

## Research Items

**Great Bear Lake Indians.** The Annual Report for 1931 of the National Museum of Canada contains an ethnographical study of the Great Bear Lake Indians of the Mackenzie District, North-West Territories, by Dr. Cornelius M. Osgood, undertaken for the Museum between May, 1928, and September, 1929. The Great Bear Lake is the focal centre of four tribes of the north-eastern Athapascans, well known in Canadian history as the Dogrib, Yellow Knives, Hares and Slaves, with the Satudene or Great Bear Lake Indians in the centre, who though politically, socially and linguistically distinct from the Hares to-day, may have become so only within the last hundred years. The tribal boundaries represent the extreme range of the tribes, but they occupy and hunt over a very small section only at any one time. Owing to climatic conditions, the food problem is insistent. It imposes a migratory habit, and at times under stress has led to cannibalism. When food is plentiful the Indians eat enormously, but no food is laid up against scarcity, as among the peoples of the Pacific coast. This in part is due to difficulty of transport, as they have to move from one place to another seasonally according to the habitat of their food supply, fishing in one place in winter, another in summer, visiting another to obtain skins for clothing and so forth. Individual effort to attain personal security, in view of the communistic habit of the tribes, is regarded as anti-social. The principal article of diet is fish, taken in winter by nets ingeniously spread under the ice. Next come moose and caribou. The moose is shot. The caribou was formerly taken by stalking, decoying, impounding, snaring and spearing. The hunting was a communal affair, initiated by the two most important men, the best hunter and the oldest man, the latter being assigned the meat for distribution. There is no individual ownership of hunting grounds. A variety of minor animals and birds was eaten. Franklin (1828) records the eating of a special kind of clay in times of scarcity or, as a chewing material, for amusement.

**Archæology of the Marianas Islands.** Miss Laura Maud Thompson has published a study (Bull. 100, Bernice P. Bishop Museum) of a collection of more than 9,000 archæological specimens and field notes made by Comdr. Joseph Thompson, and Mr. and Mrs. Hans Hornbostel in the Marianas, which is now in the Museum at Honolulu. The collection includes monuments, potsherds, stone implements, and skeletal remains as well as texts with translations, maps, photographs, etc., illustrative of the former culture of the Chamorro. The Marianas are of outstanding importance for the ethnology of Oceania, as they stand at the extreme north-west of the Micronesian culture area. No detailed account of this culture has previously appeared. Pure-blooded Chamorros became extinct at the end of the seventeenth century, when nearly all the males were exterminated in a religious war between natives and Spanish missionaries. Of the Chamorro culture only the language remains but slightly altered. One of the most striking features of the ancient culture is the stone monument. In Guam the stone monuments occur along the shores and in the well-watered lowlands of the interior. Double rows of upright stones are associated with caps and are accompanied by burials, potsherds, and

stone and shell implements. One of the most extensively excavated sites is that of Epau, on the north-west coast. It consists of two straight parallel rows of roughly cut coral uprights, four in each row, placed in a rectangular plan with axis parallel to the shore. On the surface of the ground near each upright is a coral head-cap which apparently has fallen from its position on the upright. The uprights are about 11 ft. apart with a distance of 12 ft. between the rows. Large retaining stones support each upright. Here seventeen extended burials were found, head to south-east but facing south-west (left). They were of different ages and of both sexes. At head, chest and knees were scattered bones, potsherds, stone implements, shell scrapers and slingstones. Six skeletons had parts missing, in one instance the skull, and five showed marks of fire.

