

## Research Items.

**SOME HINDU OBSERVANCES.**—In the *Scientific Monthly* for December, Dr. Elsie Clews Parsons records autobiographical reminiscences of Somesh Chandra Bose, a Bengali of the Kshatriya caste. His family are Kulin Kasyathas and his wife was Bal, a division of the Kasyathas for whom it was an honour to intermarry with the Boses, their superiors. His own immediate family was exceptional, in that its head, an "uncle," was seventy-five years old and had not followed the usual custom of men of his age and resigned his authority to a younger brother or a son. All the names of the family had been given by this uncle instead of, as usual, suggestions having been offered by several of the family at the rice-giving ceremony. The rite of "beginning education" was performed at the age of five years by the family Brahmin, who put the pen in the child's hand and guided him in forming the letters. Although S. C. Bose was at first slow to learn, he developed a prodigious memory and an extraordinary mathematical capacity. In speaking of marriage he says that parents pay a good deal of attention to colour. They know that it is inherited, particularly if it is dark. The standards of beauty are figure, contour of face and colour. Parents may be put to a good deal of expense if a daughter is dark—an interesting commentary in practice on the colour theory of caste.

**OYSTER BREEDING EXPERIMENTS.**—Experiments to ascertain the conditions governing the production and settlement of oyster spat have been carried on since 1918 at the Ministry of Agriculture and Fisheries' Shellfish Research Station at Conway, and this year the Ministry's mussel purification tanks at Lympstone were also used for this purpose during the off-season for mussel cleansing. A feeding experiment with ordinary yeast carried on this year met with some success. The young oysters were able to swallow the yeast cells, and in one tank so treated at Conway a useful spatfall was secured. At Lympstone a very heavy spatfall was obtained; so many as 150 oysters settling on a tile. Two special features were noted in connexion with the tank where the heaviest spatfall occurred: first, that there was a very large population of small fish (gobies) which were absent from other tanks; and secondly, the presence of a minute vegetable organism. The intestines of the oysters were found to be full of this green material, almost to the exclusion of other organisms. The gobies may have kept the water clear of certain organisms which compete with the young oysters for food. Some hundreds have therefore been transferred to one of the tanks at Conway, and it is hoped that they may breed sufficiently to allow of experiments being carried out next year. Cultures of the special vegetable material on which the oysters were observed to feed have been made, and further experiments with this organism will also be carried on next season. Another feature was the rapid growth of the Lympstone oysters, which reached a diameter of 2 inches in less than two months: a rate of growth outside all previous experience. The spat has been laid down in the Exe Estuary, and in the Menai Straits; the mortality has been negligible. Some of the spat has also been laid down by a large firm of oyster planters at Brightlingsea.

**WAXES OF INDIAN COTTONS.**—A curious fact emerges as the result of a study by Leslie V. Lecomber and Maurice E. Probert of the waxes of cotton samples from different countries, by the methods which have recently been worked out in the laboratories of the British Cotton Industry Research Association (*Journal*

*of Text. Inst.*, vol. 16, No. 11, November 1925). Whilst American and Egyptian cottons show no constant differences in the composition and properties of the wax extracted by carbon tetrachloride, which could be regarded as characterising the country of origin, in every case waxes from Indian cottons prove to be characterised by a high saponification value. This is the most outstanding character of the Indian waxes, but they also possess a relatively low melting-point, high acid and iodine values, and contain a low percentage of unsaponifiable material.

**GRASS RUSTS OF SOUTH AMERICA.**—J. C. Arthur reports upon the collection of grass rusts made by the late Prof. Holway during extensive journeys in South America during 1919-22, journeys made especially with the view of collecting rust fungi on grasses and on alternative host plants, in the *Proceedings of the American Philosophical Society*, Vol. 64, No. 2, 1925. This collection forms the basis for a general re-examination of all recorded data as to grass rusts in S. America, with the result that 74 species are listed with notes as to host plants and distribution; five-sixths of these species were represented in the Holway collections.

