

RESEARCH ITEMS

South African Stone Bead Industry

THE relative scarcity of the stone bead throughout the world justifies a record of the discovery of serpentine beads by Harold S. Harger on sites in the western Transvaal (*Trans. Roy. Soc. South Africa*, **38**, 2; 1940). From the collection as a whole it has been possible to describe the entire process of manufacture from beginning to end. The prime factor in the establishment of the industry was the occurrence of a serpentine dyke midway between the factories on Nooitgedacht and Winkelhaak. This region affords abundant evidence of settlements of primitive man of pre-Bantu times. The serpentine beads were found in cleared spaces where native kraals at one time had existed. Old furnace slags, an iron hammer, ornamental stone pendants, gold beads, a steatite mould, pottery, etc., combine to indicate that the industry was established by an early Bantu tribe in pre-European times. The greater part of the material consisted of 108 cylinders ready for boring, 15 were finished ready for use; and 15 beads of copper and 2 of gold were also found, the occurrence of the last named indicating a Bantu origin. Some much-corroded pieces of iron found on Winkelhaak, when fresh, might have been thin enough to perform the boring. One bead had been bent to take the palm of the hand and facilitate vertical pressure. The procedure adopted in manufacture was to trim the material into cylindrical shape and then saw it in sections—a method followed by Cro-Magnon man in the manufacture of stone beads. The segments were then drilled and smoothed, the ends being ground smooth on a stone to make them lie close. To avoid waste of labour owing to splitting in drilling, stones were sometimes drilled before shaping. While the industry is early and pre-European, it is Bantu and not, properly speaking, Stone Age, as usually understood.

The Fishing Heron

CONSIDERABLE controversy over the heron's diet has long passed between anglers and fish conservators on one hand, who claimed the large proportion of fish in the bird's menu, and bird protectionists on the other, who brought forward the results of pellet and other investigations which showed a preponderance of frogs, voles and other small waterside vertebrates. The argument will now probably be cleared up following the work of Miss A. Hibert-Ware, of Hilary, Girton, Cambridge, who, with the help of others, has collected 270 pellets from Norfolk, Carmarthenshire, Surrey and Cambridgeshire, and found numerous remains of small vertebrates and insects in them, but only remains of the dace among fish, despite the observations on the abundance of eels and coarse fish brought to the heronry nests. Subsequent studies of the digestion of the heron (*Ibis*, July 1940) suggested that fish figure more prominently in the diet than previous food investigations show, and the strong digestive juices and the soft, non-grinding nature of the gizzard leave little opportunity for remains to be ejected in the food pellets. These pellets were found to be strongly acid when fresh. The chief remains noted in the pellets were moles, water voles and Dyticus and Colymbetes insects.

Mammalian food also included small specimens of rabbit, water-shrew, and brown rat; bird remains included starling, redbreast, moorhen, coot, mallard, wood-pigeon and poultry chicks; reptiles included slow-worm, grass snake and adder; frog was the only amphibian; there were also remains of the water-boatman bugs (*Corixa* and *Notonecta*) and the water-beetle *Hydrophilus*; but a few remains of earwig, grasshopper, wood-lice, spiders and carabids or ground-beetles suggest that these were taken in the other prey consumed.

Birds on St. Kilda

ST. KILDA was evacuated in 1931, and, except for the summer visits of a few of its former inhabitants, has run wild since that time. With the deliberate intention of founding a basis on which future comparisons might be based, T. H. Harrison and David Lack made in 1931 a census of the birds on the island, and a new census by E. M. Nicholson and J. Fisher made in 1939 offers the first comment on changes induced by the absence of man (*British Birds*, **34**, 29; 1940). The majority of the birds, land or sea, show no significant change, a specially noteworthy fact in the case of the gannet and fulmar petrel, considering the allegations that have been made regarding the destructiveness of man in relation to these birds. The black guillemot seems to be disappearing, only one individual having been seen in 1939, whereas six pairs were noted eight years before. On the other hand, shags and razorbills have increased, as has also the meadow-pipit. Striking additions to numbers were observed in the case of starlings, attributed to the supply of undisturbed nesting sites in the deserted houses and to the abundance of sheep; of eider duck, attributed to the freedom from egg-robbing; and of the common snipe, which curiously enough have colonized the enclosed dry fields about the village and were more frequent there than in the marshy haunts of the island, their normal habitat.

