RESEARCH ITEMS

Osage Warfare

THE late Francis La Flesche, himself an Omaha Indian and a member of the staff of the Smithsonian Institution, Washington, among his numerous studies of the American Indians, made an elaborate record of the rites and ceremonies observed by the Osage Indians in connexion with the conduct of tribal warfare (*Bull. Bureau American Ethnol.*, No. 101, 1939. Washington, D.C. : Government Printing Office, 35 cents). Before taking any action against an enemy, a council meeting was held to choose a leader. This leader had to fast for seven days, and then three complicated and elaborate ceremonies had to be performed. The rituals making up the Wa-sha-be A-thin or war ceremony comprised twenty-eight separate songs, which, interspersed with processions, ceremonial dances and ancient rites, must be sung at just the right times, in proper order, and by the properly designated singers. The Osage, essentially a peaceful tribe who lived in three separate villages in Oklahoma, had also an elaborate peace ceremony, which was intended not only to promote peace within the tribe, but also with their neighbours. They held the peace ceremony in profound veneration because it was believed that the man who had formulated the rite had received supernatural aid in so doing. Though they were peace-loving, intolerable aggression by a neighbouring tribe would force them to take up arms. At the close of the war ceremony a band of warriors was dispatched to meet the enemy. If victory were achieved the band returned with scalps and prisoners, and victory songs were sung.

Distribution of Ceratium

E. STEEMANN NIELSEN has extended his previous researches (1934) on the Ceratia of the Pacific Ocean ("Die Ceratien des indischen Ozeans und der ostasiatischen Gewässer, mit einer allgemeinen Zusammenfassung über die Verbreitung der Ceratien in den Weltmeeren". Von E. Steemann Nielsen. (Dana-Report No. 17.) Pp. 34. (Copenhagen : C. A. Reitzels Forlag ; London : Oxford University Press, 1939.) 3.50 kr. ; 3*s*.). It was originally intended to add those of the Atlantic, but as these have been thoroughly dealt with by the two German Expeditions *Meteor* and *Deutschland* (Peters, 1932, and Schubert, 1937) this was considered unnecessary. It is now possible to give a general survey of the distribution of the three oceans and their neighbouring seas. Charts are given showing the distribution of the dominant species in the Indian Ocean and East Asiatic waters and tables of the horizontal and vertical distribution of all of them, with a review of their distribution in the different regions and the numbers in the Nansen net in the stations poor in plankton. The most striking fact that emerges is the homogeneity of distribution and the absence of geographic races or species. As was noted in the southern Pacific, the author regards the two factors temperature and oceanic-neritic influence as of supreme importance in the determination of the distribution of Ceratia. Schubert (1937) regards salinity as of great significance, but the observations of Peters (1932) in the Atlantic and of Nielsen in the Pacific and in the present work are opposed to this. It is agreed that extreme salinity is of importance; but within the limits shown in the open ocean it has apparently little influence on distribution of the Ceratia. The material came almost exclusively from tropical waters. It is found that all Ceratium species which can live in tropical waters are inhabitants of both hemispheres. The cold-water species are, however, only inhabitants of one of them. *Ceratium fusus*, which is well known from both warm and temperate water, inhabits both hemispheres. In the Antarctic there is the cold-water species *Ceratium robustum* inhabiting the whole region, and in the Arctic *Ceratium arcticum*. Most warm-water Ceratia are common to all three oceans, but there are certain forms of purely tropical species found only in the Indian Ocean and Pacific, or only in the Atlantic. This is especially the case with neritic species. The Indian Ocean and the Pacific represent one region so far as the purely tropical Ceratia are concerned.

Offspring from Artificially Activated Ova

S. PINCUS (*Proc. Nat. Acad. Sci.*, **25**, 557–559 ; 1939), following up his previous report that three litters of rabbits had been obtained from recipients of artificially activated ova, shows by further breeding that the transplanted ova which have been activated give rise to normal offspring without fertilization. For example, eighteen chinchilla ova transplanted after activation into an albino doe, which had been made pseudo-pregnant by pituitary extract, gave rise to two chinchilla females, one of which has been further bred by mating to an albino male, giving a second generation of nine chinchilla and three albino.

