

Research Items

Marriage among Serbian Gypsies

IN a final study of the Serbian gypsies, Dr. Alexander Petrovič deals with certain conditions affecting the married state (*J. Gypsy Lore Soc.*, iii, 15, 4). Although monogamy is the rule, polygamy is not unknown, depending upon ability to bear the expense of additional marriages. The orthodox gypsies, however, are forbidden plural marriages by law. Among the gypsies of Rogatika, although they are Moslem, polygamy is rare on account of their poverty. The wealthy nomad tin-smiths as a rule have a plurality of wives. One gypsy aged forty years has three wives; and for these it is the custom that one should remain on duty in the tent for a period of eight days, while the other two go out begging. Only rich Christian gypsies solemnize marriage as soon as the bride is brought home. Usually the bride is kept for a while on trial, especially when she is too young for the priest to marry the couple legally. Others do not marry in order to escape payment, or to facilitate getting rid of an undesired wife. Permanence of marriage depends upon economic conditions. In this there is great difference between towns and villages, and different occupations, as for example, between musicians and factory hands. Begging and high earnings in factories have an appreciable effect on the fidelity of the women; and this is the cause of constant quarrels. Of the men in the villages, only one quarter had been married once only, while the remainder had been married repeatedly. In both sexes more than fifty per cent of the marriages had lasted from one to four months only. As a rule, the last marriage lasts the longest—six years and upwards. While the men in the towns tend to marry at a slightly later age than in the villages, the girls marry quite as early.

Cultural Contacts between India and China

IN *Current Science* (August 1936) an interesting paper appears entitled "The Himalayan Uplift since the Advent of Man: Its Culthistorical Significance" by Prof. B. Sahni. The main idea of Prof. Sahni's paper is to show that cultural contacts between India and China have probably existed since the dawn of human existence; that intercourse between the two countries by direct route across the Himalaya was possible before man conquered the ocean. On the evidence amassed by explorers and observers, it is held that round about Middle Pleistocene time, when the main valley of Kashmir was still occupied by the great 'Karewa Lake', interglacial man of about the same stage of cultural development as Neanderthal or Mousterian man in Europe and as Peking man in the Far East, flourished (a) in the plains of the northern Punjab, (b) on the shores of the Karewa Lake in the heart of Kashmir, and (c) just across the great Himalayan Range. The close cultural contacts between India and China during the historic period are fairly easily explained, as both countries possessed considerable seafaring power in ancient times, whilst the physical endurance of the Buddhist pilgrim mountaineers has become legendary. Palæolithic man had little incentive to travel beyond the

necessary distances to provide him with his daily food. Even if he had wandered between the Punjab and Kashmir, it would be difficult to explain his crossing even the lowest pass in the Himalayas. Thus, the importance of the uplift of the Himalayas during the human epoch is evident.

Two-Factor Inheritance in Man

IN the Laurence-Moon syndrome, first described in 1866, mental retardation is accompanied by obesity, hypogenitalism, retinal degeneration with pigmentation, and polydactyly, the last condition alone being visible at birth. Dr. E. A. Cockayne has recently shown that although normal parents may produce affected children, their frequency is too great to be due to a single recessive factor. Dr. Madge T. Macklin (*J. Heredity*, 27, No. 3) has collected from the literature 53 families having a total of 283 children, 112 (or 39.6 per cent) of whom were affected. There is also an excess of affected males. An analysis of the various families leads to the conclusion that the condition is due to the presence of two genes, one an autosomal dominant and the other a sex-linked recessive. The large range of characters affected would also support the hypothesis that more than one gene was probably concerned. Cousin marriages are also found to be more frequent in these pedigrees than in the ordinary population.

Diseases of Birds

THE Biological Institute of São Paulo, Brazil, has published a valuable treatise upon the diseases of birds, compiled by J. Reis, P. Nobrega and A. S. Reis ("Doenças das Aves, Tratado de Ornithopathologia", pp. 469). The thoroughness with which the compilation has been made may be judged by the extent of a few of the sections of the work: virus diseases, 91 pages; various forms of mycetosis, 142 pages; protozoan diseases, 78 pages; diseases of nutrition, 21 pages. The book is well illustrated by photographs and diagrams.

