

Research Items

Ancestor Worship in Portuguese East Africa. An account of a village temple and ceremonial of WaBarwe ancestor worship by the Rev. D. Shropshire appeared in *Man* for May. The temple was situated in a banana grove which was entered through a doorway in a decorated bamboo screen. It consisted of a small house, 7 ft. by 5 ft., with a gabled thatched roof. It was built of poles and reeds and had a small wicket gate of reeds. Within the temple were two clay pots sunk in the ground. A large banana leaf lay on the ground in front of them, and two small pieces of bamboo and a calabash hung from the roof. An empty calabash upside down was inserted in the ground. One of the pots was for offerings to the mothers of the forefathers of the head of the village, the other for the mother of his father. In the ritual of worship the head of the village (or in this instance his deputy) swept the floor of the temple and its precincts. He then placed a reed mat in front of the door of the temple and a new large clean banana leaf inside the temple in front of the two pots. At a house in the village a procession was then formed which made its way to the temple, the wife of the representative of the village headman carrying mealie meal on a wooden plate. On arriving at the temple, all knelt and clapped hands ceremonially in greeting to the ancestors. The deputy then entered the temple and sat on the ground. After further clapping of hands he made offerings of the meal, with an invocation, to each of the pots in turn. The procession then returned to the house from which it started. At the time of the great offering and worship of the ancestors at the sowing season, they offer beer, bananas and rice in addition to the mealie meal. They do not pray to the Supreme Being except when out hunting, in prolonged drought or when the medicine man has failed to make a person well. He is too far away, and on ordinary occasions they pray to the ancestors to intercede with him, instead of addressing him directly themselves.

Tutelary Deities in Lower Bengal. A village shrine sacred to two sister deities in a paddy field near Gangajora in the neighbourhood of Calcutta has recently been described by Dr. Sunder Lal Hora (*J. and Proc. Asiat. Soc. Bengal*, N.S. 29, No. 1). The two deities were installed in a small hut built on a low mud platform like a Mohammedan tomb. They were represented by beautiful clay figures, dressed in fine and gorgeously coloured clothes. The right arm of each was upraised in the attitude of benediction. Nearby and on the platform were scattered earthen lamps and shells of coco-nuts, showing that some sort of *pūjā* had recently been performed there. Inquiry elicited the information that the deities were worshipped on a day convenient to the whole village in the Hindu month of *Māgh* (January-February). They are known as *Olā*, *Jholā* and *Bōn Bibī*. *Olā* and *Jholā* are believed to be sisters, the former presiding over cholera, the latter over smallpox. Their worship secures immunity for the village from these diseases. *Bōn Bibī* (lit. the goddess of jungles) is worshipped to secure protection from jungle beasts. The *pūjā* is a common affair for the whole village and the necessary articles are purchased from a common fund to which all

contribute according to their means. The principal item is the goat for sacrifice. When it is beheaded, the head is taken as his fee by the blacksmith who performs the killing, while the remainder of the meat is distributed among the villagers. The plot of land on which the *pūjā* is performed has been made over to the village in perpetuity by some rich villager. The social status of the Pod caste, to which the villagers belong, is so low that high class Brahmans will not take food or water from the Brahmans who act as their priests. An appended note by Dr. S. K. Chatterji adds that in Bengal, Hindu and Moslem frequently unite in worship of the cholera deity, when she is known as *Bōn Bibī* as a concession to Moslem feeling.

Parasitic Worms of Marine Fishes. The attention of zoologists interested in the collection and determination of the parasitic worms of the marine fishes, and also of the marine birds and mammals, found in the British area, is directed to a recently issued section (Lief. No. 24, 1933) of "Die Tierwelt der Nord- und Ostsee" (Leipzig: Akademische Verlagsgesellschaft m.b.H.) which contains the parts of this work dealing with the Trematoda and the Acanthocephala. The part on the Trematoda, by C. Sprehn, includes useful tables for the discrimination of the 46 genera of Monogenea and of the 144 genera of Digenea which have been recorded from marine hosts taken in the area of the North Sea and the Baltic. A total of 374 species is recorded and the host of each is stated. The part on the Acanthocephala, by D. Wulker and J. H. Schuurmans Stekhoven, Jr., opens with an admirable summary, in about thirty pages, of the anatomy, life-history and ecology of the group. Lists follow of the invertebrate and vertebrate hosts of the worms, and keys are provided for aiding the determination of the orders, families, genera and species. The characters of the fourteen genera and 29 species recorded from the area are concisely stated. This part includes 54 illustrations; there are 20 in the part on the Trematoda.

