

Research Items

Blood Groups and Physiognomy. Prof. R. Ruggles Gates has recently received from Dr. L. D. Livingston the photographs of six out of eleven Eskimo of Pond Inlet (lat. nearly 73° N.) tested by him for blood-groups, who were regarded as "practically full-blooded Eskimo". The photographs are published in the March issue of *Man*. On inspection by several anthropologists and laymen, two out of the six were selected as pure-blooded, while of the remainder one was singled out by one observer who had experience of Canadian Indians as having Indian blood. The remaining three were regarded by all observers as having European blood. This classification agrees with the blood groups. The two individuals selected as pure Eskimo belong to the *O* group, the remainder to the *A* group. In the instance of the individual showing Indian admixture, this must be explained as due to a remote white strain, which does not show in the features. Otherwise the evidence of physiognomy agrees entirely with the evidence of the blood groups, as usually accepted for American aborigines. The striking fact which emerges is that while the pure-blooded are *O*, those of mixed ancestry are all *A*. It is pointed out that a European who has the *A* group is more likely to be heterozygous than homozygous for *A*. Any white man who is heterozygous for *A* would have an equal chance of transmitting to his offspring in a cross with an Eskimo the genes for European features combined with either blood-group *A* or *O*. One must conclude, therefore, that while crosses between a white father who was heterozygous for *A* and an Eskimo woman would in many cases be expected to produce a child of *O* blood-group combined with some European features, yet on the other hand the presence of *A* in the offspring can be taken as confirming the evidence from physiognomy that a cross has taken place.

Mortality amongst Game Birds. The Hungarian partridge (*Perdix p. perdix*) has been introduced into the Great Lakes region of the United States, and there it is better adapted to intensively farmed areas than the native game birds or the pheasant, with neither of which does it seem to compete. Large numbers, amounting to more than 260,000 individuals, have been set free in the United States and Canada, mostly during the present century. In the course of a careful description of the standing and relationships of the Hungarian partridge in the Great Lakes region, Ralph E. Yeatter discusses the mortality at different stages. In the breeding seasons of 1930, 1931 and 1932, out of a total number of 143 nests observed, 32 per cent were successful, 68 per cent unsuccessful. The causes of failure were mainly farming operations, which accounted for 46 per cent of the destruction, predators (26 per cent), desertion (16 per cent), while smaller losses were due to farm animals and hatching failures (Bull. 5, Univ. Michigan, School of Forestry and Conservation, Dec. 1934). In later life, careful counts of birds in definite localities were made during the year, and these again showed a very marked decrease in numbers, both during the winter period, when in one case there was an 11 per cent loss in the course of a month, and during late summer in young birds in their first few weeks. Losses of adults appear to be gradual through autumn, winter and spring.

Aeroplane Dusting and Bees. According to Science Service (Washington, D.C.), bees are often destroyed by poisonous dusts spread by aeroplanes as a means for combating insect pests. The matter came up for discussion before the American Association of Economic Entomologists at a meeting held in Pittsburgh on December 27. One speaker maintained that such aeroplane dusting is responsible for the reduction of about one million colonies of the honey-bee in the United States during the past three decades. The mischief, it is stated, is mainly caused by the drift of poisonous dust into the flowers where they are working. Pollen-gathering bees themselves are unaffected owing to the fact that the pollen is stored on their legs and bodies, but the poisonous food is transferred to the hive, where it is fatal to the larvæ, thus inhibiting the increase of the colony at its source.

