

## Research Items

### Delaware Ceremonies and Dances

MR. FRANK G. SPECK, who has made a detailed study of the Big House ceremonial of the Delaware, or Lenape Nation, now turns his attention to other ceremonies of no less importance, but of lesser duration (*Mem. Amer. Phil. Soc.*, Philadelphia, 7; 1937). The Big House ceremonial lasts for twelve consecutive nights, and is the periodical communal ceremony, which is the consummation of Delaware religious fervour. It expresses their attitude towards the benign Supreme Being. In their annual cycle, however, there is a number of other rites and ceremonies, in which they enter into relation with other spiritual beings, from whom, for the most part, evil is anticipated. Even though the Lenape have been removed from their original home in Pennsylvania and New Jersey to Oklahoma, these ancient rites have continued in practice down to the present day. It is probable that they are of a more ancient origin than the Big House ceremony. Some of them, as for example the Grease Drinking ceremony and the Doll dance, are family properties handed down as obligations to the tribe within the family group. The ceremonies are supposed to have originated through the mythical association of family ancestors with supernatural agencies. This is usually explained in a mythical narrative. Their purpose is to satisfy an offended spiritual force and to prevent a recurrence of the original misfortune avoided by the rite. The group performing the ceremony gains an added blessing in some form, such as an augmentation of crops. There are various officials of the ceremonial, of whom the chief is a master of ceremonies. The performance usually takes place at night. In addition to the description of the ceremonies, an account is given of the Delaware form of the dance taking place when the bones of the dead, from which the flesh has been stripped, are buried.

### Early Peruvian Textiles

A LARGE number of specimens of textiles from early sites in the Nasca valley, Peru, numbering one hundred and sixty in all, collected by Prof. A. L. Kroeber in 1926, on behalf of the Field Museum, Chicago, have been described by Dr. Lila M. O'Neale, associate curator of textiles in the Museum of Anthropology at the University of California (*Anthropology: Memoirs*, Field Museum, Chicago, 2, 3). In an introductory note, Prof. Kroeber points out that Early Nasca textiles were not previously well known, and in fact were scarcely recognized; but the present material affords adequate data for satisfactory study, owing to the fact that he was able to establish the archaeological associations of his specimens. It has now been shown by Dr. Tello's archaeological investigations at Paracas that the finely embroidered polychrome shawls and garments, at first identified as Ica and then as Nasca, are now to be associated with Paracas. The stylistic relation between Early Nasca pottery designs and those of Paracas textiles is so close as to leave little doubt of a common origin, the pottery probably being the earlier. The Early Nasca textile art discovered in association with Early Nasca pottery is largely decorative and tends to the geometrical, while its representations of naturalistic

impulses are relatively undeveloped. Nasca pottery and Paracas fabrics go together, while Nasca fabrics and Paracas pottery are alike in not attempting naturalistic representation. When the Early Nasca peoples wanted a picture on cloth, they painted it on. One example of this was found, duplicating in design a well-known Early Nasca pottery type, birds in attitude and placement in the design being identical with birds painted on double-spouted jars. The most striking feature of the Early Nasca textiles is their range of colours. They show a total of 190 hues by comparison with a colour scale, the majority to be described in terms of red, orange and yellow. The material used is a finely spun cotton yarn. Five of the eight standard weaves known to modern weaving were known to the Early Nasca, and in addition they did wrapped weaving, as in basketry.

### Problems of Population Density

THE biological principles affecting populations are discussed by Raymond Pearl (*Amer. Naturalist*, 71, 50), with references to experimental work on animal populations. He points out that the fundamental underlying principles are the same in man and in other animals; and that population growth or decrease has had an important effect in shaping political conduct and national policies, human populations differing in size, growth and quality. He is inclined to conclude that the human population of the earth grew very slowly until about three centuries ago, and then, as a result of scientific discoveries, took a great spurt and so increased from some 445 millions to more than 2,000 millions, or 40 persons per square mile of the earth's land surface. He regards this cycle of population growth as about two-thirds completed, and compares it with the cycles of lessening population. He interprets these cycles as beginning with a period in which the population remains relatively constant, followed by abatement of some of the natural checks, which leads to rapid increase. Population density finally reaches a point where new stimuli, reinforced by gregariousness, lead to migratory movements and ultimate destruction of masses of individuals. In the same journal, Dr. Thomas Park discusses in detail the recent experimental work on insect populations, with special reference to density effects.