Hawaiian Cypræacea. Dr. F. A. Schilder in his paper "Cypræacea from Hawaii" (*Bernice P. Bishop Museum, Occasional Papers*, 10, No. 3, 1933) investigates a large collection of 594 specimens and 19 species collected from Pearl and Hermes Reef, Laysan Island and French Frigates Shoal, Hawaii. Most of them are well-known shells but they are interesting as they show an extension in range of distribution, and the large number of individuals of many species makes possible the investigation of local variability by statistical methods. The distribution of the Eratoïdæ (Triviinæ) does not indicate any peculiarity. With regard to the Cypræidæ, however, it is evident that the relatively large or callous species have been collected chiefly in French Frigates Shoal and in Laysan Island, whereas the smaller, less callous, or finely sculptured species occur chiefly in Pearl and Hermes Reef. The difference, which is striking, indicates ecological differences in these islands. *Lyncina sulcidentata* seems to live equally well in both environments. There is no difference in the shells from Pearl and Hermes Reef. All Eratoïdæ are relatively small. The Cypræidæ from Pearl and Hermes Reef are of medium size to small, or if larger

they are always surpassed in size by those from French Frigates Shoal and from Laysan Island, where most species become large to gigantic.

American Foraminifera. Dr. Thomas Wayland Vaughan completes the description of the species of the genus *Lepidocyclus* that have come into his hands during a number of years, thereby aiding in the solution of problems of geological correlation in the Mexican Gulf and Caribbean region in "Studies of American Species of Foraminifera of the Genus *Lepidocyclus*" (Smithsonian Miscellaneous Collections, 89, No. 10, 1933). The large and valuable material, much of which was collected by the author himself from Mexico and Antigua helped by many others, and the collections from Cuba contain numerous species, and the account of them is practically complete. These are from the Eocene, Oligocene and Antiquan formation. *Lepidocyclus* is found to vary enormously and the difficulty of defining certain species is great. The variations are of two kinds, first the difference due to alternation of microspheric and megalospheric generations, secondly the difference due to relative age. Because of this large variation it is shown that many so-called species are invalid. This paper, which is a very valuable one, is illustrated by 32 photographic plates. In the same periodical (Smithsonian Miscellaneous Collections, 89, No. 11, 1933) Mr. Donald Winchester Gravell describes some of the Tertiary larger Foraminifera of Venezuela.

Evolutionary and Mutative Degeneration of Eyes in Gammarids. Recently obtained results on the normal and mutant eyes of *Gammarus chevreuxi* (cf. Wolsky and Huxley, *Proc. Roy. Soc. London*, B, 114; 1934; see also NATURE, February 13, 1932) make it possible to compare the mutative degeneration of eyes with the evolutionary process of eye-degeneration in Gammarids. This has been attempted by A. Wolsky in a paper published in Hungarian (*Math. Term. Ért. Budapest*, 51; 1934), which also gives a description of the loss of eyes in *Niphargus aggtelekiensis*, a recently discovered cave gammarid from the Aggtelek cave in northern Hungary. The findings on this species confirm the general view held by various authors (Schneider, Vejdovsky, Strauss), that the evolutionary process of eye-degeneration in Gammarids shows a centripetal tendency. That is to say, the superficial elements of the eyes (crystalline cones) are affected first, and from these the degeneration proceeds towards deeper regions, finally affecting the optic nerve. In *Niphargus aggtelekiensis* the eyes are entirely obliterated, but traces of the optic nerve are still present, although much reduced, and probably fused with elements of another nerve. On the other hand, the eye-reduction of *Gammarus chevreuxi* mutants ('albino' type) must be considered as centrifugal, because the elements affected most are the deeper ones (retinula, optic nerve and optic tract), whereas the crystalline cones, although highly degenerated, are still present. The embryological results confirm this, and indicate that in ontogeny degeneration starts at the junction between the base of the eye and the brain, and proceeds in both directions from this centre. Thus the comparison does not support the view put forward by various authors (Banta, Nachtsheim), that blind cave species might have arisen from mutants with reduced eyes. The mutations involved in evolutionary eye-reduction

must have been of other types than those which occur under laboratory conditions.

