Research Items.

MAORI STRING GAMES.—Some further examples of Maori string figures are given by Mr. J. C. Anderson in the March number of the *New Zealand Journal of Science and Technology*. One of these, known by the name of Tahitinui and collected from a Whanganui man at Kariniti, in its final figure is the same as one called the Osage diamonds from Pawhuska, Ohlahoma, and an unnamed figure collected by Dr. W. H. Furness in the Carolines. It differs entirely, however, from the latter in method of construction, whereas the points in which it is at variance with the Osage figure appear to be due to faulty memory. It is evident that many of the figures have had stories connected with them, but most of these have now been forgotten. One figure is known as *mouti*, "a trap," because it is said to have been used to catch Kae, who killed and ate the pet whale of Tinirau. Girls sent in search of Kae by Tinirau tricked him into revealing his identity by repeating the verses which accompany this figure. When he laughed he revealed the missing tooth by which they had been told to recognise him. Dr. P. Buck (Te Rangi Hiroa) has succeeded in recovering the whole of these verses. They reveal an extraordinary knowledge of details of anatomy and are characteristic of the Maori sense of humour. On both accounts they are untranslatable.

EXCAVATIONS AT BETHSHEAN.—Mr. Clarence S. Fisher summarises in vol. xiv. No. 4 of the *Museum Journal* (Philadelphia) the results obtained by the University Museum of Philadelphia expedition to Palestine, of which he is Director, in the years 1921–1923, at Beisan. Only a small part of the site has been attacked—the mound of Tel el Husn and the cemetery on the north bank of the Jalûd. The strata of the mound extend from an Arab settlement, *c.* A.D. 800, down to a mud-brick structure, with characteristic ledge-handled jars, of the early Bronze Age dating from, at least, 2000 B.C. This is at a depth of 36 feet, but the excavation has not yet reached rock. From evidence afforded by a well which shows the ends of a succession of mud-brick and rubble walls, it is expected that further exploration will reveal a sequence of strata dating back to 3000 B.C. and possibly to an original neolithic settlement. Among the buildings revealed was an Egyptian fortress with stelæ of Seti I. and Rameses II., and a seated statue of Rameses III. The inscription on one of these finds furnishes some interesting details relating to local campaigns of Seti I. and identifies the site with the city mentioned in the El Amarna correspondence. The stela of Rameses II. is the one which contains the reference to the employment of Semites to build his name city in the Delta, which is regarded as a possible confirmation of the Biblical record of the building of the city of Rameses by the children of Israel.

TUNGUS SHAMANISM.—Prof. Shirokogoroff, in the Journal of the N. China Branch of the Royal Asiatic Society, vol. liv. pp. 246-9, analyses the general theory of Shamanism among the Tungus. The primary condition for the existence of Shamanism is animism, and its principal characteristic is recognition of the ability of some persons to possess spirits, and by their aid, and by the use of particular methods unknown to other men, to know phenomena of a supernatural order. The Shaman therefore has special rites, clothing, instruments, and social position, setting him apart from other individuals who may, however, enter into communion with spirits by other methods. The Shaman must fall into an ecstasy during his ceremonies in order that his control of his own consciousness may, so far as possible, be eliminated, and physically and mentally he should be thoroughly healthy, as any abnormality might interrupt his ecstatic state at a critical moment. The nervous and psychical weaknesses to which the Tungus clans are subject wax and wane; but their influence may be checked when the harmful ghosts are subjected at the crisis to the "Master"—the Shaman. Thus Shamanism is correlated to the spread of nervous and mental disorders, and the Shaman acts as a safety valve. In origin, therefore, it is an unconscious measure of self-defence on the part of the clan. The Shaman, however, is himself subject to nervous depression, and falls under the influence of his own spirits who become restless and dangerous to the clan. The general conclusion is that the theory of ghosts or spirits and of their relation to man are the forms that to the mind of the Shaman generalise all phenomena of normal and pathological psychic life. The Shaman and Shamanism are the means of regulating these phenomena, and are *par excellence* hygienic and preventative.

SPECIFICITY OF HERPETOMONAS IN FLIES.—The type of Herpetomonas known as *H. muscæ-domesticæ* was found by Elery R. Becker (*Journ. Parasit.*, vol. 10, pp. 25-34, 1923) to be entozoic in the alimentary canals of the following muscoid flies: *Musca domestica, Phormia regina, Lucilia sericata, Sarcophaga bullata, Cochliomyia macellaria*, and *Calliphora erythrocephala*. The flagellate from "wild," naturally infected flies of any one of these six species was found to be capable, when inoculated by the mouth, of producing a natural infection in clean, laboratory-bred flies of the other five species. Such infected flies are "carriers," capable of infecting other flies by fæcal contamination of the food or the proboscis of the fly. The author concludes that it is extremely probable that *Herpetomonas muscæ-domesticæ, H. luciliæ, H. sarcophagæ, H. calliphoræ*, and the Herpetomonas from Phormia and Cochliomyia all represent the same species.