### Laboratory Diagnosis of Psittacosis

PSITTACOSIS or 'parrot' fever is a virus disease of cage birds, and is communicable to man, in whom it causes a serious and often fatal malady. This disease was comparatively prevalent in Great Britain and in the United States some years ago, and was of sufficient importance for the Ministry of Health to issue a memorandum, with recommendations upon its diagnosis and prevention. As a result of recent investigations, it has become possible to give more precise indications for the detection of the disease in man and in animals, and the Ministry of Health has published a report containing details of the technique of laboratory diagnosis (*Laboratory Diagnosis of Psittacosis*. Repts. on Pub. Health and Med. Subjects, No. 80. London: H.M. Stationery Office. 6d. net). The examination of suspected birds and

of suspected human beings is described. The staining of smears of material for virus bodies, and the microscopic appearance of the virus are also described, and the appearances found are illustrated in an excellent coloured plate.

#### Feeding of *Chirocephalus*

SIR E. RAY LANKESTER in his essay on *Apus* (1881) first used the term 'gnathobase' for the proximal endite of the trunk limb, stating that it was a jaw-process which clearly had the function of assisting, by means of apposition to its fellows on the opposite side, in seizing and moving particles which may be introduced into the mouth. A. G. Lowndes, in his recent paper on *Chirocephalus* ('The Term "Gnathobase"' (Lankester). *Proc. Zool. Soc. Lond.*, B, Part 1; 1937), is in complete agreement with Lankester, and concludes from direct observations and by the use of his strobographic method, described in NATURE (135, 1006; 1935) that the setules of the basal endites can and do act in apposition while the limbs are working normally. He finds, however, that they do not do so always, and this, he believes, confirms his previous observation that the endites are under both muscular and nervous control and that one need not look upon the passage of food particles towards the mouth as being in any way automatic. Mr. Lowndes and his pupils have examined hundreds of specimens of *Chirocephalus* for gut contents, and find that the food consists almost entirely of quite coarse particles, such as remains of vascular bundles of leaves, etc., which are to be found at the bottom of most ponds. Other detritus such as algal filaments, leaves of moss, and dead Entomostraca are also found in the gut.

#### New Porcellanids and Pinnotherids

UNDER the title "Porcellanids and Pinnotherids from Tropical North American Waters", Mr. Steve A. Glassel describes several interesting forms, mostly collected by himself (*Trans. San Diego Soc. Nat. Hist.*, 8, No. 21; 1936) from the west coast of Mexico and from the Gulf of California. Four new species of *Petrolisthes*, three of *Pisosoma*, two of *Pachycheles* and three of *Porcellana* are included. The new genus *Orthochela* in the Porcellanidae is created for another new species, *O. pumila*, which is very peculiar in the shape of its carapace, resembling *Uroptychus* in the family Galatheidæ. This crab is figured and also the outer maxillipedes of the three new species of Pinnotheridae, *Fabia unguifalcula*, *Dissodactylus xantusi* and *Pinnixia richardsoni*. Otherwise the paper is not illustrated.

#### Locust Control

THE Committee on Locust Control of the Economic Advisory Council has issued a fifth survey of the locust outbreak in Africa and Western Asia. The latest of these surveys deals with the situation in 1935 and has been prepared by Dr. B. P. Uvarov, in collaboration with Miss W. Milnthorpe, of the Imperial Institute of Entomology. It appears that the outbreak of the three species of locusts, which have brought about so much damage during the past eleven years, is subsiding. At the same time it is pointed out that no relaxation in the campaign of locust investigation would be justified on this account. The desert locust, for the first time since 1926, had not invaded North Africa. The appearance of a swarm in May, 1926, in the Darfur province of the

Anglo-Egyptian Sudan is disquieting, since its origin must be in an unexplored coastal area of the Red Sea. The possibility that it may sooner or later develop into a new invasion needs to be kept in mind. As regards the African migratory locust, it is now known that the outbreak centres are in the Middle Niger region. It is believed that this area is the only real danger spot in the whole continent of Africa in so far as this species is concerned. Practical measures are being planned for the permanent supervision of that outbreak area. With the red locust, heavy mortality has been caused by the fungal disease *Empusa grylli* among both the hoppers and winged forms. Viewed generally, the outbreak of this species is on the decline; but swarms are likely to be still produced for some years to come.

