

Research Items.

INDIAN ORIGINS.—An ingenious if highly speculative note by Mr. H. Bruce Hannah in the *Journal and Proceedings of the Asiatic Society of Bengal*, N.S., Vol. 21, No. 1, deals with the question of the approximate period of the Mahābhārata war and the ethnological affinities of the participants in it. According to the legend the war was fought between the Kūrūs and their cousins the Pāndavas. The concrete historical protagonists appear to have been the Kūrūs (Dasyūs and their followers) and the Pāncha-Janāh. The Pāncha-Janāh consisted of the Pūrūs or Pauravas, Yādūs or Yādavas, Tūrvaśas, Ānūs, and Drūhyūs—all mentioned in the Rig Veda. They were probably four communities of western Asia, namely, the Philistines, the Amorites of Yādai in Nāharin, broken Hittites, and a Phallus-worshipping people called "The People of the Pillar," of Heliopolis, in Deltaic Khem, who had been driven out by Rameses III. about 1156 B.C. These were the people responsible for the introduction into India of the divine names afterwards transmuted into Indra, Mitra, etc. They settled in the Punjab, where they found aborigines and a dominant race of dark white, or perhaps semi-mongoloid, stock. These latter were the representatives of a widely diffused ancient central Asiatic people known to the rosy-blond Aryans as Dahyūs or Tokhs, and descendants of the Kūša or "wolf-folk." They were not, however, uncivilised, and they dwelt in cities. Possibly the culture discovered at Mohenjo-Daro and Harappa and the civilisation of Susa discovered by de Morgan are vestiges of this civilisation. As a result of the struggle between the Dasyūs and the Pāncha-Janāh about 1000 B.C. in the Mahābhārata war, the Dasyūs or Kūrūs established themselves and acquired some of the culture of the Aryan Kshatriyās, evolving what has come to be known as Brāhmanism and caste. Further, it is suggested that about 4000 B.C. Dahyūs from central Asia penetrated to south India and, combining with the aborigines, founded the Dravidian race.

NEW AND LITTLE-KNOWN INSECTICIDES.—In the August issue of the *Annals of Applied Biology* (vol. 13, No. 3) Messrs. F. Tattersfield, C. T. Gimingham, and H. M. Morris have a fourth contribution dealing with studies on insecticides. In the present instance they are more especially concerned with the insecticidal properties of plant materials, in the form of alcoholic extracts. Perhaps the most interesting plants with insecticidal properties are certain kinds used by natives of tropical countries as fish poisons. The roots and stems of White Haiari and the stems of Black Haiari (both species of *Lonchocarpus* from British Guiana), the roots of *Tephrosia toxicaria* and the leaves of *T. vogelii*, when tested as stomach poisons, all exert both a repellent and toxic action to caterpillars. The most toxic substance obtained from the Haiaris is shown to be identical with tubatoxin, the crystalline poison found in *Derris elliptica*. In the same journal Messrs. C. T. Gimingham, A. M. Masee, and F. Tattersfield discuss the toxicity of 3:5-dinitro-*o*-cresol and its sodium salt to the eggs of certain species of insects. The figures obtained show that these compounds have a very high toxicity to insect eggs. The 3:5-dinitro-*o*-cresol at concentrations ranging from 0.5 per cent. to 0.15 per cent. killed 80-82 per cent. of the eggs of the hop-damson aphid and did not injure the trees upon which the trials were carried out. These two compounds exercised a marked cleansing effect upon the bark, and it is evident, if further trials substantiate the

results obtained, that such compounds afford considerable promise as winter sprays upon various fruit-trees.

LITERATURE OF SALMON FISHERIES.—In a paper recently prepared by Mr. W. J. M. Menzies (*Fisheries, Scotland, Salmon Fish.*, 1925, II. (Edinburgh and London: H.M. Stationery Office, 3s. 6d. net)) is given a general index to the reports and papers issued by the Fishery Board for Scotland on the subject of salmon fisheries for the years 1882-1924 inclusive. This has been arranged to contain an authors' index, a subject index, and a district index in which can be found all the published information about any particular district, river, or loch. Arranged as it is in these three divisions, the work should prove of great value.