Seed Weight in the Tomato

THE weight of the seed and embryo in the tomato is dependent on the genotype of the plant, the external environment in which the fruits develop, and also upon certain internal factors such as the number of seeds developing in the fruit and the number of fruits on the truss. L. C. Luckwill (*New Phytol.*, **38**, 181–189 ; 1939) has calculated correlations and regressions between seed weight and these internal factors, and has estimated that variations in seed number may be responsible for variations in mean seed weight as large as 45 per cent. The maximum variation due to differences in the number of fruits developing on the truss was estimated at 10 per cent of the mean. It is suggested that these correlations may arise from causes connected with the nutrition of the developing ovules similar to those which give rise to the negative correlation between birth weight and litter size in certain mammals. These results have a great influence on the design of experiments on heterosis (see also NATURE, Nov. 25, p. 908).

Heterochromatin in the Chromosomes of Drosophila

B. P. KAUFMANN (*Proc. Nat. Acad. Sci.*, **25**, 571–577 ; 1939) has studied the distribution of 627 breaks due to X-rays in the *X*-chromosome of *Drosophila melanogaster*. He shows that there is no difference in frequency or distribution of breaks near or in an inversion as compared with wild-type chromosomes.

There is a significant increase of breaks in certain regions of the chromosome, particularly the known heterochromatin region, and in sections of the euchromatin part. From this and other evidence it is shown that the increased frequency of breaks in the sections of euchromatin is due to the presence of intercalary heterochromatin material.

Interxylary Cork

A PAPER in *Lloydia* (see p. 24 of this issue) by R. A. Diettert upon the morphology of *Artemisia tridentata* directs renewed attention to this interesting phenomenon. When annual growth recommences in the stem in the spring a single layer of meristematic cells, the interxylary phellogen, remains on the surface of the last-formed xylem of the previous year. Quite late in the summer, in July and August, these initials give rise to several layers of cells which suberize progressively in a centrifugal direction. As a result the wood of the current season is carried out on to a wider periphery by this late cork development; the rays are thus expanded and also the cells of the rays, in the region of the cork layer, are suberized progressively in an outwards direction. We thus have the most recently formed layer of wood cut off from all older layers of wood by a sheet of periderm, a process that is repeated in successive years. This must have a most important effect upon the water economy of the plant, which has a wide distribution throughout the western United States. E. H. Moss has directed attention previously to the presence of such rings of cork in herbaceous perennials (NATURE, **133**, 689; 1934), concluding that they afford excellent protection against desiccation and various deleterious effects that might be associated with the dying down of annual shoots.

Softening of Rubber

CRUDE raw rubber as received by manufacturers has to be reduced by heating and mechanical working to a soft plastic condition to permit incorporation of the essential compounding ingredients. Experiments have been carried out by V. H. Wentworth and J. D. Hastings at the Rubber Research Institute of Malaya (*J. Rub. Res. Inst. Malaya*, **9**, Comm. 236 and 237) to determine if softening could not be more economically effected by modifying the preparation of the rubber on the plantation. A promising line of attack is the treatment of latex prior to coagulation with substances such as zinc soaps which bring about softening in the course of the normal smoking and drying processes. Pine tar is an effective softener in common use, and in view of the fact that it was found possible to incorporate large quantities into the latex, it is suggested that master-batch preparation on estates might be worthy of consideration by the manufacturers. The incorporation of emulsions of 'peptizing agents' into the latex in the pre-coagulation stage is another method which has been used during the last two years for softening purposes. It is now shown that the degree of softness achieved depends to a large extent on the temperature at which the wet sheet is afterwards dried, high temperature in the early stages assisting the softening markedly.

Control of Loose Smut Disease

THE original delicate method of controlling the loose smut fungi upon wheat and barley by dipping the seed in hot water for a short period has gradually given place to the more workable treatment of steeping for a longer time at a lower temperature. G. Howard Jones has designed an automatic apparatus for dealing with the seed on cereal improvement farms in Egypt (*Min. Agr. Egypt Tech. and Sci. Service Bull.* 220. Govt. Press, Bulâq, Cairo, 1939. P.T. 3). About 150 lb. of seed contained in a hopper is emptied into a wire basket within a heating bath by means of an automatic electric relay control apparatus which also switches on the heating units. Six hours later, the same apparatus rings an alarm; the wire basket is then hoisted from its bath and the seed spread upon trays to dry in the sun. The heating is accomplished during the night, so that full advantage may be taken of the drying effect of the sun, and thus a continuous series of daily treatments is maintained. Germination is affected to a slight, but commercially insignificant, extent by the process.

