Research Items.

MANDAN MUSIC.—Bulletin 80 of the Bureau of American Ethnology is a study of Mandan and Hidatsa music by Frances Densmore, who has already published careful accounts of the music of the Chippewa, Sioux, and Ute. One hundred and ten songs of these two tribes of North Dakota Indians are recorded, of which the greater number are connected with the ritual of societies. Although the life of the Mandan and the Hidatsa, both of Siouan stock, has been blended for many years, each tribe has, to a great extent, preserved its own songs. The Mandan, however, frequently use the Hidatsa language to their own tunes because it is easier to sing. The instruments used are drums, rattles, and whistles of various types with specific uses. The several groups of songs, whether connected with ceremonies, legends, or tribal warriors, differ in melodic and rhythmic peculiarities. The Indian asserts that "he can tell the kind of song when he hears it." Most of the songs are said to have been received from supernatural beings or animals, and are believed to have "supernatural power." The oldest songs belong to the societies which were organised by "Good Fur Robe," the first corn priest, a culture hero, who established certain organisations and customs for the good of the tribe.

FAUNA OF NUYTS ARCHIPELAGO.—A series of papers on the fauna and flora of Nuyts Archipelago and of other islands lying off the coast of South Australia to the west of Eyre's Peninsula, has appeared in the Transactions of the Royal Society of South Australia (vol. 46, 1922; vol. 47, 1923). The material described was obtained during expeditions led to these islands by Dr. F. Wood Jones, professor of anatomy in the University of Adelaide, who visited them in the hope of finding remnants of the mainland fauna and flora which had been isolated during the Pleistocene submergence. A new species of nesting rat was discovered on the western of the two Franklin Islands, which Mr. Oldfield Thomas has named *Leporillus jonesi*. "The possibilities of the dispersal of rats is well known," writes Prof. Wood Jones, "and *Leporillus jonesi* might by some be regarded as being an immigrant to the Franklin Islands. But with the wallabies the case is very different. There can hardly be an alternative to the supposition that they are part of the original mainland fauna." Unfortunately these expeditions were already too late, for "several species have become extinct within the memory of the present generation and not even a skin or a skull is preserved in any collection." Nevertheless, the expedition was rewarded by the discovery of a new and peculiar form of wallaby on Pearson Island (*Petrogale pearsoni*) and a new bandicoot (*Isoodon nauticus*) on the Franklin Islands. The wallaby on Pearson Island has developed a strange gait and certain structural modifications, adaptations to a life among great boulders and sea cliffs. The leader of the expedition was fortunate in obtaining the co-operation of experts in Australia, New Zealand, and at home in describing the collections brought back; their reports make up the series of papers now published. The contributions by Prof. Wood Jones are illustrated by exact and instructive drawings made by himself and give full and interesting descriptions of the life-habits of all the animals studied on these unfrequented islands.

DISTRIBUTION OF MARINE ALGÆ.—Svedelius (*Arkiv f. Botanik*, Bd. 19, No. 3, p. 1, 1924) discusses the discontinuous geographical distribution of tropical and sub-tropical marine algæ and presents a good deal of new evidence on this subject. He points out that there are two good cases of seas possessing marine vegetation which must have been derived by routes which were previously sea, but are now closed by continents. Many species and genera of algæ occurring in the Caribbean Sea must have originated in the Pacific. The Mediterranean has received both phanerogams and algæ from the Indian Ocean. In both cases previous sea must have existed. It is concluded that the majority of older genera of algæ have their main distribution in the Indian-Pacific region, whence they have migrated into the Atlantic. The algæ flora of the Atlantic thus appears to be of more recent origin than that of the Indian-Pacific Ocean. This agrees with the demands of Wegener's theory of continental drift, according to which the Atlantic is of much more recent date.

