

RESEARCH ITEMS

History and Ethnology of the Caddo Indians

THE Caddo Indians, of whom very little has been written, were a group of tribes of great importance in the earliest days of which there is historical record in America, that is, in the first half of the sixteenth century. But they have been almost lost to sight and their significance underrated because they lived in a portion of the country beyond the Mississippi that was not under the control of the United States. The early records of this stock are in Spanish and French, and by the time the United States took over the territory these Indians were scattered and their culture practically destroyed. The assembling, therefore, of the materials for this study was of great importance, and the results (John R. Swanton, *Bull.* 132, Bur. Amer. Ethnology, Smithsonian Inst.) form a valuable addition to the literature dealing with the American Indian.

Death-rate Variation in Fowls and Geographical Latitude

IN order to study the rate of embryonic mortality in fowls and factors determining it, investigations were made at the Moscow Institute for Poultry Breeding by E. Penionzhkevich (*C.R. Acad. Sci. U.R.S.S.*, 32, No. 8; 1941) on 61 million eggs from 369 farms situated in latitudes ranging from 42° to 62° N. It was found that the embryonic death-rate increases (that is, the hatching-rate decreases) with latitude, and the regularity holds good for two consecutive years, the difference in the mortality-rate averaging 6 per cent. When the mortality-rate was analysed with regard to the stage in the embryonic development, it was found that the increase of mortality in more northern latitudes is particularly due to the environmental influence, not in the first seven days of development, but during the following period up to hatching. The rate of embryonic mortality, according to the author's theory, is due to the influence of the environment not on the egg itself but on the maternal organisms.

Identification of Clostridia of Gas Gangrene

G. F. Petrie and D. Steabben (*Brit. Med. J.*, 1, 377; March 27, 1943) have shown that colonies on agar plates of the three chief pathogenic clostridia of gas gangrene—*Cl. welchii*, *Cl. septicum*, and *Cl. oedematiens*—can be identified with certainty if the corresponding antitoxin is added in an optimum amount to the basal medium, which is chosen as one that favours production of the specific toxin. During anaerobic incubation the toxin diffuses from the colony and interacts with the antitoxin to produce an easily recognizable precipitate, which resembles a halo round the colony and which consists of toxin-antitoxin aggregates linked together. This precipitate tends to form concentric (Liesegang) rings that are so characteristic as to leave no doubt of the identity of the associated bacterial species. In the authors' view the most likely explanation for the appearance of concentric zones is that the forces which combine to build up the framework of molecular aggregates as a uniform deposit to the naked eye are not in equilibrium, and that at a later stage stresses or strains in the structure result in condensation of the precipitate in the form of annular zones separated by clear zones. The remarkable symmetry of the concentric zones is evidence that the molecular aggregates which constitute the toxin-antitoxin

precipitate within the matrix of the agar gel are disposed in an ordered arrangement and that the forces controlling them are in equilibrium. The method may prove to be useful in the investigation of the anaerobic flora of wounds and for the diagnosis of gas gangrene in time of war.

Alighting-Boards and Colour-sense in Bees

THE *Bee World* of March 1943 contains a translation of an article by Dr. Ruth Lotmar, published in the *Schweizerische Bienenzeitung* of October 1942, entitled "Painted Alighting-Boards and the Colour-Sense of Bees". The use of coloured alighting-boards is advocated as a measure for preventing excessive drifting of bees which may result in the carriage of disease from infected to healthy stocks. It appears desirable, therefore, to enable the bees to find their own hives more readily by marking the alighting-boards distinctively. In order to do this to best advantage, it is necessary to make full use of the available knowledge regarding the colour reactions of bees. It is recommended that the following principles be observed in painting alighting-boards. Strong dark colours should be used. Although bees are red-blind, colours with red in them can be used. Thus, cinnabar and purple-red can be used because these colours appear to the bees as dark brown and dark blue respectively. They should not be used, however, to compete with alighting-boards painted with the last-named colours. If white paint be used it is desirable to adopt as pigment zinc white in preference to white lead. White surfaces, seemingly alike to human vision, may look very different to bees according to the amount of ultra-violet in their composition. Thus, the artist's pigment white lead which scatters much ultra-violet appears white or pale grey to bees. But zinc white, Titan white, etc., scatter little or no ultra-violet and are seen by bees as intense blue-green. It is the latter type of white that is to be preferred. Since bees are able to distinguish between different degrees of brightness of a given colour, different tones of the colour may be used but it is preferable that two neighbouring hives be painted in different colours. While young bees, leaving the hive for the first time, often drift into neighbouring stocks, their return to their own hives can be made much easier by the suitable painting of the alighting-boards.

Head Musculature of Coleoptera

UNDER the title "The Musculature of the Labrum, Labium and Pharyngeal Region of Adult and Immature Coleoptera", C. K. Dorsey contributes a detailed morphological study which forms No. 7, vol. 103, of the *Smithsonian Miscellaneous Collections* (January 1943: Publication 3,697). The object of this study is to discover the arrangement of the muscles of the parts concerned and their bearing upon the process of food ingestion: also it is intended to serve as a contribution towards determining muscle homologies between different groups of insects. The author concludes that it is difficult and often impossible to identify corresponding muscles on a functional basis. A muscle, for example, may be an adductor in one species whereas its homologue in another species is perhaps a retractor because of some slight change in the position of the point of insertion. It is considered for this reason that the general application of functional names to insect muscles is limited. The 24 plates illustrating this paper com-

prise 134 figures of the muscles concerned in a very wide range of Coleoptera and their larvæ. The Leng system of classification as modified by Böving and Craighead is followed, and at least one family from each superfamily selected from which a genus is chosen for study. When possible, the immature stage of the same genus is used.

