Research Items.

THE BARAS OF MADAGASCAR.—Dr. R. Verneau has published in *L'Anthropologie*, t. xxxiii., Pts. 5 and 6, the results of a detailed examination of eleven Bara skulls now in the Muséum national d'Histoire naturelle at Paris. The generally accepted view, based largely upon linguistic evidence, is that the numerous races of Madagascar, other than the Malayan Imerinas, or Hovas, are to be related to the negroid peoples of Indonesia and the adjacent area. A comparison with Papuan skulls, however, shows that they are clearly differentiated from this group, to which they might be expected to show resemblances, by certain features, such as the smaller size of the skull, less marked dolichocephaly, a relative narrowing of the frontal region in comparison with the breadth at the parietals, a lesser breadth of the face at the level of the cheek bones and the upper maxillaries. Further, not only do these characters exclude affinity with the Papuan, but they indicate a marked resemblance to an African type, although with our present inadequate knowledge of the physical characters of the inhabitants of Madagascar it is not possible to indicate to which group precisely they should be related.

PREHISTORIC SITE IN TENNESSEE.—In the report on the field work of the Smithsonian Institution in 1923 (Smithsonian Miscellaneous Collections, vol. 76, No. 10), some interesting details are given of a great prehistoric Indian town in Cheatham County, Tennessee. The remains are known as the Great Mound Group on account of the great central mound. The original summit of a bold projecting hill had been levelled until a great plaza, or public square, had been formed, 1000 feet in length and 500 feet in breadth. At the north-east corner of the plaza the Great Mound was erected with two smaller mounds on the eastern edge, and three broad terraces on the southern side of the hill. On one side it was protected by the cliffs of the Harpeth River; on the other sides was an elaborate system of earthen breastwork, wooden walls, and earthen bastions surmounted by semi-circular wooden towers of which faint traces were found. No other mound in the south-eastern United States approaches the Great Mound Group in the artistic sense. Traces of a number of earth lodges were found, and there was evidence that the site had been occupied by four or five groups, possibly autonomous, of kindred peoples with a total population of possibly several thousands. All the buildings appear to have been destroyed by fire.

PAST EVENTS SEERSHIP.—In the Proceedings of the American Society for Psychical Research, January, 1922, Dr. Gustav Pagenstecher, a physician of repute in a Mexican city, gives an account of his experiments in "psychometry," and claims that his results establish the reality of "past events seership"—one of the forms of supernormal faculty to which Richet has applied the term *cryptesthesia*. The experiments were conducted as follows: The medium—a lady patient whom Dr. Pagenstecher had treated by hypnotic suggestion—was put into trance, and some object of which she had no previous knowledge was presented to her. She brought the tips of all her fingers into contact with the object and then described the "visions" which thereupon occurred to her. It cannot be said that the objects chosen for experiment were as a rule well adapted for testing the truth of cryptesthesia. A "piece of porcelain elephant made in China" produced the vision: "I see people with sharp-pointed straw hats on . . . coiled, braided hair. . . . These men are undoubtedy Chinese." "A mother-of-pearl shell" gave rise to the vision: "I am under water. I see many fishes of all sizes and of all colours. . . ." Nor can it be said that the conditions of the experiments are set out in sufficient detail to enable us to judge what explanation, other than cryptesthesia, might be possible. The arguments adduced to controvert the hypothesis of telepathy as a factor in the production of the phenomena are very unconvincing, and indeed show some misunderstanding of the relative importance of the parts played by the "agent" and the "percipient" respectively in experiments in thought-transference. On the other hand, Dr. Pagenstecher writes at some length on his hypothesis that "Psychometry is based upon the transmission of molecular vibrations stored in the 'associated object' and transmitted to a super-sensitive sensorium, *i.e.* to an adequate medium." Such speculations are perhaps out of place in the present state of our knowledge. As Dr. Walter Prince says in his foreword to this volume, "What is now all-important is to gather more facts by experimentation with persons found to have psychometrical power, and to classify the facts."

FILARIASIS IN BRITISH GUIANA.—Filariasis—elephantiasis, inflamed lymphatics, and lymphatic glands and other affections—is caused by a helminthic parasite, *Filaria Bancrofti*, the embryos of which occur in the peripheral blood stream. The disease is met with in many districts in the tropics, and is conveyed by various mosquitoes, which are intermediate hosts and carriers of the parasite. In 1914 the Governor of British Guiana directed attention to the frequency of the disease in that colony, and in 1921 the Committee of the London School of Tropical Medicine commissioned Prof. R. T. Leiper and Dr. J. Anderson (with whom were also associated Drs. Lee, Khalil, and Vevers) to carry out investigations, the results of which have been now published (Research Memoir Series, vol. v. No. 7, 1924, London School of Tropical Medicine). Practically one-fifth of the inhabitants of the colony were found to be infected. The intermediate host is the domestic mosquito, *Culex quinquefasciatus*. A number of drugs was tried in treatment but none was found to be definitely curative. Eradication of the disease therefore resolves itself into prevention, which means the complete banishment of the particular mosquito carrier from the dwellings of the people. The filarial affections *per se* are not dangerous to life, but they are liable to secondary bacterial infections which not infrequently prove fatal.

