

Research Items.

ROYAL COSTUME AND RACE IN ANCIENT EGYPT.—In *Ancient Egypt* for June, Miss M. A. Murray examines details of the dress of kings of the early dynasties of Egypt and suggests that certain inferences bearing upon cultural origins may be drawn from the results. On the slate palette of Narmer, the king is shown wearing a belt at the back of which is an animal's tail with long rippled hair—a bull's tail. Sir Flinders Petrie has pointed out that the bull's tail was a promoter of fertility. While the king was typified by two creatures, the falcon and the bull, he was more truly falcon. The falcon Horus conquered the country, but his religion was exotic, belonging to the king only. Egypt was and remained a cattle-worshipping country, and therefore the king had to become a bull. This was accomplished by a ceremony in which the outward and visible symbol, the bull's tail, was attached to his person. The Sed festival was connected with the tail of the king; but Prof. Newberry has suggested that this was a marriage ceremony. In Crete, when bull-worship was introduced, the queen, through whom, as in Egypt, descent was transmitted, was disguised as a cow for the celebration of the Sacred Marriage with the bull. In Egypt the Sed festival may represent the making of the foreign falcon into a bull at the time of the marriage to the queen of the bull-worshippers. The royal head-dress may suggest the provenance of these rulers. The crowns appear to be turbans. The Red Crown of Lower Egypt is of a form now worn by the Marwaris of Rajputana. This head-dress in Egypt is worn only by the king and by foreigners. It is indigenous in Asia and especially Persia and northern India. The connexion between early Egypt and Elam is established and, in view of the connexion between India and Sumeria, it is possible that there may have been a common centre influencing Egypt.

THE LAST FOREST PHASE IN BRITAIN.—Mr. O. G. S. Crawford in *Man* for July discusses the implication of certain conclusions of geologists and meteorologists which bear directly upon archaeology. From 3000 B.C. until 1800 B.C. the climate of Britain was drier than at present. Further, the land stood 60 feet higher than at present, with forest and fen in the area now the North Sea, and forests on the southern and western coasts. This last forest phase may be equated roughly with the British neolithic period, which has two stages, an earlier with no pottery and no agriculture, and small implements, many resembling palæolithic types, and a later, megalithic, stage, with agriculture and many surviving implement-types which show little change. There is no evidence that the people of the first stage are descended from our palæolithic population, and it is possible that they spread across the fen, which is now the North Sea, from Denmark. On the other hand, the megalith builders were a distinct people. The distribution of megaliths arranged in order of development suggests an eastward migration. This is supported by the legendary connexion of Stonehenge and Ireland and the Irish character of Middle Bronze Age pottery in Pembrokehire. In eastern Wales and in England south-east of the Severn and south of the Humber, later types of megaliths preponderate over the earlier. This suggests, therefore, that an eastward migration occurred at the close of the dry period when the west was becoming appreciably more moist and difficult for agriculture. Were climatic conditions also responsible for the departure of the megalith builders from their homes in France and Spain?

WINTER CLIMATE AND THE INCIDENCE OF PULMONARY TUBERCULOSIS.—The view has been expressed that the poor ventilation of houses consequent upon a rigorous winter climate may be an important factor in the causation of pulmonary tuberculosis. Thus, the higher incidence of phthisis in Sweden compared with England and the high incidence of the disease among the Esquimaux have been attributed to the influence of this factor. J. R. Miner has subjected this hypothesis to examination (*Amer. Review of Tuberculosis*, vol. 13, No. 4, 1926, p. 366), taking as his data the mortality statistics for the white population of the United States Registration Area, which covers a wide range of climate, yet refers to a population fairly homogeneous racially, and highly homogeneous in customs and social environment. The death-rates from tuberculosis of the lungs and acute miliary tuberculosis in the various registration States have been grouped according to January mean temperatures. After the application of various corrections, the result emerges that the white death-rate from pulmonary tuberculosis in the United States is higher in those States with a mean January temperature between 30° F. and 40° F. than in colder or warmer regions. No evidence is found to support the view that severe winter climates, or poor ventilation resulting therefrom, are important factors in the etiology of pulmonary tuberculosis.

