

## Research Items

**Archæological Studies of Disease Introduction.** The archæologist has always to press into his services the methods of other sciences, and Dr. John H. Provinse, assistant professor of archæology at the University of Arizona, according to a communication issued by Science Service of Washington, D.C., is utilising recent botanical studies in an interesting manner to check data upon the occurrence of disease among American Indians in prehistoric times. Dr. A. E. Douglass, astronomer of the University of Arizona, has developed very thoroughly the use of annual rings to determine dates over a period running back through many centuries, the western American climate having led to the formation, over wide regions, of growth rings that appear well correlated with varying climatic conditions. Dr. Provinse now attempts to match the growth rings in fragments of woods buried with diseased Indians with this well-established 'tree-ring calendar'. The tree-ring calendar has enabled the age to be determined of many pueblos and cliff dwellings, and Dr. Provinse now hopes to determine how far back various diseases that affect the skeleton can be traced. Among the diseases diagnosed in these early Indians are Pott's disease; rickets; osteomalacia, a nutrition disorder of adult women resembling rickets; arthritis and Paget's disease. The origin of syphilis is in the minds of the workers, but its diagnosis on pathological bone characters appears uncertain. It is stated that so far there is no proof that it existed in America before the coming of Europeans.

**Cultural History of Cook Inlet, Alaska.** Dr. Frederica de Laguna's report on her expedition to Cook Inlet (University of Pennsylvania Museum, Philadelphia, 1934) covers the material collected during three seasons (1930-32) spent in Cook Inlet and Prince William Sound. The main objective of the expedition was to investigate the question whether an earlier population with an Eskimo culture had preceded the present Athabaskan Indians. The evidence considered here is based mainly, though not exclusively, on material from Kachemak Bay. The Kachemak culture is interpreted as falling into four stages. The basis seems to have been a fairly generalised type of Eskimo culture which included a number of elements common to the Arctic and North Pacific areas. The stone industry of the earlier times is characterised by the relatively greater importance of chipping, including even the chipping of slate. Later, polished slate grows in importance and chipped stone becomes less important. In the second period notched stones appear in great abundance. In the bone industry, the importance of Thule Type I is to be noted in the First Period. Pottery and copper are rare and are restricted to the last phase of the Third Period. The Second and Third Periods alike have flexed burial with grave goods. The dismembered burial is peculiar to the Third Period. Artificial eyes and clay masks are characteristic of the Third Period. Scattered and broken human bones belong to all periods except the First. The house of the Second Period is partially built of stone and whalebone; that of the Third Period is entirely of wood. Both are semi-subterranean. The Eskimo dog, fairly well represented in the First Period, declines in numbers throughout the development of the culture. The culture of the First

Period has more points of resemblance to the Arctic Thule culture of Canada, while that of the Third Period, which is the best known in this investigation, shows development away from the more typical Eskimo pattern towards a more specialised local complex.

**Education of Exceptional Children.** In Pamphlet No. 49 of a series on "Teachers' Problems with Exceptional Children", published by the U.S.A. Education Office, Miss Elisa Martens deals with the children who, though not up to the normal standard of intelligence, are yet able to profit by training at an ordinary school. Here they grow up in a normal environment, and can be trained for useful citizenship. It is essential that the teacher should be interested in these children, and should study each case individually. The curriculum should be modified for them if necessary, and their physical fitness promoted by care and by training in health habits; but above all they must be made happy, and this can best be done by giving opportunities for the expression of such talents as they possess in creative activity. Mentally retarded children need the same basic types of educational activities as do normal children, but the teaching should be as practical as possible. The pamphlet gives much practical advice on a subject which must concern all those who are in any way responsible for the young.

**Preventive Inoculation against Diphtheria.** In the spring issue of the *Fight against Disease* (23, No. 1), the journal of the Research Defence Society, Sir Leonard Rogers contributes an article on the effect of preventive inoculation on the incidence and severity of diphtheria in nurses and children. He concludes from an analysis of a large mass of statistics that the Schick testing for susceptibility and the preventive inoculation are quite harmless, and no serious or harmful effect, still less a fatality, has resulted among 150,000 individuals treated. Of 15,478 'protected' children, only 0.1 per cent were attacked, but no less than 22.5 per cent of 258 'unprotected' contracted the disease. Similarly, of 5,579 'protected' nurses treating diphtheria cases and exposed to grave danger of infection, only 1.86 per cent were attacked, but of 166 known 'unprotected' nurses, no less than 24.1 per cent contracted diphtheria. The average severity of the disease among inoculated persons attacked is also much less than among the uninoculated.