Early Collections of Arctic Plants

BETWEEN the years 1819 and 1825 three voyages were made by Parry in search of the North-West Passage. On all these expeditions Parry and his officers made collections of plants. While some of these were intended for institutions and have long been available for consultation, other sets were probably made up for presentation to personal friends. Four small sets, perhaps all of which belong to this category, form the subject of an article by Dr. N. Polunin (*North Western Naturalist*, Sept. 1942). Three of the sets are in the Manchester Museum and one at the University of Durham. There is evidence that W. J. Hooker and Robert Brown, in preparing their accounts of the botany of the areas covered by the expeditions, had not seen all these collections, though the additional records which they furnish have been reported by later collectors. Three of the collections appear to have been made on Parry's third voyage; the remaining one, though labelled as coming from the first voyage, contains some species which were almost certainly collected on the second. Except for one set the collections are of little value for purposes of phytogeographical citation owing to the absence of localizations on the individual sheets. The most interesting species represented is *Salix polaris*. There is no satisfactory evidence for the occurrence of this species in the Canadian Arctic Archipelago, and in view of Parry's visits to other Arctic regions where the species abounds it cannot be safely admitted on the basis of this unlocalized specimen.

Autonomic Leaf Movements and Water-Balance in the Plant

THE half-yearly *Journal of the Mysore University* (3, No. 1, September 1942) contains some interesting observations by C. V. Krishna Iyengar on autonomic leaf movements and their relation to the water-content of the plant. They were studied particularly in *Desmodium gyrans*, *Mimosa pudica* and a species of *Impatiens*, but such autonomic movements are seen not only in these plants but also in many leaves with or without pulvini. The petiole shows the movement whether the lamina is present or removed, and the direction and rate of leaf movement resulting seem to be determined by the water content of the plant. Experiments indicated the occurrence of movements due to major and minor fluctuations in the water balance, major fluctuations occurring at intervals of 10–20 minutes, minor at shorter intervals of one minute or less.

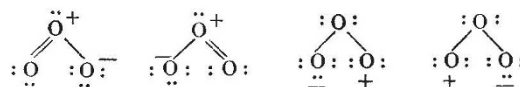
Flame Spectra in the Photographic Infra-Red

THE spectral region between 7,000 and 10,000 Å. has been neglected owing to the weakness of flames as sources and the slowness of photographic plates in this region. A. G. Gaydon (*Proc. Roy. Soc.*, A, 181, 197; 1942) has photographed in the range 6,000–10,000 Å. the spectra of the flames of hydrogen, methane, and carbon monoxide burning with oxygen and with nitrous oxide. All flames in which water is a

final product show a system of emission bands from the red to the far infra-red, the bands increasing in strength to longer wave-lengths. Outstanding bands were identified as due to the vibration-rotation spectrum of H_2O . The top of a flame of oxygen burning in hydrogen is coloured red by the emission of these bands. In the hydrogen flame the bands are probably excited mainly thermally, but the strength of these same H_2O bands in the flame of moist carbon monoxide indicates that in this flame the excitation is a result of the combustion processes. In the hydrogen-nitrous oxide flame, new band structure in the infra-red is provisionally assigned to an extension of the ammonia α band. The methane-nitrous oxide flame also shows the ammonia α band, and in addition strong emission of the red system of CN.

Molecular Structure of Ozone

DISCUSSION has recently centred about the question whether the ozone molecule is triangular or a bent rod. The angle proposed for the bent molecule has varied from 38° to 140° and the interatomic distance from 1.13 to 1.29 Å. An investigation of the electron diffraction of ozone by W. Shand and R. A. Spurr (*J. Amer. Chem. Soc.*, 65, 179; 1943) leads to the conclusion that the molecule is in the form of an isosceles triangle with the O to O bond distance 1.26 ± 0.02 Å. and the O—O—O angle $127^\circ \pm 3^\circ$. Resonance between the structures:



is assumed, although the angle is slightly larger than would be expected. The angle recently calculated by C. P. Smyth and G. L. Lewis (*J. Amer. Chem. Soc.*, 61, 3063; 1939) is much larger, 140° , and in a note added to their paper, Shand and Spurr mention that Mulliken has recently favoured, from spectroscopic evidence, a triangular molecule with the angle of 39° . It would seem that the structure of ozone is still problematical.

Rare Earths

A CONVENIENT method for the separation of ytterbium from the neighbouring rare-earth elements is described by J. K. Marsh (*J. Chem. Soc.*, 8; 1943). A hot solution of ytterbium acetate on treatment with sodium amalgam was first reduced to an orange-yellow solution containing bivalent ytterbium, and then ytterbium amalgam was formed. The reaction is almost quantitative. The neighbouring elements are devoid of amalgam-forming power. After treatment of the amalgam with acid and precipitation and ignition of the oxalate, ytterbium oxide spectroscopically pure was obtained. The purification of a lutecium preparation by removal of ytterbium as amalgam, in presence of added samarium acetate, is described. The same author (*ibid.*, 40) describes some yttrium group oxalates. In the cerium group the common oxalate is the 10-hydrate, but some 9- and 11-hydrates are known. In the yttrium group the recorded results are more diverse, but 6-, 10- and 17-hydrates of yttrium oxalate have been prepared, the first two being new, and the last peculiar to yttrium. The 9-hydrate reported is actually a complex ammonium salt. The 6-hydrate of ytterbium oxalate was prepared.