Research Items.

MEDICINE AND SURGERY IN ANCIENT EGYPT.—In *Science Progress* for October, Dr. Warren R. Dawson maintains, as the result of a direct study of Egyptian medical texts, that the generally accepted accounts of Egyptian medicine consist of a series of generalisations, many of them quite erroneous and based upon incorrect readings which have been copied from book to book for the last fifty years. There are a number of medical papyri in existence, of which the best known is the Ebers. Egyptian medical knowledge was clearly based upon magic, as is shown by the use of incantations by the object of the treatment, as indicated by the form of its title in the papyrus, such as 'against,' or 'to banish,' or 'to drive out' the disease, which was evidently conceived as a possession, and by the fact that even effective remedies were used magically. Some of the remedies were deliberately made disgusting or unpalatable to the possessing spirit. Surgery, however, the recently discovered Edwin Smith papyrus, which deals with the treatment of wounds, shows to have been based upon exact and scientific knowledge. This was due to the practice of mummification which early gave the Egyptians a knowledge of comparative anatomy. The hieroglyphic signs for the organs of the body are pictures of the organs themselves, but the fact that they are animal and not human organs is evidence that the Egyptians were first acquainted with the structure of the lower animals. The practice of mummification again also gave them a knowledge of physiology—the Ebers papyrus contains several sections dealing with the heart and its functions. Although the meaning of the terminology is not always clear, owing to lexicographical difficulties, and drugs, symptoms, and diseases, all alike are obscure at times, several diseases have been identified and the mummies themselves have furnished evidence of certain pathological conditions. Generally speaking, the diseases are those which attack the fellahin to-day,—intestinal troubles due to bad water; worms and other parasites; ophthalmia and other infections of the eyes; boils, bites, skin diseases, bilharzia infection, and mastoid disease among others.

THE BIOLOGY OF A WHEAT JOINTWORM PARASITE.—The Wheat Jointworm (*Harmolita tritici*) belongs to a family of chalcids which includes many plant feeders. This habit is unusual, since most members of the Chalcidoidea are parasites of other insects. The Harmolita is extensively parasitised by another chalcid, *Eurytoma parva*, which curiously enough belongs to the same family (the Eurytomidæ) as its host. The life-history of this parasite has recently been worked out in the United States by Mr. W. J. Phillips, who contributes an interesting paper on the subject in the *Journal of Agricultural Research* (vol. 34, 1927, pp. 743-758). It appears that the female Eurytoma prefers to oviposit in wheat stems containing Harmolita larvæ in their first instar. Having consumed its host, the Eurytoma then apparently proceeds to complete its development by feeding upon the plant sap. There is evidence also that, if a Eurytoma, on hatching from the egg, finds itself outside a cell containing its host, it feeds straight away on plant sap and does not seek out the Harmolita. In one instance Mr. Phillips mentions that a larva of the Eurytoma that had evidently consumed a Harmolita larva and had begun to feed on plant sap, was reared to maturity upon a fully grown larva of Harmolita. It is evident that the feeding-habits of the Eurytoma are in a plastic condition and that the insect is gradually forsaking its normal parasitic mode of life and becoming a plant-feeder.

VARIATIONS IN THE PROTEIN CONTENT OF WHEAT.—W. F. Gericke (*Journal of Agricultural Research*, vol. 35, p. 733) brings forward some explanation as to why applications of nitrogen to land may cause either an increase or decrease in the protein content of wheat. Starting with experiments on wheat grown in nutrient solutions, he showed that in a series of plants initially supplied with a complete culture solution, but later transferred to one from which a different essential element was omitted in each case, those deprived of calcium or nitrogen alone had the protein content of the grain affected; a decrease occurred in both cases. Tests were also made with a number of different wheat varieties grown in soil, the plants either receiving no nitrogen or dressings of sodium nitrate at different stages of development. The later applications (after 90 days' growth) invariably resulted in the production of high-protein grain, whereas a dressing of nitrogen at the time of planting gave a low-protein grain, and in some cases even decreased the protein content below that of the untreated sets. These varieties of wheat also showed widely different degrees of response to the nitrogen treatment in respect to tiller formation, due to the physiological and genetical properties of the plants. Some tillered freely only after a late dressing of nitrogen, while others tillered equally well whether the nitrate was supplied late or at the time of planting. The explanation suggested from the correlation of these results is that where early tillering occurs, the relatively large vegetative growth gives inception to more grain than would result from a plant tillering later and further utilises most of the available nitrogen; the low-protein content of the grain in such cases is accordingly attributed to a shortage of nitrogen at the critical period. It is, therefore, possible to produce high-protein grain by supplying nitrogen to the soil during the later growth stages or by curtailing excessive grain production. Further, such experiments emphasise the fact that the properties of different wheat varieties may have an important bearing on the efficiency of any fertiliser treatment.

