

Research Items

Bronzes from Iran and Elsewhere

AMONG a number of bronzes from Iran, Iraq and Asia Minor selected because they represent types not hitherto in the British Museum (Bloomsbury), and figured and described by Mr. Sidney Smith in *Brit. Mus. Quarterly*, 11, 2, are a number from Luristan, including an amulet with a suspension ring, which takes the form of a conventionalized 'naked goddess', such as were made in stone and clay at a very early period in Assyria, and similar to a type found in Crete. A small mace-head with bosses is of a type hitherto only known in stone. Each of the bosses is pierced, as if sockets were made to hold studs, but if so it is difficult to conjecture their use. An unusual object is an elaborate holder or *pelle d'offrandes*, of which the form imitates either a wheeled-cart or a sledge, the wheels or runners being replaced by four legs. Three animals stand facing the rear of the cart on an edge some four inches long by $\frac{3}{4}$ inch broad above the cart, the bottom of which is sunk nearly an inch and is only $2\frac{1}{4}$ inches long, terminated by an upturned edge $\frac{1}{4}$ inch inside the termination of the sides. The long shaft—eight inches—which turns in a socket as long as the upper edge, carries two animals facing in different directions, has a ring-attachment which serves as a support, and rises to a yoke, cast separately, the three ends thus made being shaped into unidentifiable animal heads. These bronzes are subject to the doubts about the dates of bronzes from Luristan. A fragment of a concave-sided vessel from Nihawand seems to have been chased over a bitumen ground, as it is not *repoussé*. The faces of the chased figures appear noseless with pointed chins. A harp seems to have eight strings, while a rectangular object is also doubtless a musical instrument and has been identified as an *adapu*, beaten with the hand. A curious object held by a broken seated figure seems to be a misshapen fish. A 'spectacle' amulet from Asia Minor, like others of the same type in ancient times, represented the convolutions of the intestines, and in modern Egypt is a prophylactic against the pains of childbirth.

Zuni Mythology

INTENSIVE study of folk-lore has tended to be neglected for a variety of reasons; but Ruth Benedict points out ("Zuni Mythology". *Columbia University Contributions to Anthropology*, 21, 2 vols.) that Zuni folk-lore affords excellent material for such study, in that a large body of tales has been recorded over a considerable period, indeed more than fifty years, the culture is well known, and in contrast to almost all the other tribes of North America, folk-lore among the Zuni is not moribund. This last-named factor brings out the importance of allowing for variation. In considering the relation of the themes which Zuni folk-lore elaborates in relation to culture, a number of points emerge. No folk-tale is generic. It always relates to a particular people, livelihood, social organization and religion. The final form is dependent on culture. Survivals belong to a dead culture, as in European folk-lore, and the function of myth cannot be studied in such cases. A living folk-lore reflects current use, although there is a lag. Also something must be

allowed for idealism and the conventionalization of a Golden Age, which explain the discrepancy between story and fact. A discrepancy of constant occurrence in Zuni folk-lore is the occurrence of polygamy. While all other Indians recognize polygamy and sometimes polyandry, the Zuni are monogamous. This probably represents an element analogous to the fairy element in other systems, the grandiose wish and day dream. Other contrasts are compensatory. For example, the abandonment of children is alien to Zuni culture; and yet it is a popular feature in the folk-tale. This is because the interest centres on the child, and in the story the parents are put to shame. There is no recognition of suicide in Zuni culture, or of taking vengeance on an unfaithful spouse. So in the tale the Apache are summoned, as destruction must overwhelm innocent and guilty alike. An interesting feature is the position of women in sexual matters. The women are regarded as the pursuers; the male is bashful and hangs back.

Episternal Bones in Man

IN 1820, Bécland first directed attention to the occasional presence of episternal bones in man, but they were more fully described eighteen years later by Breschet, to whom subsequent writers have generally given the credit for their discovery. Since then they have been recorded by numerous workers, and a detailed investigation of 2,218 human and 107 anthropoid sterna has enabled W. M. Cobb (*J. Anat.*, 71, Jan. 1937) to review the subject. Ossa suprasternalia were found in 6.8 per cent of 544 adult whites and 2.2 per cent of adult negroes. None was found in the 107 anthropoids. They appear to be homologous with the rudiments of the epicoracoids of the primitive shoulder girdle. The human sternum with a convex manubrial border and ossa sternalia is to be regarded as the most primitive condition, while that with no ossa and a convex border the most advanced. Since all the anthropoids studied were of this latter type, they are in this respect more advanced than human beings.

