Research Items.

THE PEARL IN OCEANIA.—The prominence given to pearls by Prof. Elliot Smith and Mr. W. J. Perry in their theories relating to the diffusion of culture, has led Dr. A. C. Haddon to make a careful examination of the evidence. The result is published in *Man* for December. Prof. Elliot Smith founded his argument upon the word *Margam*, which he stated meant in Ancient Persian "pearl" and "giver of life"; whereas it means "coral," and the interpretation "giver of life" is based upon an impossible etymology. Mr. Perry accounted for the activity of the colonisers of Oceania in certain areas by attributing it to the love of the islanders for pearl and pearl shell. An examination of the earliest writers on the Pacific shows that of all the natives of the Pacific, the Society Islanders alone had any enjoyment of pearls. When pearls are mentioned elsewhere they appear to have been obtained for the purpose of barter with the Spaniards. In Otaheite, early travellers bear witness that the women wore an ear ornament consisting of three pearls strung together. There is no evidence, however, that pearls had any special significance beyond that. Nor is there in Polynesia any general word for pearl in current use as would have been expected on Mr. Perry's view. The pearl-shell was the essential object, and the pearls were named from it. If the pearl were the prime object of interest to the "archaic" colonisers, it is difficult to see why the original name should have been lost and a derivative name substituted. In Malaysia the terms for pearl and shell suggest that the use was introduced by the Hindus. Pearl shell was both worn and used by Papuans and Melanesians when first we hear of them. There seems to be only one reference to its magico-religious significance. This is recorded by the Rev. Dr. C. E. Fox.

BEISAN FROM THE AIR.—Mr. Clarence S. Fisher has published in the *Museum Journal* (Philadelphia) for June last three photographs, taken from the air, of the excavations of the expedition of the University of Pennsylvania to Beisan. These photographs are part of a series taken by the XIVth Squadron of the Royal Air Force with the permission of the General Officer Commanding in Palestine, which forms a valuable addition to the permanent records of the expedition. The first of the photographs reproduced shows the citadel of Beisan from the east and gives an idea of the magnitude and symmetrical shape of the hill which cannot be obtained from the ordinary photograph. The second view shows the extent of the excavations up to the present, while the third gives a survey of the whole country between Mount Gilboa and the River Jalud which runs at the foot of the main hill of the site. This last is a striking example of the value of the aeroplane in archæological work as it shows how this isolated fortress dominated the area once famous for its fertility, but now mostly occupied by swamps, in a way that would not be possible either in a verbal description or in a photograph taken on ground level.

BIRD-MARKING IN AMERICA.—We have received a paper by Mr. F. C. Lincoln on "Returns from Banded Birds, 1920 to 1923," forming Department Bulletin No. 1268 of the U.S. Department of Agriculture. It consists mainly of tables giving particulars of 1746 records of marked birds recovered in a period of three and a half years, from which figures it is apparent that this method of studying migration has been greatly developed in the United States since the War and is now being exploited on a larger scale. It is of interest to note that this is largely due to its having been taken up officially by the Bureau of Biological Survey of the Department of Agriculture, an organisation which has for long paid much attention to bird-migration, as is witnessed by the well-known work of another of its officers, the late Wells Cooke. One may judge, accordingly, that the importance of seasonal movements in the study of economic ornithology is fully realised. (A parallel is to be found in Hungary alone among European countries.) The new method has evidently been applied with efficiency and thoroughness, and the form adopted for preliminary publication is a useful one. Future papers may be expected to give some analysis of the results and conclusions drawn therefrom, but here this is not attempted. There is, however, a map showing the recovery localities of a large number of mallard marked in Illinois in the spring, autumn and early winter; these are spread over a vast region from the mouth of the Mississippi to Saskatchewan. The results are interesting for purposes of comparison with those already obtained for the same species in Europe, and notably in the British area.

THE MARINE FISHES OF PANAMA.—In an important and exhaustive paper (Field Museum of Natural History, Zoological Series, vol. xv.) S. E. Meek and S. F. Hildebrand give an account of the marine fishes collected during the biological survey of the Panama Canal Zone. They make the review of the fishes of this district complete by including all previously recorded species. The collections were made on both sides of the Isthmus, and the authors find that the Pacific fauna, on the whole, is the richer. They agree that the ichthyological evidence is overwhelmingly in favour of the existence of a former open communication between the Atlantic and the Pacific, sufficiently remote, however, to have permitted the specific differentiation of forms on the two coasts. Seventy-two species are common to the two coasts, but of these, forty-eight are cosmopolitan in their distribution. Two new genera and twenty-three new species are instituted in the first part of this report.