**Jumping Rodents.** A. B. Howell (*Proc. Amer. Acad. Arts and Sci.*, 67, No. 10; 1932) has undertaken a detailed anatomical examination of the kangaroo rat, *Dipodomys*, of the New World and of the jerboas of the Old World, with special reference to the structural modifications due to jumping and to the convergence exhibited by these two groups of rodents, which belong respectively to the families *Heteromyidae* and *Dipodidae*. An account of the habits precedes the anatomical description. In both groups there is some broadening of the face and a progressive weakening of the masticatory musculature, but the first of these changes is probably correlated with the enlargement of the tympanic bullæ. The neck, always short in rodents, has undergone further shortening and there appears to be also a shortening of the body with increased saltation and an increase in the strength and complexity of the back musculature associated with its use, in connexion with the hind limbs, in leaping. There is a decrease in the length and robustness of the arm and an increase in the length of the leg. The progressive elongation of the hind limb is especially marked in the pes, involving both metatarsals and digits. The breadth of the pes decreases and there is compaction of the bony elements resulting, in the most specialised forms, in fusion of the central metatarsals, and there is a tendency toward reduction and eventual elimination of the lateral digits. The perissodactyl type of foot is eventually attained, save that in the most highly specialised forms the third digit is more slender than the second and fourth, but in these cases the three middle digits tend to become grouped into a functional unit. The result of these specialisations is the assumption of a bipedal, saltatorial, digitigrade gait. The most specialised of the jerboas are far in advance of the kangaroo rats in saltatorial features. The most generalised of the *Heteromyidae* are not discernibly fitted for leaping so that within this family saltatorial specialisation varies from little to much; the *Dipodidae* are all highly specialised and would appear to have been exposed to saltatorial influences for a longer period of time.

**Insects of the Marquesas Islands.** Under the title "Marquesan Insects—1." (1932) the first of a series of bulletins dealing with collections made in the Marquesas and Society Islands has recently come to

hand. It is issued by the Pacific Entomological Survey which is supported by grants from the Hawaiian Sugar Planters' Association, the Hawaiian Pineapple Canners' Association and by contributions from various sources made available by the Bernice P. Bishop Museum. The Marquesas Islands were selected for first consideration on account of the rapid floral changes known to be taking place in that group and its probable repercussion upon the fauna. Furthermore, the biology of this isolated archipelago seemed to afford valuable opportunity for zoogeographical study. Most of the collecting was done by Messrs. E. P. Mumford and A. W. Adamson and the specimens are being deposited, as worked out, in the Bishop Museum, Honolulu. Some twenty-seven papers are contained in the present part and are written by various authorities on the different groups of insects concerned. Special interest is attached to Dr. R. C. L. Perkins's descriptions of two species of weevil-like beetles of the genus *Proterhinus*, which is centred in Hawaii with but few forms known outside that group of islands. Among the termites, which were hitherto unknown from the Marquesas Islands, seven species are brought to notice, by Mr. S. F. Light, of which three are regarded as new. Dr. W. M. Wheeler writes on ants, a number of new Diptera are described by Mr. J. R. Malloch and, among other contributions, are two papers of Mr. G. F. Ferris on ectoparasites. The publication is issued by the Bernice P. Bishop Museum, Honolulu.

**Periodicity in Tree Growth in the Tropics.** An interesting contribution on this subject by Jean Schweizer, of Djember, Java, has appeared (*Mitt. Naturforsch. Ges. Bern.*, 1932). As a result of the recent extensive vegetative propagation of *Hevea Brasiliensis*, it is now possible to compare the behaviour of clones, propagated from the same individual, under widely different conditions of cultivation and climate. The author has thus been convinced that individual differences as to time of leaf production, length of rest period, etc., are inherited characteristics although they may be modified by climate, altitude, manurial treatment, etc. He points out that the rest periods of seedlings of *Hevea* are comparatively short, and two or more crops of foliage may be developed in the year, but that the rest periods increase in length with the age of the individual, when the periodicity tends to be linked with the annual climatic cycle. An interesting observation was the effect of manurial treatment in temporarily obliterating the markedly individual behaviour shown by the different branches of the same tree as to the period of leaf production; an individuality which reappears in later years as the effect of the manure diminishes. The results of defoliation experiments are described and shown to depend upon the periodicity of growth processes at the apex. When the new crop of leaves is expanding, the growing point is forming new leaves and at this stage defoliation has little effect on the periodic cycle. Later, the growing points are forming flower buds and defoliation during this period may postpone the rest period.

