

## Research Items

**China and the Maya.** A communication from Dr. Kiang Kang-Hu on the resemblances between the Maya civilisation of Central America and that of the Chinese, accompanied by an introductory note, dealing broadly with the question of cultural diffusion across the Pacific, by Dr. W. D. Lighthall, has appeared (*Trans. Roy. Soc. Canada*, Ser. 3, 27, Section 2). Dr. Kiang from his familiarity with the cultures of his own and kindred peoples is able to bring forward a number of instances, in which he sees resemblances between the two civilisations, for the further scrutiny of specialists. Among these are the physical characters and the mental outlook of the two peoples, the Maya more nearly resembling the Chinese physically than any other of the aboriginal tribes of Central and North America. He also points to similarities in language, in the complicated and elaborate calendrical system, both peoples using the 'large' and 'small' month count. Their religion and deities, sacrifice and worship are also alike, especially in regard to the use of idols of wood and clay to which human blood was applied. China, however, does not appear to have practised human sacrifice, although there are traditions of it in ancient days and remote parts. The astronomical and astrological systems are strikingly similar; and the creation legends of the two peoples have many common features, as also have the story of the deluge and of the creation of the first men out of mud. Art, dress and ornament are reviewed with the same result. Setting aside the elements which are common to many primitive peoples, many resemblances remain which cannot be dismissed lightly. If the Mayas were of Chinese origin, they must have crossed to America more than six thousand years ago, otherwise their culture would be more specifically Chinese. Alternatively, they may have been derived from other adjacent races, different from, but culturally related to, the Chinese.

**Phylogeny of Hemiptera-Heteroptera.** In describing a new family, Leotichidæ (*Ann. and Mag. Nat. Hist.*, Ser. 10, 12), W. E. China discusses the general classification of Hemiptera-Heteroptera and proposes a hypothetical phylogenetic arrangement of the 51 families at present recognised within this suborder. This arrangement is compared with the latest attempt by Pruthi (*Trans. Entom. Soc., London*, 1925) to revise the family classification solely on the basis of the morphology of male genitalia. It is stressed that there are no grounds for assuming that genitalia are less affected by environment and habits than are other characters. Indeed, the fact that whole groups of species exist which differ only in genital structures would seem to indicate that often these structures are the first to be affected. It is only the general plan of genital structures which is of value in supplying important clues to the phylogeny of the group. The two main types of genitalia, those of the pentatomoid and reduvioid groups of families respectively, follow the biological difference in feeding habits, members of the first group being mainly phytophagous, and those of the second mainly predaceous. Nevertheless, the primitive Heteroptera were undoubtedly phytophagous, not predaceous, and were homopteroid in character. The family Corixidæ contains the only aquatic phytophagous Heteroptera,

and it is considered to represent the aquatic form derived from those ancestors, whereas the true aquatic bugs (as opposed to the littoral and surface forms) arose from predaceous terrestrial forms of the littoral type, at a much later date. A biological sequence showing a gradual change from littoral life to a truly aquatic existence is traced from family to family, and a 'family tree' including all known families serves to illustrate the interesting discussion.

**South American Lizards.** A preliminary check list of the lizards of South America has been compiled by Charles E. and May Danheim Burt (*Trans. Acad. Sci. St. Louis*, 28, Nos. 1 and 2; 1933). The authors consider that probably, in their catalogue of 86 pages, they have listed too many rather than too few species, and that great systematic modifications of the present groupings must ultimately be made. But the list should stimulate field work and research on South American lizards, the more so since the distribution of even common species is not precisely known, and since little has been published concerning the habits and habitats of any.

**Reproductive Apparatus of *Thalassema*.** P. R. Awati and D. S. Deshpande (*J. Univ. Bombay*, 1, Pt. 5, 1933) describe the reproductive apparatus of *Thalassema bombayensis*. The single gonad is around the posterior part of the ventral vessel, and from it fall into the coelom clusters of cells which in males develop into sperm morulae while in females one cell in the centre of each mass enlarges and becomes an ovum growing at the expense of the sister ova. There are usually four pairs, occasionally five pairs, of gonoducts in the anterior region of the body. Each organ consists of a vesicle into which opens the common duct of two spiral 'flagella'; from the vesicle issues a short duct which opens to the exterior. The vesicle is small in immature examples but in mature specimens is distended with the sexual cells. Each 'flagellum' is ciliated along its margins and along its length has a ciliated groove. The two 'flagella' meet and fuse, the two grooves forming a common duct which opens into the vesicle; near this the short duct leads from the vesicle to the exterior. The sexual cells are brought from the coelom into the vesicle by the ciliated grooves of the 'flagella', accumulate therein and finally pass to the exterior by the short efferent duct. The authors regard these 'segmental organs' as coelomoducts.

**Fungi of Butter.** Many of the taints and faults of butter are due to the activities of fungi. This fact has led workers in several countries to study the fungi which occur naturally or appear during the manufacture of this product. A very complete list is published in vol. 9 of the *Canadian Journal of Research* ("The Fungi found in Butter", by G. R. Bisby, M. C. Jamieson and M. Timonin, pp. 97-107, Aug. 1933). Samples of butter from all the creameries in Manitoba were tested for the presence of fungi. One creamery produced butter with no moulds, and the product was of excellent flavour. A long list is given of all the fungi isolated from other samples, not only by the authors, but also by other workers on the same subject, and should prove valuable to dairy workers for reference.