FUNGI FROM NORTH GREENLAND COAST.—As No. 12 of Part II. of the report of the 1916–18 Danish expedition to the North Coast of Greenland, J. Lind has recently described the fungi collected there by the late Dr. Th. Wulff. A point of some interest is the fact that only one parasite, *Melampsora arctica*, is present in the collection, whilst many saprophytes are included, mainly very small Pyrenomycetes and Discomycetes, nearly all of which are invisible to the naked eye, so that the 46 species described would seem a great tribute to the energy and discrimination of the collector. Lind points out that the prevalence of saprophytic forms in North Greenland is undoubtedly due to the fact that the dead parts of plants do not rot away as in more southerly latitudes, "but remain during one or several years forming a protective coating around the young buds and shoots." These old, withered leaves and stalks constitute an excellent substratum for small saprophytes.

CYTOLOGY OF COTTON.—Mr. Humphrey John Denham has published the results of extensive studies of the cytology of cotton in two papers in the *Annals of Botany* (vol. 38, pp. 407-438, 1924), paying special attention to microspore development. The haploid chromosome number proves to be 26, two chromosomes being distinctly larger than the remainder. The author has counted the chromosomes in some 32

varieties of cotton and arrives at the interesting result that the cottons of the New World and Egypt uniformly possess 26 chromosomes, whilst those of Asia have 13 chromosomes. This result probably throws some light upon the difficulty of successful crossing between Indian and American or Egyptian cottons and is therefore of considerable interest to those engaged in the scientific development of cotton-growing within the British Empire. This is probably the reason why Mr. Denham's two papers are also printed in the Journal of the Textile Institute (vol. 15, No. 10, October 1924), but they will prove difficult to readers unaccustomed to technical botanical terminology in spite of the fact that they are preceded by a brief introductory note to which a glossary of technical terms is appended.

TERTIARY AND CRETACEOUS FOSSILS FROM THE ARGENTINE.—Our knowledge of Argentine fossils is not so extensive but that additions, however small, are welcome. Two small papers by M. Doello-Jurado are before us. The one (*Anal. Soc. Cient. Argentina*, tom. xciv.) describes under the name of *Mytilus pseudochorus*, n. sp., the cast of a mytiloid shell from the Santa Cruz formation that has lain some time in the National Museum of Natural History at Buenos Aires, and of which the likeness to *M. chorus*, Mol., had already been recognised by Von Ihering. The other communication (*Physis*, tom. v.) deals with a new species of Viviparus, *V. wichmanni*, from freshwater beds in the Upper Cretaceous of Rio Negro. The author's figures are not very clearly printed, and the doubt may be permitted whether most palæontologists would refer the specimen to Viviparus *sensu stricto*.

WELL-WATERS OF SOUTH AUSTRALIA.—Mr. R. L. Jack publishes three maps and a series of analyses on the well-waters of the South Australian part of the great artesian basin of Australia in the Trans. and Proc. of the Royal Society of South Australia, xlvii., 1923. He strikes another blow at the old view that their waters were all derived by annual percolation from the Queensland hills, by showing that some of it has come from the now arid regions of the very centre of Australia north-west of Lake Eyre. He shows that these waters are of two chemical types, one rich in sulphate and the other in carbonate. The table of analyses records only the chlorine, CO_3 and SO_4. Mr. Jack accepts the view that there should be rigid control to prevent waste of water from the bores, as they are draining water of cisternage which ultimately will only be recoverable by expensive deep pumping. It is unfortunate for the Australian artesian basin that the wholesale waste of the water was so long permitted.

THE WATER-POWER OF SWEDEN.—The growing interest in water-power, especially in countries with little or no coal of their own, adds to the importance of a paper by Mr. S. Norlindh entitled "Översikt över Sveriges Vattenkraft" (*Meddelanden från Statens Meteorologisk-Hydrografiska Anstalt*, Bd. I. No. 5). The publication is mainly statistical and gives very full data of all the important falls on more than 100 Swedish rivers and their main tributaries. For each is given the drainage area, weight and the theoretical horse-power. Other tables give the largest falls and the large falls at present utilised. From comparative statistics of various countries, Sweden with nearly 18 million H.P. appears to be better supplied with water-power than any other country in Europe, next coming Norway and France, each with about 12 million H.P. It is doubtful, however, if world statistics of this nature are altogether comparable since most are merely estimates founded in many cases on inadequate data. A notable part of the publication is a well-produced map of Sweden (scale 1 : 1,000,000) showing the location and horse-power of the chief falls with distinctive colouring for those which are now in use. This map shows strikingly how much power has been harnessed in the south of Sweden and the vast unemployed resources in the north of the country, notable exceptions being the falls on the Luleälv at Porjus and Harspränget in Swedish Lapland.

