rotate until the high-frequency oscillator is again tuned to 110 kc. per sec. below the frequency of the transmitted signal (that is, when the difference in current through the relay windings is again zero).

Fig. 1 shows a curve of the type referred to above. The frequency on which the exploring waves are sent out is increased continuously from 2·7 to 5·2 mc. per sec. The broad white trace near the bottom of the picture is due to the ground pulse. At the lower frequencies reflection has taken place both from the *E* and *F* regions. Magneto-ionic splitting and the critical frequency for the ordinary ray from region *F* are also shown. The appearance of a saw tooth effect on the upper edge of the ground pulse trace shows the 'hunting' of the receiver tuning. The light vertical lines shown in the picture are due to interfering stations.

One of the difficulties in applying this system is the small amount of energy available for control purposes. The duration of the emission, which is repeated fifty times per second, is only 10^{-4} sec. The energy is therefore less than 1/200 of that of a continuous emission of the same power. It is essential that the energy from the wanted transmitter should be great in comparison with that from all others.

This may be achieved in two ways: (1) by causing the energy to be passed from transmitter to synchronising system by means of a transmission line; (2) by arranging that the valve V_1 in the synchronising system is only sensitive for the duration of the wanted emission. The second arrangement makes it possible to link a receiver with a transmitter even in the absence of a ground ray.

This work was carried out at the Radio Research Station, Slough, as part of the programme of work of the Radio Research Board.

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[1] NATURE, **133**, 66 (1934).

Geomagnetic Effect on Cosmic Radiation in the Stratosphere

As shown in a previous note[1], the geomagnetic effect on cosmic radiation seems to begin at the same latitude (about 50°) independently of the altitude. We concluded, therefore, that it would be interesting to compare the latitude effect of all our ionisation measurements, made during the two last ascents of the *F.N.R.S.* (1932–34), without taking the altitude into account.

For this purpose, we have plotted against the geomagnetic latitude λ, the ratio between the ionisation J_λ measured at λ degrees, and the ionisation $J_{50°}$ measured at 50° at the same altitude (Fig. 1).

Each point in Fig. 1 being the mean value of a series of measurements, the rectangles give the probable error calculated from the dispersion of individual measurements. The measurements include those already used in our previous note and also those made with the high-pressure ionisation chamber. All the measurements were performed at altitudes corresponding to pressures of the atmosphere between 70 mm. and 180 mm. Hg.

It can be seen that the magnetic effect is practically the same at all altitudes, the dispersion of experimental points being less than the probable error. The critical geomagnetic latitude is about 49°, the same as at sea-level. For λ less than 49°, the decreasing rate is of the order of 7 per cent per degree.

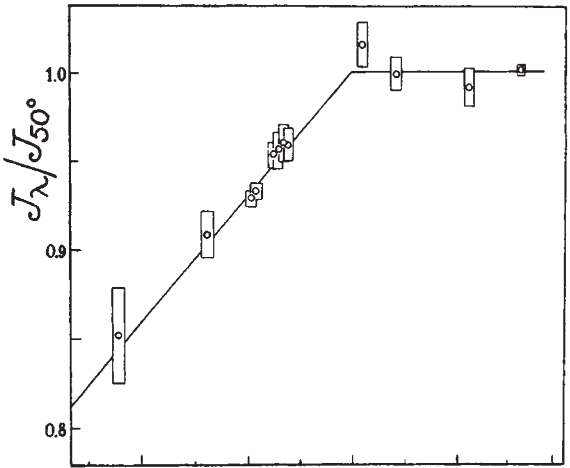

FIG. 1.

This result seems to be in contradiction with the hypothesis that the lack of magnetically soft components in the cosmic radiation at sea-level is only due to atmospheric absorption.

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[1] NATURE, **135**, 313 (1935).

Diffraction of X-Rays by Bence-Jones Protein

FOLLOWING the discovery by Bernal and Crowfoot[1] of the sharp diffraction spectra obtained from single pepsin crystals, Wyckoff and Corey[2] showed that with suitable technique certain other microcrystalline proteins (for example, oxyhæmoglobin) give diagrams with spacings between 10 A. and 40 A.

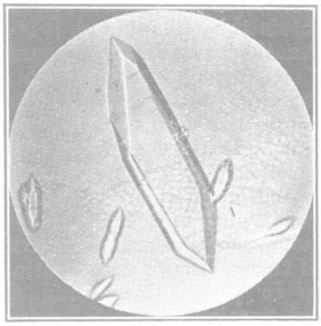

FIG. 1. Crystal of Bence-Jones protein. × about 225.

We had at our disposal a sample of crystallised Bence-Jones protein obtained by precipitating three times with ammonium sulphate, dialysing against distilled water and concentrating in the cold; the crystals spontaneously precipitated from the aqueous solution were dissolved in a little sodium chloride or urea solution and reprecipitated by dialysis, etc. The largest single crystals were 150 μ long and 15–60 μ