

RESEARCH ITEMS

Facial Deformity in Anthropomorphic Pottery

It is pointed out by R. N. Salaman that in any considerable collection of Chimu Peruvian pottery there will be found among the anthropomorphic pots examples in which some peculiar deformity of mouth or nose or both occur (*J. Roy. Anthropol. Inst.*, 69, 1; 1939). Several different explanations have been put forward. Distinct groups may be recognized, namely, those which depict abnormal localized obesity, those in which the face is distorted as a result of facial paralysis, and those in which the mutilation is induced and associated with some representation, however conventionalized, of the potato. The potato was regarded as controlled by a spirit which was strengthened by blood libations effected by the act of mutilation. This mutilation consisted in the abscission of the upper lip, and often the lower as well and the removal of the soft parts of the nose. The effect was a startling display of teeth and a cavernous mouth, the explanation being that the Peruvians regarded a potato eye as a mouth, which indeed it resembles in the Peruvian varieties more closely than an eye. A pot of the proto-Chimu period from Chimbote shows the symbolism complete. It depicts a human figure built up from a single potato tuber, in which the end of the nose and the central portion of the upper lip are removed, while on the body are displayed potato eyes from each of which are growing several slender sprouts. In the left hand the figure holds a digging stick. A large number of the pots for funerary purposes exhibit facial deformities which might be illustrative of some disease process, such as, it is suggested, the *uta* disease due to an infection with the protozoan *Leishmania brasiliensis* in various stages, after surgical treatment and after death. The reason or reasons underlying the frequent representation by the ancient Peruvians of maimed and mutilated figures remain obscure.

Moulting in Snakes

A SHORT paper by Robert M. Stabler, reporting upon twenty-one snakes observed for periods ranging from 11 to 47 months, adds to the somewhat meagre knowledge about this habit (*Copeia*, 227; 1939). The snakes belonged to seven different genera and fourteen species, and yet they showed similarity in the frequency of sloughing when account was taken of the periods of reduced activity, and when observations were confined to individuals which fed readily and were perfectly healthy. Continuous observations showed apparent dissimilarity; thus in 47 months one specimen of *Agkistrodon piscivorus* sloughed fifteen times, while another sloughed three times in 12 months, and one individual of *Elaphe o. obsoleta* only twice in 12 months, the average periods between sloughs in these cases being respectively, 3.1, 4, and 6 months. But all the snakes were kept in a room not specially heated, and it was found that when winter temperatures fell as low as 40° F. a state of pseudo-hibernation or 'rest period' was induced, during which the snakes lay motionless for days, took food sparingly, and sloughed rarely. This period, extending from about October to April, averaged 6.4 months in the year. When the rest periods,

which were carefully recorded, were omitted from the computation, the sloughing in the three cases mentioned took place respectively at intervals of 1.3, 2.3, and 1.2 months. In all the snakes the periods were somewhat similar, generally ranging around about 1.5 months.

Translocation in the Somatic Tissue

L. V. MORGAN reports the finding of two salivary gland nuclei with a reciprocal translocation between the right arms of chromosome 2 and of chromosome 3 of *Drosophila melanogaster* (*Genetics*, 24, 747-752; 1940). The interchange must have occurred in the last or in a very late division in the nucleus of a somatic cell before the full number of cells of the salivary gland was attained. The discovery is of importance in showing that reciprocal translocations, like mutation, or crossing-over, may occur during mitosis as well as during meiosis.