American Flies of the Genus *Psychoda*

THE family Psychodidae has been the subject of great attention, particularly with reference to the blood-sucking genus *Phlebotomus*, while the non-hæmophagous forms of the genus *Psychoda* have attracted much less notice. Both in Europe and North America the species *Psychoda alternata* and *P. phalænoides* breed in vast numbers in sprinkling filter beds. At times they issue in such swarms that it is impossible to work in the vicinity without the creatures entering the mouth and nose. No adequate evidence, however, has been presented with regard to their functioning as disseminators of disease germs. In the *Philippine Journal of Science* (59, No. 1, 85; 1936), Mr. F. del Rosario contributes a detailed revisional study of the genus, dealing with the American species. Since Haseman's work, published in 1907, little attempt has been made at a taxonomic study of the group in so far as North America is concerned.

Crustacea from the *Godthaab* Expedition

DR. K. STEPHENSEN has extended our knowledge of the distribution of many species of Crustacea from the waters between Greenland and Arctic America north of the east corner of Labrador in his two papers "Crustacea Decapoda" and "Crustacea Varia" (The *Godthaab* Expedition 1928. Leader: Eigil Riis-Carstensen. Meddelelser om Grønland, Bd. 80. No. 1, 1935 and No. 2, 1936). The decapods are here divided into bottom and pelagic forms, the bottom forms into Arctic, Boreal and Atlantic, the pelagic forms into Arctic and Atlantic. The Arctic forms are again sub-divided, the whole arrangement being based mainly on the summary by Holsten (1916), and maps of the distribution of the species are given. Specially interesting is the distribution of *Bythocaris leucopsis* and *B. payeri*, the former belonging to much deeper water than the latter, *Ephyrina benedicti* new to northern waters, *Hymenodora glacialis* and *H. gracilis*. The finding of the two *Bythocaris* species and *Hymenodora glacialis* proves the identity of the Arctic deep-sea faunas north of the ridge east and west of Greenland. Most useful in the decapod paper are descriptions of larval forms, many of which were hitherto unknown. The larvæ of *Chionoecetes opilio* and of *Hymenodora glacialis* are described for the first time, and a beautiful new *Eryoneicus* (*E. groenlandicus*) which is certainly a larval form. There are also numerous suggestive notes on other larvæ not definitely fitted into their respective places, but the probable adults in most cases being given. In "Crustacea Varia" are included the groups not recorded in the other *Godthaab* Expedition papers.

Anther Smut of Carnations

DR. H. L. WHITE has directed attention (*Gard. Chron.*, Oct. 3) to the prevalence of the rather unique disease caused by the fungus *Ustilago violacea*. This organism can attack a large number of Caryophyllaceous hosts; but its effects are not usually noticeable until dark-coloured smutty spores are produced upon the anthers. The disease has probably occurred frequently where carnations have been grown in glasshouses; but it has recently attained rather more serious proportions. Numerous side shoots appear on an infected plant, before spores are produced. This feature favours control, for such shoots can be removed before they become a source of further infection, and they should also be rejected in the selection of shoots for purposes of propagation.

The Plant Chloroplast

PROBABLY no more important physiological unit can be chosen for study than the green chloroplast which is usually regarded as the seat of the photosynthetic process, yet an interesting paper by Kogane Kiyohara (*J. Fac. Sci., Tokyo*, Sec. 3, Botany, 4, Pt. 5) makes it clear how little definite information we have as to its structure and life-history. From a study of 262 species of flowering plants, he finds that the plastid is always a round object, spherical or a more or less flattened disk, with a diameter of about 5μ . Treatment with silver nitrate or osmic acid reveals a blackened ring in this disk; the starch formation is associated with the non-blackening central region of the plastid. In *Hydrilla verticillata*, in the growing cells of the leaf-base, clear cases are figured of the elongation and subsequent division of such disk-like chloroplasts, an observation

which confirms the views of Schimper and Meyer. But a more controversial point is raised by the author's observation that whilst certain fixatives, particularly Kolatchev's and Carnoy's, show round typical chloroplasts in meristematic cells, the normal chondriosome fixatives distort these structures—which appear to be fluid in these meristematic cells—into typical thread-like chondriosome structures, so that the author concludes that the genetic connexion of chondriosomes with chloroplasts and indeed the presence of chondriosomes in plant cells is not as yet established.

