

Research Items.

Burial Customs of the Akaju, Southern Nigeria.—Burial customs of the Akaju tribe, Ogoja division, Southern Nigeria, are described by Mr. C. B. G. Watson in *Man* for November. Guns are fired to announce the death, and for the next two days relatives spend their time collecting food and palm wine. On the third day the corpse is dressed in a new loin-cloth, woollen cap, and shirt or singlet, and is hung in a hammock in the yard of the house. A fire is lit beneath it, the smoke serving in some degree as a preservative. The fire is tended by the wife, or in the case of a woman by women of the same age grade or by her fellow-wives. A man is kept thus for from fifteen days to thirty days according to his wealth, a woman for ten days. On one day a man of the same age grade wearing a special cap dances round the corpse. In the grave, which is oblong with a special recess for the head, the body is placed in a sleeping posture on its side, looking westward if a man, eastward if a woman. Money may be placed in the grave, a hoe is placed on a man's head, a machete may be placed on his chest, and a gun with the trigger removed by his side. No pottery or eating utensils are buried in the grave or broken at its side. After interment, no further ceremonies take place.

Price of Potatoes.—In "Factors Affecting the Price of Potatoes in Great Britain" (University of Cambridge, Department of Agriculture, Farm Economics Branch, Report No. 15), R. L. Cohen attempts to explain the fluctuation in potato prices during the forty-five years for which data are available. Total production tended to fall until 1898, and has since risen, on the average, until the present time. The more recent increases may largely be attributed to higher acreage being put under potatoes on account of the unprofitable nature of other crops, but the interests of neither producer nor consumer would appear to have been served by this heavier production. The analysis of data shows that, generally speaking, imports move in the same direction as prices, and are consequently a result more than a cause of price changes. The chief cause of fluctuation in home production is the variability of yield per acre. Variations in yield are so irregular that farmers cannot contrive to alter their acreage in compensation in order to attempt to stabilise yields, which would have a steadying effect upon prices. It is very desirable that correct information as to the season's production should be spread among British farmers with the view of price adjustment, to prevent foreign producers getting the benefit of high prices at times of shortage, while home growers are still receiving the lower rates of times of plenty. Further benefit would be derived if the fluctuations in growers' prices could be rendered more comparable with those of retail prices, as this would not only tend to stabilise rates from year to year, but also would result in a larger aggregate sum being received by the farmer for his potatoes.

Surface Precipitation Reaction of Living Protoplasm.—In the *Proceedings of the American Philosophical Society*, vol. 69, 1930, L. L. V. Heilbrunn has a very concise statement of his suggested explanation of the astonishing increase in viscosity in living protoplasm that may take place under various conditions, and which is so closely associated with the phenomenon of its 'stimulation' by various external agents. He shows that the films which immediately form at the surface of the extruded protoplasm, when a living cell is burst open in water, only form in the presence of calcium, and that, under certain conditions, similar small films,

around vacuoles, form in the protoplasmic mass. This suggests an analogy with the clotting of blood; in the first stage of this process, calcium reacts with blood platelets, thrombin is produced, and this substance can produce clotting even in the absence of calcium. Similarly in the surface precipitation of the protoplasm exuding from a burst egg of the sea urchin, in the first stage an interaction occurs between pigment and calcium and a substance is produced which can bring about the precipitation in the absence of calcium. In the protoplasm, as in the case of the blood, one problem is to explain why this precipitation does not occur until external conditions alter. The reason appears to be, in part, that the calcium inside the living cell is not free, but is bound chemically. Immediately it is freed, on 'stimulation', the precipitation reaction occurs throughout the mass and a great increase in viscosity occurs.

Haploid Plants and Animals.—Prof. R. Ruggles Gates and Miss K. M. Goodwin publish a very valuable review of this subject, with comprehensive bibliography, in the *Journal of Genetics*, vol. 23, 1930. In the plant, the sporophyte generation is occasionally produced with the number of chromosomes characteristic of the sexual cells prior to fertilisation. The authors describe a new case of such a haploid plant in *Echinochloa* and pass in review other cases previously described in this genus and in seven other genera of flowering plants. The haploids are smaller than the normal diploids, with smaller cells, and are almost completely sterile. Such plants have appeared (a) after crossing, especially with a distantly related species; (b) after subjection to cold at the time of fertilisation; and (c) (in the tomato) "spontaneously". In the case of animals, many more experimental methods appear to have been employed to bring into being such haploid organisms, but such animals usually either fail to reach maturity or double their chromosomes during development. In certain species of animals, of course, haploid males are the rule, and the authors discuss the theoretical difficulty thus created, as, from the known facts as to the part played by chromosomes in the determination of sex, one set of chromosomes with one 'x' body might be expected to carry female characters.