**"MOULDY ROT" IN HEVEA BRASILIENSIS.**—A paper by F. W. South and A. Sharples on the spread of this disease in Malaya is of interest as the record of the spread of a fungus parasite, presumably introduced about 1916 in some plantation through plant materials imported into the country, until it is now well established in a large part of the rubber-growing area (Bulletin No. 37 of Dept. of Agriculture, Straits Settlements and Federated Malay States). Inoculation experiments seem to establish definitely the identity of the causal fungus as *Sphaeronema fimbriatum* (E. and H.). One spore form of this fungus, a dark-coloured endospore or macrospore, is very resistant to drying, and as the fungus is a wound parasite, it may spread by this means on the knives of the tappers as they pass from one plantation to another. The disease has now a firm hold and there seems little likelihood of its eradication, but the authors describe experiments, confirmed by extensive trials on a commercial scale, which show that it may be kept under control by painting or spraying antiseptics on to the tapping surface. Particularly good results seem to have been obtained with a proprietary article known as "Agrisol."

**ZOOLOGICAL POSITION OF THE ARTHRODIRA.**—The position of the Arthrodira and Coccosteomorphi among fishes has for long been debated. At one time they were thought to belong to the Dipnoi, but more modern views have brought about their removal from that group without, however, assigning them to any other definite place. Dr. Eric Stensiö of Stockholm has just published a most interesting and important paper dealing with the question in vol. 4, No. 4, of the Geological Series of the Field Museum of Natural History (Chicago, October 1925). It appears that a specimen of Macropetalichthys in the collections of the Museum gave promise of showing, after suitable development in the laboratory, something of the structure of the primitive cartilaginous neurocranium. It showed eventually much more than this, in that it has enabled Dr. Stensiö to describe in detail much of the anatomy of the brain, nerves and course of the blood vessels. These are fully described and figured in the first part of his paper. The author then describes a new genus, *Epipetalichthys wildungensis*, and in a third section gives a general review of the whole group. It comes rather as a surprise to find a list

of eleven characters in the primordial neurocranium which are essentially elasmobranch, and in his concluding remarks the author, after pointing out that the Arthrodira are certainly not Crossopterygians, nor Dipnoi, nor Palæoniscids, nor *a fortiori* Actinopterygians, comes to the conclusion that as they are undoubtedly fishes unrelated to the non-fish Ostracodermi, then they must be elasmobranch in affinities. This view has much to commend it, but necessitates a somewhat drastic re-orientation of our ideas as to the course of evolution in the cartilaginous fishes, in that they must now be considered to have come from ancestors with a covering of true dermal bones which they have secondarily lost. The fact that bone is an exceedingly primitive substance, *e.g.* in the ostracoderms, gives some support to the thesis.

**SOLUTION LAKES IN SWITZERLAND.**—In a paper read on December 7 to the Royal Geographical Society on the lakes of Scotland and Switzerland, Prof. L. W. Collet directed attention to the numerous basins produced by the solvent action of water on calcareous and dolomitic strata in Switzerland. These lakes are of two kinds, according to whether they occupy a doline or a polye, the latter being the larger, and due to the union of several dolines. Lakes of this nature in the Alps frequently have their floors covered with deposits of impervious material derived from ground moraines of ancient glaciers. This points to the basins not being entirely due to chemical action. In fact, Prof. Collet believes that in the majority of cases glacial action has played a part in the process of deepening. The glacier has cleaned out and deepened a cavity formed by chemical action, and its ground moraine has completely closed up the fissures in the limestone; thus the existence of a lake has become possible. Thus the lake of Muttén, which was generally considered to be a corrie lake, proves on close examination to be a solution basin with moraine matter on its floor. The Oberstockensee and the Daubensee are cited as other examples of solution basins.

**PLEISTOCENE CAVE FAUNA OF MALTA.**—The annual report of the Valletta Museum for 1924–25 records many interesting additions made by Miss G. Caton Thompson to the fauna of Ghar Dalam. The bones were determined in the Geological Department of the British Museum by Miss D. M. A. Bate. The following represent genera not hitherto recorded from the cave deposits of the Maltese islands: a shrew, *Crocidura*, cf. *leucodon*; a bat, *Rhinolophus*, cf. *euryale*; a field mouse, *Apodemus sylvaticus*. The following species, recorded from these deposits for the first time, are now, except the owl, either rare visitors or entirely absent from the region: the short-eared owl, *Asio accipitrinus*; the sheldrake, *Tadorna cornuta*; the rook, *Corvus frugilegus*; and, most noteworthy, the carrion crow, *Corvus corone*. Other new records are the thrush, the blackbird, a very small fox, a small carnivore (? wolf). Considering the amount of work previously done at Ghar Dalam, this is a remarkable harvest for one season, and shows the advantage of expert co-operation. The importance of such precise details in working out the geography and climate of the period needs no emphasis.

