

## Research Items.

A PORTRAIT-STATUE FROM THE CONGO.—In *Man* for December, Mr. T. A. Joyce figures and describes an example of the royal portrait-statues of the Bushongo. Four of these statues were brought back from the Congo by Mr. Torday in 1909, of which three are now in the British Museum and one in the Musée du Congo Belge, Tervueren. This present example, the fifth known, which has recently been acquired by the Musée du Congo Belge, represents Mikope Mbula, 110th paramount chief of the Bushongo. Native report states that these statues of chiefs were carved only when an artist of sufficient calibre was discovered. The statue of Mikope Mbula conforms to the traditional pattern. It is of hard reddish wood and is some 62.8 cm. in height. The chief sits in the conventional cross-legged pose, his left hand holding a knife, his right on his knee. His ornaments and dress—a belt ornamented with cowries and a belt supporting a sitting cloth and armlets—are indicated by carving. An engraved brass ring is around his neck. The five statues are evidently the work of three different artists, of whom the sculptor of the present figure is inferior in expression of character, although in two points at least he is more correct—the proportion of the lower limbs and the details of the hands. The distinguishing emblem of this chief is a human figure sculptured on the plinth in front of him which may represent his slave-wife and refer to the fact that in his reign, marriage with a slave—previously forbidden—became a legalised practice.

SUMERIA AND INDIA.—In the October issue of the *Journal of the Royal Asiatic Society*, Mr. Mackay returns to the question of early relations between Mesopotamia and India which was raised by Sir John Marshall's description and illustrations of seals and other objects from the Indus Valley in the *London Illustrated News* of September 27, 1924. The seal, showing a figure of a bull standing over a heap of grain and three signs, one of them a fish, was found in 1923, in a chamber nearly two metres below the surface on the north-east side of the ziggurat of the Temple of Ilbaba at Kish, but is undoubtedly of earlier (Sumerian) date. Its resemblance to the seal found at Harappa is unquestionable. Further evidence of contact is seen in a number of beads, necklaces of carnelian and lapis lazuli, found in the last two seasons in graves at Kish, which are provisionally dated at 3000 B.C. The lapis lazuli might have come from Persia, but in view of the fact that India from time immemorial has been the home of carnelian working, the beads were submitted to Sir John Marshall, and pronounced by him to be similar to beads found in great quantities in India, dating from early to recent times. The technique of the Kish beads seems to be identical with that of the Indian beads. Every consideration points to India having been their place of origin or else a country with trade relations with both India and Mesopotamia. The lapis lazuli beads do not show the same finish in workmanship, and were therefore probably made by a different people.

SEA TROUT.—An addition to the steadily accumulated mass of valuable data, due to the work of the scientific staff of the Fishery Board for Scotland, with regard to the salmon and sea trout is given us by Mr. G. H. Nall in a "Report on a Collection of Sea Trout Scales from the River Hope and Loch Hope in Sutherland" (Fishery Board for Scotland, Salmon Fish., 1925, No. 1, Edinburgh and London, H.M.S.O., 3s. net). The material examined was collected during January and March, and July and

August. Whilst the bulk of the scales were of normal type, there were some on which a period of rapid growth in winter was followed by a winter zone and a weak summer growth in the following year; on others there was little differentiation between river and sea life. Erosion was well marked in autumn and winter on the scales of maturing fish and kelts, but, in some cases, the erosion which was slight and regular round the periphery of the scales suggests the possibility of spawning marks being undetected occasionally. The greatest number of smolts, 60 per cent., migrated to the sea after three years' river life, 10 per cent. after two years, 26 per cent. after four years, and 4 per cent. after five years. For the Forth, Menzies found 68 per cent. migrating after two years, 31 per cent. after three years, and an odd fish going down after four years. As is pointed out by Mr. Nall, this illustrates the rule that the farther north a district lies the longer is the parr life. The data show a tendency for the younger smolts to mature later than do the older smolts. The period between the smolt migration and the first spawning varies from one to four years; the greatest numbers spawn in the second winter after migration as smolts, and those which do not spawn until the third winter are more numerous than those which spawn as finnock; after first maturity, the majority of the fish become annual spawners. Information respecting three out of seven recaptured marked trout was sent without an accompanying sample of scales. This is unfortunate and suggests the desirability of giving more publicity to the experiments. It is also desirable that some records of temperature be made during winter feeding to check the statement that abundance of food, not high temperature, is the dominant factor in producing wide rings on the scales of the Salmonidæ.

