Research Items

Pomo Culture

A FURTHER statistical study of cultural elements among the Indians of California by Mr. E. W. Gifford and Prof. A. L. Kroeber deals with the Pomo as a whole (*Univ. Calif. Pub. American Archæol. and Ethnol.*, **37**, 4). The Pomo form a nationality speaking recognized related languages, or dialects, and are mainly distinguished by directional terms, such as 'south', 'eastern', etc. They are divided into a number of small groups, which, at one time or another, have been called tribes, villages, village-communities, or tribelets. Each was completely autonomous and possessed a main settlement, or central village, ordinarily in some valley, which was the residence of the chief or chiefs. Here was also situated the earth-lodge or dance-house, around which all the community gatherings centred. There was no Pomo culture, except as an ethnological abstraction; but there was a series of highly similar, but never quite identical, Pomo cultures, each carried by one of the independent communities. The aim of the present study is to discover how far the elements of this series, within the framework of a nationality, varied and how they were related. The number of communities is estimated to have been seventy-five; but in all probability this figure is too high. The number may have been about fifty, with an average population of possibly two hundred. The data for statistical treatment comprised 15,000 comparable factual items. From their analysis it emerges that generally it would appear that there existed a high level of uniformity between adjacent minimal territorial entities. The generic picture of Pomo culture accords with a numerical finding of around ninety-five per cent of cultural uniformity ordinarily shared by strictly neighbouring communities. All this presupposes a population always narrowly localized, as well as ordinarily peaceful—as we know it to have been.

Radiation and Cell Division

THE work of Spear has shown that the first effect of small doses of gamma rays on chick fibroblasts in tissue culture is an inhibition of cell division due to an action on the early phases of this process. A paper by Tansley, Spear and Glücksmann (*Brit. J. Ophthalmol.*, June 1937, p. 273) has extended the observations to a mammalian tissue (rat retina) and has presented much additional evidence as to stage of cell division at which the effect occurs. This tissue was chosen because it is still undifferentiated, and actively dividing, for some days after birth, and because it is easily accessible to radiation. Exposure to a small dose causes a diminution in the number of cells in the prophase of division, which reaches a minimum in a little less than two hours. This is followed by a minimum, first of the number of cells in metaphase, and then of those in telophase. If the dose is very small, the counts then rise to maxima which may be greater than the normal value, probably because cells which would have divided during the inhibitory period are added to cells which would have divided in this later period. When the dose is increased, this maximum does not occur and the proportion of degenerate cells increases. A further increase of dose delays the onset of degeneration. These observations confirm the view that the effect is on the very early stages of cell division, and elucidate an apparent anomaly in connexion with degeneration. If observations had been confined to twelve hours after exposure, an increase of dose would have appeared to diminish the amount of degeneration.

Control of Nematodes of Horses and Sheep

CONTINUING his studies of the control of bursate nematodes, I. W. Parnell has tested the lethal effects of ten of the more common nitrogenous artificial fertilizers upon the free-living stages of sclerostomes (*Canadian J. Res.*, **15**, 127, July 1937). The three nitrogenous fertilizers which lost most ammonia when mixed with fæces were found to be most deadly—pure ammonia water has already been shown to be lethal. In general it was shown that the proportion of fertilizer to fæces necessary to effect sterilization would, in farming practice, be too high to be used if all fæces had to be treated. But in a well-built manure heap only the bottom and outer surfaces of the heap would have to be treated, for sclerostome larvæ are unable to survive the heat of fermentation, associated probably with lack of oxygen and harmful products of decomposition, in the centre of a manure heap.

Amphibia of Connecticut

IN order to help teachers and students, biologists in schools and colleges, and the plain naturalist, the State Geological and Natural History Survey has published a popular bulletin describing the Amphibia of Connecticut (Conn. State Geol. N. H. Survey, Bull. 57, 1937, pp. 50). The State harbours ten species of frogs and toads, nine species of salamanders and newts, and a few species have been introduced, including *Necturus maculosus*. The bulletin describes each species, indicates its distribution, and gives a short account of its habitat and habits. Identification is simplified by a key to characters and by twenty plates of uncoloured photographic reproductions.