Transmission of Streak Virus by a Leafhopper. At the East African Agricultural Research Station, Amani, Dr. H. H. Storey has shown that the leafhopper, *Cicadulina rubila*, transmits the virus of streak disease from plant to plant of maize. He has since found (*Proc. Roy. Soc.*, B, 112, 46) that this vector capacity of the species is hereditary and that certain individuals do not possess it. The hoppers when hatched are always non-viruliferous and some of them are incapable of natural infection. Pure lines of active and inactive insects were bred and crossed, the results of reciprocal crosses showing that the vector ability is inherited as a simple dominant sex-linked Mendelian factor. No difference could be found in the mouth parts of the two types. In a further investigation (*Proc. Roy. Soc.*, B, 113, 463), Dr. Storey finds that after feeding on an infected plant the virus is present in the intestine but soon disappears from the rectal contents after they are voided. In the 'active' insect the virus can also be detected in the blood, whereas in an 'inactive' insect it is confined to the intestine. The intestine wall of the latter therefore resists the passage of the virus, but this may be overcome by puncturing the abdomen with a fine glass needle. Some secondary mechanism must also be present, since the frequency of success with this method is higher in active than in inactive insects. An insect once infective remains so throughout its life. In another species, *C. zeæ*, the inactive races were shown to be susceptible to inoculation by the same method.

Fusarium Wilt of Asters. A disease of China asters, which gives symptoms very similar to those of 'foot-rot' or 'black-leg', has been found in England by Messrs. L. Ogilvie and B. O. Mulligan (*Gardeners' Chronicle*, March 31, 1934, p. 215). The causal fungus of foot-rot was not present, and it was ultimately found that the asters were attacked by the fungus *Fusarium conglutinans*. Two strains of the parasite were found—var. *callistephi*, and var. *majus*. Symptoms are most conspicuous when the plants form their first flower buds. Black areas extend from the base of the stem to the flower stalks, whilst the leaves turn yellow. The plant ultimately wilts. Trials with a large number of aster varieties have shown that English varieties are almost all susceptible, but an imposing list of American varieties which are resistant in Great Britain is given. The disease appears to be the same as that known in the United States and in various European countries.

Fungi Destroying Leather. The condition known to the leather trade as 'red heat' may cause loss to salted hides by producing thin spots of weak texture. A study of the bacteria which cause this disease in Canada has been made by A. G. Lochhead ("Bacterial Studies on the Red Discolouration of Salted Hides", *Canadian J. Res.*, 10, No. 3, pp. 275-286, March 1934). Two organisms were isolated—one was similar to *Serratia salinaria*, which causes reddening of cured codfish in eastern Canada, and the other was apparently a new species, named *S. cutirubra*. Both organisms can live on substrate containing relatively large quantities of salt, and are proteolytic. They are considered to cause more damage than a species of red halophilic sarcinae which was isolated from

Argentine hide. Non-chromogenic bacteria were also isolated from salted hide, but seem to be less injurious than those which produce the red colour.

Submarine Valleys. The submarine valleys of continental margins have generally been explained as having originated during a period of emergence and having retained their form for one reason or another during subsequent submergence. This origin, at least in relation to the submarine valleys of the coast of southern California, is questioned by the late Prof. W. M. Davis in the *Geographical Review* for April. Several of these valleys are continued to depths of 200–300 fathoms, which is considerably lower than Daly's estimate of the glacial lowering of sea-level. Nor is there any evidence of upheaval or subsidence by that measure of height. Further, ordinary depositional processes which are building up the shallow sea-floor ought to have obliterated at least the inner part of these valleys, but the reverse is true: some process is keeping these valleys open. Prof. Davis termed these valleys submarine mock valleys, since he does not believe they are due to subaerial erosion. He throws out the suggestion that the real explanation lies in a slow process of submarine erosion in rock disintegrated by a sea-floor current due to some peculiarity of coastal configuration and accelerated no doubt during stormy weather. This submarine erosion, or 'marosion' as Prof. Davis termed it, might create a valley in the course of time and meanwhile of course no sedimentation would occur in it but only on either side. Monterey mock valley, seventy miles south of the Golden Gate, is cited as a typical example.