Historical Investigation of Heterœcism. A study of the heterœcious fungus *Puccinia graminis* is now part of even an elementary course of biology, and it is difficult to conceive that there was a time when the link between its two hosts, barberry and wheat, had not been established. Mr. J. Ramsbottom has published an interesting article (*Trans. Brit. Mycol. Soc.*, 19, Part 2, 128-138, January, 1935), which reveals the extensive observations made by L. G. Windt, on the connexion between the two hosts. Windt was a "counsellour in the chamber of accounts of the Count De Lippe Schaumberg", and published his findings in a book "Der Berberitzenstrauch, ein Feind des Wintergetreides" ("The Barberry-bush an Enemy to Winter Corn"), 1806. The incidence of disease on wheat and rye when barberry bushes grew in the neighbourhood was established in different places and on numerous occasions. Then wholesale eradication of the bushes was recommended, and sponsored by the Count. This measure was entirely successful, and the book closed with a summary of the available knowledge about the causal fungus. A passage, obviously written just before publication, acknowledges Sir Joseph Banks's demonstration that the æcidium fungus on barberry and the *Puccinia* on wheat were really stages of the same fungus.

Cretaceous Mollusca of Japan. The Cretaceous Lamellibranchs and Gasteropods of the Miyako district of Honshû, Japan, have recently been described by T. Nagao (*J. Fac. Sci., Hokkaido Imp. Univ.*, 4, (2), 177-277; 1934). The Cretaceous deposits occur in six small areas along the eastern border of the Kitakama mountainland in north-eastern Japan, where they rest unconformably on Palæozoic or igneous rocks and consist mainly of sandstones with some layers of shale and conglomerate. They include a rich molluscan fauna, comprising 41 species of lamellibranchs and 28 species of gasteropods, of which the striking feature is the large proportion of forms either identical with or closely allied to those found in Europe. These indicate that the deposits are of Gault age and perhaps in part Aptian, but until the Ammonites have been studied more carefully, exact zonal divisions cannot be made. In addition to the Mollusca, calcareous Algæ, Foraminifera, corals and echinoids are also found. The faunal

assemblage in some of the deposits includes numerous examples of a Rudistid lamellibranch (*Præcaprotina*), abundant reef-building corals and *Orbitolina*, recalling the Urgonian facies of Europe.

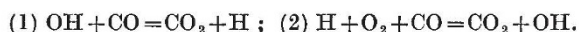
New Type of Filament Hygrometer. In the course of a paper read at the Royal Society of Arts on January 23, entitled "Humidity, Health, and some New Inventions", Mr. C. L. Burdick described a new form of filament hygrometer (*J. Roy. Soc. Arts*, Feb. 22, 1935). As is well known, old pine cones continue to open and close with changes of humidity. This is due to the fact that the outer layer of the conifer scale or bract consists of highly hygroscopic fibres, which lengthen when moisture is absorbed and shorten with desiccation, and with suitable cone fibres treated so as to oxidise remaining traces of resin, a high degree of reaction to moisture can be obtained. Using these treated cone fibres, Mr. Burdick has constructed several types of hygrometer. With hair, linen or cotton thread, paper or vellum, and gold beater's skin, all of which have been utilised for the construction of filament hygrometers, the zero point undergoes considerable alteration in course of time, but cone fibres have been found to remain almost constant during a period of two years, and the cone fibre in its reaction to moisture has three times the linear contraction and expansion of hair, and is practically non-elastic.

Nature of Lightning Discharges. In a recent paper on this subject (*J. Franklin Inst.*, December 1934), Dr. Harald Norinder describes the application of the cathode ray oscillograph to the recording of the electric field changes caused by lightning flashes. For this purpose the author has used the oscillograph and technique which he developed a few years ago for the study of lightning and other surges on electric power transmission lines. A horizontal antenna, suitably damped, was connected to earth through a high resistance, across which the deflecting plates of the oscillograph were connected. The time scale used with the oscillograph gave a sweep time which could be varied from 10 to 10^4 microseconds. The paper referred to above gives an account of the results obtained from some 290 oscillograms of lightning discharges, many of which are illustrated. It is shown that a lightning flash consists of a series of partial discharges, the duration of which may range up to 200 micro-seconds. When these partial discharges are examined on the high-speed records, they are seen to be of a quasi-oscillatory nature having a period of the order of 60 micro-seconds, with superimposed variations of a duration of 1 or 2 microseconds. An analysis has also been made of the polarity of the discharges, and the resulting net field changes. At a distance of 2-7 km. from the lightning flash, the variation of electric field intensity was found to be of the order of several hundred volts per metre.

