

Upper Carboniferous Fossils in America and Europe

THE interesting note by Prof. A. E. Trueman in NATURE of June 29, p. 1074, recalls to mind some studies of Upper Carboniferous cockroaches, which I made a number of years ago. The results are fully set forth in *Annals and Magazine of Natural History*, April 1927, but it is now pertinent to quote (p. 393):

"The typical Mylacridæ (using this expression to exclude the series related to *Hemimylacris*) abounded in America throughout Allegheny time, yet never, so far as we know, reached Europe. This suggests that the Blattid faunæ of the two sides of the world were not intermingled to any extent during that period, and makes it rather improbable that various Archimylacrid genera crossed over, though they may have done so prior to the rise of the Mylacridæ."

It is possible that land connexions northward were utilised by the plants, but were not usually available to the tropical or subtropical cockroaches. It is also possible that various types of plants did not appear simultaneously on both sides of the world, but developed first on one side and eventually reached the other. But all these matters require more detailed discussion, which is impossible here.

T. D. A. COCKERELL.

University of Colorado,
Boulder, Colorado.
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Methylene Blue as a Stain for Mucus

IN spite of a somewhat adverse criticism, and a statement apparently to the contrary¹, methylene blue is one of the best and easiest stains for mucus. According to Bolles Lee, "Microtome's Vademecum", p. 497 (ninth edition), *Methylene blue is particularly useful from its power of bringing out the merest traces of mucin*, while the following very simple experiment illustrates this.

A few specimens of the common snail (*Helix aspersa*) are collected and placed on small pieces of glass. They soon crawl off leaving a trace of mucus. If the pieces of glass are placed, without further treatment, in a 0.01 per cent aqueous solution of methylene blue the mucus stains a deep blue within two minutes.

Chirocephalus lives apparently quite comfortably in this solution for an hour, and long before that time patches of mucus or a mucus-like secretion appear deeply stained within the median groove.

A. G. LOWNDES.

Marlborough College,
Wilts.

¹ Cannon, H. G., "A Further Account of the Feeding Mechanism of *Chirocephalus diaphanus*", *Proc. Roy. Soc. Lond.*, Series B, No. 806, 117, 455-470; June 1935.

² Lowndes, A. G., "The Feeding Mechanism of *Chirocephalus diaphanus*, Prévost, the Fairy Shrimp", *Proc. Zool. Soc. Lond.*, 1110; 1933.

Points from Foregoing Letters

MRS. BARLOW quotes from Darwin's unpublished manuscripts, dealing with the fauna of Galapagos Islands, to show that so early as 1837 Darwin had begun to doubt the stability of species.

On removal of the xylan from manilla hemp cellulose fibres, X-ray photographs have been obtained which indicate a more perfect state of crystallisation, and are similar to photographs of fibres of low xylan content. W. T. Astbury, Dr. R. D. Preston and Dr. A. G. Norman state that this is compatible with the view that the association of the xylan with cellulose is a mixed crystallisation.

Dr. W. H. George submits a photomicrograph of an etched surface of a crystal of copper (grown by the Bridgman method). Its appearance, similar to that of polycrystalline metals, suggests that the crystal has broken down into a large number of small ones; X-ray photographs show that their orientation has remain unchanged.

New measurements, in vacuum, of the changes in magnetic susceptibility of tin, copper, silver and gold, during allotropic transformation or melting, have been made by Prof. K. Honda and Y. Shimizu. To check Honda's theory, they compared the experimental values with those obtained by adding the change in paramagnetic susceptibility calculated according to the equation of Pauli, Landau and Posener, to the change in diamagnetic susceptibility from the formula of Sommerfeld and Hirone.

Prof. G. Racah discusses the cross-section for the production of pairs of positive and negative electrons by collisions between electrons and nuclei. He submits several approximate formulae and concludes that both the reaction of the process on the incident electron and the interaction between this electron and the nucleus must be taken into consideration.

Many papers discussing the principles of quantum

theory have assumed that to every function of the classical variables there corresponds one unambiguously defined quantum operator. This assumption, writes Dr. R. Peierls, is not necessary in quantum theory, and consequently the paradox pointed out by Prof. Temple can be obviated.

From the uncertainty principle, which states that the position and momentum of a particle cannot both be known accurately at a given time, R. A. Newing calculates the zero-point energy of the harmonic oscillator to be equal to $\frac{1}{2}h\nu/2\pi$.

Dr. Kenneth Smith describes the occurrence of a virus in the roots of a high proportion of normal tobacco plants. The virus appears in the plants under conditions which are usually considered virus-proof. Three possible explanations of the problem are discussed.

The ultra-violet absorption, optical rotation and certain chemical reactions of synthetic vitamin D are found by Dr. O. Rygh, of the State Vitamin Institute, Oslo, to differ from those of vitamin D prepared from cod liver and tunny liver oil. The author concludes that synthetic vitamin D (obtained by irradiating ergosterol) is chemically different from the natural product, which may explain the reported discrepancy in their potency as a cure for rickets in children.

A cobalt wire was heated for some hours to about 1,200°C. in an atmosphere of hydrogen by an alternating current at frequency 50. After the wire had cooled down, Dr. T. F. Wall finds that the saturation value of the intensity of magnetisation was only about 60 per cent of that for the normal cobalt.

The word 'newton' rather than 'vis' is suggested by Dr. L. Hartshorn and P. Vigoureux as a name for the unit of force in the M.K.S. system, that is, for the force which, acting upon a mass of one kilogram, gives it an acceleration of one metre per sec. per sec.