AMPULLARIIDÆ OF JAMAICA AND CUBA.—Dr. H. A. Pilsbry publishes a revision of the Ampullariidæ of Jamaica and Cuba (*Proc. Acad. Nat. Sci. Philad.*, vol. 79). Though the members of this family present in the Greater Antilles are not rare and have been known for a long time, the literature relating to them has remained in confusion. The author uses "the generic term Ampullaria in connexion with these species because being customary it will be generally understood." This departure from orthodox methods in a systematic treatise is the more regrettable when made by one who has a world-wide reputation for systematic work and elsewhere has employed the more correct name of Pila, though he misattributes it to Röding, the editor, and not the author of Bolten's Catalogue. Dr. Pilsbry is unable to separate, as others have done, the commonest one of the Cuban forms from the *Ampullaria paludosa*, Say, of Florida and Georgia, and has had to change the name in the case of another species.

NEW FOSSIL PRIMATES FROM INDIA.—In *Palæontologia Indica* (vol. 4, new series), Dr. Pilgrim has published an account of a fragment of a palate of a new species of the important genus Sivapithecus (*S. himalayensis*). The paper also describes other primate material, there being further new species of Sivapithecus, of Palæopithecus; and two new genera;

Hylopithecus, of which only a single tooth is preserved, and Pondaungia, the true affinities of which are still in doubt. The author also discusses the evolution of the Anthropoidea in view of this new material and with reference to criticism of his already published views.

PRIMITIVE ARTIODACTYLA.—Miss Pearson has given an account (*Trans. Roy. Soc.*, B, vol. 215, 429) of the skulls of early Tertiary Suidæ and other primitive Artiodactyla, paying particular attention to the structure of the otic region. This interesting work is the outcome of a tour round most of the important university and public collections of Europe. Any endeavour to disentangle the relationships of the primitive artiodactyls by an examination of the structure of the dentition alone results in great confusion. Miss Pearson, wisely confining herself to an intensive study of the basicranial and otic regions as likely to be more conservative in their evolution than teeth, has made a survey of every specimen well enough preserved for the purpose of this investigation. Although such material is none too common, results of undoubted value and interest have emerged. It can be shown, for example, that, although the North American Perchœrus and the European Palæochœrus of the same period are at first sight so similar, the former is a primitive peccary and the latter a primitive true pig. Cebochœrus is suggested as being close to the ancestral line of the hippopotamus, and light is thrown on the position of other early artiodactyl genera. The paper is well illustrated with more than fifty line drawings, and is a valuable contribution to the study of extinct mammals.

RADIUM D, E, AND F.—A number of track photographs obtained by S. Kikuchi with a Wilson expansion apparatus, which are described in the *Japanese Journal of Physics* (vol. 4, p. 143), throw some light on the mode of disintegration of these elements. The source used was a silk fibre, which had been activated by contact with the surface of an old emanation tube, and was stretched across the cloud chamber. In addition to the α-trails of radium F, two distinct sets of β-trails were found to be present, the long group being attributed to radium E, and the short group to radium D. Within the limits of the probability fluctuations, the total numbers of α-trails and of fast β-trails which appeared on 80 plates were equal, thus confirming an earlier result that radium E emits one β-particle on disintegration. No pairs of tracks were found which could be regarded as those of rays emitted from the same atom. It is suggested that the primary rays of radium D leave the atom with too little energy to be recorded, and that its β-radiation which has been observed is all of secondary origin.