DURATION OF LIFE IN DROSOPHILA.—In a continuation of studies on the duration of life, Prof. Raymond Pearl and Sylvia Parker (*Amer. Naturalist*, vol. 58, p. 193) have made an interesting experimental and statistical analysis of the duration of life in Drosophila under conditions of complete starvation. Having formerly shown that, under conditions of feeding, the wild flies had an expectation of life practically three times as great as in the mutation with vestigial wings, they now find that under starvation conditions the mean length of life is the same in both, *i.e.* about 44 hours for males and 50 hours for females. Under conditions of starvation, the variability in length of life is also much reduced, but the relative difference in length of life of the sexes remains the same under conditions of feeding or of starvation (*v.* also NATURE, June 14, p. 854).

NEPHRIDIA OF WORMS.—Five years ago Prof. K. M. Bahl, now professor of zoology in the University of Lucknow, described for the first time a new type of nephridium in Indian earthworms of the genus Pheretima. These nephridia are very remarkable from the fact that they discharge their secretion into the alimentary canal instead of on to the surface of the body, a possible adaptation for the purpose of conserving the water supply in a very dry climate. Prof. Bahl has now discovered a similar "enteronephric" system in another Indian genus of Oligo-

chæta, Lampito. Whereas, however, in the genus Pheretima the nephridia in question are of the so-called micronephric type, being minute and multiple, those of Lampito are large, paired meganephridia, one pair in each segment (with certain exceptions). They communicate with the cavity of the intestine by means of a system of ducts, of which the chief is the longitudinal supra-intestinal duct. There are, indeed, three very distinct types of nephridia in Lampito, namely, (1) the paired meganephric and enteronephric septal nephridia above referred to, the nephrostomes of which lie in the normal position in the segment in front of that in which the coils of the nephridium are situate; (2) micronephric and exonephric integumentary nephridia, which open by separate nephridiopores on the surface of the skin; and (3) enteronephric pharyngeal nephridia which open into the pharynx through bundles of ductules. The author suggests in his recently published memoir in the *Quarterly Journal of Microscopical Science* (vol. 68, part 1) that the old classification of nephridia into mega- and micronephridia should be abandoned, as it depends merely upon size, and should be replaced by the distinction between exonephridia, discharging on to the surface of the body, and enteronephridia, discharging into the alimentary canal, and that a further distinction should be recognised in each of these types according to whether there is or is not an open internal funnel.

CYTOLOGY OF THE SALICACEÆ.—Miss Kathleen B. Blackburn and Mr. J. W. Heslop Harrison have recently published a preliminary account in the *Annals of Botany* for April, of the results of their cytological examination of many species in the difficult systematic group of the Salicaceæ, which will be of great interest to both cytologists and systematists. The fundamental chromosome number in both Salix and Populus proves to be the astonishing figure nineteen; in Populus, in addition to the typical diploid forms, *P. balsamifera* is tetraploid; in Salix both diploid, tetraploid, and hexaploid forms were found, and the authors conclude that tetraploidy has originated independently in the two subsections Pleiandræ and Diandræ. *Salix triandra* has yielded a form with 22 chromosomes as well as one with 19, and as *S. phylicifolia* has a reduced chromosome number of 44, a second orthoploid series is thus indicated in the genus. Of three recognised Salix hybrids examined, two behaved quite normally during meiosis, and the authors conclude that hybridity with successful segregation in F1 and subsequent generations explains the variability of certain Salix species. Systematists will be interested to learn that on the basis of chromosome number, *S. caprea* is easily distinguished from *S. cinerea* and *S. aurita*, and also *S. Andersoniana* from *S. phylicifolia*. The authors state that an indication of the existence of heterochromosomes in the male of both Populus and Salix is being further examined.

THE SALTON SEA REGION.—Water-supply Paper 497 of the United States Geological Survey consists of a monograph on the Salton Sea region of California by Mr. J. S. Brown. The arid regions of the United States cover about half-a-million square miles, but the present monograph is confined to a small part of that area and deals with the most arid part of the country. Until a survey of the watering places was made, many parts of it were very poorly mapped. While the volume contains chapters on the general physiography, climate, and flora of the region, most attention is paid to water supply. Apart from an average rainfall of not more than 5 inches a year, the water of value for irrigation purposes comes from the Colorado River or wells in certain basins. The distribution, origin, and mineral content of the well water, which has great importance, is discussed in detail. The paper is supplied with large-scale map and complete bibliographies.