Mysids and Euphausiids of the Great Barrier Reef

PROF. W. M. TATTERSALL, in his memoir on Mysidacea and Euphausiacea (Great Barrier Reef Expedition 1928-29. *Scientific Reports*, vol. 5, No. 4; 1936), records seventeen planktonic mysids and six species of bottom forms, and a small collection of euphausiids comprising sixteen species, two of which are larval forms which could not be identified. The occurrence and seasonal distribution of both groups have been discussed in a separate report (vol. 2, No. 8). From these observations it is shown that the night hauls of plankton contain numerous mysids which are scarce during the daytime, and it is probably that they live at the bottom and only become planktonic by night. The new genus *Pseudomysidetes* is created for the new species *P. russelli*, closely related to *Mysidetes*, and three other species are described as new to science. The euphausiids are specially interesting as they form apparently the first collection made from this locality. Twelve of

the fourteen identified species were captured by the Siboga Expedition, which operated mainly in the Dutch East Indies, and the remaining two are tropical species which might have been expected in the same area and actually occur in other parts of the Pacific. All are oceanic, except *Pseudeuphausia latifrons* which is a shallow-water coastal form, widely distributed in the Pacific, and this species is the dominant one and is the only form characteristic of the shallow lagoon area inside the reef. A fairly complete series of larval stages enabled the life-history to be followed; this is closely related to that of *Nyctiphanes* and suggests that *Pseudeuphausia* is nearer to *Nyctiphanes* than to *Euphausia*, under which genus it was first described.

Locusts in Malaya

IN a recent bulletin (No. 18, Dept. Agric., Scientific Series, Straits Settlements and Federated Malay States), Messrs. G. H. Corbett and N. C. E. Miller discuss the incidence of two species of locusts in Malaya. As regards the oriental migratory locust (*Locusta migratoria manilensis*) it appears that there is no clear evidence that this insect is indigenous to Malaya. The regular absence of its solitary phase, and the fact that swarms are comparatively infrequent, point to this conclusion. Since Malaya has only been visited twice by swarms of *Locusta* during the past twenty-four years, this fact seems to be due to the distance which swarms have to travel in order to reach that territory. The suggested country of origin is Borneo, and it is considered quite likely that swarms may visit Malaya when outbreaks are in progress in other countries of the Pacific. The second species—the Bombay locust (*Patanga succinta*)—appears to cause negligible damage, but the occurrence of the insect in its solitary phase suggests that it may be indigenous.

Metabolism and Growth-Responses of the Cucumber

MODERN research has not yet made it clear to what extent such growth responses as flowering and fruiting are caused by, or are themselves the cause of, variations in chemical composition of the plant. There is an undoubted relation between the two, and a paper by Dr. R. B. Dearborn (Cornell Univ. Agr. Exp. Sta. Mem. 192, Ithaca, N.Y., July 1936) presents a very detailed contribution to our knowledge in this field. Cucumber plants were grown under conditions of high, and of low, nitrogen supply, whilst the composition of normal bearing plants was compared with that of plants which had their flowers or fruits removed. It was found that fruiting plants had a higher rate of vegetative growth and made more plant material for 10–14 days after pollination, than deflorated plants. Pollination therefore appears to exert a stimulus upon the general growth. The development of fruit had less effect upon the plant when the nitrogen supply was adequate, than when it was low. Amino and amide nitrogen accumulated in deflorated plants, so that the utilization of these fractions is in all probability impeded by the absence of fruit. Carbohydrates accumulated more in low-nitrogen plants than in those with higher nitrogen metabolism. Detailed estimations of the various fractions of carbohydrate and nitrogen are to be found in the paper, and the results show a definite relation between certain of these fractions and the type of growth. They do not, however, determine whether this relation is causal or subjective.