Architectural Acoustics. The issue of the *Journal of the Franklin Institute* for April contains the address delivered before the Institute in December by Dr. Paul E. Sabine on recent developments in architectural acoustics. Since Prof. Wallace Sabine of Harvard, the founder of the subject, gave an address on it nineteen years ago, great improvements have taken place in both the production and the measurement of the intensity of sounds of all audible frequencies, mainly due to the vacuum tube and amplifier, and we now know that the response of the ear to a sound is proportional to the logarithm of the intensity of the sound. So far as sound insulation is concerned, it is now established that materials like felt reduce the sound transmitted through them to a much smaller extent than solid walls, 4 in. of felt giving less reduction than one inch of solid plaster. The transmission through walls and partitions depends on their forced vibrations, and the sound reduction produced by them is very nearly proportional to the cube of the weight per square foot of wall. In the case of double walls or partitions, structural connexion between the two should be avoided and one of them should be of the heavy and the other of the light type.

Isotopic Separation by Electrolysis of Water. It is known that the lighter hydrogen isotope is evolved preferentially when an alkaline solution is electrolysed, and Polanyi has concluded that this is due to a difference of overpotential for the deposition of H^1 and H^2 on the cathode. R. H. Fowler (*Proc. Roy. Soc., A*, April) has examined alternative mechanisms for the preferential evolution. He writes equations for the concentration of hydrogen ions in different parts of the cell in steady electrolysis. The

self diffusion of the water is apparently sufficient to keep the ratio of heavy to light hydrogen normal near the cathode in spite of the different mobilities of the ions. In addition to the mechanism proposed by Polanyi, however, there may be differential rates of molecule formation by combination of atoms at the cathode surface. It may be noted that Polanyi's mechanism is not consonant with Gurney's theory of electrolysis, while the theory is not inconsistent with the alternative explanation.

Crystal Structure of the Heusler Alloys. The Heusler alloys are remarkable in that they become ferromagnetic after suitable heat treatment, although they contain only non-ferromagnetic elements (copper, manganese and aluminium). A. J. Bradley and J. W. Rodgers (*Proc. Roy. Soc., A*, April) have investigated the alloys by X-ray crystallography in order to find if the ferromagnetic behaviour is correlated with a particular crystal structure. The annealed alloys (non-magnetic) mainly show a structure like that of a γ -brass, but the quenched specimens (magnetic) show a body-centred cubic structure with a face-centred cubic superlattice. The further investigation of this structure was carried out by careful intensity measurements on powder photographs. It was found possible to distinguish the positions of the copper and manganese atoms by observing the powder patterns with iron, copper and zinc K -radiation, since the scattering power of an atom for X-rays varies rather rapidly in the neighbourhood of an absorption edge. This is a new method which may have important applications. The magnetic alloys have a structure in which copper, manganese and aluminium atoms occupy quite definite positions in the lattice, but when the composition of the alloy differs from Cu_2MnAl , the positions normally occupied by atoms of one element may be replaced according to definite rules by those of another, the structure remaining homogeneous.

Lubricating Grease. Choice between grease and oil is a vital problem in industrial plant lubrication to-day and cannot be made without a comprehensive knowledge of physical characteristics and behaviour of the lubricants in question, as well as an understanding of prevailing operating conditions. Much work already done on lubricating oils has led to their several varieties being classified and their characteristics standardised. With greases, however, this is not the case since, until recently, they were regarded merely as an outlet for by-products of the petroleum industry, and not assessed on their true value as lubricants. H. S. Garlick, in a paper read on May 8 before a meeting of the Institution of Petroleum Technologists, stated that the most convenient method of classification of greases is according to the soap used in their manufacture: thus, the main types are lime, soda, lead and aluminium base greases with a fifth class of miscellaneous types and special products. In all cases, consistency, melting point (flow point), stability both in storage and in use, colour, odour and load-carrying capacity of greases should be determined under known conditions and by accepted methods before application and, in circumstances where the manufacturer or user may require fuller information, exhaustive physical and chemical analyses should be carried out. Unfortunately, research on lubricating greases has not yet reached a point where standard methods of testing can be fixed.