

### Proposed International Magnetic and Allied Observations during the Total Solar Eclipse of August 21, 1914 (Civil Date).

In response to an appeal for simultaneous magnetic and allied observations during the coming total solar eclipse, cooperative work will be conducted at stations along the belt of totality in various countries and also at some outside stations.

The general scheme of work proposed by the Carnegie Department of Terrestrial Magnetism embraces the following:—

(1) Simultaneous magnetic observations of any or all of the elements according to the instruments at the observer's disposal, every minute from August 21, 1914, 10h. a.m. to 3h. p.m. Greenwich civil mean time, or from August 20, 22h., to August 21, 3h. Greenwich astronomical mean time.

To ensure the highest degree of accuracy, the observer should begin work early enough to have everything in complete readiness in proper time. See precautions taken in previous eclipse work as described in *Terrestrial Magnetism*, vol. v., p. 146, and vol. vii., p. 16. Past experience has shown it to be essential that the same observer make the readings throughout the entire interval.

(2) At magnetic observatories all necessary precautions should be taken to ensure that the self-recording instruments will be in good operation, not only during the proposed interval, but also for some time before and after, and eye-readings should be taken in addition wherever it is possible and convenient. It is recommended that, in general, the magnetograph be run on the usual speed throughout the interval, and that, if a change in recording speed be made, every precaution possible be taken to guard against instrumental changes likely to affect the continuity of the base line.

(3) Atmospheric-electric observations should be made to the extent possible with the observer's equipment and personnel at his disposal.

(4) Meteorological observations in accordance with the observer's equipment should be made at convenient periods (as short as possible) throughout the interval. It is suggested that at least temperatures be read every fifth minute (directly after the magnetic reading for that minute).

(5) Observers in the belt of totality are requested to take the magnetic reading every thirty seconds during the interval, ten minutes before and ten minutes after the time of totality, and to read temperatures also every thirty seconds, between the magnetic readings.

It is hoped that full reports will be forwarded as soon as possible for publication in *Terrestrial Magnetism and Atmospheric Electricity*.

L. A. BAUER.

Washington, June 23.

### Asymmetric Haloes with X-Radiation.

A RADIOGRAPH of a lead disc 2.5 mm. thick, raised above the plate, does not, as might be expected, appear of an even intensity, but gives well within its shadow a distinct white ring. The area inside this ring is grey, and the annular space outside it dark. Experiment has shown that its brightness, width, and diameter vary with the distances of the disc from the plate and antikathode. It also changes from a complete circle to almost a semi-circle, the position and dimensions of the absent arc depending upon the orientation of the bulb.

The ring is found to be complete when the X-rays are in the plane of the kathode rays and the normal of the antikathode, and from  $10^\circ$  to  $15^\circ$  within the

angle of true reflection, i.e. that at which light substituted for kathode rays would be reflected. Diverging from this direction the circle becomes increasingly incomplete, the break in the curvature being always on the side furthest from it.

Apertures, cubes, cylinders, solid and hollow, spheres, etc., of various materials give analogous results, the form of the white area depending upon the shape of the object. Thus an ebonite cylinder gives this effect in addition to the peripheral bands and alternating semicircles described in former letters.

This phenomenon cannot be attributed to ordinary secondary radiation, since the ring is not dispersed by strong magnetic fields. Scattering, unless at some definite angle, is precluded by the sharpness of outline, and the asymmetry would seem to dispose of diffraction and polarisation, since the dark and light parts of the ring are opposite, and not at right angles.

It appears, therefore, that the X-radiation has been differentiated into two main types, one of which may consist of disparate doublets (magnetic); the polarity being distributed radially round a position which coincides with that of maximum intensity (Kaye). This phenomenon bears a close analogy to that of unilateral conductivity in crystals.

W. F. D. CHAMBERS.

I. G. RANKIN.

90 Gordon Road, Ealing.

### The Composition of the Atmosphere.

MR. A. PARKER (*Jour. Chem. Soc.*, April, 1914) in a study of the inflammation of mixtures of methane with oxygen and nitrogen, has found that inflammation can be brought about more easily in mixtures containing nitrogen than in pure oxygen. In fact, the mixture which requires for ignition a minimum of methane contains only about 23 per cent. of oxygen. This unexpected result is traced to the difference in the specific heats of oxygen and nitrogen, and not to any property of methane. If one may assume that combustions at other temperatures behave in a similar manner, perhaps all slow combustions can be maintained with a minimum expenditure of energy in a mixture of oxygen and nitrogen containing about 23 per cent. of oxygen.

The close proximity of this proportion to that of atmospheric air is remarkable. Is it possible that living matter on the earth's surface has evolved its own atmosphere, as it were, so that the dissipation of the energy of metabolism may be a minimum? The temporary stimulation of animals by pure oxygen is not necessarily contrary to this hypothesis. I should be glad to know if the estimated total amount of carbon in organic matter, including coal, is equivalent to an amount of oxygen at all comparable with that in the atmosphere; or, in other words, if a large increase or decrease in the amount of organic matter on the earth could alter appreciably the proportion of free oxygen in the air.

N. P. CAMPBELL.

Trinity College, Kandy, Ceylon, June 24.

### Elevation of Mouth of Harton Colliery.

WILL some reader of NATURE kindly inform the writer, through this journal, what the elevation above sea-level and the location of Harton Colliery are, where Sir G. B. Airy made his pendulum observations on the force of gravity at the mouth and bottom of that mine in 1843, and also if the result of those observations is still generally accepted as correct.

EVAN McLENNAN.

Corvallis, Ore., U.S.A., June 20.