SURVEY WORK IN ERITREA.—Some interesting survey work was recently carried out in the little-known volcanic region of southern Eritrea, the strip of Italian territory lying between Abyssinia and the Red Sea. The expedition, which was under the auspices of the Italian Government, was primarily for geological exploration, but the geographical results were of importance and are incorporated in a map on a scale of 1 : 500,000 of Central and Southern Dancalia, published in Bolletino della Reale Società Geografica Italiana for March-April, 1924. Prof. P. V. de Regny, to whom a great deal of the field work is due, contributes an article giving the positions of various places on the map and some useful itineraries and notes. The map extends from French Somaliland to about lat. 14° 40′ N., and from the Red Sea coast to the frontier lands of Abyssinia. It is naturally far from complete, but is an advance on previous maps of this region.

BRITISH CLIMATE IN HISTORIC TIMES.—In his presidential address to the Geographical Association, issued in the *Geographical Teacher*, No. 68 and 69, Sir Richard Gregory brings together some useful facts bearing on the much-debated question of possible changes in British climate within historic times. Documentary evidence is collected from literature from the eighth century onwards, this type of evidence being of course merely qualitative but the only kind available until about the eighteenth century. A mass of useful meteorological computations are recorded. These deal mainly with the London district. Several interesting truths emerge from these figures. A very dry year is not infrequently preceded or followed by a very wet one, or, more usually, two dry years are followed by a wet one. The popular association of snow with Christmas finds no confirmation in meteorological data. Even frost at Christmas, at any rate in the London district, is a relatively rare occurrence. Exact observations do not exist for a sufficiently long period to enable us to decide with certainty that there have been progressive changes or definite cyclic variations in British climate. Evidence of abnormal periods occurs, but no cycle of practical service has been established even if several of academic interest may possibly exist.

WEATHER AT FALMOUTH IN 1923.—Falmouth Observatory has recently issued its annual report for 1923, prepared by the honorary secretary, Mr. Wilson L. Fox, and meteorological notes and tables for the year by Mr. J. B. Phillips, superintendent of the Observatory. The report states that the Observatory was open to visitors from 2·30 to 4·30 on Wednesday afternoons, an advantage to students and many others. Weekly, monthly, and annual results are supplied to the Meteorological Office of the Air Ministry. The notes and tables give 51·2° F. as the mean temperature for the year, which is 0·5° above the normal for 50 years ending 1920; the mean for February, 46·9°, is the highest on record for the month. The maximum for the year was 84·9° on July 12, which is the highest recorded at the Observatory. There have been only two other readings above 80°; these were 80·2° on August 6, 1916 and 82·8 on July 18, 1921. Of 201 stations making returns to the Air Ministry from England and Wales, 147 recorded higher maxima than that at Falmouth. The lowest temperature was 29° on November 20,

and this is the only month during the year with a frost in the shade. The total rainfall for the year was 45·39 in., which is 0·22 in. below the normal. Bright sunshine totalled 1746·9 hours, which is 6·2 hours below the normal. November was exceptionally sunny, the record, 145 hours, being 30 hours more than any previous record for the corresponding month; the percentage of possible duration was 54, which is stated to be the highest recorded at any station in the British Isles. September had more sunshine than any corresponding month since 1914. The tables given in the report are of considerable interest.

TROPICAL CYCLONES.—In his presidential address to the Section of Physics and Mathematics of the tenth Indian Science Congress, Dr. S. K. Banerji reviewed the present position of our knowledge regarding the origin and causes of tropical cyclones. The contributions to this branch of meteorology of Hann, Lodge, Dines, Bjerknes and Shaw are considered and none of them found to give a satisfactory explanation of the phenomena. The recent work of Shaw contained in his essay "The Birth and Death of Cyclones" naturally received the most attention. Dr. Banerji considers that the air currents on the two sides of the "trough of low pressure" which exist over Northern India during the monsoon may be the origin of the storms which form at the head of the bay during that season, but he is unable to accept Shaw's explanation of the subsequent development and progress of tropical cyclones. He concludes by admitting considerable progress in the development of the theory of cyclones, but considers that many more data, especially from the upper air, are required before much further progress can be made.