#### Mutation in Tobacco Virus

MUTATIONS in viruses are the subject of a paper by Dr. H. H. McKinney (*J. Hered.*, 28, No. 2), who cites experimental work, especially with mosaics of tobacco. While these viruses tend to remain true to type over long periods, yet they give rise in local zones of the infected plant to aberrant viruses which when isolated induce distinct symptoms. Some of these aberrant viruses in turn give rise to others. This is interpreted as a mutational phenomenon. Such mutants differ in the changes they produce in the chlorophyll mechanism of the leaf, some producing no disturbance, others a slight disturbance (light green mottling), others a yellowish-green, yellow or even almost white colour. Temperature has an important effect on these disturbances. Nearly a hundred mutants have been isolated from the common mosaic, but the number of distinct types is uncertain. Sub-mutants are also produced, the whole system of types tending to show certain relationships. The generation of these bodies is believed to be different from that of an enzyme from its precursor. The primary virus and its mutants are regarded as a series of closely related compounds which function essentially as genes.

#### A Rice Fermentation

ALCOHOLIC fermentations fall into three groups: (1) the direct inoculation of the fruit juice by yeasts as in wine production; (2) the fermentation of a grain extract after pretreatment as the malted grain in beer; and (3) the reinoculation of a partially cooked plant material. Rice as a source of alcohol has had to be approached from this third angle by K. Rami Reddi and Dr. V. Subrahmanyam, of the Indian Institute of Science, Bangalore, who have published a most interesting paper upon 'Sonti' fermentation (*Trans. Nat. Inst. Sci., India*, 1, No. 11, 1937), which describes and analyses traditional methods of rice fermentation handed down from father to son, often as secret customs in small village communities, and then gives a preliminary estimate of their biochemical and biological basis. The 'Sonti' fermentation is practised in certain districts of the Madras Presidency. The main organism associated with the process appears to be a hitherto undescribed species of *Rhizopus* provisionally named *Rhizopus Sontii*. It is allied to *R. cambodia*, but its physiological activities are more pronounced. Indeed *R. Sontii* may have a practical future before it as it liquifies and saccharifies cooked rice more rapidly than other well-known organisms, including *Aspergillus oryzae*. This paper is fascinating in its linkage of tradition

with modern problems of biochemistry and mycology, and it shows the great possibilities of advance in standards of nutrition as the result of scientific study of methods of food preparations that are acceptable to a conservative native population. Studies of the species of *Rhizopus* isolated from Chinese yeast cakes such as are used in brewing alcohol from cereal grains in China, Manchoukou and Korea are also being extensively carried out by M. Yamazaki, professor of zymology (*Bull. Utsunomiya Agric. Coll.*, A, 2, No. 6, 1937).

#### Cyclones in the South Indian Ocean

MISCELLANEOUS PUBLICATIONS of the Royal Alfred Observatory, Mauritius, have in recent years included an annual publication in which an account is given of all the tropical cyclones that have been noted in the last cyclone season in the South Indian Ocean from Coos Keeling Island across to Madagascar and the adjacent coast of South Africa. Publication No. 16, by N. R. McCurdy, director of the Observatory, which is the seventh of its kind, covers the season 1933-34. The number of depressions of sufficient intensity to be classed as tropical cyclones or hurricanes in that season was eight, which is about the average number; but the weather was more than usually disturbed during the hurricane season, and seven other disturbances are referred to briefly. It is said to have become increasingly evident in recent years with improvements in the synoptic charts, that the formation of cyclones is closely related to the periodic invasions into low latitudes of the cooler air associated with subtropical high-pressure systems. These systems usually move north-eastwards from South Africa but sometimes northwards. In the season under discussion, areas of disturbed weather always developed at the northern limit of the high-pressure wave when the latter was of appreciable intensity, and these sometimes led to the development of a tropical cyclone. Observations with pilot balloons at Mauritius showed that this happened whenever the east or south-east trade winds of the 'high' extended up to 5,000 metres. This is held to be a result of importance in forecasting, in the absence of enough observations from the Indian Ocean to the north of Mauritius to permit of the approach of cyclones to be studied for some days before their arrival near to or over the island itself. None of the storms of this season appears to have been of very outstanding intensity, but some showed interesting features; for example, that of January 26-February 2, which was deflected from its course by the high land of Mauritius, although the highest 'peak' of the island has only an elevation of about 2,700 ft. Another storm in March was broken up into two centres by its encounter with Madagascar, and soon died out.

