

RESEARCH ITEMS

Scraggly and Ataxic Pigeons

O. Riddle and N. F. Hollander have described (*J. Hered.*, 34, 167; 1943) two recessive characters, scraggly and ataxia, in their cultures of pigeons. Scraggly squabs show crusty and flaky skin homologous to ichthyosis in man, and the feathers appear more slowly than normal and do not interlock. Flight is impossible with these hairy-like feathers, which also do not protect the bird from cold. Scraggly behaves as a normal Mendelian recessive in inheritance and shows no linkage with several other characters. Ataxia has been followed for twenty-eight years. It causes the bird to show several inco-ordinations in behaviour; nodding of the head, unsteady gait, somersaulting, irregular flight and sitting on its tail. Histological examination indicates that myelination in the nervous system is reduced and differences in chemical constitution of the cerebrum-medulla segments of the brain are marked. The condition in pigeons has points of similarity with Friedrich's and with Marie's ataxias in man. Ataxia in pigeons is inherited as a Mendelian recessive, but the inheritance is irregular.

Fibrinogen

A CURIOUS property of fibrinogen not exhibited by other serum proteins has been discovered by L. B. Jaques (*Biochem. J.*, 37, 344; 1943). Study of the clotting of purified fibrinogen by thrombin required, in order to obtain samples for analysis, a method of stopping the reaction quickly which would not affect the solubilities of fibrin and fibrinogen. When dilute iodine, potassium permanganate and potassium dichromate were tested for this purpose they were found to give heavy precipitates with fibrinogen. Both iodine and hydrogen peroxide were reduced by fibrinogen, although with hydrogen peroxide precipitation occurred only in the region of the isoelectric point. This characteristic reduction of iodine and hydrogen peroxide by fibrinogen indicates a further example of the non-sulphydryl reducing groups of proteins studied by Anson and Mirsky. The nature of this group in fibrinogen is unknown, cysteine and ascorbic acid being the only simple substances tested which show similar reducing power, but the negative nitroprusside test suggests that the former is not responsible. It is known that tyrosine and tryptophane reduce iodine in phosphate buffer, and the reducing action may be in some part due to this. Fibrinogen, however, contains a group with much stronger reducing properties than either tyrosine or tryptophane, and the number of such groups apparently increases on conversion of the fibrinogen to fibrin.

Greenland Plants

THE Julianehaab district of south-west Greenland is climatically the most favoured area of that country. It has been many times visited by botanists, and its flora, comprising about 300 indigenous vascular plants, was regarded as one of the best known throughout Greenland. Two months intensive botanizing during the summer of 1937, however, enabled N. Polunin (*J. Linn. Soc.*, 52, No. 345; Oct. 1943) to add another twenty-one species—exclusive of introduced plants—to the flora of this district. Eleven of these are new to Greenland, the rest being species not previously known to occur so far south.

The new discoveries include *Botrychium tenebrosum* Eaton, *Danthonia spicata* (L.) Beauv., *Carex Mackenziei* Krecz., *C. magellanica* Lam., *Gentiana Amarrella* L. (Agg.) and *Antennaria compacta* Malte. *Potamogeton natans* L. is also new to Greenland, but the endemic *P. groenlandicus* of Hagström is reduced to *P. Berchtoldii* Fieb. The plant which had previously been recorded from this district as *Equisetum hiemale* L. is now identified as *E. trachyodon* A. Br. In view of the suggestions which have been put forward that the latter is the hybrid *E. hiemale* × *variegatum*, its occurrence in a country from which *E. hiemale* appears to be absent is of considerable interest. This contribution to the flora and phytogeography of south-western Greenland consists of an enumeration of all vascular plants known to grow in the area visited, with critical notes thereon. Students of the British flora will find much of interest and value in the treatment of polymorphic species such as the alpine *Cerastia*, *Plantago maritima*, *Juncus alpinus*, *Poa* spp., *Carex* spp., and others. *Matricaria suaveolens* is one of the score of alien plants added to the already considerable list of introduced species.