PHOTOSYNTHESIS AND RESPIRATION.—The progress of researches on photosynthesis and respiration carried on in the Laboratories for Plant Physiology of the Carnegie Institution of Washington, situated at Tucson, Arizona, and Carmel, California, is briefly recorded in the report of the Director of the Laboratory in the Year Book, No. 22, 1923. Dr. Spoehr is still unable to obtain formaldehyde by the action of ultra-violet radiation either on carbonic acid or on carbamino- acids. The ultra-violet radiation of ice-cold solutions of calcium salts of glycocoll and alanine carbamino- acids resulted in the formation of slight traces of ammonia and formaldehyde together with small quantities of methyl alcohol. Interesting oxidation studies appear to be in progress in which glucose is oxidised to carbon dioxide and water by passing air through its solution in a buffer mixture of disodium hydrogen phosphate and sodium dihydrogen phosphate, containing also methylene blue. This solution decolorises methylene blue, but on

passing air through the colour returns and carbon dioxide is liberated. A number of substances accelerate this reaction, the most effective being iron, and the most stable form so far found in which to add the iron is the complex salt formed by dissolving ferrous sulphate in sodium pyrophosphate.

MISTLETOES IN MALAYA.—Six species of parasitic Loranthus and three of Elytranthe, growing in Malaya, are described by W. N. Sands in the *Malayan Agricultural Journal*, vol. xii., March 1924. Five of these parasitic flowering plants are described as pests of cultivated trees, the parasites spreading mainly through the action of birds in feeding on the succulent berries and reproducing readily on individual tree hosts by means of long surface root runners. Some of these hemi-parasitic plants readily parasitise each other.

LINSEED SELECTION EXPERIMENTS IN INDIA.—In India linseed is grown commercially simply for the supply of oil seeds, and so far, experiments in fibre production, though attempted spasmodically over the last 150 years, have not established an Indian fibre industry. In the Botanical Series of the Memoirs of the Department of Agriculture in India, vol. xii. No. 4, Mrs. Gabrielle L. C. Howard and Abdur Rahman Khan report upon Indian strains of linseed as the result of hybridisation and selection experiments carried on with plants obtained from the Indian commercial strains. Two groups of these Indian linseeds are distinguished, the deep-rooted types grown on the soils of Peninsular India and the shallow-rooted, vigorous, compact plants of the Gangetic alluvial soils. An interesting point is the secondary flowering of some of the strains isolated and its correlation with a crop of fresh and active roots upon a deep root system. As a result of these intensive selection experiments, new strains suitable for the special soil conditions are being tried both in the Peninsula and on the alluvium, and some of these new strains have given very promising yields of seed.

"TUNG" OIL.—"Tung" oil has become of increasing importance in the varnish and paint industry of recent years, and therefore the notes in *Indian Forest Records*, vol. x. part 2, 1923, by R. N. Parker, Madyar Gopal Rau, W. A. Robertson, and J. L. Simonsen, upon the botanical sources of this oil and its varying chemical nature have technical as well as scientific value. The oils known in commerce under this name come from China, and it appears that the Hankow oil is derived mainly from the seeds of *Aleurites Fordii*, whilst the Canton oil is probably mainly obtained from the seeds of *Aleurites montana* Wils. The authors examine chemically the "tung" oil from *A. montana* and show that it consists mainly of the glycerides of β-elaeostearic acid, oleic acid, and probably linoleic acid, whilst the oil from *A. Fordii* was shown by Fahrion to consist mainly of glycerides of oleic and α-elaeostearic acids. Figures are given of the fruits, seeds, and leaf nectaries of these two species of Aleurites, permitting the ready recognition of two plants of commercial importance which have frequently been confused. Both species are at present rare in India and Burma, but readily admit of cultivation in these countries.