**Indo-Australian Fishes.** Dr. J. D. F. Hardenberg has discussed the species of the genus *Stolephorus* in *Treubia*, 14, Livraison 3, 1934, and in the same journal he has two further papers on new or rare fishes of the Indo-Australian Archipelago and the fish fauna of the Rokan Mouth. *Stolephorus* is a genus the members of which are caught in coastal and estuarine waters. Breeding along the coasts, their eggs are rarely found out at sea, but the adults may live in the deeper open sea waters, and there is evidence of migration not fully understood. Many of them are good for food, the well-known red or Macassar fishes being coloured artificially with a fungus added during preparation. The author has discovered several new forms which he has studied

in great detail—nine species in all. He suggests from the results of these investigations, and in accordance with the embryological data found by Dr. Delsman, that the long slender forms of the open sea with a high total number of vertebrae and the anus having a backward position are more primitive than the higher coastal forms with fewer vertebrae and the anus farther forward. In agreement with this, he states that it might be concluded that there had been during the evolution of the genus a migration from the open sea towards the coast and into the tidal rivers.

**Migrations of Mule Deer.** The summer range of the Rocky Mountain mule deer, *Odocoileus hemionus*, lies along the higher ridges at elevations of 4,000–12,000 ft., but in winter it descends, as a rule, to the lower foothills, from 3,500 ft. near the lower limit of the yellow pine forest to 1,500 ft. in the oak-covered sides of the interior valley of California (Joseph S. Dixon in *California Fish and Game*, 20; 1934; now published separately). Various factors contribute to this migration, the autumn and spring journeys of which may together cover one hundred miles. Food is an important item: if suitable food is available, some or all the deer may not migrate, and food considerations seem to outweigh the effect of low temperature. But a heavy fall of snow, by making food plants inaccessible, becomes a main factor in determining the autumn migration from the high ground. It also compels the deer to move to open hill-sides where they can move freely, and this may enable them to obtain a livelihood on a winter range where forage is relatively sparse; but, most important of all, it adds to their chances of escaping from their enemies, the coyote and the cougar. The deer appear to realise that they are at a disadvantage against these carnivores in deep crusted snow, and although in some such areas food, in the form of wind-broken branches, remained abundant, they were avoided by the deer.

**Larval Trematodes in Terrestrial Molluscs.** W. Adam and E. Leloup have brought together (*Mem. Mus. Roy. d'Hist. Nat. Belgique*, No. 62, 1934) the records in the literature on the larval trematodes found in terrestrial molluscs, and have added critical and explanatory observations on them. They point out that the trematodes belong for the most part to the subfamily Brachylaiminæ (= Harmostominae), and that the determination of the larval stages is almost impossible because of defective descriptions. The authors summarise in tabular form the measurements and other data available on the adults of the species of *Brachylaima* the larvæ of which are found in terrestrial molluscs, add a similar table for the larvæ, and a third table showing the trematodes recorded in terrestrial molluscs (except the Succineidæ). They record their observations on two species of *Brachylaima* from five helicine snails collected in Belgium.

**The Embryonic Cell.** The modern fashion for sectional monographs leads occasionally to the delimitation of subjects for treatment which leave the writer revolving almost *in vacuo*, and this seemed to have happened to Dr. René Souèges in the monograph on "La Cellule Embryonnaire" published as No. 208 of *Actualités Scientifiques et Industrielles* (Paris: Hermann et Cie). He expressly disclaims any intention of dealing with the phenomena of fertilisation

or of subsequent embryonic development, and there remains very little to say in these 60–70 pages upon the plant oospore. It is probably very useful to have our ignorance of this all-important cell thus clearly exposed, and such problems as its polarity of organisation, the persistence of such structures as plastids, vacuome and chondriome are discussed very interestingly. Dr. Souèges goes a little beyond his own prescribed limits when he makes the interesting point that cell divisions follow most rapidly in Angiosperm oospores when these are associated with an endosperm also built of cells; when the endosperm remains for a long time a tissue with many nuclei without separate walls, then the oospore is slower to continue its development.