Tung Oil.—Tung oil is an essential raw material of present-day varnish manufacture, and its unique properties as a drying oil render it indispensable for certain types of varnish. It is also now widely used as an ingredient of certain types of paint media and in the manufacture of electrical insulating varnishes. The demand for tung oil, the possible extension of this demand, and the increasing areas being planted with the seed of *A. Fordii* both in the United States and in the British Dominions, Protectorates, and Colonies has led to the Imperial Institute preparing a memorandum on "The Production of Tung Oil in the Empire", with the co-operation of the Tung Oil Subcommittee of its Advisory Committee on Oils and Oil Seeds, which is issued by the Empire Marketing Board. The memorandum sums up the history of tung oil under sources of production, its cultivation in the Empire and in the United States, and comments upon the further developments in the Empire. It then deals with methods of cultivation, growth of trees and yield, plantation costs, and utilisation of the nuts. Tabular statements show the exports (amounts and prices) of tung oil from China for the years 1924-28, roughly averaging £3,000,000 per year; the imports into the United States of America for the same years, which reached the £3,000,000 mark in 1929; and the

imports into Great Britain for the same period, the amount in 1929 amounting to a value of £273,350. On the subject of the future outlook, the memorandum states that the increased production will naturally tend to reduce the price, but the reduction should not be so great as to render the cultivation unprofitable. There will always be a demand for tung oil, as it is a raw material essential in some industries, and should always command a higher price than linseed oil.

An Amœba Growing in Cultures of a Yeast.—Aldo Castellani has observed the presence of an amœba in glucose-agar cultures of a yeast-like fungus, *Cryptococcus parvoseus* Cast. (*Jour. Trop. Med. and Hyg.*, June 2, July 1, Aug. 1 and 15, 1930). The amœbæ appeared as large, delicate, roundish or oval bodies, which from time to time slowly emit blunt pseudopodia of clear ectoplasm, usually singly. A single round nucleus is present in the protoplasm, which often contains yeast cells. The diameter without pseudopodia varied from 13·5 μ to 22·5 μ . Movements of translation were observed only in preparations made with Ringer's solution. Cysts occur, 9 μ to 12 μ in diameter, with a somewhat coarse granular protoplasm and well defined double-contoured membrane. The organism develops only in association with fungi or bacteria: for example, typhoid bacilli, alive or dead. When inoculated into cultures of various bacteria, alive or dead, zones of clearing or lysis were observed. The systematic position of this amœba is discussed by M. Douglas, who concludes that it is an undescribed species belonging to the genus *Hartmannella*, for which he proposes the name *Hartmannella castellanii* (*Jour. Trop. Med. and Hyg.*, Sept. 1).

Reversal of Cilia on the Gill of Mytilus.—D. Atkins (*Jour. Mar. Biol. Assoc.*, 16, 1930) found that nearly one-third of the mussels obtained from the Fal Estuary during October and November 1927 presented abnormalities in their gills "doubtless correlated with some factor in the environment". Mussels from other localities were occasionally found with abnormal gills, perhaps in the majority of cases due to the presence of a large female pea-crab (*Pinnotheres pisum*), but the percentage of pea-crabs in the mussels from the Fal was so low (4·8 per cent) that their presence could not account for the large number of abnormal cases observed. The most interesting abnormality is the occurrence of supernumerary food grooves on the surface of the gill, accompanied in most cases by a permanent reversal of the beat of the frontal cilia on that part of the lamella between the main and secondary grooves. Particles drawn on to that part of the gill over which the cilia beat in a reversed direction are carried dorsally into the secondary groove and along it until they reach a filament with normal ciliation, along which they are passed into the main groove. While the author considers that the evidence points to a reversal of the effective beat of the cilia, she has not overlooked the possibility that the epithelium bearing these cilia may be partly formed anew after the production of the secondary groove, and the cilia may from their first formation have acted in the reverse direction.

Absorption of Fats and Lipoids in the Plaice.—Mr. B. Dawes (*Jour. Mar. Biol. Ass.*, vol. 17, No. 1, pp. 75-102; 1930) gives an account of his investigations on fat and lipid absorption in plaice. He found fat to occur in all three types of cell composing the gastric epithelium of the plaice, at the end of a fasting period extending over six or seven days, but to be completely absent from the mucosa of all post-pyloric regions of the alimentary canal at such times. He found a marked increase in the fat content of the superficial

epithelium of the stomach after thirty hours and fifty hours of gastric digestion, the stomach thus being shown to be an effective organ of fat absorption. Considerable quantities of fat are present in the duodenal and intestinal epithelia after fat-containing meals have been digested. The rectum also is capable of slight fat absorption. The author suggests that there is a transference of the function of fat absorption from the stomach to the post-pyloric intestine when the frequency with which meals are taken is increased. Globules of true fat are not typically observed in the areolar tissue layer of the alimentary canal, though lipid granules may occur in abundance. It is concluded that resynthesis of the cleavage products of fat does not occur in this layer.