ENZYMES IN PLANT GUMS.—Oxidase and diastase activity have been found in plant gums by Gilbert J. Fowler and M. A. Malankdar (*Journal of the Imperial Institute of Science*, Bangalore, Vol. 8 A, Part 12), these enzyme activities being much more marked in two gum-oleo-resins, myrrh gum and the gum of *Boswellia serrata*, than in gum-arabic. In the case of the *Boswellia* and myrrh gums, there is evidence that the oxidase may consist of the usual peroxidase-oxygenase system, and an alcohol soluble catechol compound may form part of this system. Analyses for manganese do not suggest that the traces of this element present can be correlated with the oxidase activity. The diastatic enzymes saccharify starch solutions, but are without action on unchanged starch or gum and have no dissolving action on hemi-celluloses. There is a note of some interesting experiments suggesting enzymic conversion of tannins into non-tannins by extracts of these gums.

THE ANDAMAN SEA BASIN.—Major R. B. Seymour Sewell has commenced a systematic study of the Indian Seas, and in a first paper (*Mem. Asiatic Soc. Bengal*, vol. 9, No. 1, 1925) he deals with the geotectonics of the Andaman Sea. The Andaman-Nicobar ridge connects the Arakan Yoma with the main ranges of Sumatra. It probably began to rise from the sea-floor in early Tertiary times as part of the outer arc of the great Alpine-Himalayan system. Simultaneously a shallow-water basin formed on the east, into which poured the great alluvium-charged rivers of Burma, and from which the waters escaped into the Bay of Bengal through channels between the Islands. At a much later date the Straits of Malacca were formed and permitted the entry of the Pacific

shallow-water fauna into the Andaman Sea, where already an Indian Ocean fauna was flourishing. The same sequence of structural elements—upfolds, depressions and volcanic belt—can be traced across Burma, from the Bay of Bengal to the Mergui Archipelago, and from the Indian Ocean across Sumatra to the Malayan ridge. The greater part of the Andaman Sea is a large basin, but on the west it is complicated by the volcanic belt of Barran Island and Narkondam. Farther south, olivine-basalt has been dredged from a depth of 1240 fathoms, 35 miles east of the Central Nicobars. The distribution of coral-reef throws new light on the recent development of the Andaman anticline. Raised coral-beaches along the eastern coasts of the Islands indicate uplift, while a barrier reef, much interrupted, occurs on the west and points to subsidence on that side. Many other topics of geological and oceanographic interest are discussed; and all the available data of a fascinating and little known region are brought to bear on the problem of its origin and evolution.

CRETACEOUS GASTROPODA FROM PORTUGUESE EAST AFRICA.—Mr. L. R. Cox has described a series of Gastropoda from Catuane and Incomanini in Portuguese East Africa (*Ann. Transvaal Mus.*, 11, Pt. 3). The deposits at the former locality are considered to be Upper Albian, while those of the latter probably belong to the Upper Maestrichtian. The Catuane fauna is represented by nine species, three being described as new, while in point of numbers an indeterminate *Chenopus* is the most abundant form present. Of the sixteen species in the Incomanini fauna, not one has been identified with any previously known form, but they appear to indicate shallow-water and possibly estuarine conditions at the time of the deposition of the beds. The two plates on which these fossils are represented are very unsatisfactory.

NEW MAGNETIC ALLOYS.—In the September issue of the *Journal de Physique*, M. H. Tscherning gives the results of his comparison of the magnetic properties of the new alloys "permax," manufactured by the Imphy Steel Works, and "permalloy," manufactured by the Western Electric Co. Both specimens were in strip form and were coiled spirally to make rings on which were wound the magnetising and induction coils. The induction coils were connected to a Grassot fluxmeter, the readings of which were taken for each change of current in the magnetising circuit. For a maximum field of 1 gauss, permax has an induction of 3350 gauss, a residual of 2760 gauss, and a coercive force of 0.45 gauss. Under the same conditions, for permalloy the figures are 7500, 4900, and 0.075 respectively. With the maximum field raised to 200 gauss, permax has an induction of 10,800 gauss, residual about 5000 gauss, and a coercive force only 0.48 gauss, while for permalloy and for electrolytic iron the figures are of the order of 19,000, 10,000, and 1 respectively. Permax is therefore inferior to permalloy in permeability but has a smaller hysteresis loss in strong fields and seems less liable to change its magnetic properties under rough treatment.