Multiperforate Plates in Xylem Vessels of Monocotyledon Roots

VON MOHL described net-like cross walls in the vessels of palm roots, and B. C. Kundu (*Proc. Ind. Acad. Sci.*, 16, 6; 1942) has now shown that the multiperforate is the only type of vessel segment to occur in the roots of certain Araceae (*Colocasia* and *Alocasia*) and also in *Crinum*, and they are also of frequent occurrence in *Canna indica*. These roots do not have secondary thickening, so that the scalariform-reticulate vessels in which the multiperforate plates occur are in the protoxylem formed about the time of cessation of growth in length. The occurrence of this type of vessel segment associated with earlier differentiated tracheid-like spiral protoxylem elements is of interest, but does not appear to be the same phenomenon as the less general occurrence of multiperforate plates in vessels of certain relatively specialized, herbaceous dicotyledon shoots such as *Helianthus annuus* and *Heracleum Sphondylium*. They are also so different from the scalariform perforations of certain woody dicotyledons, that it would seem premature to draw conclusions as to the primitive nature of the vessels in these monocotyledonous roots.

Fusarium Wilt of the Carnation

THE fungus *Fusarium Dianthi* causes a serious wilt disease of the carnation crop on Long Island, U.S.A. This malady has been studied by J. M. Bickerton (*Bull.* 788, Cornell Univ. Agr. Exp. Sta., Ithaca, N.Y., December 1942). Yellowing, stunting and necrosis accompany the wilted condition, and the pathogen is soil-borne. It generally enters the host through the roots and progresses very rapidly into the shoots when temperatures are optimal—about 80° F. Control measures suggested include the selection of healthy cuttings and the use of resistant varieties grown upon fresh soil. Soil disinfection is apparently successful only within the limits of greenhouse benches, and not in the open. It is interesting that, in addition to formaldehyde, the incipient war 'gas' chloropicrin has been found satisfactory for this purpose—a subtle variant of the beating of swords into ploughshares.

Structure of Boron Hydrides

THE structure of the hydrides of boron has been the object of many theoretical investigations and is still somewhat puzzling. H. C. Longuet-Higgins and R. P. Bell (*J. Chem. Soc.*, 250; 1943) have adopted the view that the molecules contain a

hydrogen bridge linkage $\text{>B} \begin{array}{c} \cdot\text{H} \\ \cdot \\ \cdot\text{H} \end{array} \text{:B}<$ which is re-

garded as a resonance hybrid between structures containing only normal electron-pair bonds, and differs from the ordinary type of hydrogen bond. This provides an explanation of the diamagnetic character of B_2H_6 , and agrees with the fact that all the boron hydrides contain an even number of electrons. The absence of a direct link between the boron atoms explains the chemical behaviour of the hydrides. The authors discuss the bearing on the hypothesis of the data for the electron diffraction, Raman spectrum, infra-red spectrum and specific heat of B_2H_6 , which support a bridge configuration rather than one resembling ethane. Structures for the higher hydrides are suggested.

Synthesis of Adenine

IN the synthesis of adenine by Traube in 1904 from 4:5:6-triamino-2-thiolpyrimidine the overall yield was poor. J. Baddiley, B. Lythgoe and A. R. Todd (*J. Chem. Soc.*, 386; 1943) describe a synthesis from 4:5:6-triaminopyrimidine as parent substance, this being obtained by reduction of 4:6-diamino-5-benzeneazopyrimidine, formed by the condensation of formamidate with benzeneazomalonalonitrile. The thioformyl derivative of 4:5:6-triaminopyrimidine was converted on boiling in aqueous or pyridine solution into adenine, with high overall yield (more than 50 per cent). A comparison of the ultra-violet absorption spectrum of the synthetic product with that of natural adenine showed no divergence. This work makes adenine a readily accessible compound, and similar methods of synthesis could probably be applied in the case of other naturally occurring purines. In another paper, by G. W. Kenner, B. Lythgoe, A. R. Todd and A. Topham (*J. Chem. Soc.*, 388; 1943) some reactions of amidines with derivatives of malonic acid are described, in which some results of other earlier experimenters are corrected.

