Research Items

Socio-political Grouping in the Great Basin, U.S.A.

IN 1935 the University of California, and in 1936 the Bureau of American Ethnology, instituted an ethnographic reconnaissance of the Western Shoshoni and their Paiute and Ute neighbours of the Great Basin area, under Julian H. Steward. In a study of their socio-political groups (*Bull.* 20, Bur. Amer. Ethnol., 1939), it is shown what are the sociological patterns among these simple hunters and collectors, and the factors which produce them are analysed. Most of the Basin Plateau peoples live at bare subsistence level, and their culture is meagre in content and simple in structure. Problems of daily existence dominate their activities and limit and condition their institutions. Population density depended directly upon the quantity of plant and animal food which the hunting or gathering devices known in the area allowed to be procured. This, therefore, determined in each region the size, nature and permanency of the population aggregate, which in turn determined the social structure and political controls. Generally exigencies of existence allowed little latitude for variation; but where ecology permitted such latitude, warfare, festivals, ceremonies, etc., became determinants of sociological patterns. Hence among the Western Shoshoni and Paiute it was physically impossible for families to remain long in one place or in permanent association. The outstanding sociological unit, therefore, was the biological family and the small winter village.

Carbohydrate Metabolism and Muscular Work

F. C. Courtice, C. G. Douglas and J. G. Priestley (*Proc. Roy. Soc.*, B, **127**, 41; 1939) have studied in detail the respiratory exchange and quotient and the sugar, lactic acid and carbon dioxide combining power of the blood in two subjects during the period after prolonged moderate muscular work (a ten-mile walk at a speed of 4½ miles per hour). During rest after work there is a reduction in the glucose tolerance, which is very like that following a low-carbohydrate, high-fat diet, and is also associated with a low respiratory quotient and ketonuria. It appears, therefore, that the low R.Q. after exercise is to be attributed to a diminution in the ratio of carbohydrate to fat oxidized. There was no evidence that the reduced tolerance to glucose was accompanied by a change in the sensitivity of the tissues to insulin, since the response of the blood sugar to intravenous insulin was the same whether after exercise or after a low-carbohydrate, high-fat diet. The administration of insulin is followed by a prolonged but slight increase of the respiratory quotient, suggesting an increased oxidation of carbohydrate, and it is tempting to assign the similar rise in quotient which occurs during exercise to the same cause. The injection of insulin is, however, accompanied by a large fall of blood sugar, and such falls do not occur during exercise. It is probable that other endocrine secretions, for example, adrenaline, play a considerable part in the control of carbohydrate metabolism during exercise. Administration of adrenaline causes an increase in the oxygen consumption, hyperglycæmia and certain characteristic changes in the lactic acid of the blood. If insulin and adrenaline are injected together, they neutralize one another in so far as their effects on the blood sugar are concerned, but the changes in the blood lactic acid are the same as if adrenaline alone were injected.

Habits, Distribution and Anatomy of *Ophelia cluthensis*

IN 1935, I. P. McGuire described a new polychæte worm from the sands near Millport under the name of *Ophelia cluthensis* which had escaped recognition until that time, sometimes possibly because it had been taken for the young of another species. R. S. Brown (*Proc. Roy. Soc. Edinburgh*; 1938) has given a full account of the habits, distribution and anatomy of this form, thus establishing completely its identity and specific distinctness. The adult reaches a length of 15 mm. in the male and 18 mm. in the female or rarely slightly larger than this, so it is not a large worm. It has twenty-five segments, all save the last being setigerous, and 8–10 pairs of gills. The body wall is semi-translucent so that the animal is a pinkish colour due to the colour of the hæmoglobin-containing blood showing through. It is found just below high-water neap tides, and in spite of its recent discovery may be present up to 273 per square metre.

Effect of Apple Diet on Intestinal Flora

G. M. Dack, R. Johnson and L. R. Dragstedt (*J. Inf. Dis.*, **64**, 52; 1939) have made a comparative study of the bacterial flora of the duodenum, ileum and cæcum of three *Macaca mulata* when these monkeys were on a control and a raw apple diet. Surgical fistulæ were made in the three levels of bowel to simplify the removal of specimens under physiological conditions. The bacteriological examination included the determination of the relative numbers of *Bact. coli*, the predominant organism, and the numbers of *L. acidophilus* in the cæcum. Dysentery bacilli were looked for as the monkey is a susceptible host to bacillary dysentery. A search was also made for *Bact. necrophilum*, which has been associated with ulcerative processes in the bowel of man and animals, but with negative results in both cases. No essential differences were found in the flora of monkeys on a control diet as compared with the apple diet. The authors conclude that any therapeutic effect that raw apple diet may have is not by virtue of any change which occurs in the bacterial flora of the bowel. Hydrogen ion determinations were made and there was no radical shift in the *p*H of the cæcum which would account for inhibitory effects or bacterial growth.