Parasitic Copepods of the North Sea and Baltic

G. M. VAN OORDE-DE LINT and J. H. Schuurmans Stekhoven, jun., give a good account of the parasitic copepods in this most useful series ("Die Tierwelt der Nord- und Ostsee", **31**, Teil X.c. Leipzig: Akademische Verlagsgesellschaft m.b.H., 1936). Fish parasites are specially dealt with, and a large number of these have been recorded from the area covered. Dr. Stekhoven has recently described several parasitic copepods from the Belgian coast (*I. Bull. Mus. Roy. d'Hist. Nat. Belgique*, 1936) and worked at the physiology of *Lepeophtherius*, *Acanthochondria* and *Lernæocera*: a large amount of work has also been done by other authors on this favourite group. The copepod family Calanidæ is the only one without parasitic species. Even the Harpacticidæ include, according to Sars, a species probably parasitic for part of its life on whales, although it is not recorded from the area. A useful register of species, 214 in all,

and their hosts, both vertebrate and invertebrate, occupies thirteen pages, showing the parts of the body parasitized. Of the invertebrate hosts the Mollusca, especially nudibranchs, are the most numerous, Crustacea coming second, and there are a few in or on annelids, echinoderms and tunicates. This section of "Die Tierwelt" will be very useful for reference to those working on the group. It is well and clearly written, and the illustrations are numerous and well chosen. The same part includes Decapoda (Nachträge und Berichtigungen) by H. Balss (X.h.3), and *Pantopoda* (2 Nachtrag) by H. Helfer (XI.a.3).

Ciliary Currents on Lamellibranch Gills

MR. ALASTAIR GRAHAM makes some interesting observations on the gill currents of certain members of the Tellinacea (*Proc. Roy. Soc. Edin.*, **57**, Part 2, No. 8). He has noted previously that the outer gill of *Solecurtus scopula* is peculiar in the absence of a groove along the free edge which is usually present in lamellibranchs. He has also shown (1934) that *Solecurtus* is almost certainly related to the Tellinacea. In his new investigation he finds that the ciliary mechanisms of the outer gill agree with other members of the Tellinacea (*Gari*, *Scrobicularia*, *Tellina*) and thus a further argument is produced in favour of this relationship. In discussing the homologies of the outer gills of the Tellinacea, the author puts forward various views, the most favourable, which he appears inclined to support, being that the outer gill of *Solecurtus* is not homologous with the outer gill of other lamellibranchs, but is a new structure formed from the supra-axial extension of the outer lamella. There are, however, certain arguments against this view, and the question remains unsettled.

Effect of Moulds upon Tanning Liquors

SEVERAL trees growing in the Philippine Islands yield liquors suitable for tanning purposes. The betel nut, *Areca Catechu*, the black wattle, *Acacia decurrens*, kalumpit, *Terminalia edulis*, and kamachile, *Pithecolobium dulce*, are four of the most important trees. Tanning liquors prepared from them are, however, subject to attack by common mould fungi, and Messrs. Luz Baens and F. M. Yenko have investigated their action (*Philippine J. Sci.*, **61**, No. 4, 417–428; Dec. 1936). They found that the activities of the fungi *Penicillium glaucum* and *Aspergillus niger* gradually reduced the tannin content of prepared solutions. A rise in the relative acidity of the liquid was usually accompanied by a large decrease in tannin content. Variations in susceptibility of the liquids to attack by the fungi appeared, for extracts of betel-nut kernel and black wattle bark were susceptible to *A. niger*, but somewhat resistant to *P. glaucum*, whilst kalumpit bark extract allowed *P. glaucum* to increase more than *A. niger*. Both moulds would find their way to the liquid when natural infection took place during practical tanning operations.