WHEN TO STOP RETTING FLAX.—Dr. J. Vargas Eyre and Mr. C. R. Nodder seem to break new ground in the experimental retting of flax straw in a paper published in the Journal of the Textile Institute, vol. 15, May 1924. They plot the acidity, temporary and permanent (after removal of carbon dioxide), produced in the stagnant ret, pointing out that the curves seem to indicate the successive development of four stages which they interpret in chronological order as (1) fermentation of soluble sugars, etc., with rapid rise of acidity and frothing; (2) fermentation of soluble pectin, etc., accompanied by scum formation; (3) the main fermentation of the pectin of parenchymatous tissue with a consequent loosening of the fibre bundles; (4) a very slow increase of permanent acidity as the pectin of the middle lamellæ, cementing together the fibres in the bundle, is attacked. They point out that in practice the ret should be stopped in stage 4 and hope as a result of examination of factory practice in the light of this work to show that their data provide clear indication as to how the duration of the ret should be controlled. For practical purposes conductivity measurements can replace the titrimetric determination of acidity, the same stages being indicated on these curves as upon the acidity curves. The "dionic water tester" has proved satisfactory in practice for these conductivity determinations, and as this method is but little affected by the carbon dioxide in the retting water, it would appear that a very practical method of control of retting may develop out of these experiments by the staff of the Linen Industry Research Association.

AN ACOUSTIC SPECTROSCOPE.—At the second annual conversazione of the Royal Society held on June 18, Dr. Fournier d'Albe showed a set of resonators in the form of an "acoustic spectroscope." Each resonator was a Helmholtz resonator provided with a mica reed fixed opposite the opening. The reed was provided with a small mirror which reflected a pencil of light upon a ground-glass screen. The light being a linear source, the images on the screen were a series of short straight lines, each of which was drawn out into a band on sounding the corresponding note. Selectivity was complete within half a semitone, and the response being practically instantaneous it was possible to follow a piece of music and identify the notes as they occurred.

LONG-DISTANCE PROJECTION OF LARGE AUTOCHROMES.—M. Louis Lumière has solved the difficulty of providing a projection lens suitable for giving an image of 7 in. × 5 in. autochromes on a screen that is 55 ft. from the lantern, as in the large lecture hall of the Sorbonne (*British Journal of Photography*, Supplement, June 6). The lenses hitherto available for the purpose, as they must have a focal length of 40 inches or more, are of relatively small aperture, of impractical dimensions, and of prohibitive price. The arrangement consists of two equal plano-convex lenses mounted in a plain wooden box with the convex sides inwards, and with a separation equal to two-thirds of the focal length of each of the single lenses. The combination is in principle the same as that of the ordinary Ramsden eyepiece. The lenses actually used were 8 in. in diameter and of 55 in. focal length. The focal length of such a combination is equal to $\frac{3}{4}$ the focal length of one of the components, and it should be borne in mind that the nodal points are crossed, and that their separation is equal to $\frac{1}{3}$ the focal length of one component. The focal length of each lens is equal to $\frac{4}{3}$ of the desired focal length of the whole.

"DAVON" METALLURGICAL MICROSCOPE.—When the "Davon" Super Microscope was put on the market a few years ago it met with severe criticism mainly because its chief object appeared to be the production of high magnifications unaccompanied by the necessary resolution of detail. Recently, however, the makers, Messrs. F. Davidson and Co., 29 Great Portland Street, London, W.1, have had the assistance of Dr. Rogers in re-designing the instrument, and the new metallurgical form which is now on the market is a great improvement on the old one. The makers have apparently realised that mere magnification is useless, hence the objectives they now list have numerical apertures which are suitable for the work for which they are recommended. The distinguishing feature of the original Davon microscope, that of using a secondary objective to magnify the image formed by the primary objective, is still adhered to; with the magnifications now recommended, however, the secondary objective appears to function merely as a rather elaborate ocular. The use of a projection ocular in addition to the secondary objective is apparently now recommended only for very high magnifications (*e.g.* 2000–5000 diameters) taken with a 2 mm. objective as primary. Such high magnifications can only be regarded as enlarged pictures of what the same objective would give at about 1500 diameters, and the examples given in the "Davon" booklet do not lead one to modify the opinion that, when required, they can be obtained quite as well by enlarging a negative taken in the ordinary way at about 1500 diameters. In addition to the ordinary form of Davon microscope the makers also list a new model (the Davon "Metal Works") intended for taking photomicrographs rapidly at one standard magnification. For those who wish to take photomicrographs "by the score" at one fixed magnification the apparatus may probably be of use; one wonders, however, what the real value of such photomicrographs would be.