**Probable Meteorite Scars in Carolina.** In 1930 some peculiar elliptical depressions occurring in South Carolina were photographed from the air. A careful study of the photographs showed that the origin of these 'bays', as they are called locally, presents problems of extraordinary interest. F. A. Melton and

W. Schriever visited the region in the following year and their account of the observations made and conclusions reached is now published (*J. Geol.*, 52-66; 1933). The characteristic features and relationships of the depressions are (a) a smoothly elliptical shape; (b) parallel alignment in a south-eastern direction; (c) a peculiar rim of soil that is generally larger at the south-eastern end than elsewhere; and (d) mutual interference of outline. Consideration of all these and other related facts leads to the conclusion that the origin cannot be attributed to the operation of ordinary geological processes. A hypothesis involving impact by a cluster of meteorites is presented as affording the most reasonable explanation. The supposed swarm must have been large enough to possess a cross-sectional area of the order of 50,000 square miles at right angles to the direction of movement. Similar features are not known to exist elsewhere on the earth's surface. The depressions are, however, so inconspicuous to observers on the ground that even the topographic surveyors seem to have failed to see their significant characters. Aerial surveys in other coastal plains may therefore disclose the existence of similar scars that have hitherto been overlooked.

**Geology of South Africa.** At the meeting of the Geological Society of South Africa on November 14, 1932, Dr. S. H. Haughton recorded the results of the revised survey of the Cape Town-Stellenbosch area. The succession of the pre-Cape rocks is thus pictured: (1) Deposition of the Malmesbury sediments with local volcanic activity shown by amygdaloidal lavas, obsidians and agglomerates. (2) Accumulation of the French Hoek volcanics of the Simonsberg area, consisting of felsitic lavas and tuffs and some quartz-porphyrries. (3) Formation of the French Hoek Beds: conglomerates, arkoses, grits and shales. (4) Folding and shearing of the above deposits. Intrusion of the granite, which mainly invaded the older Malmesbury beds, followed by quartz-porphry sheets in the newer French Hoek beds. (5) Erosion, followed by the deposition of the Klipheuval sediments. (6) Movement and possible faulting of all the above. Some of the faulting, however, is post-Cape, as the Table Mountain Sandstone is also affected. It is shown that there is a marked similarity in lithological characters and sequence of events shown by the Malmesbury, French Hoek and Klipheuval beds of the Western Province with those of the Pretoria, Rooiberg and Waterberg series of the Transvaal. Dr. Haughton's paper will appear in the *Transactions of the Geological Society of South Africa*.

**Steam Tables.** The American Society of Mechanical Engineers, with the support of the steam power industries, has taken steps to secure greater reliability in steam tables, and the first contribution to this desired end is a paper in the February issue of the *Journal of Research* of the Bureau of Standards by Messrs. N. S. Osborne, H. F. Stimson, E. F. Fiock and D. C. Ginnings, describing their measurements of the pressure of saturated water vapour from 100° C. to 374° C.—well above the critical point. The static method is used, about 300 gm. of air-free water being enclosed in a shell of chromium-nickel-steel, the temperature of the surface of the water being determined by a platinum resistance thermometer supplemented by thermo elements of 'chromel' and 'copel', and the pressure

by a piston loaded with weights. The results are given in tables, the temperature in International Centigrade degrees, the pressure in centibars, and in standard atmospheres and kilograms per square cm. for gravity 980·665. An additional table gives the temperature in Fahrenheit degrees and the pressure in lb. per sq. in. for gravity 32·174. Rates of change of pressure with temperature are also tabulated for thermodynamical purposes. None of the usual formulæ gives the pressure correctly over the whole range of temperature and the authors use a five constant formula with different constants for the ranges 100°–275° C. and 275°–374° C.

**Reaction between Hydrogen and Oxygen.** Hinshelwood, Moelwyn Hughes and Rolfe (*Proc. Roy. Soc.*, March) have studied the reaction between hydrogen and oxygen in a hot silver vessel. At a temperature of 650° the reaction remained fairly slow, though in a silica vessel at this temperature it would be unmeasurably fast. The explosions which occur for the silica vessel when the pressure lies within a certain range were not obtained with the silver vessel. The reaction always showed behaviour characteristic of a pure surface reaction, and the authors conclude that the silver surface has a powerful effect in breaking reaction chains which are the mechanism of a rapid reaction in the gas phase.