RUDIMENTARY PARTHENOGENESIS.—In a paper on rudimentary parthenogenesis in the meal-worm, *Tenebrio molitor*, in the *Journal of Genetics* (Vol. 14, No. 1), Dr. A. M. Frederikse directs attention to the fact that in animals belonging to various groups the unfertilised eggs have more or less power to develop. He refers to the papers of Lécaillon on this subject, but not to the observations of segmentations in unfertilised egg-cells of the rat. In the meal-worm, as in other animals, the development of such eggs does not proceed very far. It takes place slowly and shows various irregularities, such as tripolar spindles and other mitotic aberrations, with perhaps amitosis and budding. The chromosomes are often not of the usual form, and the resulting blastomeres vary in size and are irregularly distributed, the development finally coming to a stop. These irregularities make it all the more remarkable that chemical and other stimuli in artificial parthenogenesis enable the egg to complete normal development.

RIVER DISCHARGE MEASUREMENT.—The Egyptian Ministry of Public Works has published a report by Mr. E. B. H. Wade, Director of Research, on Investigations into the Improvement of River Discharge Measurements, Part V., which contains a description of an improved instrument for the measurement of the velocity of slow-moving waters. The instrument in use in Egypt for the measurement of discharge is the small Gurley current-meter, which is spoken of as an excellent instrument; but it has been found desirable to endeavour to design a special appliance which will give better results at low velocities. The instrument devised by Mr. Wade for the purpose is referred to in the Report as K.I., and is an improvement on an earlier instrument designated T.13. Sensitiveness to low velocity has been increased by the introduction of guide vanes for the purpose of giving a rotary movement to the water prior to impact on the propeller of the meter. Experiments carried out on the Blue Nile, particulars of which are given, have demonstrated the feasibility of employing K.I. under field conditions, but they have also shown that, while designed mainly with the view of removing frictional errors, it is unduly sensitive to turbulence, and until that objection is removed, the low velocity instrument problem cannot be regarded as solved. "For the present," concludes the report, "we must regard the Gurley as the most reliable current meter we possess."

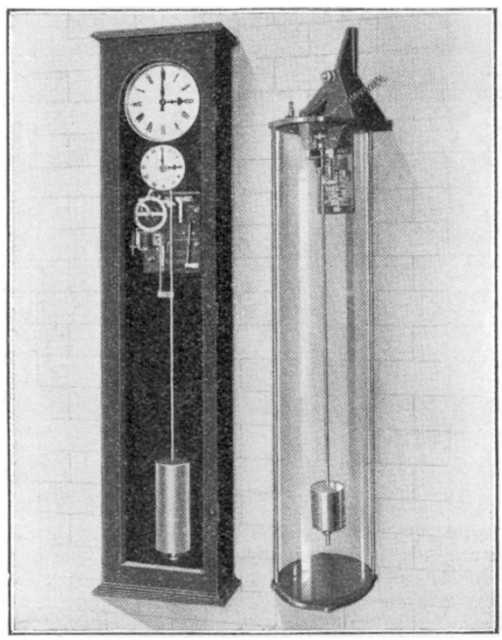
THE OIL GEOLOGY OF SOUTH-WEST PERSIA.—Since the publication of Messrs. Busk and Mayo's paper on the Persian Oilfields (Journ. Inst. Pet. Tech., vol. v., 1918), much detailed geological survey has been done in this important region, especially by the Anglo-Persian Oil Co.'s geological staff, and Mr. R. K. Richardson's recent paper read before the Institution of Petroleum Technologists on May 13 is a welcome addition to our knowledge of the country. The chief features of scientific interest are (1) the publication of a detailed palæontology of the Tertiary rocks exposed, based on the work of Dr. Douglas, (2) the age of the Asmari Limestone, a long-disputed subject, and (3) the opinion expressed by the author regarding the stratigraphical horizon of the productive oil-measures. In connexion with (1) it is noteworthy the extent to which Foraminifera are developed, especially in the Asmari Limestone series, while their value as indices of correlation and differentiation of beds is evident. The Asmari Limestone has been assigned to the Oligocene-Burdigalian phase of Tertiary history, the *Nummulites intermedia* beds (Upper Oligocene) in the south, and *Lepidocyclina* beds (Lower Miocene) in the north, suggesting a mingling of two faunas as conditions of desiccation proceeded from south to north. Thirdly, the author holds the view that the Asmari Limestone is the mother-rock of the oil in the Maidan-i-Naftun field, and not the Fars series as generally supposed; an alternative theory suggests a Cretaceous origin followed by migration into the Asmari Limestone series. The paper concluded with a summary account

of the famous Maidan-i-Naftun oilfield, from which it appears that since 1912 and up to last year more than 12 million tons of oil had been produced from it, that it has not as yet been troubled with water incursion, that no dry hole has ever been drilled in the field, that the extent of its untapped resources of oil is unknown, and that its areal boundaries are widening with every new well drilled.