Atlantobellerophon, a New Rhætic Gastropod.—Under the name *Atlantobellerophon zealandicus*, n. gen. et sp., Dr. C. Trechmann describes a *Bellerophon*-like mollusc from the Upper Trias, or Rhætic, of New Zealand (*Trans. N.Z. Inst.*, vol. 61). That its affinities are with *Bellerophon* and its allied forms, here discussed by the author, is evident. That it was presumably a Heteropod mollusc and allied to the modern *Atlanta*, as the author is inclined to infer, is a suggestion which malacologists are scarcely likely to accept without much stronger evidence, seeing how widely apart *Atlanta* and *Bellerophon* have always been ranked in the molluscan phylum.

Raman Effect.—A valuable analysis of the literature of the Raman effect published up to the end of June of this year is given by S. Bhagavantam in the September number of the *Indian Journal of Physics*. Some three hundred and fifty references are dealt with—a large increase on the 150 listed by Dr. Ganesan last year in the same journal—and have been grouped under twenty-six heads, the first three of which contain book references and articles of a general character, and the remainder papers on special aspects of the effect. These are followed by an author index and an alphabetical list of the substances which have been studied, and there is a further list of almost a hundred other papers on light scattering which have been published by Indian authors since 1919.

Radioactivity of the Alkali Metals.—Investigation of the radioactivity of potassium and rubidium, which is a matter of considerable difficulty when attempted by the usual methods, has been much facilitated by the introduction of the new sensitive particle counter of Geiger and Müller, and the radioactive constants for these elements found in this way by W. Mühlhoff (*Annalen der Physik*, vol. 7, p. 205) are probably as accurate as any yet published. Mühlhoff has confirmed the existence of a hard γ -radiation from potassium, and, from comparative measurements with radium-C and thorium-C, finds for the value of its absorption coefficient in lead, $\mu = 0.59 \text{ cm.}^{-1}$: the absorption was followed up to a thickness of more than 8 cm. Measurement of γ -radiation from rubidium could not be undertaken for lack of material, but the β -ray activity was found to be 14.2 times that of potassium, and it was confirmed that many of the rubidium β -rays are relatively very slow, their absorption coefficient in aluminium approaching 10^9 cm.^{-1} . The half-period for decay of rubidium is given as 4.3×10^{11} years, and the half-period for potassium 1.5×10^{13} years, but the latter number must be reduced to 7.5×10^{11} years if, as is probable, radioactivity is confined to the heavier isotope (41), which is present to the extent of some 5 per cent in ordinary potassium. In any event, the average life of a potassium or rubidium atom is not less than about 100 times that of an atom of uranium.

Band Spectra of Carbon Isotopes.—The July issue of the *Astrophysical Journal* contains an article by A. S. King and R. T. Birge, in which they review the work which has been done up to the present on the isotope bands of carbon. The evidence for the existence of the heavier isotope, of atomic mass 13, is now conclusive, bands due to the molecules $C^{12}C^{13}$, $N^{14}C^{13}$, and $O^{16}C^{13}$ being known to accompany the more intense bands of $C^{12}C^{12}$, $N^{14}C^{12}$, and $O^{16}C^{12}$, and from a study of the isotopic bands of C_2 at 4737 Å. ($C^{12}C^{12}$) and 4744.5 Å. ($C^{12}C^{13}$) it has now been shown that the mass ratio of the isotopes is 12 to 13, with an accuracy of one part in ten thousand. The most surprising result of this investigation is, however, that the relative intensity of two related isotope bands depends upon the conditions of excitation, making it impossible to estimate their relative abundance with certainty. There is some evidence that the controlling factor may be the effective temperature of the source; when the degree of excitation is low, as in a furnace or in the N type stars, the spectra associated with the heavier isotope are prominent. With more intense excitation, such as that of the arc, bands due to the heavier isotope are less strong, the only evidence for the existence of C^{13} from this particular source being a group of lines in the cyanogen band at 3883 Å. It is not easy to see how such differences can arise, and after a discussion of the most probable influences (true differences in relative abundance, excitation difference, and dependence on the optical path), the authors practically leave the question open with the remark that the abundance of the isotope of mass 13 and the dependence of its spectrum upon excitation conditions will require much additional evidence. [See in this connexion NATURE, Oct. 25, p. 649.]