**Mesozoic Pteridosperms from South Africa.** In a recent publication (*Phil. Trans. Roy. Soc. London*, B, 222) Dr. Hamshaw Thomas gives an account of some remarkable fossil plants from rocks of Triassic Age in Natal which notably extends our knowledge of Pteridosperms as constituents of post-Palaeozoic floras. He describes an interesting set of seed-bearing and pollen-bearing fructifications which, by evidence of cuticular structure, other morphological considerations, and close association, he is able to relate to one another and to such well-known form-genera of fronds as *Thinnfeldia*, *Dicroidium*, *Pachypteris*, etc., fronds which have for some time been suspected, without adequate evidence, of being pteridospermous. These he groups into two families: (1) the *Corytospermaceæ*, characterised by having seed-bearing branches with terminal recurved cupules each of which bears a seed with a curved bifid micropyle. The pollen-bearing branches bear their microsporangia in groups on small laminae, and the microspores, which have also been found adhering to the nucellus in the seeds, have two lateral, symmetrical wings and closely resemble those of *Antholithus* in the Caytoniales. The foliage probably was of the types known as *Dicroidium* and *Pachypteris*. (2) The *Peltospermaceæ*, a closely allied family, have seed-bearing branches with the seeds attached to small peltate terminal expansions of the axis. The foliage was of the *Lepidopteris* type but the pollen-bearing structures have not as yet been identified. These discoveries have an important bearing on the question of the possible origin of the Angiosperms from a Pteridosperm stock and on the morphological nature of seed-bearing structures in general.

**Artificial Vibrations of the Ground.** Some interesting experiments on this subject, made by S. K. Banerji and M. D. Manohar, are recounted in the *Indian Journal of Physics*, 8, 95, Sept. 1933. An iron ball of about 28 lb. weight was dropped on to the ground from a height of about one yard, and the resulting ground vibrations were measured by two horizontal component (north-south and east-west) Milne-Shaw type seismographs (period 12 sec., damping ratio 20:1) and a vertical component seismograph (period 3 sec.). Records were taken when the point of impact was in different directions from the small seismograph house, and at numerous distances up to about 50 yards. The records show a sudden impulse followed by oscillations compounded of forced vibrations of the ground (period 0.05 sec.) and the free period of the seismograph house (0.015 sec.). Using a theory given by Lamb, the ground vibrations, and their law of variation of amplitude with distance (proportional to  $1/\sqrt{\text{distance}}$ ) can be reasonably well accounted for. The free period for the building also agrees with a theoretical estimate.

**Landing of Aircraft by Radio.** The October *Bulletin of the Bureau of Standards* contains a description of the complete form of the equipment for enabling aircraft to land in fog or other conditions of low visibility. The methods have been developed since 1928, and have now been incorporated into a practical form and tested by repeated use in actual fog and in an aeroplane with hooded pilot's cockpit. The course of the aircraft is directed to the airport by a beacon station using a 200-400 kc. frequency and a visual indicator on the machine. The intensity of the beacon signals provides an approximate indication of the distance from the airport on a millimeter

graduated in miles. When several miles from the airport, the machine picks up a landing beam from a special short-wave transmitter (10,000 kc. frequency) which is arranged so that a surface of constant signal intensity is a sloping path down which the aeroplane may glide. The signal intensity meter on the aeroplane is combined with the beacon indicator, so that the pilot needs only to keep the two pointers intersecting over the centre of the dial by movements which easily become intuitive. As the machine approaches the airport it picks up a marker signal beam modulated with a distinctive tone and directed vertically at a position a few thousand feet from the landing field. At the edge of the field itself a second distinctive marker tone is heard. The aeroplane is then only a few feet from the ground and a landing may be effected without difficulty (see also *NATURE*, 132, 925, Dec. 16, 1933).

**Helium in Beryl.** Lord Rayleigh (*Proc. Roy. Soc.*, Nov.) has made determinations of the helium content of a number of specimens of beryl of varying geological age. The beryls were finely powdered and decomposed with molten caustic potash at about 300°; the gas was purified and measured over mercury in a McLeod gauge. The beryls obtainable were predominantly from Archæan formations, but a number of specimens were classified as Palaeozoic, Mesozoic or Tertiary. Within each group the helium content was very variable, but the helium content showed a definite tendency to increase in going from younger to older specimens. The largest helium contents were limited to specimens of great geological age. The conclusion appears to be that the helium has accumulated in beryl during geological time, and that it was not trapped when the mineral was formed or produced by the disintegration of short-lived radio elements during the early life of the beryl.

**Holley-Mott Continuous Counter-Current Washery and Petroleum Products.** In a paper read on November 14 before the Institution of Petroleum Technologists, Mr. E. Thornton maintained that sponsors of the Holley-Mott continuous counter-current washery for the treatment of cracked spirit were justifiably proud of the good results achieved with this plant, the usefulness of which is determined solely by the application of generally accepted principles in the most straightforward manner. All good treating plants must be so designed as to be capable of mixing reagent and treated material in suitable proportions, maintaining the admixture for a given length of time and separating reagent and treated material at the expiration of that time. Intimacy of contact between reagent and treated material is achieved in the Holley-Mott process by means of a vessel containing a suspended stirrer revolving at a moderate speed and with no footstep bearings. Not only is this method of mixing simple and efficient, but it is also definitely economical. The time of contact between reagent and treated material is controlled by the size of the vessel in relation to throughput, as is the case with most continuous plants. Since the degree of mixing is kept definitely under control, the problem of separation is not formidable and is solved simply and cheaply by means of gravity-settling in reasonably-sized vessels. In addition to fulfilling the above main requirements, the Holley-Mott plant satisfies a number of other conditions essential to the effective treatment of spirit.