Oceanography of Davis Strait

AN important contribution to the oceanography of the north-west Atlantic is contained in the Scientific Results (Part II) of the Marion and General Greene Expeditions to Davis Strait and the Labrador Sea 1928–1931–1933–1934–1935 (Washington: U.S. Treasury Department, 1937. 75 cents). One of the most interesting of many conclusions reached is in regard to the vertical distribution of water in the Labrador Sea. The intermediate water between 500 and 2,000 metres appears to be derived from the warm, saline West Greenland current. The bottom water is formed by the winter-time chilling of the surface, intermediate and deep water in the northern part of the Labrador basin in the area off-shore from rapid currents. In that area it seems that convection currents occur down to the bottom. On the other hand, in summer the bottom water is isolated from the cold surface water by the intermediate warmer water. Part of the bottom water escapes into the Atlantic basin eastward of long. 38° W., and part may enter round the southern end of Greenland. The report points out the necessity for mid-winter observations in these seas in order to test this theory of vertical movements of water within the Labrador Sea.

Soil Erosion in the United States

A WELL-ILLUSTRATED article by Mrs. E. Huxley on this topic in the *Geographical Magazine* of September reveals some striking facts regarding the devastation of natural resources by over-cultivation, especially in areas of poor soil and steep slopes. It is estimated that more than ten per cent of the total land area of the United States has lost more than three-quarters of its top-soil and that a further thirty per cent can be regarded as moderately eroded. In the Mississippi valley alone, 400,000,000 tons of good rich top-soil are swept annually into the Gulf of Mexico, and in that area twenty-five per cent of the cultivated land has been stripped down to the subsoil and rendered useless for cultivation. A reduced yield of crops is the first sign of soil erosion, and this is generally countered by the use of fertilizers, which are, however, only a temporary remedy. A change in agricultural practice is required, and this is being carried out in some areas. Terracing, strip cropping, embankments along contours and other devices are being used, but most important of all is the reversal from one-crop cultivation to crop rotation and mixed farming. This, of course, will reduce the output of cash crops and mean a greater production of livestock products. The tendency will be to put American agriculture on a basis of home food production rather than intensive export production.

Haboobs in the Sudan

A PAPER read at the Royal Meteorological Society on June 16 entitled "Haboobs and Instability in the Sudan", by J. S. Farquharson, dealt with the cause of disturbances that are distinct from sandstorms and sand-devils, although associated with increases of wind and an atmosphere unpleasantly charged with dust. Recent observations of sand-devils were described in NATURE of January 30, p. 201. Sandstorms, according to Bagnold, are clouds of flying sand that rarely extend more than two metres above the ground. The haboob is very much greater in vertical extent than this, contains much smaller particles and in general structure is very different from the slender column of the sand-devil. In this paper a detailed description of all the haboobs observed in 1936 brings out the main characteristics of this phenomenon. A sample of dust in a haboob at Khartoum was collected with the aid of a pilot balloon from a height of 50 feet above the ground and it was found that the greatest length of a particle was generally between 0·01 and 0·07 mm. The observed changes of wind, temperature, etc., seemed

to indicate clearly that the necessary wind is associated with a thunderstorm or at least with a cumulo-nimbus cloud and is of the nature of the outrushing squall of the thunderstorm. The evaporation of rain from such a cloud before it can reach the ground was often observed near Khartoum, this process being very favourable for the development of a high degree of instability, seeing that the descending air in which the rain is evaporating would warm up dynamically at only the saturated adiabatic lapse-rate, while the environment would have a dry adiabatic lapse-rate. The instability resulting in the cumulo-nimbus development appears to occur near the boundary between the south-west monsoon and the north-east trade winds, and this year was more often associated with an advance of the relatively cool air from the north than with a northward extension of the warmer monsoon wind. Photographs of some of the haboobs showed the advancing storm to have a wide lateral extension across the direction of its advance, giving it something of the nature of a line-squall.