THE NUCLEUS OF RADIOACTIVE ATOMS.—In a paper in the *Comptes rendus Acad. Sci.*, Paris, of November 20, M. J. Thibaud assumes that a radioactive nucleus consists of a very dense central portion with a total positive charge  $Ne$ , that the force around it is central and given by the formula

$$F = Ne^2(1 - b^{a^2}/r^{a^2})/r^2,$$

and that certain positive elements of the nucleus move as satellites round this central portion in the narrow region where the force upon them is attract-

ive. It can be shown that the only periodic orbits possible are circles and that the motions in them are unstable, which would account for the disintegration of these atoms. It is assumed that these orbits are quantised, like Bohr's electron orbits in the external portion of the atom. The  $\gamma$ -rays emitted by these elements apparently obey quantum laws, and the author finds in the case of mesothorium 2, by assuming  $a=3$ ,  $N=100$ ,  $b=3.29 \times 10^{-12}$  cm. and that the emitting particle is a proton, that the energy differences  $W_n - W_1$  as observed and as calculated are almost identical,  $n$  the quantum number having the different values 2, 3, 4 . . . 8.  $N$  and  $b$  agree with values obtained for the charge and diameter of a heavy nucleus by studying the deviations of colliding  $\alpha$ -particles. The agreement is not so good when  $a$  is assumed to be 4 with a revolving  $\alpha$ -particle.

THE AMMONIUM RADICAL.—Direct experimental evidence for the tetrahedral distribution of the hydrogen atoms of the ammonium radical about the nitrogen atom in simple ammonium compounds is given by W. H. Mills and E. H. Warren in the *Journal of the Chemical Society* for November. Spiroammonium salts were investigated and, by a simple diagram, it is shown that resolution is possible if the ion has the tetrahedral configuration. Fractional crystallisation of the bromocamphorsulphonates yielded *d*-spiroammonium bromide, molecular rotation  $[M]_{5461}^{25}$  of  $+50.5^\circ$  and the corresponding *l*-salt  $[M]_{5461}^{25}$  of  $-50.8^\circ$ .

PHOTOCHEMICAL DECOMPOSITION OF SILVER CHLORIDE.—The microbalance has been employed by E. J. Hartung to investigate the photochemical decomposition of silver chloride. The work is described in the *Journal of the Chemical Society* of November; thin films of chloride on silica sheets were sealed in tubes with different chlorine absorbents. After insolation for definite periods, the tubes were opened, air, nitrogen, or hydrogen admitted, and the films weighed. The decomposition into silver and chlorine has a maximum value of 91.1 per cent., 89.8 per cent., and 94.8 per cent., in air, nitrogen and hydrogen respectively. In addition, experiments on the rate of chlorination of silver and previously insolated silver chloride are described, and these show that a maximum rate exists for certain concentrations of chlorine in air. No evidence of the existence of a subchloride was obtained.

ORIENTATION OF CRYSTALS IN METALS.—Two papers in the *Memoirs of the College of Science of the Kyoto Imperial University*, Ser. A, Vol. 8, No. 5, Aug. 1925, deal with the orientation of the crystals in cold-worked metals of the face-centred cubic type. The X-ray patterns obtained from platinum plates which have been cold-rolled from a thickness of 0.5 mm. to 0.03 mm. suggest that the majority of the crystals are so arranged that a dodecahedral face lies parallel to the rolled surface, the direction of rolling being perpendicular to a trigonal axis lying in this face. This ideal arrangement does not exactly hold for all the crystals, the dodecahedral planes of some being rotated slightly around the direction of rolling. In the case of gold leaf, the surface of the leaf is a cube face. A second investigation of the orientation of the crystals in cold-drawn aluminium wire suggests that a trigonal axis lies nearly parallel to the axis of the wire, the orientation being otherwise somewhat at random. The deviation of the trigonal axis from that of the wire is most generally about  $7^\circ$ . The exact amount of reduction in drawing is not given. An examination of a cold-drawn copper wire shows that the orientation of the crystals is identical with that in aluminium.