Direct Oxidation of Soil Humus

DECOMPOSITION of organic matter in the soil leads, amongst other things, to the production of nitrates, which may be used directly by growing crops. Mr. C. B. Greening has suggested (*J. Roy. Hort. Soc.*, 61, Pt. 9; Sept. 1936) that this change might be brought about directly by oxidation of the organic matter with potassium permanganate. Lawns and several garden crops have benefited by the application of a dilute solution of this substance. Experiments quoted in the paper are on a very small scale, but larger trials are in progress at Wisley. The production of large quantities of nitrate in the soil is not to be desired for most crops, and any quick process of oxidation would deplete the soil of its reserves of organic matter, but the new process may well find application in some particular technique of horticulture, and in any case it would provide a new item of intellectual equipment for the scientific gardener.

Continental Motions

IN the October issue of the *Journal of the Franklin Institute*, Dr. Ross Gunn, of the United States Naval Research Laboratory, calculates by an approximate method the gravitational force on the North American continent due to the probability that the density of the earth's outer shell under the Pacific Ocean is about two per cent greater than under the continents. He finds it is equivalent to a slope downwards towards the Pacific of 1 part in 15,000. He is not prepared to say whether under these conditions the continent is at present at rest, but he considers that the presence of mountain ranges bordering the Pacific shows that in the past these forces have produced crushing and folding of the crust. For the North Atlantic he calculates these forces as being about half those of the Pacific. He considers these unsymmetrical distributions of density throughout the earth's crust support the theory that satellites were produced by fission due to tidal forces in the parent planet when in the liquid state.

Diamagnetism and Particle Size

INVESTIGATIONS on the susceptibility of substances in the form of small particles, produced by colloidalization or cold working, have revealed, in many cases, an apparent dependence of diamagnetism on particle size. There has been considerable controversy as to whether this is a true surface effect or, as has been maintained by Bhatnagar, simply an impurity effect, due to the larger surface of finely divided material facilitating such processes as oxidation and hydration. A critical survey of the subject has recently been made by Prof. H. Lessheim (*Current Science*, 5; 1936). He shows that the theoretical arguments which have been advanced in favour of a surface effect are certainly inadequate to account for the magnitude

of the changes observed, and gives a detailed discussion of the experimental work on different substances. In many cases, as with bismuth, antimony and lead, the change in diamagnetism is due to the formation of surface layers of oxides; when the oxide is chemically removed, or when sufficient care is taken to exclude the possibility of oxidation during the preparation, the finely divided material has the same susceptibility as the material in bulk. Carbonization and the adsorption of gases may produce similar effects. Changes in diamagnetism are often associated with changes in crystal structure, and in some cases such changes may be brought about by the processes by which the fine particle material is produced. Where such changes can be excluded, Lessheim concludes that there is no definite evidence of an appreciable change in diamagnetism due simply to change in particle size.

A New Oxide of Phosphorus

THE discovery of a peroxide of phosphorus, with the formula PO_3 (or possibly P_2O_6) is reported by P. W. Schenk and H. Platz (*Naturwiss.*, 24, 651; 1936). When a mixture of phosphorus pentoxide vapour and oxygen is admitted to a discharge tube under a pressure of about 1 mm., and the discharge is passed, a bluish-violet product collects behind the discharge zone. The substance may be kept for about a day at ordinary temperature and in the absence of moisture. In aqueous solution it liberates iodine from potassium iodide. Using this reaction as a method of estimation, it is found that the bluish violet substance contains about two per cent of the new peroxide.

