

Research Items.

EFFECTS OF MENTAL WORK.—A paper of great interest on the changes which take place in the metabolism of the body during severe mental work has been published by Prof. V. Suk of the Masaryk University, Brno, Czechoslovakia (*Bull. internat. de l'Acad. des Sc. de Bohême*, Nov. 20, 1925). Prof. Suk took the following three groups of students: Group 1—29 men undergoing physical training in a teachers' college; group 2—31 members of the highest class in a *gymnasium* working for final examinations; group 3—31 members of another class also working for examinations. He kept these three groups under observation for three months, keeping a record of the amount of hæmoglobin and of sugar in their blood. There was a slight increase on the percentage of hæmoglobin in those undergoing physical training while that in the brain-workers remained stationary. On the other hand, while the blood-sugar remained stationary in those who exercised their bodies, there was a fall of 36-38 per cent. in the sugar content of the blood in the brain-workers. Severe and prolonged mental toil, therefore, does interfere with the carbohydrate metabolism of the body. The exact mechanism by which the nervous system produces this change is not apparent, but it may be through an effect produced in the functions of the liver. It is well known that brain-workers are particularly liable to colds and other infections, and Prof. Suk suspects that this liability may arise from the reduction of their blood-sugar.

THE CHANCELADE SKULL.—In *Annals of Eugenics*, vol. 1, Parts 3 and 4, Mr. G. M. Morant compares, by means of modern statistical methods, the cranio-metrical features of the skull found in 1888 by Féaux and Hardy near Raymond, Chancelade, with those of Fürst and Hansen's series of Greenland Eskimos. He concludes, in agreement with the suggestion of Testut, and contrary to Keith's recent verdict (*Man*, 1924), that the Magdalenian skull is not more removed from the mean type of the modern inhabitants of Greenland than many individuals picked at random from that population are likely to be. In accordance with the view that the Chancelade individual was closer to the Eskimo than to the modern English, he sees justification for assuming that, in the Magdalenian period, a race of hunters existed in southern Europe, which migrated northwards following the reindeer, or was pushed to the fringe by other and invading races. Excellent photographs, taken with a telephoto-lens to reduce distortion, accompany the study.

POTTERY FROM CHANCAY, PERU.—A further study of the Uhle Collections of Peruvian pottery in the University Museum appears as vol. 21, No. 7, of the *University of California Publications in American Archaeology and Ethnology*. Mr. A. L. Kroeber now describes the pottery from Chancay which was obtained by Dr. Uhle in graves on five sites described in his field notes, part of which form an appendix to the present publication. Five successive styles are represented: black-on-white, a style known as that of Chancay and the latest in date; three-colour geometric, epigonal (three and four colour), white-on-red, and the interlocking style. White-on-red is a hitherto undescribed style which is definitely Central Peruvian. The interlocking type, of which the most common design has the typical outline of complementary animal heads with worm-like bodies having serrated edges, is undoubtedly textile in origin. Certain vessels present affinities with the Proto-Nasca of Ica, and, further, round lumps of adobe character-

istic of Proto-Nasca construction were also found with the Chancay burials. Dr. Uhle has demonstrated the relation of Ica in the north and Truxillo in the south. Notwithstanding the wide geographical separation of the two styles, Chancay, lying half-way between the two, appears to bridge the gap by a civilisation of the same general character, and suggests a cultural stage all over Peru at a remote epoch antedating Tiahuanaco. The importance, undoubtedly religious, of this design was indicated by the discovery of a painted wall belonging to a small terrace building on an artificial base. The wall was 23 m. long and 1.6 m. high at its best-preserved part, and was painted in four colours with outlines of the textile design.

THE FOX INDIANS.—The fortieth annual report of the Bureau of American Ethnology (1918-19), which has just been issued, contains, in addition to the report of the chief of the Bureau, five accompanying papers by Dr. Truman Michelson based upon material gathered fourteen years ago and supplemented by later information dealing with the Fox Indians of Iowa. Each paper is a Fox text written out in the current syllabary by one of the Indians and afterwards phonetically restored, accompanied by an English translation and ethnological and linguistic notes by the author. The first paper deals with the mythical origin of the White Buffalo dance, and contains, in addition to the information about Fox ritual, some interesting data bearing upon changes in custom and the social and religious outlook of the Indians. The reverent observance of religious rites still to be found among the older men is no longer characteristic of younger generations, who attend the dance purely for social purposes and to get something to eat. A note on mortuary customs and beliefs is important for its detail and for the light it throws on observances in connexion with behaviour after death of a husband or wife and remarriage. Of the remaining three papers, two deal with Fox religious societies, and the third, an autobiography of a Fox woman, is unique. It begins with her earliest recollections, and from her eighth year gives particulars of her introduction to the various household duties which fall upon the woman in the Indian family. At nine years she helped her mother in the planting; at ten in washing clothes and cooking, and in cutting and gathering wood; at eleven she learned to make bags, and so on. One of the most interesting features of the story is the importance of the mother's brother, which becomes especially marked after marriage, when the father ceases to function in relation to his daughter and his place is more than taken by the uncle. For example, the uncle advises his niece as to her behaviour after divorce, and when her husband dies instructs her in the mourning ceremonies and the observances which secure release from the death ceremonies. Apparently this function of the maternal uncle has nothing to do with matrilineal descent, and cannot be regarded as a survival of that system, though the Foxes are now patrilineal.