**Study of  $\alpha$ -Particle Groups.** A recent paper from the Cavendish Laboratory deals with the analysis of  $\alpha$ -particles by an electromagnet of new design (*Proc. Roy. Soc.*, March). The magnet consists of two bell-shaped pole pieces with a central core carrying the windings. The bells are placed mouth to mouth and an annular region of strong magnetic field is formed between their edges. A field of 10,000 gauss may be produced over an annular region 80 cm. in diameter, 5 cm. wide and 1 cm. deep with an energy of only 200 watts, and  $\alpha$ -rays may be analysed by semi-circular focusing as in familiar  $\beta$ -ray apparatus. The source is placed in the annular gap, and diametrically opposite there is a small ionisation chamber connected to a valve amplifier and counting system. Successive groups of  $\alpha$ -particles are focused on to the slit of this chamber by adjusting the magnetic field. An arrangement of search coils, fluxmeter and compensating circuit is used to measure the changes in the field. The results obtained are comparable with those obtained by Rosenblum using the great Paris magnet. The fine structure of the  $\alpha$ -rays from thorium C is revealed, and the long-range  $\alpha$ -particles from radium C<sup>1</sup> and thorium C<sup>1</sup> can be studied. The interest of the investigations lies largely in the relation between  $\alpha$ -ray and  $\gamma$ -ray energies, and in some cases satisfactory correlations have already been made between the quantum energies of  $\gamma$ -rays and the energy differences between  $\alpha$ -particle groups.

### Astronomical Topics

**Astronomical Notes for May.** Venus is an evening star, but too near the sun for convenient observation. Mars and Jupiter are approaching each other in Leo, but do not reach conjunction until June 4. Mars is 47' north of Neptune at 8 p.m. on May 16; this may aid observers without circles in identifying Neptune. Saturn, in the eastern part of Capricornus, may be seen after midnight; it is still too far south for convenient observation in England.

The times of disappearance, as seen from London, of four stars occulted by the moon are May 3, 10.31 p.m.; May 5, 8.57 p.m.; May 30, 10.21 p.m.; May 31, 10.17 p.m.; the magnitudes are 6·7, 5·5, 6·2, 7·0.

Two comets are within reach of moderate instruments. Comet Geddes is in Canes Venatici; an ephemeris is given in the B.A.A. Handbook. Comet Pons-Winnecke is in Aquarius; the following ephemeris is for 0<sup>h</sup> on the days named:

	R.A.	Decl.
May 4	20 <sup>h</sup> 56 <sup>m</sup> 16 <sup>s</sup>	N. 1° 48'
8	21 17 20	N. 0 25
12	21 36 44	S. 1 1
16	21 56 32	S. 2 28
20	22 15 46	S. 3 55

It is in perihelion on May 18, at a distance from the sun of 102 million miles; this distance has increased by 6 million miles during the last revolution, owing to large perturbations by Jupiter.

To reduce to Summer Time, add one hour to all times given.

**Faint Stars with Common Proper Motion.** W. J. Luyten has recently published a paper describing a research that he has made with a blink microscope of plates of the region within 30° of the south pole (*Mon. Not. Roy. Astro. Soc.*, Jan.). It contains a list of stars which are concluded to be physically connected from the fact that they have common proper motions of

considerable size. The paper attempts to find the probable distances and masses of the stars from a careful statistical study. There are seventy-three pairs which may be confidently taken as physically connected; a few of these had been already announced by other observers.

Two of the new pairs appear to show appreciable orbital motion in the interval of twenty-nine years between the plates; their periods are roughly estimated as 2½–3 centuries, and their parallaxes as about 0·1" (deduced statistically, not by measurement). Both appear to be dwarf pairs, of the type of Kruger 60; they would repay visual measures with large instruments.

**New Proper Motions of Stars from Bergedorf Observatory.** Band 7, No. 37 of the *Bergedorf Mitteilungen* contains the seventh instalment of the "Eigensbewegungs-Lexicon". There are 3,757 new proper motions of stars (mostly faint) in the hours 4 and 5 of right ascension. Altogether 45,204 proper motions have now been published in this series. The present list has been compiled by C. Vick under the direction of Prof. R. Schorr. The declinations of the stars lie between 90° North and 1° South; they are arranged in degrees of declination, the reference numbers of the Bonn Durchmusterung being given.

For nearly all the stars observations in the present century are available; the dates of the latest observations for each star are given. Reference is made to the "Geschichte des Fixsternhimmels" for the early observations; the proper motion lists are designed to be used in conjunction with the "Geschichte". They give the magnitudes, the number of observations used for each star, and the proper motion in R.A. and declination in 100 years. No stars with less than three observations are included; generally there are four or five.