Theory of Photographic Development

EXPERIMENTS in favour of their adsorption theory of photographic development have recently been carried out by A. J. Rabinovitch and S. S. Peisachovitch (*Acta Physicochim. U.R.S.S.*, 4, 705; 1936). The conditions obtaining in the exposed photographic plate may be imitated by mixing a colloidal solution of silver bromide to represent the nuclei of silver bromide, and a silver sol, to represent the nuclei of silver present in the exposed plate. Addition of alkaline hydroquinone, metol, adurol, and other photographic developers causes a rapid blackening of the mixture. The colloidal silver may be replaced by platinum, gold, or copper sols, and the same development is obtained. If, however, Bredig's silver sol, or sols of palladium, bismuth, the hydroxides of aluminium, and iron, titanium oxide, or activated charcoal are substituted for silver, development does not occur. It has been shown that the sols which may replace silver and give similar results are those which will adsorb hydroquinone and other developers, whilst those which inhibit development are sols which do not adsorb the developer. By a study of cataphoresis and other experiments it is shown that the particles of the added silver sol are intimately linked with the silver bromide particles. If gelatin is added to the silver bromide sol before the addition of the silver sol, no development of the mixture occurs. Many other phenomena of importance in the theory of photographic development can be examined by means of the above system, including the effect of size of silver particles, hydrogen ion concentration, and addition of various chemicals, such as sodium sulphite and potassium bromide, on the rate of development.

Numerical Methods in Late Babylonian Astronomy

PROF. OTTO NEUGEBAUER, of Copenhagen, has published in *Osiris* (2, part 12, 517) what is intended to be the first of a series of studies of Naburimannu's and Kidinnu's systems of the solar and lunar motions, to be continued elsewhere. The texts used are the same as those used by Kugler in his epoch-making work, "Die Babylonische Mondrechnung" (1900) in one of which Prof. Neugebauer has introduced a number of corrections from a British Museum photograph. His interest is in the arithmetical methods used in these texts, especially in the length of the day and the anomalous motion of the sun. His exposition is remarkably clear, and he finds, as Kugler found before him, that in the system now known as Naburimannu's, the sun is given two uniform velocities each lasting half the year, and the length of the day is made to increase at a uniform rate from one solstice to the other and to diminish at the same uniform rate in the opposite half of the year, while in Kidinnu's system, instead of uniform motions changing suddenly in amount or direction, we have a uniform change between two extremes in the rate of change. In other words, with Naburimannu, first differences are constant between limits, while with Kidinnu second differences are constant between limits. These methods, as Prof. Neugebauer has illustrated elsewhere, are very characteristic of Babylonian mathematics.

Multi-Cylinder Steam Turbines

THE English Electric Co. so early as 1923 constructed multi-cylinder turbines, but the development of this engine in recent years is due to the great increase in steam pressures and temperatures, and in the outputs of turbines. In the *English Electric Journal* of September, Mr. J. T. Moore describes the large multi-cylinder turbines now made by the E.E.C. The multi-cylinder turbine has the great advantage that the high pressures and temperatures are confined to a comparatively small section of the turbine. The high pressure cylinder which the steam first enters can be made of symmetrical and very simple design. The casting is therefore free from residual stresses, and high temperatures cause little distortion. It is admirably suited for work in large power stations where sudden changes in the electrical load cause fluctuations in temperature. Recent engines are of the three-cylinder type, the steam after passing through the high-pressure cylinder passing into the much larger intermediate cylinder and finally into the still larger low-pressure cylinder which works at much lower temperatures. Mr. Moore points out that with very high initial steam pressures and temperatures, the casing of the high-pressure cylinder, which is subjected to the highest temperatures, could be made of molybdenum cast steel. The intermediate-pressure cylinder, which is subjected to more average temperatures, could be made of normal cast steel and the low-pressure cylinder of close-grained cast iron. Multi-cylinder turbines have proved their worth in service. For example, a 25,000 kw. set in Sheffield was in operation for 93 per cent of the greatest possible time for a year at an average load of 86 per cent of the total. A 30,000 kw. set at the West Ham power station has generated over five consecutive years 75 per cent of the total output of the station.