Preparation of Germanium and Gallium

THE presence of small quantities of the rare metals germanium and gallium, in coals and flue dusts has been known for some time. Sir Gilbert Morgan and Dr. G. R. Davies (*Chemistry and Industry*, **56**, 717; 1937) have recently made a systematic investigation of British coals and flue dusts and find that, with the exception of certain South Wales coals, all contained some germanium, although the ash from Kentish coal contained only a trace. All gas-works' dusts contained both germanium and gallium, irrespective of the coal used, and these flue dusts constitute a valuable potential source of germanium and gallium, so that by suitable and probably minor alterations in working conditions, a material could be obtained which would be much richer in these metals than anything hitherto examined. It was found that loss of germanium occurs when a coal is burnt, so that its presence in flue dusts is explained. The method used for the extraction of the germanium and gallium was the distillation of the volatile germanium tetrachloride by heating the material with hydrochloric acid in a still, and the extraction of gallium trichloride from the residue by means of ether. The authors calculate that very large quantities of germanium and gallium are annually dissipated into the atmosphere or discarded as useless dust by the combustion of coal. F. Sebba and W. Pugh (*J. Chem. Soc.*, 1371, 1373; 1937) also describe an improved method for the extraction of gallium and germanium from the mineral germanite. The usual method of acid extraction leads to a troublesome separation from copper, iron, lead and zinc, and the extraction of gallium is probably incomplete. The new method consists in digesting the finely powdered mineral with sodium hydroxide solution. In this way both the rare elements are concentrated in a single operation. The authors also describe the electro-deposition and purification of gallium. Conditions for the electro-deposition of quantities of the order of 10 gm. of the metal are specified.

Carbon-Carbon Bond Distances

L. Pauling and L. O. Brockway, in considering the dependence of interatomic distances on resonance, have assumed that the C–C single bond is characterized by the distance 1·54 A., as in diamond, and the shorter distances observed in several compounds have been attributed to partial double bond character resulting from resonance. It might, however, be questioned whether this interpretation is justified, as the single bond radius for aromatic carbon might well be different from that for aliphatic carbon. These authors have now (*J. Amer. Chem. Soc.*, **59**, 1223; 1937) determined the configuration of thirteen hydrocarbons by the electron diffraction method and have arrived at the conclusion that the value assumed for the carbon double bond covalent radius, obtained by linear interpolation between the single bond and triple bond radii, is 0·02 A. too large. They now give corrected values for covalent radii as follows:

Bond	C	N	O	F	Si	P	S	Cl
Single ..	0·77	0·70	0·66	0·64	1·17	1·10	1·04	0·99
Double ..	0·67	0·61	0·57	0·55	1·06	1·00	0·95	0·90
Triple ..	0·60	0·55	0·51	—	0·99	0·93	0·88	—

In the case of other atoms than the first four, it is supposed that the factors converting single to double and triple bond distances are somewhat different from 0·87 and 0·78 adopted in the above table. The curve drawn by the authors connecting interatomic distances and bond types is somewhat altered. It does not differ appreciably from the old one up to 50 per cent double bond character; in the region between 50 per cent and 100 per cent double bond character the new curve makes it possible to determine bond type, whilst the old one was useless because of its small slope. They also show that the curve may be represented by an equation based on a potential function for a resonating bond as given by the sum of two parabolas, representing single bond and double bond potential functions.

Bright Solar Eruptions and Radio Fadings in 1935-36

Messrs. H. W. Newton and H. J. Barton have produced a very comprehensive paper (*Mon. Not. Roy. Astro. Soc.*, **97**, 8, June 1937) in which a comparison is made between sudden radio fadings and bright eruptions observed on the sun in hydrogen light or in that of ionized calcium. In 1936, when rapidly increasing solar activity took place, 29 close associations of radio fadings with bright solar eruptions were recorded, and in those cases where the origin of the solar eruptions was observed, the radio fadings took place 7 minutes before the observed time of the solar eruption. There is no doubt that the fadings are due to a solar agency, travelling with the approximate speed of light from a limited part of the sun's chromosphere. The data are insufficient at present to show any correlation between terrestrial magnetic effects and radio fadings, and, in addition, are insufficient to establish a tendency for fadings to recur in intervals of 27 or 54 days.

The Orbit of OΣ 79

MR. L. T. S. SYMS has published a paper with this title (*Mon. Not. Roy. Astro. Soc.*, **97**, 8, June 1937). The preliminary orbit was computed by Russell's method, largely a graphical one, and then the method of Innes and van den Bos was applied for a more definitive orbit. The period of this binary is 89·20 years, the semi-axis major 0·53″, and the inclination ± 51·6°. It is interesting to notice that the elements give a dynamical parallax of 0·021″, as compared with the spectroscopic parallax 0·022″ determined at Mt. Wilson and the trigonometrical parallax 0·046″ ± 006″ found at Allegheny.