THE ALIMENTARY CANAL OF SCORPIONS.—In the current issue of the *Quarterly Journal of Microscopical Science* is a detailed account by Prof. E. N. Pavlovsky and Prof. E. J. Zarin of their studies on the structure and functions of the various parts of the alimentary canal of scorpions. The authors have not been able to investigate the physiological properties of the maxillary glands, which it is believed may produce a proteolytic ferment. The food—the juices and muscles of arthropods and of earthworms—passes

into the stomach of the scorpion, where it is acted upon by pepsin, trypsin, chymosin, and lipase. The mid-gut of scorpions is of insignificant volume as compared with the cavities of the liver tubules, and it is evident that the latter are of the greatest importance. They contain two kinds of cells, secretory cells, producing ferments which act on proteins, fats, and carbohydrates, and absorptive cells. The authors suggest that the liver also plays a part in excretion, the presence of brown granules in its cells being cited as evidence. The intestine appears to play little or no part in the digestive processes.

LUMINOUS FISHES AND CEPHALOPODS OF THE MEDITERRANEAN.—Number 9, vol. 2 (Biology), A. 12, of the report of the Danish Oceanographical Expedition, 1908-10, to the Mediterranean and adjacent seas includes an extremely interesting account of the Mediterranean Sternoptychidae by P. Jespersen and Å. Vedel Tåning (Copenhagen: Andr. Fred. Høst and Søn, 1926. 35s.). In their study of these peculiar luminous fishes, much light is thrown on their breeding, life-histories, and migrations. Many of these fishes tend to move to a greater depth with increasing age, the adults often occurring naturally at a depth of more than 1000 metres, whereas the post-larvæ are found much higher up. The photophores in this group are important as a means of classification, but in many of the genera these do not appear until late in post-larval life or after metamorphosis, and there is often an enormous alteration in general appearance and also a great reduction in length, as, for example, in *Ichthyococcus ovatus*. Dr. Degner's important monograph (C. 1), which is also included in No. 9, vol. 2, of this report, on the cephalopods deals also with a group which in many forms is luminous, but in this case comparatively few are from great depths. The majority occurred between the surface and a depth of 65 metres, and mainly belonged to the Decapoda. A single specimen of an adult Argonauta was obtained in the Mediterranean and one of Spirula just outside, close to Gibraltar. Many young forms of various species were taken and a few new species are described, including *Mastigoteuthis Schmidti* and *Desmoteuthis Thori*, both from waters of 2700 metres depth.

AMPHIPODS AND DIATOMS FROM THE DANISH OCEANOGRAPHICAL EXPEDITION.—In Number 9, vol. 2 (Biology), D. 5, of the report of the Danish Oceanographical Expedition, 1908-10, to the Mediterranean and adjacent seas (Copenhagen: Andr. Fred. Høst and Søn, 1926. 35s.), Dr. K. Stephensen finishes his account of the Hyperiidæ-Amphipoda, of which Parts 1 and 2 have already appeared. A large portion of the present work is taken up by the valuable synopsis of the Hyperiidæ in which the Mediterranean species, eighty in all, are fully discussed. The author finds that there do not seem to be any species endemic to the Mediterranean, nearly all being found also in the Atlantic, and there seem to be scarcely any differences between specimens from the two areas. The Hyperiidæ are almost exclusively oceanic, and many are found over great depths, some never rising above a 300-metre level; but of these deep-water forms few enter the Mediterranean. The species found there belong almost exclusively to the surface layers. Prof. Pavillard, in the same volume (J. 4), gives an interesting account of the planktonic diatoms which in these regions are really fairly well known, and his investigations show few new species but much new matter as regards distribution. The absence or great rarity in the Mediterranean of certain species common and well known in the English Channel and outside is striking. Thus *Hyalodiscus stelliger* apparently does not occur, *Paralia sulcata* is very rare, and *Thalassiosira*

gravidæ is replaced by *T. rotula*. The summaries of the larger genera such as *Chaetoceros*, *Rhizosolenia*, and *Coscinodiscus* are instructive and helpful, and as an up-to-date guide to pelagic diatoms the whole work is extremely valuable.