Phenology of 1938

THE Phenological Report, 1938, by Major H. C. Gunton (*Quar. J. Meteor. Soc.*, **65**, No. 279; 1939) is the forty-eighth annual report of this kind. For meteorological reasons the period with which it is concerned, namely, December 1937–November 1938, is one of exceptional suitability for the study of the

reactions of wild life to abnormal conditions. The change from winter to summer in the British Isles, instead of taking place in its usual rhythmical manner, spring being made up of short bursts of warmth, sometimes equal to that of summer, followed by abrupt wintry retrogressions due to sudden incursions of cold air from the Arctic, seemed on this occasion likely to be a sudden one, winter holding sway in February and summer from the beginning of March onwards. In actual fact, however, the exceptional warmth of March did not persist beyond that month, and there were long cold and dry periods in April and May, with frequent night frosts. These conditions caused much damage to blossom and foliage, and the report instances cases where song thrushes and blackbirds deserted the young birds in their nests in the drought, when insects must have been unusually scarce. The weather continued very abnormal even after May, for there were notably severe midsummer gales, and very stormy weather again in October, which resulted in an early fall of the leaves, which had already suffered damage. In November came the second spell of unseasonable summer warmth, which was as remarkable as that of March except in its duration. It is not surprising that butterflies and moths were on the whole scarce throughout the year, but there were some exceptions, among them the silver ground carpet moth and the chalk hill blue butterfly. Red admirals, moreover, were observed in large numbers in September and October, and even as late as November. The early fall of the leaves made the autumn a poor one for colour, but the November warmth caused numerous abnormal second flowerings of shrubs and trees.

The Weddell and Ross Seas

THE Weddell Sea and the Ross Sea, the two great bights on the opposite sides of the Antarctic continent, have different relations with the Southern Ocean. These contrasts are indicated by G. E. R. Deacon in a paper on the "Antarctic Voyages of R.R.S. *Discovery II* and R.R.S. *William Scoresby* 1935–37" in the *Geographical Journal* of March. In the south-west of the Weddell Sea freezing is intense in winter; this raises the salinity of the surface layers by the salts left when the ice is formed. Thus the surface waters sink rapidly and, as a bottom current, spread over the whole Southern Ocean and northwards into the Atlantic, Indian and Pacific Oceans. Bottom temperatures and salinities at great depths show a continuous increase towards the east and the oxygen content a continuous decrease. The increase in temperature is due to mixing with the deep Southern Ocean water subsequent to sinking from the cold surface, and the decreased oxygen content is due also to distance from surface origin. It is thus clear that the Weddell Sea is the chief supplier of the cold bottom water. The Ross Sea has comparable surface conditions but a submarine ridge between Cape Adare and King Edward Land cuts off the bottom waters from the Southern Ocean. This basin, south of the ridge, is filled with very cold saline water that cannot escape. Thus the Ross Sea has little influence on oceanic circulation in general.

Analysis of Ethylene Oxide - Carbon Dioxide Mixtures

A MIXTURE of carbon dioxide (90 per cent) and ethylene oxide is now largely used as a fumigant. The analysis of this mixture has caused some difficulties and J. R. Branham and M. Shepherd (*J. Res. Nat. Bur. Stand.*, **22**; February 1939) have now described a simple and accurate method with a reproducibility of 0·05 per cent. Ethylene oxide is rapidly and quantitatively absorbed by a small volume of sulphuric acid, which takes up more than 5,000 times its volume of the oxide but no significant amount of carbon dioxide, which is then absorbed in concentrated potash solution. A type of apparatus in which the gases are measured dry is described.

Reduction of Silver Ions by Hydroquinone

ALTHOUGH the reduction of silver ions by hydroquinone is of considerable interest in connexion with photographic development and fogging action, no detailed investigation of its mechanism has been made until recently. T. H. James (*J. Amer. Chem. Soc.*, **61**, 648; 1939) has now studied the reaction in gelatin and gum arabic solutions. The reaction in slightly acid solution is strongly catalysed by colloidal silver, gold, palladium and silver sulphide. The rate of reaction catalysed by silver varies as the first power of the hydroquinone concentration and as the two thirds power of the silver ion concentration. The dependence of the rate upon the hydroxyl ion concentration shows that both unionized hydroquinone and the univalent ion participate in the reaction in the *p*H range 5·15–6·27. The rate of the catalysed reaction varies proportionately with the surface of the catalyst and inversely with the concentration of gum arabic. The mechanism suggested by the results involves a primary adsorption of silver ions on the surface of the catalyst, as is indicated by the fractional power of the concentration. No adsorption of hydroquinone is disclosed by the experiments. The difference between the mechanism and that found for the reduction of silver ion by ferrous ion, which indicates that the homogeneous reaction between the ions is very rapid in comparison with the rate of deposition of silver on condensation nuclei, is pointed out.

Solid Adsorption

THE great influence which the addition of a very small proportion of a second metal may have on the resistance of a metal to corrosion has been known for some time; for example, small quantities of aluminium added to copper or brass retard oxidation. In two recent papers (*Bull. Polish Acad.*, March–May and October–December, 1938), the first by Dr. S. Dobinski, the second by Drs. Dobinski and Jagielski of Cracow, it is shown that these effects are due to adsorption of one of the constituents of the solid solution at the surface, in accordance with the Gibbs rule of the 'Equilibrium' paper of 1878, that if diffusion of the constituents can take place the one with the smallest surface tension will concentrate in the surface. Unfortunately the surface tensions of solids have not yet been measured, but Desch and others conjecture that they are proportional to those of the liquids. By surface electron diffraction photographs the authors show that for alloys of lead and antimony, zinc and tin, copper and calcium, silver and cadmium, copper, aluminium and nickel, and copper, aluminium, nickel and magnesium, the constituent which concentrates in the surface when polished or when the alloy is heated to about 200 °C. is in each case that the surface tension of which in the liquid state is the least.