoon in summer have different variances, that in the afternoon being usually much the greater, when the stations were 11 km. or 12 km. apart, but at 28.5 km. separation the distinction was not clear. The greater variance on summer afternoons is explained as an effect of the increased turbulence due to the decreased static stability of the air. Other values relative to variance are given, and the memoir is of a high scientific order.

RECENT FUNDAMENTAL WORK IN PHYSICS.—The address entitled "The Last Fifteen Years of Physics," which Prof. R. A. Millikan delivered at the annual meeting of the American Philosophical Society in April, is reproduced in Part 2 of the *Proceedings of the Society for 1926*. Sixteen of the twenty-one fundamental discoveries of the past thirty years fall within the last fifteen years, and there seems no sign of diminution of the rate of progress in the near future. Amongst the more recent discoveries may

be mentioned that of isotopes by positive ray analysis, that of the excited atom, which Prof. Millikan thinks may be the foundation of a new era in science, the interpretation of the fine structure of spectral lines as due to changes in quantum numbers, the bridging of the gaps in the spectrum between electromagnetic and long heat waves and between ultra-violet light and X-rays, and the recent discovery that, by assuming every electron has unit angular momentum, we get an explanation of doublets to replace that previously provided—unsatisfactorily however—by an assumed change of mass of the electron with speed. His own discovery of cosmic rays of enormous power hitherto unknown—one of the most important and stimulating—gets an all too modest notice of nine lines.

ELECTRICAL CONDUCTIVITY OF CYANOGEN BROMIDE.—According to the theory of 'pseudo atoms' put forward by Grimm, it is possible to regard atoms possessing the same total nuclear charge as similar. If this idea is true, the cyanogen radical is like the sodium atom, and therefore its fused salts should conduct electrically. This reasoning led G. Glockler to study the electrical conductivity of fused cyanogen bromide (m.p. 52°). Details of the preliminary experiments and an approximate value for the specific conductivity are given in the *Proceedings of the United States National Academy of Science* for August 1926.

HYDRION CONCENTRATION AND PHOTOGRAPHIC EMULSIONS.—The effect on the sensitiveness of a gelatine emulsion of adding a little acid or alkali during its preparation has long been known in a general sense, and Messrs. S. O. Rawling and J. W. Glassett, of the British Photographic Research Association, have sought to find more exactly the effect of changing hydrion concentration during the washing and digesting stages (*Journal of the Royal Photographic Society*, November 1926). The range of pH values studied extends from 5 to 9. They find that with samples of gelatine having widely different photographic properties, and emulsions precipitated in the presence or absence of ammonia, the photographic sensitiveness obtained after digestion is greater as the hydrion concentration is increased. With any one emulsion, on prolonged digestion, a steady value is obtained and maintained for a time which is different for each different pH value employed. The grain size and appearance seem to be unaffected, and in most cases, if digestion is continued long enough, the development velocities and shape of the characteristic curve of the emulsion also are independent of the hydrion concentration during digestion.

OXIDATION OF PHOSPHORUS VAPOUR.—In an examination of the oxidation of phosphorus vapour at low pressures, Chariton and Walta (*Zeit. für Phys.*, p. 547, October 1926) have found that, for a given vapour pressure of the phosphorus, there exists a definite critical pressure of oxygen below which no reaction takes place. They also found that this critical pressure was lowered by the addition of small quantities of argon, and at the same time the light emitted during the reaction was decreased in intensity. As a working hypothesis, the authors assume that the critical pressure of oxygen is that pressure above which each active centre is able to produce other active centres. Consequently, the argon atoms added may be considered to assist in the formation of active centres by means of 'collisions of the second kind,' and hence the reaction may proceed in the presence of less oxygen. It is found that when such centres are produced artificially, by electric discharge or by means of a glowing wire, the critical pressure of oxygen is lowered.