Genetical Investigation in Neurospora

Neurospora tetrasperma normally has four spores per ascus, and differs in this respect from *Neurospora sitophylla*, which forms eight spores per ascus. One culture of *N. tetrasperma* was found by B. O. Dodge (*J. Hered.*, 30, 467-474; 1939) to form ascocarps which contained aborting and sterile asci. About 10 per cent of the ascocarps occasionally contained a fertile ascus, with usually eight not four ascospores. If these eight spores were cultured, those that germinate again produced 4-spored asci. On the other hand, a binuclear spore sometimes found in an ascus would give aborting ascocarps with an occasional 8-spored ascus, as in the original culture. It would seem that this culture of *N. tetrasperma* produced eight spores, half of which carry *E*, a lethal which prevents germination. As a result of segregation at the second division for both sex factors, *Aa* and the lethal *Ee*, a large spore may contain *AE* and *ae* in the two nuclei, and can germinate and give rise to ascocarps. Many of these will abort, but some will contain 8-spored asci, since *E* affects the nuclear distribution and spindle mechanism at spore formation.

Separation of Amino-Acids in Protein Digests

AN interesting new method of protein analysis is outlined by R. L. M. Synge (*Biochem. J.*, 33, 1913, 1918, 1924 and 1931; 1939). The amino-acids in a digest are acetylated and then extracted with chloroform in a continuous liquid extractor. The partition coefficients of these acetylated amino-acids between chloroform and water vary so widely that separation into groups is readily accomplished, for example, acetyl-1-phenylalanine is soluble and *N* acetyl-1-hydroxyproline almost insoluble in chloroform. Subsequent benzylation of hydroxy groups, however, produces derivatives easily soluble in chloroform such as *N*-acetyl-*O*-benzoyl-1-hydroxyproline and hydroxy-amino-acids can thus be readily separated from other amino-acids. Fractionation of hydroxy-amino-acids from each other may be carried out by preparing their *N*-acetyl-*O*-methyl derivatives, which have very different chloroform-water partition coefficients.

Solvent Effect on Solubility

THE solubilities of barium iodate, silver acetate and silver sulphate in dioxane-water mixtures at 25° over the complete range of solvent mixtures have been determined by T. W. Davis, J. E. Ricci and C. G. Sauter (*J. Amer. Chem. Soc.*, **61**, 3274; 1939). This corresponds with a variation of dielectric constant of 2.10 to 78.55 (the widest so far reported in solubility work), and the results have been treated in the light of the interionic attraction theory and Born's theory of solvent interaction, in which the free energy of charging spheres of radius r in a medium of dielectric constant D is set equal to $Z^2e^2/2Dr$, where Z is the ionic valency and e the charge on the electron. This equation, even when corrected for interionic effects, fails to account for the variation of solubility with solvent, the predicted solubility in each case being too low. An empirical result, that the mean activity coefficient of an electrolyte in saturated solution is almost independent of the dielectric constant of the medium, is pointed out. The test of the Born equation applied was to determine whether the value of a , the effective ionic diameter, remained constant from one medium to another and was related to the solubility and dielectric constant according to an equation made up by combining Born's equation with the Debye-Hückel equation containing the simple correction for ionic diameter. This was not found to be the case. The questions of a changing with solvent and incomplete ionization of solute (for example, with barium iodate) are to some extent considered by the authors, but not the use of a more accurate equation for activity coefficients than the Debye-Hückel equation.

Chaulmoogra Oils

CHAULMOOGRA is the native name of the oil expressed from the seeds of the fruit of the *Taraktogenes kurzii*, and it has been used for centuries in Burma and India in the treatment of leprosy. The tree is widely distributed in Burma and is also found in Thailand (Siam), eastern Bengal and Assam. The gathering of the seeds is dangerous on account of wild animals, and as the fruit is no longer fresh when gathered the oil is of poor quality and is often adulterated. The name 'chaulmoogra' is also applied to any oil containing chaulmoogric acid, such as *Hydnocarpus wightiana* and *H. anthelmintica*. The latter occurs abundantly in Thailand, Cambodia, Cochin China and Laos, and has been successfully cultivated in Hawaii and the Belgian Congo; its seeds form an article of export to China, where they are known as Ta-fung-chi or Ta-feng-tzu. *T. kurzii* has also been acclimatized to Brazil. H. I. Cole and H. T. Cardoso (*J. Amer. Chem. Soc.*, **61**, 3442; 1939) find that chaulmoogra oil (from *T. kurzii*) keeps for years if expressed from dried fresh seeds and not from old seeds, and is non-irritating upon injection. They give the first quantitative analyses of oils from *H. anthelmintica* and *T. kurzii*, finding that they contain hydnocarpic, chaulmoogric, goric, oleic and palmitic acids as well as small amounts of lower homologues of hydnocarpic acid. They also give the physical and analytical characteristics of five chaulmoogra oils. One of these (from *O. echinata*) contained no hydnocarpic acid but was very rich in chaulmoogric acid. The true chaulmoogra oil contained the highest percentage of goric acid.