MICRO-ORGANISMS IN INDUSTRY.—In his presidential address to the Royal Microscopical Society, Mr. A. C. Chapman gave an account of some of the Fungi imperfecti—torula, mycoderma, ooidia—and their activities (*Journ. R. Micr. Soc.*, vol. 46, Part 1). He referred to a yeast-like organism, isolated by Prof. Lindner of Berlin in 1916 from the sap which had exuded from a birch tree, which was able to grow freely on the surface of carbohydrate solutions containing ammonium salts and to form a thick greasy film. This film when separated and dried was found to contain 18 per cent. of fat, 31 per cent. of crude protein, and 43 per cent. of carbohydrates, so that, given a cheap source of carbohydrate and ammonium salts, it was evident a food product rich in fat and protein could be produced in large quantity. Mr. Chapman isolated a similar organism in 1917, and reports that the product of its activity contained about 50 per cent. of crude protein and up to 10 per cent. of fat, and that when pressed it formed cakes having the odour and flavour of cream cheese. He points out that if an efficient biochemical process were discovered for the conversion of cellulose into sugar, the production of a synthetic food product on a large scale would become practicable perhaps even under peace conditions. He quoted a sentence from a lecture which Hayduck delivered in Berlin in 1916—"when we can convert our evening papers into sugar so rapidly that we are able the following morning to eat the albumen prepared therefrom, then indeed we shall have solved one of the greatest problems of the century." Mr. Chapman advocates the founding of a National Institute of Industrial Microbiology for research on micro-organisms which play an important part in industry, for the training of teachers of microbiology, and for maintaining a collection of pure cultures of micro-organisms for industrial purposes.

AUSTRALIAN RIVER BASINS.—A map of Australia, showing the extent of the drainage areas of the various rivers, has been published by the Bureau of Meteorology of the Commonwealth of Australia. The positions of river gauges and flood report stations are also shown. The map should prove useful in connexion with the flood warning service of the Bureau. In times of heavy rainfall, it will facilitate the issue and distribution of flood warnings to the districts concerned. The map is on the scale of 200 miles to an inch and a half.

THE CLIMATE OF HELWAN.—A discussion on the above by Mr. L. J. Sutton, Director of the Egyptian Meteorological Service, has been issued by the Ministry of Public Works, Egypt, as Physical Department Paper No. 20 (Government Publication Office, Cairo, price P.T. 10). The present report deals with the observations of the years 1906-20, and fifteen years are said to be probably sufficient in a climate like that of Helwan to give a fair representation of a true normal, except perhaps for rainfall. The scheme for the report was commenced by Mr. Knox-Shaw, but, owing to his appointment as Radcliffe Observer at Oxford, the work of preparing the report was handed to Mr. Sutton. The climate of Helwan is essentially of the Saharan desert type. There is a short winter, December to February, when the nights are cold, averaging 9° C., and the days comparatively warm, averaging about 20° C. The temperature never falls to the freezing-point, the lowest ever

recorded being 1.6° C. Nearly 8 hours of sunshine are enjoyed each day, and normally there are only 3 days of rain in each of the winter months, but sometimes thunderstorms occur with heavy rain. Summer commences in June and lasts until the end of September; from June to August there are more than twelve hours of sunshine a day, the temperature reaches 35° C. on the average during the daytime and falls to about 21° C. at night. In the early part of summer, temperatures of 40° C. are not uncommon, and on two occasions a temperature of 46° C. (115° F.) has been recorded. The summer is rainless, and there is scarcely any rain from May to October. Tables and diagrams with detailed accounts are given of all the meteorological elements. The work adds much to our knowledge of weather conditions in this part of the globe.

WEATHER AND AGRICULTURE.—Responsible United States officials engaged in the Weather Bureau, the Bureau of Agricultural Economics, and the Forest Service have co-operated in producing a discussion, No. 918, published by the United States Department of Agriculture (Washington: Government Printing Office, price 20 cents). It is asserted that so early as 3000 years B.C. man was a tiller of the soil and gathered a harvest. Since then the history of agriculture and the weather has been contemporaneous with that of civilisation itself. The development of agricultural education such as the establishment of agricultural colleges and experimental stations is dealt with. The influence of the weather and especially the control of weather by cyclones and anticyclones is referred to and the adjustment of agriculture to climate, soil condition and topography. Maps are given showing the distribution of rainfall over the globe, and the natural vegetation, and also air isotherms over the world for January and July. Referring to the rapidly increased population in recent times, the unoccupied arable land of the world has become gradually occupied until to-day very little remains in regions with healthful climates. It is stated that the United States, with only about 5 per cent. of the world's population, produces one-seventh of the world's cattle, one-fifth of its wheat, and three-fourths of its corn. Rainfall and crop growth is gone into with considerable detail, also the temperature influence on crop distribution. It is asserted that where climate and other conditions permit of mixed farming, the weather hazard is very much reduced. Many matters such as weather and the railroads and details intimately associated with salving the crops are of much interest.