#### Absolute Measurements of Sound Intensity

E. N. DA C. ANDRADE and R. C. Parker (*Proc. Roy. Soc.*, A, 159, 507) have measured the amplitude of vibration of smoke particles suspended in a vibrating air column. A theoretical calculation shows that, in the case of fine particles (radius about  $0.03 \mu$ ), this amplitude is very nearly indeed that of the air itself, and this result is confirmed by the fact that particles of different size in the same air column show the same amplitude of motion. The particles were seen and photographed by scattered light: they appeared as well-defined short lines of light. The

apparatus was kept at a constant temperature both to reduce convection and to give generally consistent operation. When the apparatus had been calibrated, it was used to determine the minimum amplitude audible to a number of observers. The end of the tube was allowed to radiate into the open air, and the intensity varied while the observer indicated when the sound passed above and below his threshold of hearing. The observed minimum intensities for audibility were very similar for a number of observers. They corresponded to a pressure variation of  $1.2 \times 10^{-3}$  dynes/cm.<sup>2</sup> R.M.S. at 410 cycles and  $0.9 \times 10^{-3}$  dynes/cm.<sup>2</sup> R.M.S. at 646 cycles. The corresponding energy fluxes are  $3.4 \times 10^{-8}$  erg./cm.<sup>2</sup> sec. and  $2.1$  erg./cm.<sup>2</sup> sec.

#### Lead Borates

A KNOWLEDGE of the system PbO-B<sub>2</sub>O<sub>3</sub> is of importance in the manufacture of ceramic glazes and glasses, and a study by well-known methods involving quenching and petrographic examination has been made by R. F. Geller and E. N. Bunting (*J. Res. Nat. Bur. Stand.*, 18, 585; 1937). Four compounds were characterized, namely, 4PbO.B<sub>2</sub>O<sub>3</sub> occurring in two forms and melting congruently at 565°; 2PbO.B<sub>2</sub>O<sub>3</sub> occurring in two forms and melting incongruently at 497°; 5PbO.4B<sub>2</sub>O<sub>3</sub> melting incongruently at 548°; and PbO.2B<sub>2</sub>O<sub>3</sub> melting congruently at 768°. No evidence of compounds richer in B<sub>2</sub>O<sub>3</sub> was obtained, although these have previously been reported. Particular attention was given to the proof that the compound 5PbO.4B<sub>2</sub>O<sub>3</sub> is not the metaborate (PbO.B<sub>2</sub>O<sub>3</sub>). The eutectic of lowest melting point, 493°, was composed of 88 per cent PbO and 12 per cent B<sub>2</sub>O<sub>3</sub>. The report also gives the indices of refraction and optical characters of the compounds, and the indices of refraction, coefficients of expansion and softening points of some lead borate glasses.

#### Isotopes of Potassium

THE abundance ratio for the two principal isotopes of potassium, K<sup>39</sup>/K<sup>41</sup> (the exceedingly rare isotope K<sup>40</sup> is responsible for part and possibly all the radioactivity) in various animal tissues has been measured by J. H. Yoe and R. T. Hall (*J. Amer. Chem. Soc.*, 59, 869; 1937) by means of the mass spectrograph. Any process which concentrates K<sup>41</sup> will doubtless concentrate K<sup>40</sup>, and as speculations have been made on the possible biological importance of potassium, owing to its radioactivity, it was of interest to see whether the abundance ratio varied in different tissues. The results showed that the ratio for most organs is close to the value found for most plants and minerals and for ocean water. A few tissues, such as the lining of the auricle and the lining of the small intestine, appear to possess an abnormally high concentration of K<sup>39</sup>, whilst bone marrow is abnormally high in K<sup>41</sup>. The atomic weight of potassium was calculated, with the most probable value of the packing fraction and the conversion factor; for most tissues it is 39.094. Since all deviations from this normal value are small, it does not seem probable that potassium in animal tissue could be distinguished from mineral potassium by radioactive measurements as has been suggested by some investigators. The results with bone marrow indicate a possible relationship between the abundance ratio and the age of the animal, and hence with the development of embryonic cells within the organism.