SOLAR RADIATION.—In the April issue of the Quarterly Journal of the Royal Meteorological Society, a report is published which was presented by its author, Dr. A. Angström, to the 1923 meeting at Utrecht of the International Commission for Solar Research on Actinometric Investigations of Solar and Terrestrial Radiation. The first part deals with continuous registrations of direct and reflected solar radiation, which have been carried on at Stockholm since July 1922; the yearly and daily variations of the radiation-income have been computed separately for the direct and diffused radiation: the latter is found to be of great importance in these high latitudes. A simple formula is given expressing the total radiation-income Q_s on any day with Q_o, the value corresponding to a perfectly clear day, and S the duration of sunshine expressed as a fraction of the total possible duration; this formula is $Q_s = Q_o(0{\cdot}25 + 0{\cdot}75S)$. It holds almost exactly for Washington as well as Stockholm. The second part of the report deals with atmospheric and nocturnal radiation. About 25 per cent. of the radiation from a black surface of temperature between −30° and +30° C. can pass quite freely through the atmosphere without absorption, whatever the water content of the air. A further range of the same spectrum, corresponding to about 50 per cent. of the energy, is totally absorbed in a very thin atmospheric layer, probably about 30 metres thick for ordinary vapour pressures (about 10 mm.). A third group of waves, accounting for the remaining 25 per cent. of the energy, is very variably absorbed, according to the humidity. It is suggested that up to a height of about 15 km. the atmosphere radiates about 50 per cent. of the energy radiated by a black surface at the same temperature.

ABNORMAL WEATHER OF WINTER AND EARLY SPRING.—A short article dealing with the weather of the British Isles for the six months October 1923–March 1924, by Mr. C. E. P. Brooks of the Meteorological Office, is given in the *Meteorological Magazine* for May. The author is clearly aiming at long-period forecasting, an inquiry of profound interest to meteorologists and others. Monthly pressure maps showing the deviation of pressure from the normal are now available for Western Europe, North Atlantic, and North America. Any deficit or excess in the normal pressure in distant parts from the British Isles reacts on winds and temperature as well as other meteorological elements. It is shown how such differences of pressure have influenced weather in the British Isles of late. March 1924 is given as an illustration; there was a deficit of pressure amounting to 15·5 mb. in the Azores, whilst in Iceland there was an excess of 6·7 mb. These differences completely reversed the normal pressure gradient, and cold easterly winds prevailed over the British Isles. It is pointed out that the whole winter of 1894–1895 was rather similar to that of 1923–1924. The conditions of February this year resembled those of February 1895, but in 1895 the cold was more intense and skating was general in the east and south of England, while at Greenwich the mean temperature for the month was 29°, the lowest for at least 150 years. A notable feature of abnormal weather during the past winter was the remarkably high air temperature at Spitsbergen, where the excess on the normal amounted to 9° F. in October, 14° F. in November, 12° F. in December, 15° F. in January, and 20° F. in February. Naturally the ice conditions in the Arctic were similarly abnormal, there being generally much less ice than usual.

THE FREE PENDULUM.—Much has been heard in scientific circles lately of the free pendulum, a development of the Synchronome system of electric clocks, which has surpassed every known record of accuracy in time measurement. It was the subject of a lecture by Mr. F. Hope-Jones at the Society of Arts on April 9, and was exhibited at the Royal Society's soirée on May 14. To those who have a knowledge of clock escapements, the idea of a perfectly free pendulum is fascinating. It would appear to be impossible, on the face of it, to devise a means of giving impulse to a pendulum, which shall not require that pendulum to unlatch or release a small instalment of the reserved store of energy; yet



Slave clock. Free pendulum.

FIG. 1.

this has been accomplished. The solution of the problem lies in the use of a slave clock to perform this duty for it. It is enabled to do so at precisely the right moment because its pendulum is kept in perfect phase synchronisation with the free pendulum. Two examples of the free pendulum (Fig. 1) are being exhibited at the British Empire Exhibition at Wembley, one in the Royal Society's exhibit in H.M. Government Building and the other in the exhibit of the British Horological Institution in the Palace of Industry. The latter is used as the fundamental timekeeper of the twenty large electric clocks which serve the Palace of Industry, the Conference Hall, and adjacent buildings in that part of the Exhibition. These clocks have been exhaustively tested at the Royal Observatory, Edinburgh, throughout the last two years by means of special apparatus, including a cinematograph which takes cognisance of thousandths of a second. It is only by such means that any error has been discovered, and the variations have never exceeded one-hundredth of a second in twenty-four hours.