METEOROLOGY AND GEOPHYSICS IN POLAND.—In Communications Nos. 1-18, Institut de Géophysique et de Meteorologie de l'Université de Lwów, Prof. H. Arctowski and eight collaborators publish a series of papers on meteorological, astronomical, and geophysical subjects. Eight papers contain discussions of temperature variations observed during the years 1910-1919 at Arequipa and at a number of widely separated stations. These temperature variations are employed to show the distribution and movement of "thermo-pleions" (areas of positive departure of temperature from the normal) and "anti-pleions" (areas of negative departure) in Egypt, Hawaiian Islands, India (the Deccan), New Zealand, Peru, Philippine Islands, Russia, and Scandinavia. The agreement between the Arequipa or standard type of thermo-pleion fluctuation and that prevailing in the Deccan is found to be particularly striking during the ten years of observation. Four other papers deal with pyrheliometer observations. During 1924 a number of these observations were

made by three different methods at Pozyzewska (altitude 1406 metres) in the eastern Carpathians for the purpose of finding a suitable site for a solar observatory. The remaining contributions relate to (1) The dissimilarity of the variation of the frequency of sunspots observed north and south of the sun's equator, and the desirability of considering sunspot statistics for each hemisphere separately; (2) the anomalies in the measurement of rainfall and the exposure of rain-gauges; (3) the determination of the "geothermic" degree from observation of the temperature gradient existing in certain petroleum wells in Poland; and (4) the occurrence of potassium salts in Poland. The above series of papers have been published in the *Kosmos*, vols. 46-50, 1922-1925.

MAGNETIC VARIATION IN NORTH AFRICA.—The secular magnetic variations at Tunis, Carthage and Malta are considered by Dr. L. Palazzo in the *Memorie della Pont. Accademia delle Scienze Nuovi Lincei*, vol. 8, 1925. Dr. Palazzo himself made observations of all three magnetic elements at Tunis and Malta in 1890, and has recently repeated the observations. In 1890 he also measured the horizontal intensity at Carthage. In this memoir he summarises other observations available for the three stations, and constructs graphs showing the secular variation of declination, dip and horizontal intensity; for Tunis the graphs extend from 1875 to 1925, in which time the declination has decreased by about 5° to its present value of about $7^{\circ} 20'$ E. The Carthage declination and dip graphs extend from 1820 to 1905, and are in general agreement, as regards secular variation, over the period in common with those for Tunis, as would be expected from the proximity of the stations. The Malta data extend from about 1820 to 1925, and show a decrease in E. declination from $17^{\circ} 20'$ to $5^{\circ} 40'$.

VELOCITY OF DETONATION FOR EXPLOSIVES.—The explosives in general use in fiery and dusty mines belong to the class of detonating explosives. It is known that the ignition of inflammable gases in the neighbourhood of the borehole depends in large measure on the velocity of detonation. It is therefore of great importance to find a method of determining this velocity for the practical explosives used in mines. To determine this velocity, very small intervals of time of the order of a millionth of a second have to be measured. A method suitable for doing this is described by E. Jones in the Safety in Mines Research Board, Paper No. 22 (London: H.M. Stationery Office, 1926. Price 9d. net). The method is an electrical one. It depends on the partial discharge of a condenser through a known non-inductive resistance. The time of the discharge is the time taken by the detonation wave to travel between two points at which the circuits are broken. The times computed were tested with mechanical arrangements which gave time intervals of the order 10^{-4} sec. to 10^{-6} sec. The results were concordant for long fuses, but unsatisfactory when the trinitrotoluol fuse was only about 10 cm. long. The discrepancies in this case were traced to electrical phenomena due to detonation, and were overcome by removing the break-points of the circuit to a distance from the detonating explosive. Consistent results were now obtained, although the fuse length was reduced to 2 cm. The difference between the results and that given by the Mettengang method for metre lengths of the explosive was rather less than 3 per cent. The latter method, however, only gives the average velocity over the metre. The agreement consequently is satisfactory. Further researches are in progress.