SCOTTISH SEA TROUT.—Mr. G. H. Nall gives us interesting information on the sea trout of the River Ewe and Loch Maree (Fishery Board for Scotland. Salmon Fisheries, 1926, No. 1. (Edinburgh and London: H.M.S.O., 1926.) 4s. 6d. net), as a result of measurements and scale readings of a very representative number of fish, 1512 in all. Included among these are examples representing the hatches of 12 consecutive years, 1912–1923, fish ranging in size from 3 oz. to 10 lb. and in age from 2½ years to 13 years. Nearly three-quarters of these undertook their smolt migration after three years' river life, thus tending to confirm the theory that length of parr life depends on food supply, northern streams having comparatively low food resources, which leads to long parr life. The record of two fish remaining as parr for six years is interesting, being the first such case recorded for the British Isles. Of the Ewe trout, the scales of which showed spawning marks, 48.8 per cent. spawned for the first time in the second winter after smolt migration and 40.6 per cent. in the third winter. The main runs begin in mid-July and last until autumn. The great majority of fish spawned in successive years. The oldest fish in the collection had spawned eight times and was thirteen years old. In condition, as measured by the standard *K*, these sea trout were good. Sea trout have previously been studied in the River Forth by Menzies and the River and Loch Hope by Nall, who, in this paper, makes interesting comparisons between the fish from the various regions.

STUDIES IN DE-DIFFERENTIATION.—Prof. J. S. Huxley has described reduction phenomena in *Clavellina lepadiformis* (*Pubblicazioni della Stazione Zoologica di Napoli*, vol. 7, 1926), in which he confirms Driesch's discovery that whole individuals of this species will undergo de-differentiation or reduction as readily as pieces of the animal. Examination of some of the morphological changes occurring during the process shows that the pharynx and atrium are reduced much more rapidly than any other organs. The nervous system passes through a stage in which the anterior portion is hollow. The heart remains differentiated and active for a long period, but is

finally suddenly reduced to a mass of de-differentiated cells. The gonads may be represented at a late stage by a single hollow vesicle. The digestive loop usually remains very little changed until late stages. The atrium may be converted into two separate vesicles by the breaking and subsequent resorption of its dorsal cloacal portion. The epicard is relatively resistant, and in advanced stages of reduction shows horn-like processes which may be attached to the peribranchial cavities. Some organs may disappear, apparently by cell-migration. The view is put forward that the changes cannot be supposed to represent reversions to stages passed through in embryogenesis. The resemblance to such stages is accidental, and is brought about chiefly by mechanical means.

SPERMATOGENESIS IN SPIDERS.—In a paper on the spermatogenesis of the spider, *Tegenaria domestica* (*Bull. Internat. de l'Acad. Polonaise des Sci. et Lettres*, Série B. No. 3-4), Mme. Julia Sokolska shows that the number of chromosomes in the male is 18 pairs, together with an unpaired heterochromosome or X-chromosome composed of three equal bodies, which are separate during meiosis, but all usually pass to the same pole in the reduction division. The two resulting types of sperm can be identified by the visible presence or absence of these three bodies from the spermatids. Abnormal cases were found, however, in which two of the three elements of the X-chromosome separate from the third in the heterotypic division, as well as cases in which four such bodies were present. These clear-cut results contrast in some respects with those of Dr. E. Warren (*Annals of the Natal Museum*, vol. 5, part 3) on the habits, oogenesis, and early development of a South African spider, *Palystes natalius*. After describing the spinning of the egg-sac and the 'psychological behaviour,' a detailed description of the egg development is given. The author falls readily into the old snare of amitosis, and his observations on this head are unconvincing. In the maturation of the egg two polar bodies are formed, but the second is retained within the egg. The author admits that these divisions are mitotic, but in the five cases observed the chromosomes 'averaged' 16 for the first polar body and 9 each for the second polar body and the egg nucleus. Chromosome counts are now, however, of little value unless they are exact. It is to be hoped that an effort will be made to get more precise results.

STUDIES ON A PARASITE OF THE HESSIAN FLY.—C. C. Hill contributes (*Journ. Agr. Res.*, Washington, vol. 32, No. 3, 1926) an account of *Platygaster hiemalis*, one of the most widespread and effective parasites of the Hessian fly in the United States. In the eastern wheat-growing regions, this Hymenopterous parasite kills annually from 16 to 40 per cent. of the autumn generation of the fly. The eggs are deposited in the egg of the fly and develop polyembryonically (by twinning) or monembryonically; the resulting yield in adults is about a 50 per cent. increase over the number of eggs deposited. The larva consumes the contents of the host, but the latter, before succumbing, usually succeeds in forming a puparium. Within this the cocoons of the parasite are formed, and an average of six adult parasites emerge from each host. The adult is about 1 mm. long, very active, flies readily, and is positively phototropic. The female is able to reproduce parthenogenetically, and impregnated females usually deposit both fertilised and unfertilised eggs at each oviposition. Approximately 66 per cent. of the adults are females. The female lays from one to eight eggs at a time, and shows marked ability to recognise eggs