FOREST IN RELATION TO HUMUS.—Dr. W. H. Pearsall has recently reviewed (*Journ. of Ecology*, vol. 14, No. 2, August 1926) a number of publications upon the Finnish forests; a comprehensive publication of similar nature upon the Swedish conifer forests and their relation to the different types of humus, by Henrik Hesselman (*Meddelanden från Statens Skogsförsöksanstalt*, Häfte 22, No. 5), has also appeared. Different types of humus covering are distinguished, and attention is directed to the importance of the agencies preventing undue accumulation of leaf debris in the permanent forest. The mobility of the nitrogen in the products of decay, during the changes undergone by vegetable remains in the humus layer, is suggested as a very important factor in forest ecology, as also the content of the humus in acid and basic buffering substances. The Swedish study covers some 330 pages, with a 40-page abstract in German.

VALUES OF SCOTS AND CORSICAN PINES.—A recent number of the Oxford Forestry Memoirs (No. 6, by W. E. Hiley), entitled "The Financial Return from the Cultivation of Scots and Corsican Pine," should prove of value to those interested in afforestation work in Great Britain. By means of financial calculations the author endeavours to show, using for convenience the general term *range of probability*, the financial advantages to be attained by planting either Scots pine or Corsican pine on suitable soils of different quality. Mr. Hiley bases his conclusions on the possibility that higher prices may rule in the future than those at present obtainable for these timbers. It may be premised that Corsican pine costs more to raise in the initial stages than the Scots, and its timber is at present priced lower. "The result of this investigation," says the author, "shows that on first quality plantations, if the costs of the two species are the same, except that Corsican pine costs 1*l.* per acre more to plant than Scots pine, then the financial yield from the two species will be equal if the prices obtained for Corsican pine timber are 59 per cent. of those obtained for Scots pine timber of the same size. On Quality II. sites, too, the price of Corsican pine timber would have to be about 60 per cent. of that of Scots pine to yield the same financial return. If the prices for Corsican are more than 60 per cent. of those for Scots the advantage is with the former, and if they are three-quarters, the advantages in favour of Corsican pine are very great." As a result of his study of this important matter the author considers that only under the most favourable set of conditions—cheap land, planting and cost of maintenance combined with high quality growth and a rise of prices of 1½ per cent.

per annum—could Scots pine yield five per cent. compound interest on money invested in it, and under similar conditions four per cent. on second quality soil. The possibility, of doubtful practical feasibility on large areas, of so ameliorating pine soils that they would grow more profitable conifers, for example, larch, or Douglas fir, is also considered.

UNITED STATES RIVER SURVEYS.—In recent years the United States Geological Survey has published a number of monographs on various river systems from the point of view of water supply. The same department has now issued, as Water-Supply Paper 558, a preliminary index to all existing river surveys in the United States accompanied by a map showing the drainage areas. Twelve major drainage areas are recognised as the basis of the classification adopted both by the Geological Survey and the Weather Bureau. The index is by States and rivers, with references to the drainage areas indicated on the map. Maps produced by all Government departments and various States and private bodies are included. The list, which is to be revised from time to time, forms a useful guide to the cartographic resources of the United States.

TERTIARY MARLS IN NORTH CAROLINA.—Mr. L. B. Kellum undertook the task of clearing up certain doubtful relations in the Tertiary section of North Carolina represented by the Castle Hayne and Trent Marls, through a systematic study of their faunas. The result, as set forth in the *U.S. Geological Survey Professional Paper 143*, has been to show that the Castle Hayne Marl has its strongest affinity with the Jackson horizon of the Eocene, and that the Trent Marl is of approximately the same age as the Miocene 'Silex Beds' of the Tampa of Florida. The palæontological portion occupies the greater part of the paper. The Castle Hayne fauna comprises 305 species, of which 214 are Bryozoa, and these last have been described elsewhere by F. Canu and R. S. Bassler (*U.S. Nat. Mus. Bull.* 106). The Trent Marls yielded only 26 species of Mollusca. Tables of the local distribution of all these are given with systematic descriptions, especial attention being devoted to the new species and varieties. Eleven exceedingly good plates and a useful index complete this important paper.

