Luminous Night Clouds.

DR. G. M. B. DOBSON, in his recent Halley lecture on "The Uppermost Regions of the Earth's Atmosphere," makes mention of the phenomenon of 'luminous clouds' (NATURE, May 15, 1926, vol. 117, p. 697).

These clouds, discovered in 1885 by Prof. Ceraski, Moscow, may be observed in northern latitudes

FIG. 1.—Luminous night clouds on August 8-9, 1925, 22 h. 47 m. U.T. Exposure 2 min.

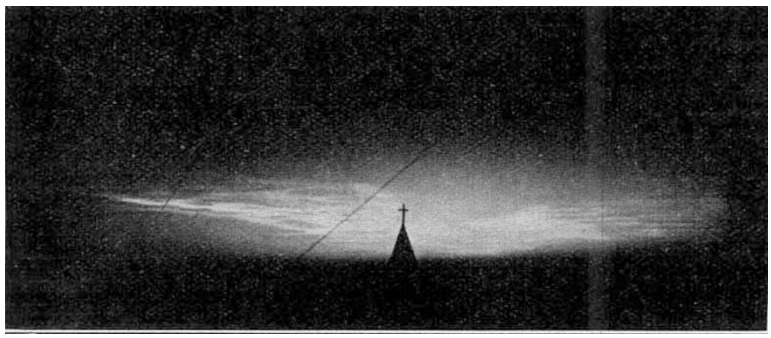

FIG. 2.—Luminous night clouds on August 8-9, 1925, 23 h. 29·5 m. U.T. Exposure 3 min.

50°-60°, during the summer period, between the middle of May and the middle of August; in the southern hemisphere they are observed from November to February.

The 'luminous' clouds are rather like the 'cirri' in appearance, but they seem to gleam on the background of the segment of the dawn, whereas the common 'cirri' appear dimmed and dark when seen against the sky at dawn. The characteristic feature of luminous clouds appears to be, as indicated by O. Jesse, their unchangeable altitude over the earth's surface; on the average about 82 km. It is interesting to note that the Heaviside layer, which plays such an important part in radio telegraphy, is at the same height of 80 km.; moreover, according to Trowbridge (*Astrophys. Journal*, 1907), the tails of meteors are generally also observed at this same height (87 km.). These facts indicate peculiar properties for the layer lying at an altitude of 80-85 km. above the earth's surface; it seems possible that all phenomena observed at this height are closely connected with one another.

Our knowledge of luminous clouds is very incomplete and we have no satisfactory theory relating to their origin. The hypothesis of volcanic origin, maintained for some time after the first observations of luminous clouds in connexion with the eruption of Krakatao in 1883, had to be rejected, these clouds being observed almost every year, and independently of volcanic eruptions.

Lately (*Met. Zeitschrift*, Oct. 1925) a theory proposed by A. Wegener regards luminous clouds as being due to condensation of normal water vapour; this theory, however, has also met with many objections (*Met. Zeit.*, Mar. 1926.)

Luminous clouds, after being a vary rare phenomenon for a certain period of time, were again frequently observed during recent years. They were observed in Russia in 1916–19–20–22–23–24, and 1925; on the night of August 8-9, 1925, I succeeded in obtaining six photographs of these clouds from Leningrad at the Astronomical Observatory of the Russian Amateur Society for the Study of the Universe (Mïrovédénïé) and the Scientific Institute of P. F. Leshaft (Figs. 1 and 2). The measurements of the photographs showed that the clouds, having started from a point 13° to the east from north, moved with the velocity of 230 metres a second to the south-south-west.

A detailed account of these observations will shortly appear in the Journal *Mïrovédénïé* (vol. 15, No. 2, 1926).

We consider observations of luminous clouds to be extremely valuable and should feel greatly obliged if any one would send to us duplicates of observations made either at the present time or relating to any other epoch. Photographs would be especially valuable.

Guidance as to methods of making these observations may be found in an article by W. Foerster and O. Jesse in *Astron. Nachrichten*, Bd. 130, 1892.

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Magnetic Properties of Single Crystals of Iron.

REFERRING to the letter in NATURE for May 29, p. 753, by Messrs. Honda, Kaya and Masuyama, it will be noted that Fig. 1, showing the magnetisation curve for a large crystal of iron, indicates the occurrence of definite and distinct steps in the magnetisation curve, but no explanation is foreshadowed.

In the *Journal of the Institution of Electrical Engineers* for September 1920, vol. 58, p. 832, I suggested that such steps were likely to be found in the magnetisation of iron crystals on the probability that more than one configuration would be involved before saturation was reached. Any such steps would be hidden in commercial iron owing to the irregular arrangement of crystals and the resultant overlapping in their individual characteristics, but in an individual crystal with a wholly symmetrical arrangement one would expect a relatively sudden change of pattern falling into a different space-lattice.

It would be interesting now to have an X-ray examination made of the crystal to ascertain the configuration corresponding to each stage of the magnetisation curve.

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