Indian Chalcid Wasps

MISCELLANEOUS BULLETIN 30 of the Imperial Council of Agricultural Research (India), by Hem Singh Pruthi and M. S. Mani, contains biological notes on Indian parasitic Chalcidoidea. It is in the main a host list referring to 175 species of these insects—the phytophagous forms of Chalcids, it may be added, are not included in this bulletin. Some fifty-six of the species dealt with are figured on the accompanying plates. From the list at the end of the bulletin it will be gathered that the Rhynchota feature as the most frequent hosts for these parasites, the Lepidoptera coming second in this respect. The insect collections in the Laboratory of the Imperial Entomologist contain a large amount of material, with data, concerning insect parasites. Information derived from this and other sources is being worked up and made available to workers in India and other countries. It is intended to publish the data so obtained, taking one group of parasites at a time. The series has been started with the present host-parasite account of the Indian Chalcids, concerning which no information has been available in comprehensive form at present.

Crinoids from the "Discovery" Expedition

D. DILWYN JOHN has beautiful material to describe, consisting entirely of Comatulids from the "Discovery" expedition (Crinoidea, *Discovery Rep.*, 18, 121-222; 1938). There are 326 specimens, mostly from depths between 100 and 600 m., 269 from the Antarctic region, the majority from the South American sector, a small number from the Ross Sea. 54 are from the Burdwood Bank and the Patagonian Shelf and are all of one species, *Isometra vivipara*, common to that region and to the Antarctic. The other 3, all *Comatula novaezealandiae*, are from New Zealand. 9 species of the family Antedonidae are new. A feature of the collection is the number of species which care for the brood and are viviparous. Most Comatulids shed their eggs directly into the sea and only 3 viviparous species were previously known, 8 more are now added, 6 belonging to new species and a new variety, and 2 which were not before recognized as being viviparous, making 11 viviparous Comatulids now recorded, 8 of which have only been obtained from the Antarctic. Out of 19 species known from the Antarctic 50 per cent are viviparous. A gradual series is shown in the methods of brood protection, from those with numerous eggs and larvæ with ciliated bands presumably emerging in the free-swimming stage to those with very few eggs which retain the young in the brood-pouch until the Pentacrinoid stage or, in one case, even as far as the young Comatulid. In all the viviparous species there is in the female a brood-pouch beside each ovary.

Maternal Constitution and Infant Mortality

AN extensive analysis of the morphology of mothers and the mortality of their infants up to one year old has been made by H. C. Seibert (*Human Biol.*, 12, 232-246; 1940). Those mothers whose infant had died were significantly shorter in mean stature at exterior auditory canal, at suprasternal notch, and at lower costal margin and in mean sitting height, but not in mean trunk height. Body weight, span, head-length and -breadth, mean biachromal, bi-iliac hip and sagittal chest diameters were not significantly different in mothers with and without infant mortality. Several physiological phenomena were found to be uncorrelated with infant mortality.

Genetics of the Fowl

F. B. Hutt and W. F. Lamoreux (*J. Hered.*, 31, 231-235; 1940) publish a map of the chromosomes of the fowl, involving six linkage groups and 21 mutant genes. With the exception of the sex chromosome, it is as yet unknown which of the 40 chromosomes bear these linkage groups.

Structural Changes in the Chromosomes of *Drosophila*

H. J. MULLER (*J. Genetics*, 40, 1-66; 1940) has made an intensive analysis of the phenomenon giving rise to structural changes in the chromosomes of *Drosophila*. The genetically observed rearrangements are secondary effects to the primary changes brought about by irradiation. The frequency of these observed effects varies as the $3/2$ power of the total dose for the range 1,000 r.-4,000 r. At lower doses the observed exponent rises nearly to the square, indicating that nearly all the rearrangements represent combinations of independent primary changes.