Powdery Mildew of Cucurbitaceæ in Egypt

THE fungus *Erysiphe cichoracearum*, which causes a powdery mildew of melons, cucumbers and other members of the Cucurbitaceæ, is very destructive to these crops in Egypt. Dr. Amin Fikry has published a detailed account of the disease (*Bull.* 175, Tech. and Scientif. Serv., Min. Agric., Egypt, Govt. Press, Bulâq, Cairo, 1936. P.T. 7), particularly with the view of controlling it. Powdery mildew is distributed widely throughout the country, and freely attacks all cucurbitaceous crops except water melon, which may, however, be attacked severely under conditions of high relative humidity. Dusting infected plants with flowers of sulphur was found to be the most satisfactory and practical means of control, though spraying with Burgundy mixture was also effective. A simple apparatus, which applied the sulphur by shaking it through a muslin cloth, was designed, and appeared to be very effective—superior, even, to mechanical dusters. Striking increases of crop followed two applications made when the fungus first appeared, but very little benefit accrued when the sulphur was applied either as a precautionary measure, or when the disease was well established. The bulletin is well illustrated by twenty-four plates, which portray symptoms on different plant hosts, and show various methods of control.

Native Agriculture in Northern Rhodesia

THE Ecological Survey of Northern Rhodesia, which was inaugurated in 1931, was faced with the difficult problem of evolving a quick and sound method of mapping and classifying large areas of country in order to provide a basis for native agricultural development. To have employed a large-scale soil survey would have been both slow and costly. Regional or geographic survey would be unsatisfactory without soil or geological information, which was not available. Vegetation survey, if conducted with due allowance for climatic variation and for changes induced by biotic factors, was found to provide the quickest efficient means of land classification. Mr. Trapnell (*Bull. Misc. Inform., Kew*, 1, 1937), the ecologist of the Survey, describes in detail the method he employed. A direct correlation between vegetation type and native agricultural practice was soon established. The degree of correlation obtained between soil and vegetation type, the reasons for lack of correlation where found, and the type of mapping unit which emerged as desirable for agricultural purposes are explained. The rest of the paper is concerned with agricultural aspects.

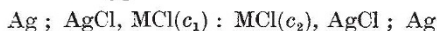
Directional Properties in Rolled Brass Strip

AT the annual meeting of the Institute of Metals (March 1937), a paper by Dr. Maurice Cook dealt with a matter of profound importance to producers and users of rolled brass strip. It is shown that the tensile strength of such strip, when the reduction has been sufficient to induce a directional effect, is greatest, and the ductility least, when tested in a direction normal to that of rolling, whilst in the direction of rolling itself the converse obtains. When such cold-rolled strip is annealed, it may still show directional properties which are revealed both by tensile tests and by the occurrence of 'ears' or waves on the edges of cups pressed from such strip. In annealed strip which shows a variation of properties in different directions, the tensile strength is least, and the ductility greatest, when tested at an angle of

45° to the direction of rolling, and it is in this position that the 'ears' are formed. The extent to which 'directionality' exists in rolled and annealed strip is determined largely by the conditions of the penultimate and final annealing treatments and by the degree of the reduction by rolling between them. A study of the orientation of the twinning planes in rolled and annealed 70 : 30 brass strip which shows an appreciable variation of properties in different directions indicates that the frequency of orientation of the twinning planes is least at 45° to the direction of rolling. In the case of strip which does not show directional properties, the twinning planes occur fortuitously in the sample.

Activity Coefficients from Cells with Transference

T. SHEDLOVSKY and D. A. MacInnes (*J. Amer. Chem. Soc.*, **59**, 503; 1937) have measured the activity coefficients of potassium chloride and calcium chloride by means of potential measurements of cells of the type:



in which M represents the cation. The calculations involved the transport number t of the cation through the equation

$$-E = 2(RT/F) \int_1^2 t \, d \log cf,$$

where f is the activity coefficient, for the potassium chloride, and the corresponding equation with the factor $3RT/2F$, instead of $2RT/F$, in the case of calcium chloride. The values of t must be known, and accurate values for the two electrolytes over a range of concentrations have recently been measured by Longswort hand by MacInnes and Dole. It was found that the simple Debye-Hückel equation: $-\log f = \alpha\sqrt{c}/(1 + \beta\sqrt{c})$ reproduced the results with great precision over the range of concentrations 0.005–0.2 for $c_2(c_1 = 0.1)$ —the actual measurements extended to $c_2 = 3.0$ —and 0.0018–0.03 for calcium chloride (actual measurements up to $c_2 = 0.096$; $c_1 = 0.05$). The constant β involves the distance of closest approach of the ions, and for potassium chloride and calcium chloride this distance was calculated as 4.1 and 5.2 Å, respectively. For higher concentrations, agreement was obtained for the former up to $c_2 = 3$ and for the latter for $c_2 = 0.1$, by modified equations obtained by subtracting terms in $c \log c$ and c , respectively, from the simple equation. The results with calcium chloride are of particular interest, since they show that the Debye-Hückel equation in its simplest form applies to the dilute solutions of this unsymmetrical type of electrolyte, the distance of closest approach being sufficiently large to make the higher terms of the La Mer equation negligible.

