Crystalline Nature of the Chief Constituent of Ordinary Coal

DUE to the pressure of other duties, I overlooked Prof. H. G. A. Hickling's presidential address to Section C (Geology) of the British Association, delivered at Norwich on September 6, 1935, and extracts from which appeared under the title "Some Geological Aspects of Recent Research on Coal" in NATURE of November 23 and November 30, 1935.

The subject of some fundamental colloidal substance, which acts as the matrix to all the materials of a coal, is, of course, an old one, but I presume to think that a modern aspect of this substance was discussed by me in NATURE several years ago[1] for the first time. I described the substance seen in coal sections in plane polarised light, and between crossed nicols, with a petrological microscope.

The same curious, all-pervading substance is more fully discussed in "The Natural History of Indian Coals"[2], where it is suggested that *fusain* contains dried up matter which in *gel* form makes *lignite* and almost entirely constitutes the substance *vitrain*. The 'rank' of a coal depends on the condition of this fundamental substance, as Prof. Hickling has found.

The value of Hill's law is also appreciated in the same memoir[3], and the question of temperature is also considered. In fact, for several years now the Geological Survey of India has used coal, or I should say the volatile percentage (excluding moisture) of a coal, as a guide to ascertaining pressure (where squeeze has occurred) or temperature (in the case of igneous intrusions) where coal bearing strata are involved. Moisture proves to be a very serious objection in these investigations for obtaining reliable criteria.

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[1] NATURE, **120**, 547 (Oct. 15, 1927); **118**, 913 (Dec. 25, 1926).
[2] *Mem. Geol. Surv. India*, **57**, 224–225, 271, 273, 279–280 (1931).
[3] Ibid., pages 95–97 and 269–271.

Points from Foregoing Letters

Two photographs of desert flora of Central Australia showing extensive growth of the prickly porcupine grass (*Triodia*) are submitted by Prof. J. B. Cleland. This grass has been frequently referred to as 'spinifex', but this name belongs properly to the 'sandhills cane-grass' (*Spinifex paradoxus*), a less common plant in this region.

Prof. B. P. Gerasimovič brings arguments against the accepted view that our galactic system, unlike other nebulæ, consists of several groups or local 'clouds' of stars. He considers that our galaxy is a flattened system the star density of which varies continuously from the centre (in *Sagittarius*), and that the uneven appearance of the Milky Way clouds is due to the presence of dark absorbing matter, such as has also been observed in the Andromeda nebula.

The weight and shape of the 'molecules' of various proteins (ovalbumin, lactoglobulin, etc.) is calculated by A. Polson from the diffusion constant and viscosity of their solutions. The particle weight so deduced is about two-thirds of that calculated from the rate of sedimentation in an ultra-centrifuge, and it is suggested that the difference may be due to hydration.

The heat conductivity of heavy hydrogen, a constant useful in the analysis of mixtures of heavy and light hydrogen, is found by Dr. G. W. Kannuluik to be $32{\cdot}94 \times 10^{-6}$ calories per centimetre per second per degree, as against 41·34 in the case of ordinary hydrogen. Prof. T. H. Laby points out that the method used by Kannuluik, in which a thick electrically heated wire co-axial with a vertical metal tube is employed, eliminates the effect of temperature discontinuity at the wire surface, which affects the results obtained by the thin wire method.

The quantity and composition of the milk obtained from a lactating cow was considerably changed by the injection of large doses of sex hormones (œstrone and œstradiol benzoate). Dr. S. J. Folley submits graphs showing that while the quantity of milk was decreased the percentage of non-fatty solids in the milk became greater.

K. C. Dixon suggests that the readiness with which the removal of lactic acid formed by brain cortex tissue (*in presence of oxygen*) is inhibited by potassium salts may be due to the fact that the chemical changes involved are located in the more accessible surface branches (dendrites) of those cells. He explains, in terms of the accessibility of the glycolitic enzymes, how two of the factors of tissue respiration, namely, the change of carbohydrates into lactic acid and the further oxidation of lactic acid to carbon dioxide, can vary independently.

From the proportion of cocoons parasitised in a definite time by a Chalcid fly, C. C. Ullyett deduces that the area searched by the parasite varies inversely as the number of cocoons per square foot and that the searching is at random.

The fading of short radio waves (1·6–4·8 metres) travelling across a 70-mile water-path, between Long Island and the American mainland, indicates complex interference, due to the presence of two or more components, travelling along different paths. C. R. Englund, A. B. Crawford and W. W. Mumford suggest that this multiple transmission is caused by a stratified atmosphere ; this is supported by measurements of the dielectric constant of air at different heights.

By means of a new formula which gives a linear relation when the energy of the electrons emitted by certain radioactive substances is plotted against a factor based upon the number of cloud-tracks in an expansion chamber, Dr. F. C. Champion and N. S. Alexander find that the highest energies of electrons given off by radium E and thorium C″ should be $1{\cdot}35$ and $2{\cdot}25 \times 10^6$ electron volts respectively.

ERRATUM. In connexion with a note in this column on April 18, Mr. F. Greenshields writes : "The impaternate males of purely arrhenotokous species are not sterile ; and moreover their fertility depends on the regular abortion of the reduction division. It is this abortion of meiosis which would require an explanation if my inferences are correct."