There is little effect of temperature, wave-length or duration and intensity upon the frequency change brought about by irradiation. Therefore, change is caused by individual ion-effects which act separately. The $3/2$ power relationship is accounted for by the survival value of the secondary changes and by the occurrence of unidentifiable multiple rearrangements. The author therefore brings forward strong evidence that 'breakage followed by union' as distinct from 'previous contact' is the phenomenon which gives rise to the observed chromosome rearrangements and other chromosome mosaics. Related work and theories are discussed.

Crystallization of Olivine-basalt

THE Hat Creek basalt flow, north of Lassen Peak, California, has been described by C. A. Anderson (*Amer. J. Sci.*, 477-492; 1940). The lava was erupted along a line of north-south fissures, probably within the last two thousand years, and although it is holocrystalline for the most part, with an ophitic to sub-ophitic texture, it possesses many characters indicating marked fluidity at the time of eruption, for example, lava tubes, ropy pahoehoe surfaces, pressure ridges and slump scarps. It is shown that the Hat Creek basalt is of essentially the same composition and texture as the widespread Pliocene Warner basalt which covers a large area of north-eastern California, where it forms the major part of the Modoc lava plateau. The rock is rich in alumina and magnesia, and the history of crystallization is shown to be simultaneous separation of olivine and plagioclase, followed by pigeonitic pyroxene, plagioclase and iron ores. If chilling is rapid, hyalopilitic, intersertal or intergranular textures result from basaltic magmas of this composition, but with slower cooling, sub-ophitic textures develop with local areas of ophitic (poikilitic) texture. On the other hand, in plateau basalts of tholeiite type olivine is absent or rare and the lower amount of alumina results in a smaller proportion of feldspar, so that the magma begins to crystallize near the boundary surface of the pyroxene and plagioclase fields and simultaneous crystallization of these minerals soon follows after the initiation of crystallization.

Upper Palaeozoic Floras and Climates of South America

At the Eighth American Scientific Congress held in May 1940, several papers were presented dealing with the floras and climates of South America in Upper Palaeozoic times. C. B. Read well summarizes present knowledge of the floras. The little that is known of the Devonian floras suggests identity with those of the northern hemisphere. Similarly, the Lower Carboniferous assemblages known from Peru and Bolivia show a very striking relationship to those of certain stages in the Mississippian of North America and the Lower Carboniferous of Europe, as well as to those of the Kuttung series of Australia and the Po series of India. The occurrence of Glossopteris floras and their relationships to tillites in the Falkland Islands, Argentina and Brazil is discussed. The general succession appears to be one in which the earliest floras are few in genera and species and completely austral. This is followed by larger associations in which distinct boreal elements appear. There appears to be a considerable body of evidence favouring a Carboniferous rather than a Permian age for these older Glossopteris floras and, in consequence, for the subjacent 'Gondwana' tillites.

M. de Oliveira Roxo discusses the habitat of the plant remains found in the coal-bearing deposits of South Brazil. He arrives at the conclusion that the plants flourished in a climate similar to that of the southern part of New Zealand at the present day, a climate that favoured the growth of a mixed flora with both cosmopolitan and 'Gondwana' types. In another paper the same author states that 17 species of 'Gondwana' plants, 8 of which are peculiar to Brazil, and 12 species of cosmopolitan plants have so far been identified.

A Seismograph for Microseisms

WITH the aid of a small research fund given by friends in St. Louis, U.S.A., it has been possible for the Department of Geophysics of St. Louis University to build a comparatively simple and relatively inexpensive seismograph especially for the study of microseisms. The instrument was designed by Rev. J. B. Macelwane, S.J., and built by W. F. Sprengnether (*Trans. Amer. Geophys. Union*, 1938). The design chosen was a small horizontal pendulum with tension-hinge supports, induction transducer, and electromagnetic damping. The relatively small dimensions and slight moving mass of only about two and one half pounds make the instrument readily portable. The boom of aluminium tubing carries a brass frame into which is set a brass box containing the two coils wound with a large number of turns of fine wire. This coil box is supported in the field of a strong horse-shoe magnet of Alnico alloy, and the wires are led back through the hollow boom to binding posts on the frame. At the outer end of the boom is a copper damping vane which moves in the fields of four opposing pairs of small commercial Alnico magnets, the separation of which may be adjusted to secure critical damping at any period desired. The current from the coils of the transducer is led to a Leeds and Northrup type *R* galvanometer of seven seconds period, the critical resistance of which is that of the coils in series. The period of the pendulum is adjusted to seven seconds, so that the whole system is in resonance with the microseisms that are to be studied. The results have been very gratifying, and excellent records are obtained with the magnification adjusted to about five thousand.

