in the declination traces (Fig. 2), and this fact makes it difficult to interpret the exact effects of the eclipse. The magnetic disturbance is reported on a world-wide scale and appears to have begun about 17.45 G.M.T. on June 18. The most significant facts emerging from our observations are:

Fig. 2.

(1) On June 18 and 20, f_E^0 rose fairly steadily from 03.30 to 07.30, but on June 19 it was below the average before and during the eclipse, and rose suddenly to a value above the average of June 18 and 20 immediately after the eclipse. Previous eclipse results have shown that f_E^0 decreases when the ultra-violet light is cut off, but it is probable that in our case it was from the abnormal Region E that echoes were obtained. The persistence of echoes from the region beyond the critical frequency makes the determination of the exact value of this frequency difficult.

(2) On June 18 and 20 the ionization density of Region F increased as the day advanced. On June 19, however, after 05.30 it became vestigial and remained so until 07.30, but the ionization had increased again by 10.30, local noon.

(3) The height of Region F_2 was greater on the morning of the eclipse than on the other two mornings. At the time of maximum eclipse, it showed a marked increase in height, and $f_{F_2}^0$ decreased appreciably, showing a marked minimum.

A. B. WHATMAN.

Royal Signals Mess,
Catterick Camp,
Yorkshire.

R. A. HAMILTON.

Electrical Laboratory,
Oxford.

The 2.73μ Absorption Band of Fused Silica

DR. D. G. DRUMMOND, in commenting¹ upon his own and our suggestions² that the 2.73μ band of fused quartz is possibly produced by dissolved carbon dioxide, suggests that it would be of interest to know whether the quartz specimens which we used were prepared without contact with carbon. This interest arises from the fact that in none of our specimens did we find a trace of the band in question, whereas other investigators always have found such a band. Inasmuch as we had made a particularly careful study of a 5 mm. plate furnished us by the Hanovia Chemical and Manufacturing Company, of Newark, N.J., we wrote to this company and wish to quote them as follows: "Quartz specimens of our manufacture are prepared between carbon blocks and fusion is done with flames containing carbon dioxide. As a result, our quartz has an excellent opportunity to dissolve carbon dioxide gas." Inasmuch as we found no trace of the 2.73μ band in this company's product, it seems that the impurity which enters in

some methods of manufacture must be other than carbon dioxide. We made observations on several other samples, some of which were probably furnished by other companies, but we are unable to make a complete trace of the records of purchase.

In our previous letter², we gave our reasons for believing that the impurity involved may be water vapour. Evidence for the existence of either carbon dioxide or water vapour could doubtless be obtained either by Dr. Drummond or by some other experimenter possessing a fused quartz specimen several centimetres in thickness which shows the 2.73μ band. This could be done by locating higher overtone bands in the region of waves shorter than 2.7μ . In support of the water vapour hypothesis, we wish to point out that if this appeared as an impurity to the extent of only a few tenths of one per cent, it would account for the depths of the 2.73μ absorption band even in the cases of those earlier investigations in which the bands appeared with considerable intensity.

J. W. ELLIS.
W. K. LYON.

University of California
at Los Angeles.

¹ Drummond, *NATURE*, **138**, 248 (1936).

² Ellis and Lyon, *NATURE*, **137**, 1031 (1936).

THE note by Drs. Ellis and Lyon appears to leave no longer tenable the hypothesis of carbon dioxide impurity as the cause of the 2.73μ absorption band in fused silica. They suggest searching for higher overtone bands as a method of identifying the impurity. From my published curves¹ in the shorter wave-length region, it will be seen that though the 2.73μ band appears with considerable intensity in Section C (29.85 mm. thickness) the water vapour bands near 1.36μ and also 1.87μ are absent, though they might have been expected with intensities of the order of 10–20 per cent. The water vapour band near 6μ would not be expected to show, even if present, in Section H (0.109 mm. thickness), since here the thickness of material is much too small.

I should mention that in curve A , in my paper quoted, the resolving power was too low to decide whether narrow bands were present, the great length of this specimen preventing the utilization of the full resolving power of the apparatus.

I have observed this 2.73μ band also in emission from hot fused silica, and intend publishing a note to describe this work.

D. G. DRUMMOND.

Physics Department,
Armstrong College,
Newcastle-on-Tyne.

¹ Drummond, *Proc. Roy. Soc., A*, **153**, 328 (1936).

Mechanism of the Diastole of Contractile Vacuoles

It is still not known what causes the passage of fluid from the cytoplasm into the contractile vacuole of a protozoan. In a recently published paper¹, Picken has claimed that the rate of this "infiltration" of fluid into the vacuole will be proportional, among other things, to the difference between the hydrostatic pressure of the cytoplasm (which is maintained by tension on the pellicle) and the colloid osmotic pressure of the cytoplasm, the former tending to produce infiltration and the latter to prevent it. The system which Picken has envisaged appears to resemble the excretory mechanism of vertebrates