of the fly in which she has already oviposited. In one instance a female, crawling over a leaf which bore 42 eggs of the fly, oviposited in 24 of these in fairly regular order on the first tour; on the return she brushed all the eggs with her antennæ and attacked two that had not previously been pierced, but only one of those previously visited was pierced a second time. Females have been observed to examine with their antennæ the area on a wheat leaf from which the egg of the Hessian fly had been removed, and even to attempt to oviposit thereon. It would appear that chemotropism plays an important part in the location of the host egg. *Platygaster hiemalis* passes the winter and early spring in the embryonic stage; by the end of August the adults are ready to emerge from their cocoons during the oviposition period of the Hessian fly in the fall of the year.

WEST INDIA HURRICANES.—An important publication upon the hurricanes of the West Indies has been issued by Father Sarasola, Director of the newly organised National Observatory of Colombia ("Los Huracanes de las Antillas." *Notas Geofisicas y Meteorologicas* Num. II., Bogota, 1925). In addition to marshalling a large number of facts about these destructive visitations, he discusses methods of forecasting and reviews current theories regarding the origin of tropical cyclones. It is pointed out that whereas the cyclones of temperate latitudes are most severe in winter when 'polar front' discontinuities of temperature and humidity are sharpest, tropical cyclones are most active in the warmest season. The view is favoured that tropical cyclones are fundamentally connected with the conflict of air currents, and in this connexion it seems a pity that the author appears to overlook what is really very convincing evidence that this view is correct. Tropical cyclones occur mainly in late summer and autumn towards the margin of the tropics on the western sides of the oceans in both hemispheres, precisely when and where one Trade system having crossed the equator encounters currents from the opposing Trade system, the one exception to the rule being the South Atlantic, which is hurricane-free in the absence of a seasonal migration of the North-east Trade across the equator. This is the significant geographical background of tropical cyclones, and should be observed by all writers who investigate the structure of these storms in detail. Whether there is anything corresponding to the 'discontinuities' of temperate latitude cyclones on 'polar front' principles is not yet clear, but it is likely that there are considerable differences of humidity, if not of temperature, between the opposing currents feeding a tropical hurricane. Father Sarasola's work contains much local detail in relation to the storms of the Caribbean Sea; the wider influences bearing on the subject are not neglected, a good deal of attention being given to solar activity in relation to the weather.

WIND AND SPEED OF WAVES.—In a paper entitled "Observations of Wind, Wave and Swell on the North Atlantic Ocean" in the *Quarterly Journal of the Royal Meteorological Society*, vol. 51, No. 218, Dr. Vaughan Cornish records his observations on the relationship between velocity of wind and waves. He found a close agreement between the wind and the velocity of the waves under the conditions of the final stage reached after a prolonged wind. The discrepancies between the two figures which were apparent in some observations were almost entirely due to swell. A crossing swell effects considerable reduction in the speed of the waves, a concurrent swell little reduction in speed and a diminution in height of the waves. When two sets of swell cross

the waves, their effects in reduction of wave speed are additive. This would explain the rapid rise of waves with wind on large lakes and inland seas when there is little swell to hamper the wave-making action of the winds. Dr. Cornish gives his figures in full and describes the methods he devised to measure the velocity of the wind.

SUBSIDENCE OF KILAUEA VOLCANO.—A rough estimate has been made of the total volume of subsidence of Kilauea during the years 1921–24 (*Volcano Letter*, No. 74, May 25, 1926). At Halemaumau the amount of subsidence in this interval was 13 or 14 feet, and at a distance of twenty miles to the north-east it was little more than an inch. Assuming that the subsidence was symmetrical about Halemaumau as a centre, the total volume of subsidence would be about one-seventh of a cubic mile.

COLOURS DUE TO IRON IN MINERALS AND ROCKS.—In the *American Journal of Science* for July 1926 Mr. G. R. MacCarthy presents the results of a comprehensive study of the colours produced in rocks by various types of iron compounds. It is shown that the natural yellows, browns and reds are due to the presence of ferric compounds. Hydrous ferro-ferric minerals are blue in colour, and are responsible for the blues frequently exhibited by clays and shales. The suggestion that these tints are produced by disseminated organic matter is refuted. Greens are considered to be the result of mixtures of iron-blues and iron-yellows, for no evidence of the existence of any single green compound has been found. The chocolate-red of hæmatite sometimes approaches purple, but the true purple colours of shales and slates are ascribed to mixtures of iron-reds and iron-blues. Anhydrous ferro-ferric compounds produce only greys and blacks, like the carbonaceous matter that is generally present in black argillaceous rocks. The rôle of iron as an inorganic colouring agent has thus been rationally extended over the whole range of colours found in sediments.