**'Brown Spot' Disease of Turf.** A short article by Dr. F. T. Bennett, in the *Gardeners' Chronicle* of February 23, describes a disease of grass turf known as dollarspot in America. It has been assumed that *Rhizoctonia solani*, the fungus causing *Rhizoctonia* disease of potatoes, was a common cause of brown spot maladies of turf. Dr. Bennett shows, however, that this is rarely the case in England, where another species of *Rhizoctonia*, named provisionally *R. Monteithianum*, is responsible for most of the damage. No spores of the fungus have yet been discovered, but it propagates itself readily from pieces of mycelium and sclerotial flakes. These may be blown by wind, and can withstand storage for fifteen months or more. Cultural characters of the fungus on artificial media, and symptoms of the disease on lawn turf, are described.

**Gaseous Transfer of Silica.** In *Economic Geology* (pp. 454–470; 1934), E. Ingerson discussed in a most stimulating way the problem of the possibility of transfer of 'insoluble' oxides by solution in gases at supercritical temperatures. That the process is a real one, and of fundamental importance in the genesis of both ore deposits and igneous rocks, is indicated by some experimental results recorded by F. V. Syromyatnikov (*Econ. Geol.*, pp. 89–92; 1935). The object of the study was the synthesis of serpentine from magnesium hydroxide (in the upper part of an autoclave) and silica and water (in the lower part of the autoclave). Silica was transferred upwards by water (gas) at temperatures of the order 400° C., and in some of the experiments Fe<sub>2</sub>O<sub>3</sub> was also found to have migrated upwards. A sample of gas with 'dissolved' SiO<sub>2</sub> and Fe<sub>2</sub>O<sub>3</sub> was condensed and analysed. The amounts found were 0.74 gm. of SiO<sub>2</sub> and 0.90 gm. of Fe<sub>2</sub>O<sub>3</sub> per 1,000 gm. of water. Another point of interest is the proof that more silica was carried up, and fixed as serpentine, than was present at any given time in the gaseous solution. Hence diffusion of silica through the gaseous medium must have occurred.

**New Zealand Pastoral Industries.** A monograph on the pastoral industries of New Zealand by Dr. R. O. Buchanan is the first publication of the newly established Institute of British Geographers, which appears along with the *Transactions* as Publications Nos. 1 and 2. The treatment of the subject is mainly economic, and goes at length into questions of labour, marketing and prices; but certain facts of geographical importance emerge. The whole of the occupied area of the country seems to be suited for both cattle and sheep, but almost everywhere there is a more or less pronounced bias, in which

local geographical conditions play a part, in favour of one or other branch of the live-stock industry. Conditions favouring cattle, which means dairy cattle since the world situation does not favour beef export, are low elevation, easy relief, rich soil and frequent, dependable rainfall. Absence of these factors, especially the topographical ones, leads to predominance of sheep. The monograph is well illustrated by maps and statistics, and is furnished with a detailed bibliography.

**Ignition of Firedamp in Coal Mines.** We have received papers Nos. 89 and 90 from the Safety in Mines Research Board, the former headed "The Ignition of Firedamp by Broken Electric Lamp Bulbs" by G. Allsop and R. V. Wheeler, and the second headed "The Ignition of Firedamp by Coal-Mining Explosives" by C. A. Naylor, W. Payman and R. V. Wheeler. The former is somewhat inconclusive. It is pointed out that under certain conditions the heated filament of an electric lamp after fracture of the glass bulb can ignite firedamp, and experiments have been carried out by the Research Board to see whether it is possible from the appearance of a tungsten filament to determine whether or not the filament has been burnt out in the presence of air (possibly air and firedamp mixed) and may therefore have originated an explosion. Whilst the condition of the filament, whether oxidised or not, can be determined, the results are by no means conclusive. The second paper gives a historical review of experiments on the Continent on the use of cooling salts for preventing explosives from igniting firedamp. It seems that an explosive sheathed in sodium bicarbonate is effective and practicable in this respect, and that the sheath does not interfere with the action of the explosive.