The Ogasima (Japan) Earthquake of May 1

THIS is the subject of three papers by T. Hagiwara, N. Miyabe, R. Takei and Y. Otuka (Earthquake Research Institute, Tokyo Imperial University, 17, Part 3, September 1939), who have studied respectively the shock and aftershocks, the deformations of the earth's surface and the geological implications. The earthquake occurred about 14h. 58m. on May 1, 1939, and shocks of the same magnitude followed twice with an interval of two minutes, in the neighbourhood of Ogasima and the neck of a small peninsula in the Akita Prefecture. The aftershocks which followed the main earthquake were observed by four portable seismographs installed temporarily in the peninsula, and these aftershocks were found to have had epicentres near to where the surface effects were greatest within the peninsula, but not all originated in one place. Hundreds of dwelling-houses were destroyed by the earthquake and a landslide which followed it, and 29 people were killed. The surface effects including damage to property, surface cracks and permanent movement were found to be greatest (1) in the neighbourhood of Kitaura-mati on the northern seashore, where also a cliff extending about one kilometre along the Japan Sea slid down to the sea and destroyed more than a hundred houses; (2) near the villages of Anden and Kotogawa where the damage was greatest and surface features most distorted; (3) on the northern slope of Kanpūzan volcano; and (4) in Katanisi-mura, in the narrow isthmus dividing Lake Hatirōgata from the Japan Sea. In several places where the ground was permanently deformed, the horizontal displacements were up to 3·9 m. whilst the vertical displacements ranged about 1 m. Yanosuke Otuka is of the opinion that these displacements were due to surface ground disturbance and that they had no tectonic significance. The landslide however was due to slipping along the bedding plane of the Kitaura sand and mud alternation of the Middle Neogene.

Meteorology of the Byrd Expedition

SUPPLEMENT No. 41 of the *Monthly Weather Review* of the U.S. Department of Agriculture, issued last October, is an account running to 377 pages of the meteorological results of the Byrd Antarctic Expeditions of 1928–30 and 1933–35, by C. Grimminger and W. C. Haines. Part of the data had been prepared in the Antarctic in 1929–30 by W. C. Haines and H. T. Harrison. Apart from the

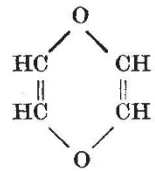
introduction, the volume is occupied by the tables in which the meteorological observations are set out. These include the observations made on the various ships of the Expedition between New Zealand and the Bay of Whales, those made at Little America (the base of the Expedition in lat. 78° 34′ S., long. 163° 56′ W., which was at nearly the same spot as "Framheim", where Amundsen obtained 10 months' records in 1911–12) and at the Bolling Advanced Weather Base, which was occupied by Admiral Byrd alone from March 26 to October 11, 1934, and on various sledging journeys. Upper air observations were made with the aid of kites carrying Marvin kite meteorographs. On the first expedition a kite meteorograph was installed on the aeroplane that formed part of the equipment, and on the second expedition an autogyro was taken, primarily for the purpose of making temperature observations, because of difficulties that had been encountered with kites. The best method of mounting the kite meteorograph was found to be that of suspending it within the fuselage to the rear of the cabin on rubber cords, ventilation being secured by having a tube of wind-proof cloth leading from an air vent in the top of the fuselage to the meteorograph. This enabled a perfect record to be obtained on the flight to and from the South Pole. The completeness of the meteorological record under the most trying conditions testifies to the keen work not only of the meteorologists but also of those who assisted, notably the leader of the expedition during his lonely vigil during the whole of an Antarctic winter night less than 10° from the Pole. In spite of difficulties arising from the intense cold, from drifting snow and frosting of the lenses of the pilot balloon theodolites, pilot balloon observations of upper wind were made at Little America on 569 occasions during the 310-day period when the pilot balloon station was in operation on the second expedition. A critical discussion of the results obtained will, it is hoped, be made in due course, although no objection can be made to this early publication of the raw material for such a discussion.