THE EARTH'S CRUST.—"The Composition of the Earth's Crust," by F. W. Clarke and H. S. Washington (Professional Paper 127, United States Geol. Survey, Washington, 1924), sets out in detail the results obtained by these authors in their most recent examination of the best analyses of igneous rocks available up to the present time. A summary of these results was published in the Proceedings of the National Academy of Science (1922, vol. 8, p. 108), and referred to in NATURE of August 19, 1922, p. 253, where an analysis of the average igneous rock of the earth's crust, and the estimated percentages of the commoner elements in the lithosphere, hydrosphere, and atmosphere, according to Clarke and Washington, were given. The figure obtained is the average of 5159 analyses of specimens of igneous rocks, and should correctly be described as such, rather than as the average igneous rock of the earth's crust. This may be best realised from a consideration of the fact that, of the 5159 analyses, 1985 represent Europe, 1709 North America, and 1465 the rest of the earth. The Pacific is represented by 72 analyses of rocks from Polynesia. On p. 19 of their paper the authors quote the Italian proverb: "Chi va piano va sano." They themselves, however, fail to exemplify the teaching of this good old proverb, for they proceed at an unsafely quick pace when they infer that an average of the available analyses of specimens of igneous rocks shows the average composition of the earth's crust.

UPPER AIR OBSERVATIONS.—Successful results of observations in the upper air by means of *ballon sonde* and pilot balloon are given in the *Meteorological Magazine* for October and November. A Dines meteorograph, according to the number for October, was sent up from H.M.S. *Kellett* in the English Channel on June 16. Two balloons were employed in tandem. The apparatus fell into the sea near Eastbourne and was returned to the Meteorological Office. The lifter balloon was followed by means of glasses and is thought to have burst at a height of about 12 km. (7 miles). At sea-level the atmospheric pressure was 1014 mb. and the temperature 68° F.; at 3 km. (1·8 miles) pressure was 709 mb. and temperature 43° F.; at 5·4 km. (3·3 miles) pressure was 520 mb. and temperature 12° F. Two *ballon sonde* ascents were made from the meteorological station at Sealand Aerodrome, near Chester, on July 14 and 15, each of which reached a height of about 20½ km. (12·3 miles); this is the greatest height reached in Great Britain for 12 years. The November number gives a note on a high pilot balloon ascent at Shoeburyness on May 28. The balloon was followed with two theodolites up to a height of 50,000 ft. (9·5 miles), when the home station lost it. The ascent reached well into the stratosphere. To a height of 16,000 ft. the wind was south-easterly with a speed of 10 m. per hour; it veered to south at 25,000 ft., and beyond this height it continued to veer becoming south-west, 20 m.p.h. at 30,000 ft.; beyond 40,000 ft. it backed slowly and decreased. At 50,000 ft. the wind was west or west by south and very light. At the time of the ascent there was a depression far out in the Atlantic and an anticyclone extended eastward from the southern Baltic; the pilot balloon thus showed the southerly circulation between the two.

PERIODICITY OF TEMPERATURES IN EUROPE.—A. Wagner, in a paper read at the Academy of Sciences, Vienna, in July of this year, presented evidence for the existence of a 16-year periodicity of temperature in Europe, based on the examination of long series of data for Vienna and other stations. He finds that the phases of this cycle are opposite in summer and winter, so that it is best seen in the annual range. The amplitude is greatest in Central Europe, whence it decreases southwards and especially northwards, but the phase remains constant. Along a line from Stykkisholm through Stockholm to Petrograd the periodicity vanishes, to reappear farther north with the phases exactly reversed. The author is quite satisfied as to the reality of the periodicity, but until the full evidence is available it would be premature to express an opinion. It should, however, be pointed out that if the periodicity is as definite as the author claims, its length is not sufficiently defined. A cycle of 16 years may imply anything between 15·5 and 16·5 years. If it is real, the series of 147 years observations available at Vienna should be quite sufficient to determine the length to one place of decimals. If every discoverer of a periodicity would set himself to calculate accurately its length and amplitude before giving it to the world, there would be less confusion in the subject.