**Insulators of High-Voltage Transmission Lines.** It is now well known that when the insulators of high-tension lines are subjected to an atmosphere loaded with industrial or saline matter, the deposits they receive frequently cause 'faults' on the line owing to 'flashovers' at the normal pressure. In a paper read to the Institution of Electrical Engineers on March 20 by W. J. John and F. M. Sayers, it is stated that these flashovers are usually due either to the insulators getting coated with dirt or grit if near an industrial neighbourhood or, if near the sea, to a coating of salt. To prevent faults forming, it is necessary to keep the insulators clean, as the deposit may increase rapidly. In some cases an ounce of matter has been collected from an insulator after only a few weeks service. When it is an industrial deposit, experience has shown that all faults occur during fog and mist, and that all insulators which fail are covered with a deposit of carbon. It has also been noticed that no faults occur during or after rainfall. Normal rainfall keeps the insulators reasonably clean. This shows that the insulation can be improved by designing the insulator so that a large length of the leakage path is exposed to direct rainfall. Although rain can wash deposits away, it unfortunately provides a wet surface which forms by itself a leakage path. Similarly wind blows the deposits away, but it also brings grit and dust to them. Hence the good and bad effects of wind and rain have both to be taken into account when designing insulators. Salt spray is deposited when near the sea in moist sticky patches on their surfaces. When dew falls a conducting film of salt moisture is formed which may lead to sparking

giving excessive leakage current and so cause the protective gear to operate and interrupt the supply. An important conclusion the authors arrive at is that insulators of different designs may be advisable along different sections of the transmission line.

**Cataphoretic Velocity of Colloid Particles.** Measurements of the cataphoretic velocity of colloid particles made by Messrs. G. N. Mukherjee and S. G. Chandhury, University College of Science and Technology, Calcutta, since 1923 and published in the *Journal of the Indian Chemical Society* from time to time, have indicated that the concept of the 'critical coagulation potential' is of doubtful value, since the value of the cataphoretic velocity at which coagulation occurs may vary very considerably according to the electrolytes employed. Furthermore, coagulation may occur when the velocity is greater than that of the original sol. The forms of the curves relating the cataphoretic velocity to the electrolyte concentration show no correlation for various electrolytes of differing valencies, whilst the velocity may often increase at high concentrations of univalent coagulating ions, especially near the stage of rapid coagulation. Some experiments with arsenious sulphide sols, made by Mr. K. D. Bhaback, have shown that on adding electrolytes, the cataphoretic velocity increases with time as aggregation proceeds, and falls sharply on coagulation. This increase of cataphoretic velocity with aggregation confirms the experimental conclusions of Robinson (*Proc. Roy. Soc., A*, **143**, 130; 1934) who observed a similar effect in the case of particles of benzopurpurin B.

**Alchemy at the Time of Dante.** In a recent issue (pp. 411-417; 1934) of the *Annales Guéhard-Séverine* (Institut Guéhard-Séverine, 4 rue du Seyon, Neuchâtel. Issued free), Prof. J. Ruska gives a brief survey of Latin alchemy of the first third of the fourteenth century. It is to this period that he would ascribe the composition of the celebrated "Summa Perfectionis Magisterii", a work which he says has nothing in common with the genuine books of the Arabic Geber. A treatise of the same period, but one which in argument and exposition is in marked contrast to the "Summa", is the "Margarita Pretiosa Novella" or "New Pearl of Great Price" of Petrus Bonus of Ferrara. This is an introduction to alchemy, and was completed at Pola in 1330. Although the author apparently had some knowledge of practical chemistry and metallurgy, the book as a whole is an uncritical justification of alchemy on philosophical and metaphysical grounds. Its value to the historian of chemistry lies in the numerous and interminable quotations from previous authorities, which render it a rich mine of discovery in the detailed study of the influence of the older alchemists. The principal authorities are the pseudo-Rhazes, the "Turba Philosophorum" and the "Summa"; the paradox of the equal esteem accorded to the last two is explained by the fact that Petrus Bonus appreciated the value of the "Summa" but wished also to appeal to the venerable authority of the "Turba". As usual, the book concludes with a solemn assurance that it contains nothing but the pure truth. Prof. Ruska points out in his closing paragraph that the fourteenth and fifteenth centuries now form the most obscure period in the history of chemistry, and hopes that the problems they present may attract the young generation of chemists.