Induced Radioactivity. Mr. Wenli Yeh, writing from the Institut de Biologie Physico-Chimique, 1 rue Pierre Curie, Paris, sends us details of a classification of isotopes which shows that there is a continuous sequence of radioactive isotopes from ${}^3\text{Li}^3$ to ${}^8\text{O}^{14}$, whereas from ${}^9\text{F}^{18}$ to ${}^{17}\text{Cl}^{37}$ the unstable and stable isotopes alternate, this sudden variation in the sequence affording some evidence of a change in the nuclear structure beyond oxygen. The classi-

fication cannot be extended beyond chlorine owing to the lack of experimental data. A shell model of the nucleus proposed by Mr. Yeh (*Comptes rendus*, 199, 1209, 1404; 1934) suggests that ${}_{18}\text{K}^{40}$ is formed from ${}_{19}\text{K}^{39}$ by neutron capture, the unstable ${}_{18}\text{K}^{40}$ disintegrating with the emission of positrons, or electrons, into ${}_{18}\text{Ar}^{40}$, or ${}_{20}\text{Ca}^{40}$. Recent work by Klemperer (*Proc. Roy. Soc., A*, 148, 638; 1935) indicates that probably the relatively rare isotope K^{40} is responsible for the β -ray activity of potassium. A communication upon the same subject has been received from Mr. S. Nishida, who writes from Konan-Koto-Gakko, Motoyamamura, near Kobe, Japan. Applying the Landé neutron shell nuclear structure to the light elements, Mr. Nishida finds that the radioactive isotopes which emit negative electrons possess neutrons in excess of those required to complete an inner shell, whereas positive electrons are emitted from those isotopes which have incompleting shells. Accordingly there are two types of electron emission, namely, (a) a reaction in which an α -particle is formed with γ -ray emission, for example, ${}_{11}\text{Na}^{24} \rightarrow {}_{12}\text{Mg}^{24}$, (b) the formation of a proton and a deuteron, for example, ${}_{12}\text{Mg}^{27} \rightarrow {}_{13}\text{Al}^{27}$. In addition, two types of positive electron are possible; in each reaction a proton loses a positron and so an additional neutron is produced, for example, ${}_{7}\text{N}^{13} \rightarrow {}_6\text{C}^{13}$, ${}_{15}\text{P}^{30} \rightarrow {}_{14}\text{Si}^{30}$. The proton within the nucleus, if associated with zero or one neutron, is unstable, being converted into a neutron with the emission of a positive electron. This suggests that a proton may be formed by the combination of a neutron and a positron.

Combustion of Carbon Monoxide. The catalytic action of moisture in the reaction $2\text{CO} + \text{O}_2 = 2\text{CO}_2$ has been clearly realised since the researches of H. B. Dixon, and different explanations of it have been given. W. F. Jackson (*J. Amer. Chem. Soc.*, 57, 82; 1935) has made experiments with the object of gaining knowledge of the steps postulated in the chain mechanism involving hydroxyl radicals and hydrogen atoms according to the scheme:



An electrical discharge through moist hydrogen or water vapour provides a reliable source of hydrogen atoms, and there is some evidence that hydroxyl can be drawn from the water discharge. It was found that carbon monoxide was oxidised by the products of an electrical discharge through water vapour. Numerous substances are present during such a discharge, and the discussion of the probable effects of these shows that several of them could not well be assumed to act as catalysts in the oxidation of carbon monoxide. Atomic hydrogen is shown to cause oxidation but it is considered probable that the reaction does not occur directly according to equation (2) but in two steps, with the intermediate formation of HCO or HO_2 . It was found that the products of the action of the discharge on water vapour at pressures below 1 mm. cause the oxidation of carbon monoxide even when they have been drawn several decimetres from the discharge. One of the products of such a discharge is shown to be hydrogen peroxide. It is considered possible that OH radicals may be withdrawn in sufficient concentration to account for the fraction of the carbon dioxide yield which cannot be attributed to hydrogen atoms.