Structures of Ozone and Some Compounds

THE structures of ozone, silicobromoform ($SiHBr_3$) and dichlorogermane (GeH_2Cl_2) contain contributions from several forms among which resonance exists. The dipole moments of these substances have been measured by G. L. Lewis and C. P. Smyth (*J. Amer. Chem. Soc.*, **61**, 3063; 1939), ozone being measured in solution in liquid oxygen, silicobromoform in heptane and dichlorogermane in carbon tetrachloride. The moments (in usual units) are O_3, 0·49; $SiHBr_3$, 0·79; GeH_2Cl_2, 2·21. The finite moment of ozone excludes the symmetrical triangular molecule in which each atom is linked to two others by a single bond. A linear molecule with a central atom joined to one on each side by identical bonds is also excluded. A bent structure, analogous to that of sulphur dioxide, seems indicated. The electronic structures which seem likely to the ground state of the molecule are the following: $:\ddot{O}::\overset{+}{\ddot{O}}:\overset{-}{\ddot{O}}:$ $:\overset{-}{\ddot{O}}:\overset{+}{\ddot{O}}::\ddot{O}:$ $:\overset{+}{\ddot{O}}:\ddot{O}:\ddot{O}:$ $:\overset{-}{\ddot{O}}:\ddot{O}:\overset{+}{\ddot{O}}:$ and the first two, in which each atom has a complete octet of electrons, should make the largest contribution. All these structures are bent, the O—O—O angle being not less than 120°. It is concluded that the two oxygens linked to the central atom form an angle of about 140° and in any case very obtuse. The two identical bonds have some polar character as a result of resonance among forms containing semi-polar bonds. The results for silicobromoform and dichlorogermane show that silicon compounds tend to have minimum moments in the group of carbon, silicon, germanium and tin compounds, which, otherwise, increase in the order named.

Dioxadiene

THE compound used as the fundamental or parent nucleus for dioxane, dioxene and their derivatives, namely:



previously called dioxin, has now been prepared for the first time by R. K. Summerbell and R. R. Umhoefer (*J. Amer. Chem. Soc.*, **61**, 3020; 1939) and called dioxadiene. It was obtained by the action of magnesium and magnesium iodide on 2,3,5,6-tetrachlorodioxane in boiling *n*-butyl ether (no reaction occurred in the lower boiling ethyl ether). Other reactions tried did not succeed. Dioxadiene boils at 75°, which is 26° lower than dioxane, it is insoluble in water, and in its chemical properties it behaves generally as an unsaturated ether. It is, however, more stable towards dilute acid than other unsaturated ethers such as dioxene and vinyl ether. It polymerizes in two to three weeks to a hard colourless solid, not melting below 250°, and insoluble in water, benzene, etc. Dioxadiene reacts vigorously with bromine and adds on hydrogen chloride. The reactions indicate that the unsaturation in the molecule is modified to a marked extent by conjugation with the ether oxygens.

Determination of Meteor Velocity from Zenith Attraction

IN a recent paper, Hideo Inouye shows how meteor velocities can be determined by finding the radiants of a shower at fairly short intervals when the radiant is not far from the meridian (*Mon. Not. Roy. Astro. Soc.*, **99**, 9; October 1939). The observations are made when the radiant is near the meridian because the effects of the diurnal aberration in displacing the radiant are then negligible. It is well known that the attraction of the earth on a meteor causes a movement of the radiant towards the zenith, and the amount of this movement depends upon the velocity of the meteor and also on the distance of the radiant from the zenith. From the displacement of the radiant when it is at various altitudes an angle θ can be easily found, and from this latter the value of the velocity is read off from a table. An example is given from the Leonid shower of November 13, 1937, and from this the velocity of the meteors associated with this shower is 59·5 km./sec. The actual value is 71·4 km./sec., and it is suggested that this can be explained by errors of observation in the amount of the displacement. Although the method is interesting, it does not lend itself to very high accuracy.