Constitution of the Solar Corona

A NEW theory of the solar corona has been put forward by H. Alfvén in a paper which has recently reached Great Britain (*Ark. Mat. Astron. Fys.*, 27A, No. 25; 1941). Observational facts have been accumulating for many years that particles exist at or near the sun's surface with energies of perhaps hundreds of electron volts, at any rate far above that corresponding to the photospheric temperature. The hypothesis suggested is that the corona is an atmosphere consisting entirely of such particles. If the light of the corona is regarded as sunlight scattered by electrons which are in equilibrium under gravitation and thermal agitation alone, the observed density function leads to an energy distribution in which the mean energy of the electrons remains almost constant at 180 eV. in the region between 0.2 and 2 solar radii from the surface. This corresponds to a thermal equilibrium temperature of nearly 1.4 million degrees. A very good representation of this state of affairs is found if about 10^{-5} of the solar energy output is used in producing high-energy

particles in the upper chromosphere, and if the low density of the corona prevents loss by radiation. A still better agreement with observation is obtained by allowing for the force on the charged particles due to the gradient of the general magnetic field of the sun; in this case the temperature found is about half that for the simpler assumption. The theory explains at least qualitatively the production of the emission lines and their great breadth, and the characteristic ray structure observed near the magnetic poles of the sun.

Stellar Companions of Small Mass

IN an article (*Pub. Astro. Soc. Pacific*, 55, 79; 1943) H. N. Russell investigates the probable physical characteristics of the quasi-planets recently found in the systems 61 Cygni and 70 Ophiuchi (*NATURE*, 152, 66; 1943). The gravitational attraction of these bodies causes perturbations in the motions of their primaries which suggest that they are only about one-hundredth the mass of the sun. On various plausible assumptions as to the chemical composition of such companions, Russell deduces upper and lower limits for their radii and for their internal and surface temperatures. Even at their hottest the companions are probably not self-luminous, though their internal constitution resembles that of a star. Almost certainly most of their light will be that reflected from the primaries. Until about thirty years ago it was believed that Jupiter and Saturn were feebly self-luminous, yet no objections were raised to calling them planets. Probably the newly discovered bodies are much bigger relative to their primaries than the solar planets, but that raises no insuperable objection in nomenclature; before the secondary minimum of Algol was discovered its variation was described as due to eclipses "by an enormous planet". The author concludes that it is well within the bounds of accepted usage to describe the new bodies as planets.

Polyatomic Emission in the Visual Spectra of Comets

CLOSE on the heels of the discovery a year ago that the bands near 4050 Å. in cometary spectra are due to the polyatomic emitter CH_2 , comes the news that the strong 6300 Å. group is probably to be attributed to NH_2 . Study of cometary spectra in the visual region has not progressed as fast in the past few decades as the improvement in photographic plates might suggest, mainly because of the lack of fast grating spectrographs and of bright comets. The present work (*Astrophys. J.*, 98, 142; 1943) is the result of co-operative study of the spectra of Comet Cunningham and Comet Whipple II carried out at the McDonald, Dominion Astrophysical and Mt. Wilson Observatories. Wave-lengths are given for the emission features in the spectra of the heads of these comets in the region 4800–7050 Å., and possible identifications are discussed. The group of bands at 6300 Å., which is the strongest unidentified feature, behaves with respect to heliocentric distance much as the 4050 Å. group does. Many coincidences are noted with bands in the spectrum of the ammonia-oxygen flame, and it is suggested that the emitter is a photo-dissociation product of ammonia liberated from the solid constituents of the cometary nucleus. Study of the electronic structure and the energy-level diagram to be expected in NH_2 suggests that this molecule is likely to be the one responsible, particularly as the NH molecule, a product of further dissociation, is known to be well represented in cometary spectra.