CONTRASTED TYPES OF MUD-CRACKS.—Continuing his valuable work on the structural features of sediments, Mr. E. M. Kindle has published and described a most instructive suite of photographs of various types of mud-cracks (*Trans. Roy. Soc. Canada*, 20, sec. 4, 1926, p. 71). A series from the playas of north-western Nevada shows polygonal shrinkage cracks (*a*) with flat tops, (*b*) with curled-up edges, (*c*) with rounded margins, and (*d*) with a reticulation of small polygons within the larger ones. The curling-up tendency is associated with the presence of abundant colloidal matter in the clay, while the downward rounding of other mud-cracks indicates a notable percentage of sodium chloride in the material undergoing desiccation. Another series of desert mud-cracks shows a number of radiating rosette-like fissures, due probably to convection currents in the oozy mud during the initial stages of desiccation. In another type, from Jervis Island in the Pacific and from Southern Australia, the ordinary polygonal cracks are not open fissures, but are outlined by narrow ridges composed largely of alkali sulphates and other salts. It is thus clear that the muds of saline lakes, fresh-water lakes and the sea-shore, develop shrinkage cracks of sharply contrasted types, and the recognition of similar features in older sediments may therefore provide valuable evidence bearing on the origin of the latter, and particularly of continental facies of sediments.

RANGE OF α -RAYS OF THORIUM C + C'.—Experiments with a modified form of the Wilson cloud apparatus, enabling a large number of photographs

to be taken one after another under conditions which made it possible to measure the range of the α -rays accurately, are described by Fraülein L. Meitner and Herr Kurt Freitag in the *Zeitschrift für Physik* of June 16. Altogether three thousand photographs were taken. Thorium C breaks up partly into thorium C' with emission of a β -particle and partly into C'' with emission of an α -particle, the mean range of the latter being 4.8 cm. Thorium C' sends out an α -particle with mean range 8.6 cm. and gives thorium lead. The ratio between the numbers of these two classes of α -particles was determined by counting to be 34.3 : 65.7, which agrees well with the value obtained by Marsden and Barratt using the scintillation method. The ranges in different gases were determined and the mean relative braking power of these gases calculated. The variations of the range on either side of the mean were determined in the different gases and compared with the values deduced by Bohr from the classical theory; good agreement was found. The existence of a group of α -rays with 11.5 cm. range in air discovered by Rutherford and Wood was confirmed and a new group with 9.5 cm. range was found. There were on the average 200 of the 11.5 cm. range particles and 70 of the 9.5 cm. range to 10^6 ordinary thorium C' α -particles. The existence of α -particles of greater range than 12 cm., announced by Bates and Rogers has not been confirmed; particles with longer range than this are clearly shown to be hydrogen rays.

DRAWING INSTRUMENTS.—Among other sets of instruments manufactured by Messrs. Harling, 117 Moorgate, London, E.C.2, at their new factory in Upper Clapton is a wallet case, B.E. 114, which we have had the opportunity of testing. This case contains a 4½-inch divider with hair-spring adjustment and movable needles; 3-inch bow pen compass and a bow pencil compass of the same size, both instruments having double knee joints, while the ink point of the pen is made of stainless steel. All these instruments are made of hand-drawn electrum; the head joints work on steel cones and are fitted with a device for maintaining the handle upright. The case also includes a set of three spring bows, the steelwork of which is made of stainless steel; these instruments have central screw adjustments, and are both light and rigid in use. There are also a 6-inch drawing-pen, made of stainless steel with a lift-up nib permitting of cleaning and instantaneous resetting to the same width of line, and another 6-inch drawing-pen, also of stainless steel, but without the lift-up arrangement. A pricker is included. All the above described instruments are thoroughly well made; the design is good and the instruments are suitable in a high degree to the work of an engineer's drawing office. The last instrument in the case is a portable beam compass with divider, pen, and pencil points. The duralumin beam of this instrument is made in three lengths with push-in joints, and makes up to 29½ inches. The travelling heads are driven by means of milled rollers. The section of the beam is wedge-shaped, and each head has a spring which presses the head into the wedge and also presses the roller against the top side of the beam. The design is good, the heads move easily, and are rigid whilst circles are being drawn. Unfortunately, sufficient care has not been taken in manufacture to get all three bars of exactly the same cross-sectional dimensions; two of the bars in the set submitted for examination are very good in this respect, and the heads pass easily over the joint of these bars. The other joint is bad owing to the defect mentioned, and the head requires assistance to pass the joint.