PINK BOLL-WORM IN EGYPT.—A paper prepared by Mr. C. B. Williams, Senior Entomologist, on behalf of the Cotton Research Board of the Ministry of Agriculture, Egypt, for presentation at the International Cotton Conference at Rio de Janeiro in 1922, and now published in the Third Annual Report of the Board for 1922, issued in 1924, throws a vivid light upon the contributory cause of the prevailing shortage of cotton. The paper records that the pink boll-worm was first found in Egypt by Mr. Willcocks in the autumn of 1910, and since then the total loss to Egyptian cultivators from this pest up to 1922 is estimated at 50,000,000 *l.*, whilst it is further considered that without the control measures introduced the loss would have been twice as great. There are two types of life-cycle in this moth—the short-cycle larvæ pupate immediately they are full grown and emerge at once as moths; the long-cycle larvæ make a cocoon of silk, usually between two cotton seeds, and remain thus in the larval stage for months before they pupate. With the regulation now in force in Egypt preventing the growth of cotton or other host plants after November 30, the moths that infest the new crop of cotton, planted in March and April and flowering from May onwards, practically all come from the long-cycle larvæ, hibernating in dropped, scattered, and partly buried bolls, and amongst the sticks stored as fuel on the roofs of the houses, or in the picked cotton. Now every ginnery has to heat cotton seed to 57° C.-60° C. for a time sufficient to kill all worms, but the dropped bolls and stored fuel remain difficult legislative problems, as appears from the letter on this subject in NATURE, May 24, p. 745. Modified agricultural processes in the winter to destroy the bolls in the soil, compulsory burning of all stored fuel after a certain date in spring, and the plant breeder working to find a variety of cotton that speeds up boll production, may work together to lessen the length of time during which the host plant is at the disposal of the pest.

THE FIGURE OF THE EARTH.—Two interesting papers on the figure of the earth were read at the Royal Geographical Society's afternoon meeting of May 12. In the first, Captain G. T. McCaw reviewed our existing knowledge of the subject and analysed broadly the published data. In the second, Mr. A. R. Hinks pointed out the desirability of using direct, rather than indirect determinations, and expressed a preference for Clarke's 1880 figure, if an existing figure were to be adopted for continental areas. We may take it that, at present, the best value for the semi-axis major is 6,378,300 metres, with a probable error of 50 metres; and the reciprocal of the compression may be taken as $296 \pm 1{\cdot}5$. The old

figures of Airy, Everest, and Bessel, in which the semi-axis major is considerably too small, may now be left out of account. It is well known that the United States, Canada, and Mexico have adopted, for the continent of North America, Clarke's 1866 figure, in which the semi-axis major is 6,378,206 m. and the reciprocal of the compression is just under 295. The International Geodetic and Geophysical Union will this year meet at Madrid, and will discuss, amongst other matters, the question of recommending a figure for continental areas. This is chiefly a matter of cartographical convenience, and no doubt the geographers will have something to say to it. On the continent of Europe at the present time the multiplicity of figures and differences of origin cause some slight difficulties along the frontiers. We might reasonably consider, in the case of Africa, whether we might not avoid some of these difficulties in the future by adopting an arbitrary standard figure *now*. There remains the scientific problem of the best general figure; and it may be hoped that no attempt will be made to decide this until we have digested the mass of geodetic data accumulated during the last forty years, but still unused for this purpose, in Europe, India, Canada, South America, Africa, and Spitsbergen. This laborious task might well be undertaken by the Geodetic Section of the International Union.

THE PROPAGATION OF SOUND.—The *Meteorological Magazine* for April contains an article on the propagation of sound in the atmosphere by Mr. F. J. W. Whipple of the Meteorological Office. It was suggested after the War, by Prof. de Quervain, of Zurich, that the destruction of surplus explosives might serve a good purpose scientifically by causing explosions and listening for them; arrangements were made with the International Commission on the Exploration of the Upper Atmosphere. An experimental explosion was produced at Oldebroek in Holland in October 1922, and was heard or registered instrumentally in south-east England, south Belgium, northern France, and also in Austria. The "normal" zone of audibility reached only to a distance of 12 miles to the north-east and 40 miles to the south-west of the site of the explosion. Beyond the wide "zone of silence" the explosion was heard at a distance of 450 miles to north-west, 400 miles to west-south-west, and 350 to the south. The distance from La Courtine, where the recent experimental explosions have taken place, to the south coast of England is nearly 400 miles, and the author is of opinion that autographic records should have been obtained. There are many conditions in the atmosphere to complicate calculations, and the discussion of the observations will involve a heavy task.