The Schütz Law of Enzyme Action.—According to the Schütz law, if x is the quantity decomposed, E the quantity of enzyme, and t the time, then $x/\sqrt{Et} = K$, a constant. In the *Journal of the Faculty of Agriculture*, Hokkaido Imperial University, Sapporo, Japan, vol. 28, part 3, K. Nakajima describes experiments by many previous investigators, and in a critical discussion arrives at the conclusion that the so-called law has no validity in the kinetics of enzymes except in the form $x/\sqrt{E} = K$ for dilute pepsin solutions. He also criticises the Arrhenius law and the Northrop theory, which are held to confirm the Schütz law. A bibliography is provided.

Solubilities of Salts in Ethyl Alcohol.—In the October number of the *Journal of the American Chemical Society*, some experiments on the effect of one salt on the solubility of another without a common ion, ethyl alcohol being the solvent, are described by Seward and Schumb. An increase in solubility (as in other solvents) was found. In agreement with results of previous experimenters, it was found that the solubility curves show considerable deviations from the theoretical curve given by Debye and Hückel's equation, but they are considered to be in qualitative agreement with the extensions of that equation which take account of ionic size.

Reactivity of Coke.—The reactivity of a coke, which measures its capacity for reacting with steam and carbon dioxide, has usually been expressed as the percentage of each gas decomposed under defined conditions. This method of expression does not allow of a quantitative comparison of different coques, or of the application of values determined under one set of conditions of temperature, gas velocity, etc., to another set of conditions. These shortcomings are avoided by a method described at a meeting of the Society of Chemical Industry, at Leeds on Oct. 28, by Dr. A.

Key and Prof. J. W. Cobb, who express reactivity as the reciprocal of the weight of coke required to decompose a definite percentage of gas under specified conditions. It is not necessary to find this weight experimentally, since it is related to the percentage of gas decomposed by a standard weight of coke. This relation has been found and expressed on a reactivity curve which covers all known kinds of coke. It was also shown that the reaction between carbon and carbon dioxide is unimolecular with respect to the gas, while that with steam deviates from this because of complications. The uses of coques are very largely dependent on their reactivity, and a method of comparison which can be applied generally should prove of great value in the study of carbonised fuels.

Synthesis of Creatine and Alacreatine.—A method worked out by Wheeler and Jamieson in 1908 for the preparation of alkylated guanidines is applied by H. King in the October number of the *Journal of the Chemical Society* to the synthesis of creatine. Sarcosine hydrochloride is treated with alkali and methyl isothiocarbamide hydriodide, with production of a 40 per cent yield of crude creatine. From alanine, the base alacreatine was similarly obtained. The substances were analysed as the crystalline picrates.

Sulphonation of Hydrocarbons.—Although it is generally supposed that saturated hydrocarbons are more or less inert to powerful sulphonating reagents, there have been references in recent technical literature which indicate that this is not the case, and in a paper in the October number of the *Journal of the Chemical Society*, G. N. Burkhardt shows that when an excess of n -hexane, cyclohexane, or methyl cyclohexane is stirred vigorously with fuming sulphuric acid (35-65 per cent SO_3) at 0° - 10° for four to five hours, practically all the sulphuric anhydride is used up. About 1 mol. of sulphur dioxide is formed per mol. of hydrocarbon, and oxidation of some of the hydrogen of the hydrocarbon is an important part of the reaction, perhaps after sulphonation has occurred. The product contained sulphato-sulphonic acids, such as are formed by the action of fuming sulphuric acid on unsaturated compounds; the barium salts, however, were not crystallisable, and special methods were used for the identification of the products of reaction.

Bionomics of Marine Algæ.—In *Bulletin 67* of the Bernice P. Bishop Museum, "Hawaiian Marine Algæ", Miss Marie C. Neal investigates the seaweeds of the Hawaiian reefs by studying certain small areas throughout the year. The iron stakes which marked out the areas proved very satisfactory for algal growth, also concrete slabs and blocks. Most of the algæ are at their lowest state in December and January, the largest kinds old and dying out. Young plants appear usually in February, when temperatures are slightly higher. Many of the seaweeds have regular life cycles, maturing once, twice, or three times in a year. The succession of plants on an originally clean surface was approximately uniform, diatoms appearing first, then *Ectocarpus*, sometimes *Colpomenia sinuosa* third, or *Padina*, minute green, blue-green, or red algæ occurring at the same time. The succession was rather different on a scraped concrete block which was nearer shore and exposed to the air at very low tides, and was thus subjected to some drying and to strong light, the surrounding shallow water being often warmer than the deeper area. The best base for algæ is apparently an immovable one, raised above the sea floor so that sand and stones do not collect on it. Many of the larger seaweeds grew fastest before maturity. The work is illustrated by many text figures.