MAGNETIC MOMENTS OF ALKALI METAL ATOMS.—In the *Physical Review* for September, J. B. Taylor describes a modification of the apparatus of Gerlach and Stern with which he has carried out determinations of the magnetic moments of sodium and potassium atoms. The metals were evaporated into the apparatus at 345° C. and 245° C. respectively, and the images formed by the deposition of the atomic rays on cool glass strips were rendered visible by immersing the strips in hydrochloric acid gas, whereupon films of opaque chloride were formed. Both metals were found to possess an atomic moment of one Bohr magneton, within the limits of experimental error, which were about ten per cent.

ELECTROMETERS.—The new list of electrometers and photo-electric cells issued by the Cambridge Instrument Co., Ltd., contains complete descriptions of the instruments and outlines of the theory of their action. The table of sensitivity data of electrometers given in the list will prove of special value to research workers. Taking the instruments under normal working conditions, the sensitivities of those using microscopes magnifying 8 to 12 times with eyepiece scales of 0.1 mm. are for the tilted gold leaf 100, the string 30, and the Lindemann 40 divisions per volt ;

for the Dolezalek quadrant 1000 mm. and the Compton quadrant 12,000 mm. per volt on a scale a metre away. These values may be varied considerably by changing the volts on plates or needle or the diameter of the suspending fibre, with corresponding changes in the time required to obtain a reading of the instrument. The photo-electric cells are of the pattern used at the Clarendon Laboratory, Oxford.

SURVEYING INSTRUMENTS.—A new catalogue (No. 541), issued by Messrs. C. F. Casella and Co., Ltd., contains a description and price list of the very large number of instruments which this well-known firm is prepared to supply. There is scarcely an instrument required by the surveyor, engineer, navigator, or draughtsman which cannot be found in the catalogue. The firm invites special attention to its new Double Reading Micrometer Theodolite. This instrument is so arranged that all four micrometers and the bubble can be read without moving from the front of the instrument. Much time is saved by this device. Another new instrument to be noted is the Casella Precise Tilting Level. The spirit-level is entirely enclosed in the instrument, and is fitted with a prism, which brings the two ends of the bubble into view in the field of the telescope. By means of a slow-motion tilting screw under the telescope, the two ends of the bubble can be brought into vertical alignment, and the telescope is then level. The adjustment of the bubble is made by moving the prism longitudinally, by means of a slow-motion screw. This enables a very fine adjustment to be obtained. Messrs. Casella are willing to let out certain survey instruments on hire.

NITROGEN IN IRON-CHROMIUM ALLOYS.—In a paper on "The Effect of Nitrogen on Chromium, and some Iron-Chromium Alloys," read at the Stockholm meeting of the Iron and Steel Institute by Mr. Frank Adcock, it is shown that when chromium is melted in an atmosphere containing nitrogen, the gas is rapidly absorbed and alloys containing up to 3.9 per cent. of nitrogen are readily obtained. Hence the melting-point of the pure metal cannot be ascertained when the melt is exposed to such an atmosphere. Pure iron, on the other hand, absorbs the gas slowly, and even when nitrogen is passed for thirty minutes over the surface of molten iron, 0.02 per cent. only is retained. Iron-chromium alloys both in the liquid and solid states take up nitrogen at high temperatures ; the quantity of nitrogen in the alloy increasing with the chromium content. In alloys containing about 12 per cent. of chromium, nitrogen gives rise to a martensitic type of structure closely resembling that usually associated with iron-carbon alloys. The hardness of these alloys can be considerably modified by heat treatment, and ranges from about 115 Brinell in the annealed state to 315 Brinell when quenched. Most of the alloys containing nitrogen in the range 20 to 60 per cent. chromium present a two-phase structure under the microscope. Although one of these constituents invariably develops a structure of the sorbitic or pearlitic type on suitable heat treatment, these changes are not accompanied by any great variation in hardness. This pearlitic or lamellar type of structure is absent from the corresponding pure iron-chromium alloys, and is thus not due to carbon. It would thus appear that the presence of nitrogen in iron-chromium alloys can give rise to structures closely resembling those generally attributed to carbon in ordinary steel. Micrographs of stainless iron often reveal a martensitic type of structure which has been difficult to explain. This work on the effect of nitrogen may reveal the cause of this structure.