and the drawing of the continuous spectrum on a microphotometer tracing is, to a large extent, a matter for individual judgment. This is especially true in the Hγ region and near λ4500, and it is perhaps significant that the secondary maximum found by Barbier, Chalonge and Vasy is based on measures at these wave-lengths.

The Greenwich measures for December 31, 1934, were taken in the spectral regions surrounding Hα, Hβ, Hγ and Hδ. The results when plotted form a curve continuous with Barbier, Chalonge and Vasy's values for the ultra-violet (λ3400–λ4000) and no secondary maximum is shown. The continuous curve is, however, not a Planck curve.

In view of the part played by individual judgment, it would be rash to maintain that any particular observer's idea of the 'continuous spectrum' is the correct one. But one thing at least is clear. It is dangerous to base a physical theory on a feature, such as a secondary maximum, which has been noted by one set of investigators, and which is entirely absent in the results of others.

W. M. H. GREAVES.

Royal Observatory,
Greenwich.
Feb. 5.

[1] *Z. Astrophys.*, **10**, 5, 366, October 1935.

The Electrometer Triode Valve as a High Resistance and as an Earthing Key

WHEN the electrometer triode valve is used for the measurement of ionisation currents obtained in the ionisation spectrometer[1,2], a high resistance, consisting of a pencil line on amber, is commonly used as a 'leak'. This type of high resistance, which demands skill and experience for its successful construction, may be conveniently replaced by a commercial electrometer triode valve.

The grids of two electrometer triode valves are connected together and to the source of charge to be measured. The normal anode potential is about 5 volts, but if the anode potential on one of the valves is raised above $7\frac{1}{2}$ volts, then the valve acts as a high-resistance leak. Within the experimental error, the change in anode current of the 'measuring' valve is found to be directly proportional to the current leaking away through the 'high-resistance' valve, over the range investigated, namely, 0 to 2×10^{-12} amp. The error in measuring the integrated reflections from the crystal planes is ± 2 per cent for the larger reflections and more for the smaller. The value in ohms of this high resistance is quite reproducible and depends only on the filament, grid and anode voltages applied to the valves. Since an increase of anode or filament voltage reduces the resistance, its value is easily changed.

When the leak is increased sufficiently, the 'high-resistance' valve behaves as an earthing key, which is unique in our experience, in that on opening it introduces no spurious deflection of the galvanometer.

Two electrometer triode valves coupled in this way have been used to measure the total charge collected in an ionisation chamber during the transit of a crystal plane through a reflecting position. Normally the filament current is passing in the 'earthing key' valve, but when the charge is to be collected the filament current is cut off. The grid of the 'earthing key' valve then has no appreciable leak and the change in anode current of the 'measuring valve' is proportional to the charge collected. On switching on the filament current of the 'earthing key' valve, the potential of the grids is rapidly brought back to its former value. (Over a period of six hours this 'floating' potential does not change more than 0·02 volt.) The same valve may, therefore, be used either as a high-resistance or as an earthing key according to the values of the filament and anode potentials.

A full account of the application of this work to an automatic ionisation spectrometer will shortly appear elsewhere.

W. A. WOOSTER.

Crystallographic Laboratory,
Cambridge.

A. J. P. MARTIN.

Nutritional Laboratory,
Cambridge.

[1] W. A. Wooster, NATURE, **131**, 545 (1933).
[2] B. W. Robinson, NATURE, **131**, 546 (1933).

Conditions in Cumulus Cloud

IN a note in NATURE of February 1, p. 194, reference is made to a theory of supersaturation, which, it appeared, observations did not support. I would point out that the theory is possibly unsound in any event. Apart from the question whether there could be an equilibrium between liquid water and vapour in the supersaturated state, there is the question whether vapour in the supersaturated state is lighter than air. I suggest that at twofold saturation the effective molecular weight may be nearly 36, owing to overcrowding of the simple molecules which must then aggregate in (presumably) unstable groupings smaller than the smallest liquid drop.

The reports of glider flights suggest that cumulus need not be in static equilibrium at all but may be supported on a rising column of air, as the little balls we used to shoot in fair-grounds were supported on rising columns of water.

W. BARRETT.

Fuglestemmen,
Layters Way,
Gerrard's Cross,
Bucks.
Feb. 3.

MR. BARRETT has misunderstood the main point of the note to which he refers. Meteorologists do not expect cumulus clouds to be in static equilibrium, but on the contrary to be associated with rising air currents composed normally of air that is less dense than its environment at the same level. If observations showed that the rising air were warmer than its environment, the lower density of the former would be easily explained, but observations show that it is often colder, and the problem is to explain the anomaly of cold air rising as a result presumably of convection, since these clouds are normally regarded as of convectional origin. The reports of pilots of gliders merely confirm what has long been known to meteorologists, for example, from the behaviour of pilot balloons on encountering cumulus clouds.

THE WRITER OF THE NOTE.