of testing the theory by experiment and also of determining the sign of the earth's charge, should the theory prove correct.

Details of the calculations and other aspects of the theory are given in a paper which will appear elsewhere.

I have found since writing my first communication[1] that the hypothesis of a radial cosmic electric field, with the earth near its centre, had previously been suggested by T. H. Johnson[5] in an attempt to account for his observation that the primary corpuscular radiation is exclusively positive.

L. G. H. HUXLEY.

University College,
Leicester.
Sept. 15.

[1] NATURE, **134**, 418, Sept. 15, 1934.
[2] *Phys. Rev.*, **43**, 87; 1933.
[3] NATURE, **132**, 407, Sept. 9, 1933.
[4] NATURE, **131**, 713, May 20, 1933.
[5] *Phys. Rev.*, **45**, 569; May, 1934.

Distortion of the Crystal Lattice of α-Brass

WHEN a metal is cold-worked, its X-ray spectrum is modified. In most cases, this modification includes a diffusion of the diffraction lines. If the diffused lines are photographed in an X-ray camera giving high dispersion, and analysed with the aid of a microphotometer, it is found that, in general, the broadening does not take place symmetrically about the normal position of the line.

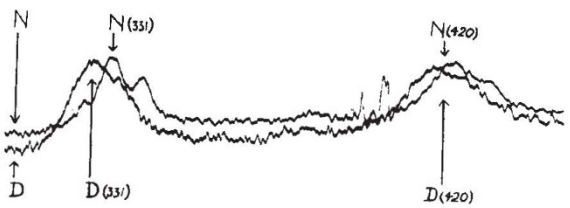

FIG. 1.

This observation is illustrated by the accompanying microphotometer record (Fig. 1). It is selected from results obtained on specimens of α-brass which have been cold-rolled to different degrees. The curve marked *N* shows the trace of the (331) and (420) lines of the spectrum; these are given by a normal annealed specimen. That marked *D* is the corresponding trace, taken on the same record, from the same specimen but after deformation has occurred. For convenience of illustration, the photographic negatives were placed in the microphotometer carrier in such a way that the (420) line of the normal specimen was made to fall directly above that of the cold-worked specimen. It is seen that the (331) line of the latter is then definitely displaced relatively to the normal (331) line; it differs in position and in intensity distribution.

This means that the deformation of the metal is accompanied by a change in the average size and shape of the unit cell, and by a change in the latent energy of the crystal lattice.

W. A. WOOD.

National Physical Laboratory,
Teddington,
Middlesex.
Sept. 14.

Raman Spectrum of Nitrosylsulphuric Acid

THE structure of nitrosylsulphuric acid is being investigated by Raman spectra. The acid was prepared by bubbling sulphur dioxide into specially purified nitric acid to which a small amount of glacial acetic acid had been added. A solution of nitrosylsulphuric acid in commercial 100 per cent pure sulphuric acid was examined using a Hilger Raman spectrograph and Ilford New Double X-Press plates. The spectrum obtained after $6\frac{3}{4}$ hours exposure was rich in Raman lines. Raman displacements of 424, 549, 730, 915, 1043, 1181 and 1378 cm.$^{-1}$ were obtained. These clearly arise from the sulphuric acid and are in good agreement with previously recorded values. In addition, a number of other lines due to the nitrosylsulphuric acid were present; most of these were faint, but one corresponding with a displacement of 2340 cm.$^{-1}$ had an intensity comparable with the intensities of the sulphuric acid lines.

Further work is in progress, and a full discussion of the results will be published elsewhere.

W. ROGIE ANGUS.
A. H. LECKIE.

Sir William Ramsay Laboratories of
Inorganic and Physical Chemistry,
University College,
London, W.C.1.
Sept. 20.

Denitrification in Sunlight

THE ordinary denitrification taking place in the absence of oxygen and in presence of an easily oxidisable organic substance and a nitrate effected by many micro-organisms, is well known. There is another variety of nitrogen loss, which takes place in presence of oxygen, but has not yet been satisfactorily explained. It will be evident that this loss of nitrogen from the soil, which may amount to double the quantity of nitrogen taken up by plants, is due to an oxidation process followed by a photochemical and catalytic decomposition.

J. G. Lipman and A. W. Blair[1] have shown that nitrogen in the gaseous state is lost from soils when the conditions are favourable for oxidation. The loss amounted to 100 lb. per acre per year in the first nine inches of the soil, both in New Jersey and California. In these experiments, the conditions existing in the soil in the past were disturbed by making the soil suitable for more oxidation. Similar nitrogen losses have been observed at Rothamsted, Minnesota, Kansas, Indian Head (Saskatchewan), Nagpur (India) and other places. Nearly 70 per cent of the added nitrogen is said to have been lost when wheat plots in Rothamsted have received 14 tons of farmyard manure containing 200 lb. nitrogen. These losses are more pronounced in soils which have been highly aerated.

That the oxidation of ammonium salts is an important factor in this type of denitrification is also evident from the following observations. Niklewski[2] reported that when the manure was free from nitrifying bacteria, only 3 per cent nitrogen was lost as ammonia but when supplied with nitrifying bacteria, the manure lost more than 20 per cent of its nitrogen. Moreover, Russell and Richards[3] have observed a greater loss of nitrogen when a manure was composted under aerobic than anaerobic condition. Vishwa Nath[4] has obtained greater nitrogen loss and velocity of oxidation in the nitrification of