THE AURORA BOREALIS.

Now Auroras and magnetic storms increase and diminish in like ratio with each other and in proportion to Sun spots. But something else besides spots help to produce these magnetic phenomena, and these are Eruptions of glowing vapor known as "Faculæ." In 1859 an outbreak of Faculæ was coincident with a violent magnetic storm and Aurora, but with the exception of one other similar occurrence referred to by Prof. C. A. Young in his "Treatise on the Sun," nothing having sufficient precision to be worthy of notice has been published. But the occasional outbreak of an Aurora or a magnetic storm at times when there are no dark spots on the sun, is traceable to "Faculæ." The finest Auroras of recent years have appeared 26 or 27 days apart, such recurrence closely approximating the time of the revolution of the Sun, and the point most powerful in influencing the display is on the Sun's eastern limb. Observations have now given evidence that solar disturbances originate Auroras when by rotation they appear at the Sun's eastern edge. Dr. Veeder says that out of 188 well defined outbreaks of Aurora in three years, 162 of these by actual observation disclosed a disturbance on the Sun's eastern edge. When no auroras were visible within the borders of the United States, although the outbreaks on the Sun were noticed, there was a manifest increase in thunderstorms, as though they had taken the place of Aurora. Observations now show that on the days when solar disturbances are in process of being directed earthwards, either by the rotation of the Sun on its axis, or by some sudden outbreak of the eruptive forces, there is an immediate impulse given to the atmosphere and perhaps even to the solid portions of the earth itself. Years ago Dr. Veeder began to seek to identify the precise solar conditions on which the Aurora depends, and why the Aurora remains visible for one or two nights only, although the disturbance that is presumed to originate it remains in most cases on the earthward side of the Sun for nearly a fortnight. He now thinks this is due in part to difference of character of the eruptions on the Sun and in part to difference in terrestrial conditions. Grouping together phenomena as they appear from day to day makes it probable there are several terrestrial conditions which are more or less related to each other and to certain

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