SPECIFIC HEATS.—The well-known technical method of heating by bombardment with cathode rays has been applied quantitatively by H. Klinkhardt to the measurement of specific heats (*Annalen der Physik*, vol. 84, p. 167). A specimen of the substance to be investigated is supported on quartz in an evacuated enclosure, and brought to any desired temperature between 100° C. and 1000° C. in an electric oven. It is then made the anode for an electron discharge at a few hundred volts from an oxide coated filament, and its subsequent change in temperature is followed by means of an embedded thermo-junction. The rate of supply of energy is known from the current and voltage, due allowance being made for contact differences of potential, and after applying the usual calorimetric corrections, the final results are claimed to be correct to within 2 per cent. Insulators and liquids can be studied inside a hollow metal electrode. Measurements of the specific heats and of latent heats of change of phase are recorded for ammonium chloride and for a number of metals and alloys, and particular interest attaches to the behaviour of iron and nickel at their Curie points, where the specific heat was found not to fall abruptly to a value characteristic of the unmagnetised material, but merely to pass continuously and reversibly through a sharp maximum.

THE PROTECTION OF ALUMINIUM AND ITS ALLOYS AGAINST CORROSION.—A paper by H. Sutton and A. J. Sidery, read before the Institute of Metals on Sept. 8, contains a full account of the process of anodic oxidation of aluminium devised by Bengough and Stuart. Sutton and Willstrop, by volatilising the metal in a stream of dry hydrogen chloride, have shown that the film produced consists of a coating of aluminium oxide of the order of 1 μ thick. Especially when a grease such as lanoline is afterwards applied, the anodic oxidation affords an excellent means of protecting the metal and its alloys from sea-water corrosion. As a result of the great 'throwing power' of the anodic process, samples of irregular shape can be satisfactorily treated without special arrangements. Parts in contact with other metals, however, cannot be treated, and the process must be used prior to the assemblage. Further, there may at times be difficulties as a result of the insulating properties of the film where good electrical contact is required. Electrolytic coatings of zinc and cadmium 0·0005 in. thick afford good protection to the metal and its alloys with the exception of cadmium on aluminium itself. Nickel coatings of the same thickness, however, were found not to give adequate protection.

CATALYST POISONING IN THE OXIDATION OF METHYL-ALCOHOL.—The *Chemiker-Zeitung* of Oct. 12 contains an account of some investigations into the causes of catalyst poisoning in the oxidation of methyl-alcohol to formaldehyde. Since poisoning has been found to be due to a considerable extent to impurities in the air supply, it is advisable to draw pure air from an area quite outside the range of factory products. The cost of the necessary installation is rapidly counterbalanced by the increased yield, which under good conditions has been found to amount to 92 per cent. of the theoretical value and to be easily maintained at that figure.

AN OXIDE OF FLUORINE.—No compound of fluorine and oxygen has hitherto been described, and hence the communication by Messrs. P. Lebeau and A. Damiens in the *Comptes rendus* of the Paris Academy of Sciences for Oct. 3, demonstrating the existence of such a compound, will arouse considerable interest. In the preparation of fluorine by the electrolysis of acid potassium fluoride, it was noticed that at the commencement of the operation some substance other than fluorine was present, and the cause of this was traced to the presence in the liquid of a small quantity of water. The new gas has not been obtained pure, but only in admixture with oxygen. From the density of the mixture and the chemical reactions, the formula of the gas has been established as F_2O, and it is noteworthy that it is more stable towards a rise of temperature than the corresponding chlorine compound, Cl_2O, since it remains unaltered when heated to 125° C. in contact with glass. It can also be kept unchanged for several days in contact with water and glass. With alkalies it forms fluorides, setting free oxygen; free iodine is produced by interaction with potassium iodide.