

has been caused by the spreading of bracken on good pasture lands, and it is possible that by utilising the rhizomes for animal food the infested areas can be cleared without incurring much loss.

THE October issue of the Journal of the American Chemical Society contains a long paper by Mr. W. D. Harkins on the structure of atoms. Evidence is given for the statement that atoms in which the ratio of negative to positive electrons in the nucleus is high are rare, both in meteorites and on the earth. Suggested constitutions are assigned to the nuclei of the more abundant light atoms. The constituents of atoms are regarded as α -particles, positive electrons (hydrogen nuclei), electrons, particles of mass 3 (ν -particles), and secondary structures of positive and negative electrons (μ -particles).

Engineering for November 5 contains an illustrated account of a large depôt to be used for the storage of wool, now approaching completion at Hull. This building is being constructed for the Ministry of

Munitions by Messrs. Nissens, Ltd., of Birmingham, and is a development of the well-known Nissen hut, which proved its practical utility on a wide scale so successfully during the war. The area covered is approximately 10 acres, and construction was commenced only on June 16 last. The depôt consists of eighteen buildings of the Nissen type, each 552 ft. long by 40 ft. wide, all communicating. Each semi-circular rib is made up of five segments joined by fish-plates; the ribs are held together by wood purlins. The buildings are double-skinned, with an air-space of 7 in. between the inner and outer linings of galvanised corrugated sheet, and are thus damp-proof and not affected by condensation. Only forty men, on piecework, have been employed, and the rate of building has been approximately one bay of 552 ft. completed per week. The form of construction has several advantages, and is suitable for many purposes. Buildings of practically any length can be made; they are absolutely weather-proof, are capable of erection by unskilled labour, and if lined with 2-in. plaster slabs will be found as cool as brick buildings.

Our Astronomical Column.

THE ECLIPSE OF 1922 IN AUSTRALIA.—Further details concerning this eclipse have come to hand. Mr. W. E. Cooke, the Government Astronomer of New South Wales, has visited various points on the Queensland railway within the totality track, and sends a pamphlet containing his experiences. The inhabitants of the villages are willing to give all possible help to observers. The weather prospects are distinctly hopeful, though the altitude of the sun in this region will not be great (26° at most). The most easterly and most accessible station is Stanthorpe, on the Dividing Range, 2656 ft. high, a favourite summer resort, having several good hotels. Those undertaking observations of a delicate nature should go further inland, to Coongoola or Goondiwindi. As there is a branch of the British Astronomical Association in New South Wales, there is reason to hope that all these stations will be occupied. The west coast of Australia in the neighbourhood of Condon or Wallal is favourable as regards height of sun and probability of a clear sky. Mr. H. A. Hunt, the Commonwealth Meteorologist, notes that Wallal, which is a telegraph station, might be reached from Port Hedland, 150 miles to the west-south-west by pearling lugger; a steamer visits Port Hedland about once a month. Mr. Hunt considers the weather prospects much more hopeful here than in Christmas Island. Another possible locality is in Central Australia, near the telegraph station of Charlotte Waters, which is 110 miles from the head of the railway at Codnadatta.

JUPITER'S SATELLITES.—Mr. R. T. A. Innes has carried out a regular series of observations of the eclipses of these satellites, especially of I. and II., since 1908; he gives the main results in *Union Obs. Circ.* No. 50. On comparing the observed duration of eclipse with the tabular value, there is a regular wave in the residuals with a six-year period, from which it is inferred that the tabular inclination of Jupiter's equator to its orbit needs a positive correction; it is indicated with less certainty that the node of the equator on the orbit needs a negative correction. The tabular values of mean longitude at epoch need the following corrections: I., -0.080° ;

II., -0.031° ; and III., -0.006° . These results are of interest, and they show that the idea, so generally held, that ordinary visual observations of these eclipses are no longer of use, is not correct.

Mr. Innes appeals to all observers to unite in observing the eclipses with special care for the period 1920 December 9 to 1921 May 31. The month February 18 to March 18 may be omitted, as eclipses then take place very near the primary. The disappearance of the last speck of light and the re-appearance of the first speck are the phenomena to which attention should be specially directed. The aperture and condition of seeing should be noted. Mr. Innes points out that observations of satellite I. afford a delicate test of the constancy or otherwise of the earth's rotation.

THE ORIGIN OF SPECTRA.—Dr. H. H. Plaskett contributes an interesting article on spectra to the *Journal of the Royal Astronomical Society of Canada* (vol. xiv., p. 7). The paper summarises Nicholson's work on the atom and that of Planck and Einstein on the quantum theory of light. It is pointed out that there are some serious difficulties in the quantum theory. "Interference can be obtained with a path-difference of more than a million wave-lengths. This seems to require that the quantum must have this length (several feet) in space. Further, the experimental fact that a 3-ft. O.G. has a higher resolving power than a 3-in. can only be interpreted as meaning that the quantum has a 3-ft. cross-section. It is difficult to see how a quantum of such dimensions is indivisible, and if it is, how any light gets into a 3-in. telescope." It is suggested that the facts seem to require some compromise between the undulatory and quantum theories; in fact, the author considers a satisfactory theory of radiation as the first desideratum of future progress, the second being a solution of the three-body problem as applied to the more complex atoms.

Dr. Silberstein's suggestion that the atomic nucleus may not be a homogeneous sphere of positive electricity, but a collection of point charges, is shown to remove some difficulties, but to create others, which have not yet been solved.