Reactions between Dry Salts

REACTIONS between the alkali halides in the solid state have been studied by H. L. Link and L. J. Wood (*J. Amer. Chem. Soc.*, 62, 766; 1940), mixtures of salt pairs being heated for long periods of time below the fusion point and the resulting mixtures analysed by the X-ray method. If the pair of salts containing the heavy cation united with the heavy anion and the light cation united with the light anion is called the stable pair, and the other mixture the reciprocal pair, then evidence for the partial or complete conversion of the reciprocal to the stable pair was obtained for forty out of forty-two reactions examined. Except in the mixtures containing lithium salts but no fluorides, no tendency for reversal of the stable to the reciprocal pairs was noticed. It was found in general that there was very little reaction in the solid state if the reaction temperature was more than 200° below the melting range, and that there was likely to be considerable reaction if the reaction temperature was within 100° of the melting range.

Organic Compounds of Tungsten

VARIOUS attempts have already been made to prepare organic compounds of tungsten, but with little success. The possibility of the existence of such compounds was, however, rendered very likely by the preparation of organic compounds of chromium, and later of molybdenum. Bearing in mind the types of chromium and molybdenum salts which were used in the successful preparation of their organic compounds, F. Hein and E. Nebe have now obtained similar compounds of tungsten (*Naturwiss.*, 28, 93; 1940). The best starting materials are non-electrolytic complexes of the type $[MeX_3A_3]$ and pseudo-salts of the type $[MeX_n]$. Tungsten hexaphenate, described by Funk (1936), was found to combine readily with phenyl magnesium bromide, forming a brown substance. This resembled in appearance the organic molybdenum compounds. Analogous compounds were obtained by the reaction of tungsten hexachloride and Grignard reagents or lithium phenyl. $(C_6H_5W)_2O_7H_4$ and $(C_6H_5)_3W_2O_8H_7$ have been isolated. In colour and reactions they resemble the corresponding molybdenum compounds. Like them, they are less stable than the organic chromium salts.

Apparent Places of Fundamental Stars

IT was recommended at the International Astronomical Union held in Paris in 1935 that the apparent places of stars in all astronomical ephemerides should be based on the mean places of the Third Fundamental Catalogue of the "Berliner Astronomisches Jahrbuch", known as FK3. It was further recommended that, from the date of the adoption of the star places of the FK3, the apparent places of the 1,535 stars in the FK3 and its supplement should be published annually in a single volume, under the auspices of the I.A.U. The first volume is now available (London: H.M. Stationery Office. 30s. net). Its preparation has been shared by the co-operation of the national almanac offices in Berlin, Paris, San Fernando, Washington and London. The computations of the apparent places of the stars have been shared by the first four, while Great Britain has been responsible for the collation and preparation of copy, independent checks and proof reading, and the British Government has borne the cost of printing. The 1,535 stars for which mean and apparent places are given consist of 853 10-day and 20 circumpolar Auwers' stars, and also 630 10-day and 32 circumpolar additional stars. In the reductions to apparent place, the constants of precession, nutation and aberration involved are those adopted by the Conférence Internationale des Étoiles Fondamentales, which met in Paris in 1896. The details relating to the numerical values and methods of reduction are given in each of the five almanacs issued by the countries participating in the work. The introduction is printed in English, French, German and Spanish, and full explanations are afforded of the various sections under mean places of stars, apparent places of stars, short-period terms of nutation, etc. There is an index to apparent places of stars which enables the page upon which the apparent place of any star is tabulated to be found from a knowledge of the star's name alone, and all names given to stars in the work are included in the index, which is, therefore, very complete. It is satisfactory to know that the recommendation of the I.A.U. regarding co-operation in the production of this volume has proved possible.