Estimation of Arsenites, Arsenates, Selenites, and Selenates

In a communication read before the Czech Academy of Sciences on December 10, 1936, and published in the Academy's *Bulletin International* (1937, p. 1) Prof. J. Milbauer and Dr. J. Vodrážka describe a method of estimating arsenites, arsenates, selenites and selenates in mixtures containing all four salts. Molybdic acid serves to detect arsenates in such a mixture, but cannot be used for quantitative estimations since selenium compounds are found to be occluded in the arsenomolybdate precipitate. No such occlusion occurs when arsenates are precipitated as magnesium ammonium arsenate, $\text{MgNH}_4\text{AsO}_4 \cdot 6\text{H}_2\text{O}$, on adding ammoniacal magnesium solutions to the mixture. The precipitate is converted into

magnesium pyroarsenate, $\text{Mg}_2\text{As}_2\text{O}_7$, and weighed as such. To determine the arsenite a weighed amount of the mixture is oxidized (nitric acid, bromine, sulphuric acid and bromine, potassium chlorate, perchlorate or bromate can be used) to arsenate and the estimation carried out as indicated above. Selenates can be estimated, in absence of chloride, by means of barium perchlorate, which precipitates barium selenate in the presence of perchloric acid. Selenites can then be determined by means of barium perchlorate after suitable oxidation. Should hydrochloric acid or a chloride be present, the total selenium is estimated by reduction with hydrazine sulphate, which yields elementary selenium.

Fuel Briquetting

THE agglomeration of powdery material—especially fuels and ores—is a technical problem of world-wide interest. Its importance is not felt in full measure in Great Britain, favoured as it is by well-distributed supplies of excellent coal. In many countries, fuels are lacking or available supplies consist of low-grade, non-coking or pulverulent material to which the briquetting process is applicable. Accordingly, we find that the technique of briquetting lignite has been highly developed in Central Europe. South Wales has found a Continental market for its anthracite dust in the form of briquettes. In North America the quest of an anthracite-substitute has produced an enormous patent literature. The problem is essentially the production of a suitable binder—preferably smokeless—waterproof, furnishing a briquette which is not only mechanically strong enough for storage and handling before use but also during the process of combustion. The state of the art can be realized from a report on fuel briquetting by R. A. Strong, E. Swartzman and E. J. Burrough issued by the Canadian Bureau of Mines, Ottawa (25 cents, pp. 100). It contains a critical bibliography, and is a welcome contribution to a branch of technology imperfectly supplied with literature.

The Orbit of the Binary Star, Σ 2026

In *Mon. Not. Roy. Astro. Soc.*, (97, 3, Jan. 1937), Dr. R. v. d. R. Woolley and Mr. L. S. T. Symms contribute a paper in which they describe their method for improving the orbit of this binary, which was discovered by Struve in 1830. Since Comstock published his orbit in 1918, very satisfactory observations have been made, and these have been used to compute an orbit which will probably not be improved for a great many years. The attempt to compute an orbit by Russell's method met with little success, and discordances as large as 15° in position-angle were found when an ephemeris was computed from preliminary curves. Arbitrary alterations were then made in the elements until these discordances were reduced to $\pm 3.5^\circ$ in the observed minus computed position-angle, and differential equations were applied to improve the elements of the orbit. A detailed description follows showing the procedure adopted, with the ten places selected as representing the observations satisfactorily. The results show that the period is 680 years, the semi-axis major $3.04''$, and the inclination $\pm 130.6^\circ$. It is observed that much of the work in the northern hemisphere which needs to be done on double star orbits is of the nature of improving existing orbits with the use of later observations, and for this purpose the differential method of Innes and van den Bos is well suited.