Prehistoric Copper

AT a meeting of the Newcomen Society held at the Iron and Steel Institute on February 14, Mr. H. H. Coghlan read a paper on "Prehistoric Copper and Some Experiments in Smelting". Native copper, he said, occurs as thin plates, or in massive form in crevices in the rocks. The latter form is very intractable to work, and it was the former that prehistoric man used for making such things as needles, awls, beads and chisels. These were made by cold-working. As to the discovery of the processes of tempering, melting and smelting, Mr. Coghlan thought that at some early date, say about 5000 B.C., small objects were made by hammering; then when tempering was discovered and understood, larger objects were made, followed by, first, the discovery of smelting, and then of melting. The discovery of the process of smelting from ore must have been accidental. Some thought it was due to ore melting in a camp fire. To test this theory, the author made experiments trying to reproduce the conditions likely to have obtained, but the result was negative. Taking the green carbonate malachite, he had subjected it to the heat of a charcoal fire, but all he obtained was black oxide of copper. The result led him to try smelting the ore in an arrangement in which the conditions were such as existed in the ancient pottery kiln, and in this experiment he obtained metallic copper in the form of well-shaped crystals. Mr. Coghlan concluded by discussing the problem of how malachite may have been used in connexion with pottery.

Constants of the Star-Streams

W. M. Smart and T. R. Tannahill have utilized the photographic proper motions of 18,323 stars in the zone -40° to -52° for the determination of the constants of the star-streams (*Mon. Not. Roy. Astro. Soc.*, **100**, 1; November 1939). The results of the analysis according to the two-stream theory are as follows:

	Drift i	Drift ii
R.A. of apex	$88.0^\circ \pm 1.4^\circ$	$303.6^\circ \pm 9.5^\circ$
Dec. of apex	-8.5 ± 0.6	-75.0 ± 13.5
Space velocities of drifts	1.463 ± 0.035	0.650 ± 0.035

The probable errors are small in the case of Drift i but they are not very satisfactory in the case of Drift ii. The vertex of the star-streaming is R.A. $271.5^\circ \pm 1.6^\circ$, Dec. $-14.5^\circ \pm 2.0^\circ$, or, in galactic co-ordinates, long. $343.2^\circ \pm 1.0^\circ$, lat. $-0.5^\circ \pm 1.7^\circ$. The vertex derived from the Cape proper motions is seen to lie on the galactic equatorial plane, but the longitude exceeds that derived by other methods by 16° , though it is almost exactly the same as Jackson's value. The equatorial co-ordinates of the solar apex are R.A. 265.1° , Dec. $+26.1^\circ$; solar speed 0.879 astronomical unit. From the values of the stream-constants the ellipsoidal constants are calculated, and the results are compared with those obtained by Jackson from his analysis of the proper motions according to the ellipsoidal hypothesis. Those obtained by the first method are $G_0 = 334.6^\circ \pm 1.2^\circ$, $K/H = 0.705 \pm 0.002$, and the corresponding values found by Jackson are 343.6° and 0.59° ; G_0 denotes the longitude of the vertex and K/H is the ratio of the minor axis to the major axis of the velocity ellipsoid. The authors show that a very close agreement between the two values derived by such dissimilar methods is not to be expected.