

RESEARCH ITEMS

Bony Growths in the Human Jaw

CERTAIN secondary formations on the human jaw were first reported in 1884 by Danielli. Though noted repeatedly since by various scientific workers, they are still far from being generally known and understood. Aleš Hrdlička, in a recent discussion of the condition (*Amer. J. Phys. Anthropol.*, 27, 1; 1940), has reviewed and analysed recorded observations and has added to them new data based upon an examination of 5,632 lower jaws—cases which offered no possible doubt as to the nature of the formation. These hyperostoses consist of various grades and forms of supplementary hard bony tissue above the mylo-hyoid line on the lingual surface of the mandible. They have no connexion with anything pathological, though they may, when overdeveloped, cause trouble mechanically. They do not as a rule develop in the higher apes. In man they occur sporadically from palaeolithic times—they are reported in *Sinanthropus*—are more frequent in the neolithic period, and later grow more or less common in various human groups. They do not show any clear racial selectiveness, but are more common in the Yellow-Browns than in White or Black. This preponderance, however, appears more regional than racial. It is most marked in the northernmost or cold, least marked in the southern or warm, regions. A remarkable and instructive difference is seen to exist between the North American and the Old Peruvian Indians; in the latter the hyperostoses are almost wanting, while in the North Americans they are four times in number and even more in weight. The evidence furnishes a strong indication that the mandibular hyperostoses are neither of phylogenetic transmission nor show any plain racial heredity. Apparently they are brought about by environmental conditions, which can only mean food, and hence mastication. They tend to be both more frequent, and on the whole more strongly developed in the males. It is impossible to reach any conclusion other than that they are caused by stresses of mastication in excess of the capacity of the individual bones, and that they are the efforts of the organism to provide additional strengthening to the parts affected.

The English Sparrow in the United States

THE common house-sparrow, introduced from England to Brooklyn (N.Y.) in 1850 and 1852, has long been established in the United States beyond the possibility of eradication. And the introduction and establishment are regretted, for the evidence gathered by a new investigation of the activities of the bird show that its harmfulness to agriculture outbalances whatever good it does. E. R. Kalmbach in his inquiry into the economic status of the sparrow examined the food content of 8,004 stomachs, a larger number than ever before employed in the study of the food habits of a single species of bird (*U.S. Dept. Agric., Tech. Bull.*, No. 711; June 1940). Since the publication fifty years ago of Barrows' classic account of the sparrow in the United States, the range of the species there has more than doubled and the bird has come to be of economic importance in every State. It is admitted that in special localities and on special occasions sparrows have done notable service,

for example, in destroying the alfalfa weevil in Utah in 1911 and 1912 or in destroying bark-beetles in a lumber-yard in Alabama in 1913–1915, but such beneficial activities are almost confined to the short period when the nestlings are fed on insects. They do not appear to counterbalance the real and potential harm with which the adults must be charged on account of their feeding activities. In addition, it is known that the sparrow is an agent in the transmission of certain poultry parasites and diseases. The author, however, does not advise ruthless slaughter; control measures should always be limited to the needs of the occasion, and it should be remembered that in cases of unforeseen insect plagues the sparrow may turn out to be a valuable helper in checking and suppressing the enemy.

Variation in the Bull- or Gopher-snakes (*Pituophis*)

IN the first thorough attempt which has been made to analyse the variations in the snakes of the genus *Pituophis*, Olive Griffith Stull recognizes six species and thirteen "forms" (*U.S. Nat. Mus. Bull.*, 175; 1940). This genus of conspicuous and well-known snakes ranges from Guatemala to Canada, including most of Mexico, all the United States west of the Mississippi, several to the east, and all Atlantic States from Alabama to New York, and everywhere it seems to be little restricted as to habitat. Comparison of the different forms in their geographical relationship shows that from the probable centre of dispersal outwards a general decrease in scale characters accompanied by an increase in proportionate length of tail occurs in all forms. Also in every form which is represented by a sufficient number of specimens there is a similar variational tendency in scale rows, ventrals, and caudals. As a rule decrease in scale characters within any form is correlated with general dwarfing, but this is not necessarily true for comparisons between different forms. Sexual variation is indicated by higher numbers of scale rows and ventrals in the females, and higher caudals, proportionate tail length and number of tail spots in the males.

X-Ray Radiation on *Tradescantia* Chromosomes

A. C. FABERGÉ (*J. Genetics*, 40, 379–384; 1940) describes an experiment involving the radiation of chromosomes of *Tradescantia bracteata* by X-rays of differing wave-lengths. He shows that several checks on the accuracy of such an experiment may be made by statistical treatment; it is shown that in this experiment it is uneconomical to examine more than 18 cells per slide. The estimation of chromosome breaks was made by counting the number of bodies in the cell after radiation. No difference between the results of hard and soft radiation was found.

Cyto-genetics of Brassica

THE genus *Brassica* contains species showing aneuploid chromosome numbers and is interesting from an evolutionary point of view. S. M. Sikka (*J. Genetics*, 40, 441–509; 1940) has studied the chromosomes of several species and hybrids between them. *B. juncea* is an allopolyploid derived from the crossing of *B. campestris* and *B. nigra*. The hybrid between *B. tournefortii* and *B. trilobularis*, although

both have $2n = 20$ chromosomes, has an irregular meiosis showing a quadrivalent, 1-3 bivalents or a lack of pairing in different nuclei. On the other hand, *B. rapa* \times *B. trilocularis* shows 10 bivalents at meiosis. The correlation between the number of satellites and number of nucleoli was observed, while secondary association indicates that the basic chromosome number of the genus is five. Hybridization has played the most important part in the evolution of the genus.