THE ELECTRICAL CONDUCTIVITY OF ROCK-SALT CRYSTALS.—A very comprehensive investigation of the electrical behaviour of rock-salt, at temperatures ranging from 15° to 500° C., is described by Dr. D. v. Seelen in the *Zeitschrift für Physik*, October 23. It was found that all the specimens available required a preliminary treatment by heating to 400°; measurements made before this treatment did not agree with those made under similar conditions afterwards, but the effect of the heating was to give a material which had a fairly definite conductivity and temperature coefficient for each temperature. One of the experiments, in which three polished plates were carefully weighed, piled between silver plates, heated to 400° C. for several days while a current was passed through them and again weighed, showed that conduction took place according to Faraday's law, and was electrolytic in character. Sodium ions (Na^+) are the only carriers of electricity, and chlorine ions (Cl^-) do not travel through the crystal. The distribution of potential along the length of the crystal was investigated; it does not follow the straight line law, and space charges in the interior of the crystal have to be assumed. There is nothing which alters the potential distribution, such as double layers or space charges, at the electrodes. The author considers that his experiments indicate a loosening of the crystal lattice as a preliminary to conduction; under the conditions of his experiments the formation of metal bridges in the crystal lattice was not possible, and the fact that the crystals did not lose weight when heated all day to 400° excluded the possibility that conduction was due to salt solution included in the crystal.

RANGES OF POLONIUM α-RAYS IN OXYGEN AND NITROGEN.—Mlle. I. Curie, using air in the Wilson apparatus, formerly obtained a very different result for the above distribution than that given by the scintillation method, and found that the latter does not detect the majority of the rays towards the end of their range. In the *C.R. Acad. Sci. Paris*, Oct. 20, Mlle. Curie and Mr. N. Yamada describe measurements in oxygen and nitrogen. The number of particles with ranges between x and $x+dx$ is proportional to $\epsilon^{-\xi^2/\alpha^2}$; $\xi=x-\rho$, ρ being the most probable range, and α an experimental constant. The value of α/ρ for nitrogen is 0·0208, for oxygen 0·0208, and that previously found for air is 0·015. The exact equality of the values of α/ρ for oxygen and nitrogen is partly fortuitous, the difference in the case of air being due to the greater thickness and possible irregularity of the preparation and impurities. It appears that the difference in the form of Bragg's ionisation curves for oxygen and nitrogen is due to the law of variation of ionisation along the α-ray, and not to any difference between the distribution of ranges in the two gases.

HALIDES OF SILVER.—The photochemical decomposition of silver bromide has recently been investigated by E. J. Hartung with the aid of the microbalance (Jour. Chem. Soc., November). It is interesting to note that experiments on the rate of bromination of thin films of metallic silver afforded no evidence of the formation of silver sub-bromides or perbromides. Thin films of silver bromide, when sealed up in a vacuum in the presence of copper gauze and placed in the light, lose more than 96 per cent. of their bromine. These results support the non-existence of silver sub-halides, and they bear out the conclusions reached by Reinders in 1911 and Bancroft in 1923.

ELECTRO-ENDOSMOSIS.—A contribution to the study of electro-endosmosis, by F. Fairbrother and H. Mastin, appears in the Jour. Chem. Soc. for November. The calculation of the potential gradient along the walls of the capillaries in the diaphragm of an electro-endosmose apparatus involves uncertain assumptions, and a method is described for overcoming these difficulties. In effect, the method consists in measuring the "cell-constant" of the diaphragm, the conductivity of the calibrating liquid being assumed. Measurements with carborundum powder in acid and alkali are recorded; the electrokinetic potential, calculated from the modified Helmholtz equation, reaches a maximum in dilute alkali; it decreases as the concentration of the latter decreases and as the concentration of the acid increases. At the intermediate point (water) the carborundum is negatively charged; the value −0·0698 volt is found for the potential between the two parts of the double layer in distilled water. No reversal of the direction of electro-endosmosis was found with carborundum in hydrochloric acid solutions up to N/50 strength.

THE ATOMIC WEIGHT OF ANTIMONY.—In the November number of the Journal of the American Chemical Society, P. F. Weatherill describes experiments on the atomic weight of antimony. Antimony trichloride, prepared from pure antimony and chlorine in a vacuum, was repeatedly distilled in a vacuum in an all-glass apparatus. It was dissolved in a solution of pure tartaric acid, and compared with pure silver. The mean of nine analyses gave $Sb = 121{\cdot}748 \pm 0{\cdot}00086$, which may be compared with the value 121·77 obtained by Willard and McAlpine from the analysis of the tribromide, and the value 121·76 obtained by Hönigschmidt from the analysis of both the tribromide and the trichloride. By taking all three independent researches into account, a value of 121·76 would seem to be close to the truth. The value 120·2, which has appeared in the tables for a number of years, is much too low. It may be remarked incidentally that no atomic weight table appears to have been published by the International Commission since 1921, and that a new table would seem to be due. Differences of the order indicated affect ordinary analytical practice.