

Research Items

Palæolithic Portraiture

DR. HERBERT KUHN has assembled all known reproductions of the human form in the Franco-Cantabrian school of palæolithic art with the view of studying how the artist of this school represented himself and his fellow men and women as a type (*Z. Rassenkunde*, 4, 3). These representations, more numerous than is appreciated, fall into three classes: (1) sculptures and reliefs; (2) engravings in which the figure is masked; and (3) engravings in which there is no mask. In (2) and (3) the masked figures predominate, owing to the preoccupation of the period with magic. In (1) statuettes of Aurignacian age in ivory, bone, or other material number fifty-nine from sixteen sites, distributed over an area extending from Italy-Spain-France to Siberia. All but two are female. Of reliefs there are five, all from Laussel, Dordogne. Two of the female figures hold horns in one hand. Of the statuettes of Magdalenian age there are four from four sites, all situated in France. They are of slender type, whereas the Aurignacian statuettes and reliefs are full-fleshed, with the sexual characters strongly marked, thus pointing to connexion with a fertility cult centring in the female. These statuettes, like the masked figures of (2), throw little light on physiognomy in the period. Of the masked figures of (2) there are seventy-one from twenty-four sites. With two exceptions (Klause bei Neuessing, Bavaria, and the Pin Hole Cave, Derbyshire), all the sites are in France. The masks include birds, lion, buck, goat, bison. A number show no features or are unrecognizable. They afford evidence of a cult of magic. The figures without masks (3), from this point of view the most interesting, number nineteen. Of these, eight, including hunting scenes, show no features; but the remaining eleven, with features either in full face or profile, show how palæolithic man saw himself, though at times in so grotesque a form as to suggest caricature. It is to be noted that the head is always short and round. The nose is prominent but broad. A beard is indicated, and the bodies of both sexes are hairy, even on the female breast.

Ætiology of Goitre

GOITRE is a disease, with enlargement, of the thyroid gland, which has a high content of iodine. The results of an investigation by the Committee on Iodine and Thyroid Disease, jointly appointed by the Medical Research Council and the Agricultural Research Council, are contained in a report issued by the Medical Research Council entitled "The Relationship of the Iodine Contents of Water, Milk, and Pasture to the Occurrence of Endemic Goitre in two Districts of England" (Special Rep. Series, No. 217. London: H.M. Stationery Office, 1936. 6*d.* net). Two former studies upon this subject have already been published (Nos. 123 and 154), but revealed discrepancies which made this further work desirable. The accurate determination of minute quantities of iodine met with in the materials examined was carried out by a method devised by Mr. C. O. Harvey, and contained in a report in this series (No. 201). The results embodied in the present report give general confirmation of previous work that environ-

mental deficiency of iodine, as indicated by the iodine content of the local water, is once more shown to be associated with a high incidence of goitre. At the same time, the actual amount of the iodine in the environment is not simply and directly related to the intensity of the incidence of goitre. It is suggested that some factor other than the mere iodine content, such as variations in the availability of the iodine present, may be responsible for the discrepancies met with.

Caddis Flies of India

VERY few species of Trichoptera or caddis flies have been described or collected in India. A recent contribution to this subject is to be found in a paper by Prof. A. B. Martynov, the well-known authority in Leningrad (*Rec. Ind. Mus.*, 37, 93-209; 1935). The paper forms the first part dealing with the suborder Annulipalpia. The material studied by Prof. Martynov was from the Indian Museum, and numbered about 93 species. It is significant that 77 of these species constituted new records for continental India and that 61 of them were previously undescribed. This paper brings the number of Trichoptera-Annulipalpia known from continental India up to about 134 species. From the points of view of zoogeography and ecology, caddis flies are an interesting group. It is very desirable that further investigations should be undertaken, including the larvæ and the exact nature of their habitats. Prof. Martynov's paper, which is very fully illustrated, is one of special importance to students of this order of insects, who will doubtlessly welcome further contributions from the author dealing with the Indian forms.

Corpuscles in Cœlomic Fluids of Invertebrates

A SERIES of four communications by Toshio Ohuye (*Sci. Reports, Tôhoku Imper. Univ.*, Oct. 1936) continues the author's investigations on corpuscles in the cœlomic fluids of invertebrates. The previous papers dealt with a holothurian and an earthworm and the present papers include the examinations of four ascidians, another holothurian, an echinoid and a brachiopod. The papers are well illustrated, and the value of the survey is enhanced because a similar technique is employed throughout and the same person is responsible for the interpretation. In the ascidians and the holothurian, nine different types of corpuscles, and in the echinoid and the brachiopod, six different types are recognized. Some of these corpuscles exhibit considerable variation in the body of the animal and some undergo marked changes when they are removed from the body. Amœboid corpuscles are present in all species examined, and in the echinoid the hyaline amœbocytes may run together to form a plasmodium.

Crossing-over and Chiasmata

THE mechanism of crossing-over is still the subject of much investigation, based on both cytological and genetical data. Dr. K. Mather (*J. Genetics*, 33, No. 2) has applied the chiasmata theory to the knowledge that crossing-over is not constant per cytological unit distance along the chromosomes,

particularly in *Drosophila*, and is able to draw various conclusions from the mathematical discussion. If crossing-over is more frequent at certain points, there must evidently be some localized determining mechanism. The spindle fibre attachment appears to be the site of this mechanism, and in the V-shaped chromosomes of *Drosophila* the two arms are known to be independent in their crossing-over. This is less surprising as it is evident that these were originally separate chromosomes. The frequency of crossing-over and chiasma formation in any region is then a function of its distance from the spindle attachment. Owing also to interference, the frequency of crossing-over at any point depends on (1) its distance from the spindle attachment, (2) the length of the chromosome arm. It is concluded that, in *Drosophila*, crossing-over and chiasma formation begin at the spindle attachment and proceed regularly along the arm.