Physiology of Storage in Bananas

A RECENT publication by C. W. Wardlaw (Mem. 15, Trinidad Low Temperature Research Station, May 1940), on the storage of Gros Michel bananas, centres around the possibility of transporting fruit from Trinidad by the use of refrigerated gas storage. The problem is to retard ripening without serious disturbance in the course of metabolism. The results obtained under laboratory conditions indicate that with suitable control of atmospheric conditions, bananas considerably heavier than "3/4 full" could be safely subjected to a journey of some 16 days with no deleterious effects on the fruit when afterwards ripened. Thus, when rapidly cooled to 53° F. in an atmosphere containing 5 per cent carbon dioxide and 5-7 per cent oxygen, considerable retardation of ripening is produced, in comparison with controls in air, with no evidence of chilling or gas injury. A carefully regulated series of experiments indicate these as the optimum atmospheric conditions. It is further suggested that this atmosphere could be maintained under storage, without recourse to artificial atmospheres, by the use of 'gas-tight' holds, carefully controlled ventilation and partial removal of oxygen by chemical means, and by control of the (vol. of fruit/vol. of hold) ratio. It is emphasized that fruit showing incipient ripening must be rigidly excluded, since the presence of even small quantities of such fruit tends to accelerate the ripening of immature fruit, probably by accumulation of physiologically active substances.

Composition of Coal

THE resins and hydrocarbons which exist in small proportions in coal are of considerable importance in the caking properties. In the rational analysis of coal, these resins and hydrocarbons are extracted with pyridine but it is known that this extraction is incomplete: in the residue there is still a fraction dissolved by subsequent extraction with benzene under pressure. R. Belcher and R. V. Wheeler (*J. Chem. Soc.*, 866; 1940) have examined the use of quinoline (already used by Vignon in 1914) instead of pyridine as a primary solvent but find that it has no advantage over pyridine either in rapidity or completeness of extraction. With technical quinoline exposed to daylight there is also a possibility of the photochemical formation of material liable to be confused with the true extract.

Phosphonium, Arsonium and Stibonium Salts

J. Chatt and F. G. Mann (*J. Chem. Soc.*, 1192; 1940) have shown that tetraphenylarsonium salts can be obtained by the action of aluminium chloride on (1) arsenic trichloride and benzene, (2) phenyldichloroarsine, (3) diphenylchloroarsine, (4) triphenylarsine, (5) triphenylarsine and bromobenzene, the best yield being obtained in (5). Tetraphenylphosphonium and tetraphenylstibonium compounds can

be obtained by methods analogous to (5). The tetra-arylstibonium salts were hitherto unknown. The reactions evidently follow a complicated mechanism, involving the migration of phenyl radicals.

Constitution of Pectic Acid

THE structure of a pectic acid or polygalacturonic acid prepared from citrus pectin by treatment with dilute hydrochloric acid has been examined by Miss S. Luckett and F. Smith (*J. Chem. Soc.*, 1106, 1114; 1940). By methylation with methyl sulphate in presence of alkali, precipitation of the thallium salt of the methylated acid, and reaction of this with methyl iodide, the methyl ester of the methylated pectic acid was obtained as a solid. Hydrolysis of this with methyl-alcoholic hydrogen chloride gave as the main product the methyl ester of 2:3-dimethyl galactofuranoside, the structure of which was confirmed by its oxidation to 2:3-dimethyl mucic acid with silver oxide and methyl iodide, and also by the formation of the methyl ester of 2:3:5-trimethyl β -methyl galactofuranoside, which after oxidation gave the γ -lactone methyl ester of 2:3:5-trimethyl mucic acid. Citrus pectic acid is thence supposed to be composed of pyranose residues of galacturonic acid joined by 1:4- α -glycosidic links. The molecule of the methyl ester of methylated pectic acid appears to be relatively small, the size as determined by osmotic pressure measurements being about 13 units. The methyl ester of 2:3:5-trimethyl β -methylgalactofuranoside was synthesized from methylgalactofuranoside and its structure determined by its conversion into the crystalline γ -lactone ester of 2:3:5-trimethyl mucic acid. Some derivatives of 2:3:5-trimethyl galactonic acid were isolated in a crystalline state.

Basic Nature of Vanadium Pentoxide

ALTHOUGH vanadium pentoxide V_2O_5 is a typical acidic oxide giving rise to series of salts (the vanadates) with bases, it has been known since the time of Berzelius that it is considerably more soluble in acids than in water, so that it also shows basic properties. Some solid compounds with sulphuric acid have been reported. These have been re-examined by O. E. Lanford and S. J. Kiehl (*J. Amer. Chem. Soc.*, 62, 1660; 1940), who find that only the solids V_2O_5 , $4SO_3$, $4H_2O$, V_2O_5 , $2SO_3$, $3H_2O$ and V_2O_5 , $2SO_3$, $8H_2O$ are formed at 30°, no indication being found of the two compounds described by Berzelius. H. T. S. Britton and G. Welford (*J. Chem. Soc.*, 895; 1940) have examined the solubility of vanadium pentoxide in solutions of acids. The solubility depends on the strength of the acid and the temperature. Hydrochloric, nitric, perchloric, sulphuric, acetic and trichloroacetic acids, and sodium hydrogen sulphate were used at temperatures of 180° and 100°. The action of acids in precipitating vanadium pentoxide from solutions of sodium vanadate was also examined, in this case at the boiling point, when reproducible results could be obtained, the oxide held in colloidal suspension being then precipitated. The results show that V_2O_5 is amphoteric and is an extremely weak base. Even in the presence of excess of acids it does not show a basic function extending beyond the ion VO_2^+ . The specific conductivities and freezing points of acid solutions of vanadium pentoxide were also measured; the conductivities fell and the freezing points rose slightly as the vanadium pentoxide content increased.