

eliminated by correct design. I have described the correct design of the tapped seating for screw-spindles on p. 52 of my monograph on "The Kinematical Design of Couplings in Instrument Mechanisms" (Adam Hilger, Ltd.) and also in the Thomas Hawksley Lecture¹ for 1933. In the latter will also be found a description of the correct design for the seatings of the ends of the levelling screws for a theodolite, which is just as important as the correct design for the seating of the screw-spindle if strains are to be reduced to a minimum.

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Nov. 29.

¹ *Proc. Inst. Mech. Eng.*, 125, 154 and 177; 1933.

The New Star in Hercules

THE discovery of this star in the early morning of December 13 by Mr. J. P. M. Prentice at Stowmarket was kindly reported to the Solar Physics Observatory at Cambridge by the Astronomer Royal later in the same morning. Watch has been kept the whole of each night since, the star being circumpolar, and spectra were obtained with the Newall telescope in the early mornings of December 14 and 15. The spectrum is of the usual Nova type, just after maximum brightness, consisting of bright bands of hydrogen and of ionised metals with absorption

borders on the side of shorter wave-length. The unusual features on this occasion are the outstanding strength of the displaced absorption lines due to Mg II at 4481 and the fact that the velocity of approach given by the hydrogen and other absorption lines has shown a decrease from about 500 km./sec. to about 250 km./sec. between December 14 and 15. This decrease of the velocity of the first outburst was shown by Nova Geminorum 1912, but it is not a usual feature in Novæ.

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Red 'Water-Bloom' in Iceland Seas

COMMENTING on Mr. John Hart's note¹ on blood-red water-bloom caused by a ciliate in South African Seas, I may refer to a description of exactly the same thing caused by apparently the same organism, but in Iceland waters, published in *Meddelelser* from the Danish Kommissionen for Havundersøgelser (Ser. Plankton 1, No. 8, p. 27; 1909). Hence this phenomenon seems to be, if of short duration, widely distributed, and has previously been recorded.

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Oct. 10.

¹ NATURE, 134, 459, Sept. 22, 1934.

Points from Foregoing Letters

LIGHTNING may take place either in a single discharge or step-wise, according to evidence obtained with the string galvanometer and the cathode ray oscillograph. Study of the atmospherics which originate in lightning flashes has led Prof. E. V. Appleton and Mr. F. W. Chapman to the view that, when intermittent, lightning is similar to the discharge from a Wimshurst machine to which a small Leyden jar condenser is connected, the frequency between successive discharges being often proportional to the magnitude of the first spark. It seems as though the electrical energy used during the first lightning stroke is being replenished at a constant rate, until a critical value is reached.

A knowledge of the mass of the neutron is important in calculating the energy involved in atomic transmutations. Prof. W. D. Harkins and Dr. D. M. Gans obtain as the most probable value for this constant, 1.006 (oxygen = 16).

The radioactivity induced in silver and iodine by bombardment with neutrons (obtained from a beryllium-radon source) is greater if the neutrons are first passed through a thick barrier of gold or lead; the opposite is true of the radioactivity induced in the lighter elements, silicon and aluminium. This result, obtained by a group of Polish investigators, leads them to the view that the capture of a neutron by a heavy nucleus without the emission of any heavy particle (Fermi effect) can take place only when the energy of the neutron does not exceed a certain value.

Phosphomolybdic acid will detect two parts of caesium in a million of water, and will precipitate one part of potassium in ten thousand parts of water; it

is therefore more sensitive than the cobaltinitrite test, according to Mr. J. W. Illingworth and Mr. J. A. Santos.

Chemical combination, according to Prof. R. F. Hunter and Prof. R. Samuel, consists always of the coupling of atoms by means of the entry into the same group in the molecule of two electrons possessing opposite (antiparallel) spin. They disagree with the views that a single electron can act as a bond, and that two electrons coming from one of the atoms only can act as a link, as envisaged by Sidgwick in the case of one of the oxygens in the nitro group ($-\text{NO}_2$), and they claim that all evidence points to the two oxygen atoms in the nitro group being linked in identical manner. Their views were criticised in a Research Item, the writer of which now states that he believes their theoretical conceptions to be unsound.

Manganese, in small quantities, is essential to plants. Mr. G. W. Leeper describes a method of determining the available manganese in soils, and suggests a mechanism for its absorption by plants. He finds more than 100 parts of this element per million in 'healthy' soils; less than 15 parts per million leads to manganese deficiency diseases. This condition is likely to occur in alkaline soils (pH 6.7), particularly in podsols, and it is inadvisable to render such soils more alkaline by the addition of lime.

Mr. F. S. Richards directs attention to several imperfections in the design of the axes of theodolites used in survey work, and also in the optical qualities of the telescopes. Prof. Pollard expresses the hope that theodolite manufacturers will take note of the various suggestions which are being made.