Internal Cork of Apples

'INTERNAL CORK' of apples, which has for some years been a prevalent source of loss in certain areas of New Zealand, has recently been effectively controlled by the injection of boron compounds. H. O. Askew and E. Chittenden (*J. Pom. and Hort. Sci.*, 14, 3, 227; 1936) have found that hydrated borax applied as a top dressing will rapidly increase the boron content of certain soils to a depth of eighteen inches, and is readily absorbed by Jonathan and Dougherty trees. The boron content of apples from a healthy area and free from internal cork was similar to that of fruits from unhealthy soil receiving 100 lb. borax per acre. The treatment was effective in reducing the incidence of internal cork on trees previously affected, and no definite effect on the size or dry weight of the fruits was observed. It was estimated from the boron content of healthy leaves and fruits that the annual boron requirement is approximately 44 gm. per acre, which is amply supplied by a top dressing of 50 lb. of hydrated borax per acre to the soil. Complete control of internal cork was obtained by injecting individual branches of Jonathan and Delicious trees with 0.25 per cent hydrated borax solution. A total quantity of 2.5 gm. was effective, though 15 gm. could be given without injury. Control was also achieved by spraying the trees with 0.1-1 per cent borax solution, and as the addition of lime did not diminish the control, it is suggested that borax may be applied along with routine lime-sulphur sprays.

Cereal Rusts on Incompatible Hosts

DR. THEODORA B. HANES has studied the important problem of what happens when a rust fungus attacks a host upon which it does not normally occur (*Trans. Brit. Mycol. Soc.*, 20, pts. 3 and 4, Nov. 1936). Uredospores of *Puccinia triticina*, *P. glumarum* *Triticici*, *P. anomala*, *P. coronata* and *P. graminis* *Secalis* were inoculated upon a wide variety of cereals, and many 'inappropriate hosts' were included. The fungus usually initiated invasion of these unsuitable host plants, but was soon checked by local death of the mesophyll, or even of the stomatal guard cells. Experimental results are set forth in great detail in the paper.

The Refractivity Intercept

THE value of investigations of refractivity in the examination of hydrocarbons and mixtures of hydrocarbons is emphasized in a paper by S. S. Kurtz, jun.,

and A. L. Ward (*J. Franklin Inst.*, 222, 563; 1936). The authors have used the accurate data available for the isomeric heptanes to examine the additivity of the molecular refractivity, and come to the conclusion that too much is demanded of the classical refractivity equations of Lorenz-Lorentz, Gladstone and Dale, and Eykman. Such equations cannot be expected to give the effect of both variation of temperature and constitution on refractive index and density. A graph of refractive index (n) against density (d) for the homologous series of paraffins confirms the fact that a linear equation expresses the relationship between these two quantities. It is therefore proposed to use the equation $b = n - d/2$ where b is a constant, and is referred to as the refractivity intercept. The latter is characteristic of each homologous series. The refractivity intercept is of greater use in the study of hydrocarbons and hydrocarbon mixtures than the classical refractivity equations, since it is practically independent of boiling point and molecular weight. It is of value in the selection of reliable data concerning the properties of hydrocarbons, and for confirming the structure of new hydrocarbons and establishing their purity. It is of use also in the qualitative analysis of organic liquids. The refractivity intercepts of organic compounds other than hydrocarbons are usually less than unity, whereas hydrocarbons themselves (except in a very few cases) give a value greater than 1.01. In the case of mixtures of hydrocarbons, the intercept may be used to distinguish between saturated cyclic and aromatic hydrocarbons. It is possible, by a graphical method, to analyse quantitatively mixtures containing two or three different types of hydrocarbons. The authors discuss briefly the electronic interpretation of the refractivity intercept.

Development of Radio Receiving Valves

At a meeting of the Wireless Section of the Institution of Electrical Engineers held on December 2, a paper entitled "Modern Receiving Valves: Design and Manufacture" was presented by Messrs M. Benjamin, C. W. Cosgrove and G. W. Warren of the M.O. Valve Co., Ltd., and the G. E. C. Research Laboratories. This paper discusses the main features in the geometrical design of the types of valve in common use to-day and the various factors, mechanical and chemical, which impose limitations in manufacture. Attention was directed to the fact that the minimum tolerances of the dimensions of the electrode systems must be of the order of one per cent if reasonable similarity of characteristics is to be obtained in the mass production of valves of the same type. The paper includes a brief historical survey of the recent improvements in thermionic emitters and gives details of the precautions necessary in the production of modern highly efficient oxide-coated cathodes and insulated heaters. A brief description of the pumping and activation processes employed in modern manufacture is given, and the main factors affecting the life of a valve are discussed. The authors conclude with some observations on possible future developments of the receiving valve. The reading of the paper was accompanied by demonstrations, illustrating, first the improvement attained in the past five years in making the receiving valve free from microphone noises, and secondly the use of the very small 'acorn' valve for the transmission and reception of telephony on a wave-length of about one metre.