**PORCELAIN CENTRIFUGAL VESSELS IN CHEMICAL ANALYSIS.**—In the *Chemiker Zeitung* of November 20 there is an interesting account by Pincussen and Arinstein of the adaptation of the centrifugal method of filtration to chemical analysis in physiological chemical analyses. The rapidity, ease, and cleanliness with which separations can be obtained render this method superior to the older methods of filtration in physiological investigations, since changes which are

due to adsorption phenomena can be avoided with much greater certainty. The new vessels are made of porcelain and can therefore be ignited and weighed if necessary. Tests were made of the efficiency of the method by carrying out estimations of sulphuric acid as barium sulphate and of aluminium as alumina. In both cases the error was greater than that obtained in the usual way. On the other hand, the quantities of material weighed were unusually small.

**THE ABSORPTION OF HYDROGEN BY PALLADIUM AND BY PALLADIUM SILVER ALLOYS.**—The great difference between the atomic weights of palladium and hydrogen makes it impossible to determine directly the position of the hydrogen atoms with respect to those of palladium by means of X-ray spectrograms. If, however, the density of saturated palladium, which at 0° C. and 760 mm. Hg. absorbs 523 times its volume of hydrogen, or about one hydrogen to two palladium atoms, is calculated on the assumption that the hydrogen atoms replace those of palladium in the lattice, the value obtained is 7.3, while that observed is 10.76. Messrs. F. Krüger and A. Sacklowski, in a paper in the *Annalen der Physik* for November, conclude that the hydrogen atoms are distributed between the atoms of the palladium lattice, which is thus expanded considerably. They have investigated electrolytically the absorption of hydrogen and determined the dimensions of the resulting lattices for a number of alloys of palladium and silver. The result is rather remarkable; the lattice dimensions of the hydrogen-free alloys increase according to a linear law as the amount of silver increases, in accordance with Vegard's law; those of the hydrogen-saturated alloys remain practically constant from pure palladium up to about 70 per cent. silver, the amount of hydrogen absorbed following a linear law as the amount of silver is increased, and dropping to zero for about 70 per cent. of silver in the alloy.

**THE PHOTOGRAPHIC ACTION OF H-RAYS FROM PARAFFIN AND ALUMINIUM.**—The hydrogen nuclei ejected by collisions of  $\alpha$ -particles have so far been mainly investigated by the scintillation method and by the Wilson cloud method. Mühlstein in 1922 indicated the possibility of the use of photography for the purpose, and in the *Zeitschrift für Physik* of October 5, Fraülein M. Blau describes a method, based on that employed by Michl in connexion with  $\alpha$ -rays, in which the H-rays produced by the bombardment of a thin sheet of paraffin with  $\alpha$ -rays from polonium pass at a rather steep angle through a photographic film, each H-nucleus producing a row of black dots which appear when the plate is developed. Various difficulties had to be overcome owing to the long exposure required, which made it necessary to reduce all photographic action due to  $\beta$ - or  $\gamma$ -rays to a minimum, and it was impossible to obtain results with the longer range  $\alpha$ -particles produced by radium C, which give H-rays with a range of nearly 30 cm. and could be expected to give longer rows of black dots than the H-rays due to the  $\alpha$ -particles of polonium, the range in air of which is only about 16 cm. A comparison experiment in which the paraffin sheet was replaced by a layer of lamp black, containing the same amount of carbon as the paraffin with very little hydrogen, did not show the rows of dots. Aluminium foil free from adsorbed gases also gave H-ray tracks in the photographic plate when bombarded with  $\alpha$ -rays from polonium, so that it appears that the atoms of this metal can be disintegrated by  $\alpha$ -rays of less than 4 cm. range, which agrees with the results of E. A. W. Schmidt, and contradicts those of Rutherford and Chadwick, who found a lower limit of 4.9 cm.