THE INFLUENCE OF GASES ON THE PHOTOELECTRIC EFFECT.—It has been found that, when either hydrogen or oxygen is generated by electrolysis on the dark side of a thin iron plate, the photoelectric sensitiveness, P, of the other side is greatly increased, and that P falls off quickly when the generation of gas ceases. Messrs. R. Dümpelmann and W. Hein, in the *Zeitschrift für Physik*, April 4, describe experiments in which the illuminated surface of the iron could be scraped in vacuo by means of a magnetically operated scraper. The effect of electrolysis was observed immediately after scraping, showing that the action is not simply a renewal of the clean surface by the gas which diffuses through the metal. It was proved experimentally that the changes of P caused by starting and stopping the electrolysis are not due to changes of temperature produced by the electrolysing current, and also that the changes in P observed when a current is sent through the iron plate are caused by changes of temperature, and not to any other effect of the current. When hydrogen is generated over the dark side of the plate by the chemical action of dilute sulphuric acid, the same increase in P takes place as is observed when it is generated electrolytically. Using a copper plate, which only absorbs a small quantity of gas, the increase in P due to electrolytic gas generation is very small or zero. With iron, P diminishes under illumination, and recovers in the dark. So far as the experiments go, the recovery is more rapid with iron containing much absorbed gas than with that containing a small quantity.

DISTORTION IN RADIO TELEPHONY.—Mr. L. C. Pocock read an important paper on distortion in radio telephony at the Institution of Electrical Engineers on May 7. The extending use of broadcasting has directed great attention to the improvement of the design and construction of telephone apparatus. So far as land line and cable telephony is concerned, the problem has been solved sufficiently well for practical requirements. But to receive and transmit music so that a critical ear will be satisfied is immensely more difficult. Mr. Pocock pointed out that frequency distortion is much the most difficult problem in high quality sound reproduction by a loud-speaking receiver. If cost were no consideration, a near approach to perfection could be attained. The troubles arising from amplitude distortion of particular components can be overcome if amplifiers of sufficient capacity are used. Where crystal sets or amplifiers of low power having good characteristics are used with head receivers, it is generally agreed that the quality of reproduction is excellent. The naturalness also is probably good, but the conditions of listening make the judgment of naturalness difficult. The differences produced by various head receivers can, however, easily be detected. These differences are due to differences in the natural frequency of the mechanism, and more particularly to differences in the degree of damping. Kennelly's methods of impedance analysis and modern research have placed receiver design on a sound scientific basis. This is proved by the fact that the first receiver designed by the new methods had an acoustic power $2\frac{1}{2}$ times greater than previous receivers for the same power input, although it was actually smaller and lighter. Recent improvements in design have considerably reduced both the frequency distortion and the amplitude distortion.

FOSTER OPTICAL PYROMETRY.—Messrs. The Foster Instrument Co., Letchworth, have issued a descriptive pamphlet of the Foster optical pyrometer. This is of the disappearing filament type, in which the intensity of the visible radiation from the hot object is matched against the brilliance of the filament of a small incandescent lamp. In the usual form of this instrument, an ammeter is inserted in the lamp circuit and the current required for heating the filament to the desired intensity is a function of the temperature. The disadvantage of this is that only a portion of the ammeter scale is employed, as the scale range up to the value of the current which heats the filament to redness is not utilised. In the present instrument, openness of scale over the working range is secured by arranging the lamp as one arm of a Wheatstone bridge and inserting a milliammeter in the usual position occupied by the galvanometer. The scale of the milliammeter is engraved to read temperatures directly. A detailed account of the instrument is given in the *Journal of Scientific Instruments* for April.