does not show any structure at its tip although the spore is completely empty. Finally, I do not think that a polar capsule exists in the spores, nor do I believe that such a delicate structure as the polar filament can penetrate the thick cuticle of *Moniezia*. I suggest that all it does is to help apply the very fluid sporoplasm to the host tissue, and that thereafter the sporoplasm works its way in by secreting a histolytic substance.

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[1] Korke, V. T., *Ind. J. Med. Res.*, 3, 725 (1916).
[2] Ohshima, K., *Annot. Zool. Jap.*, **11**, 235 (1927); *Parasit.*, **29**, 220 (1937).
[3] Trager, W., *J. Parasit.*, **23**, 226 (1937).
[4] Gibbs, A. J., *Parasit.*, **43**, 143 (1953).
[5] Kudo, R. R., Illinois Biol. Monographs, **20**, 7 (1944).

Uses of the Globe Photometer

One may measure the vertical component of daylight in any site by exposing a photometer with a plane perfectly diffusing surface set horizontally. For certain purposes one may set the photometer so as to receive the maximum illumination possible. These illuminations may be expressed as percentages of the diffuse light of the whole sky. Much attention has been given to such determinations in the design of modern buildings.

We measured these daylight factors about twenty-five years ago when studying plant growth in woodlands, illumination in houses and in the sea. For this work vacuum photo-cells were used, also solutions of uranium oxalate in tubes or flasks. The flask[1] gives a better measure of the illumination as it affects plant growth, since it receives light from all angles as a bush does, and it is equally sensitive to sunlight at any angle.

Later[2] we described a globe photometer in which a selenium rectifier cell—a disk—was mounted horizontally under the usual opal-flashed glass plate but covered with both an opal hemisphere and an opal globe, so as to render the disk equally sensitive to sunlight at any angle.

Using two such globes, one can determine the illumination at a shaded point expressed as a percentage of the total diffuse light in the open, namely, I/I_{sky}, as against V/V_{sky}. The former gives a more satisfactory expression for the general lighting of a room, direct and indirect, especially as to plant growth. With the selenium cells low-resistance galvanometers must be used and the form of the current/illumination curve must be determined.

More recently, we have assembled a globe photometer with a thin-film cæsium-on-silver-oxide vacuum photo cell, a type which had proved constant in sensitivity when exposed for more than three years on a roof. This is free from temperature error and always gives a rectilinear relation between current and illumination. It is thus suitable for use in recording daylight over a long period.

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[1] Atkins, W. R. G., and Poole, H. H., *Sci. Proc. Roy. Dublin Soc.*, **19** (18), 173 (1929).
[2] Atkins, W. R. G., and Poole, H. H., *Phil. Trans. Roy. Soc.*, A, **235** (752), 245 (1936).

Rotational Analysis of the Tantalum Oxide Bands

The bands of tantalum oxide have been photographed in the second order of a 21-ft. concave grating having 30,000 lines per inch and giving a dispersion of 0·6 A./mm. Rotational structure of three of these bands, λ 3,747 (ν 26,679), λ 4,155 (ν 24,063) and λ 4,282 (ν 23,348), has been analysed; the first of these is the (0,0) head of one system and the other two are the (1,0) and (0,0) heads of another system of TaO[1]. The analysis indicates that (1) the three bands have a common Σ ground-state which is probably a doublet, (2) ν 26,679 results from a transition between two doublet Σ states, and (3) ν 23,348 and ν 24,063 are attributed to the transition $^2\Pi - {}^2\Sigma$.

The following constants have been determined for the different states involved in the emission of these bands:

Ground state Σ	Excited state Σ	Excited state $^2\Pi_{3/2}$
$B_0 = 0{\cdot}3434$ cm.$^{-1}$	$B_0 = 0{\cdot}3205$ cm.$^{-1}$	$B_e = 0{\cdot}3178$ cm.$^{-1}$
$I_0 = 81{\cdot}51 \times 10^{-40}$ gm. cm.^{2}	$I_0 = 87{\cdot}34 \times 10^{-40}$ gm. cm.^{2}	$B_0 = 0{\cdot}3156$ cm.$^{-1}$
$r_0 = 1{\cdot}827 \times 10^{-8}$ cm.	$r_0 = 1{\cdot}891 \times 10^{-8}$ cm.	$B_1 = 0{\cdot}3112$ cm.$^{-1}$
		$\alpha = 0{\cdot}0044$ cm.$^{-1}$
		$I_e = 88{\cdot}06 \times 10^{-40}$ gm. cm.^{2}
		$r_e = 1{\cdot}900 \times 10^{-8}$ cm.

The D values in all cases are of the order of 10^{-6} cm. A study of the Λ type doubling in the two bands ν 23,348 and ν 24,063 indicates that the $^2\Pi$-state belongs to a near case (*a*) of coupling and is probably inverted. Details of this work will be published elsewhere.

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[1] Premaswarup, D., *Ind. J. Phys.* (in the press).

Origin and Age of Meteorites

In his recent article under this title[1], Prof. H. C. Urey says: "While the excellent studies of Paneth and his co-workers are most interesting because of the facts which they present about the formation of meteorites and the effects of cosmic rays, I believe that it is very difficult to decide what event or events were recorded by the helium, uranium and thorium abundances".

We should like to put on record that we agree with Prof. Urey that there are difficulties in the interpretation of our results; but that we do not think that his statements prove that our arguments, leading to an age of no more than a few hundred million years, are incorrect. We are not convinced that his interesting thermodynamic reasoning can be applied to the calculation of the maximum quantities of uranium and thorium in iron meteorites, since it is by no means certain that their distribution was achieved under equilibrium conditions.

Prof. Urey conjectures that the uranium and thorium are present only in silicate and sulphide inclusions, and that the helium has leaked from these inclusions along fissures. While it is true that some meteoritic irons do contain substantial inclusions and fissures, we should like to direct attention to the fact that the beautifully homogeneous Savik iron (in which