

effects of atmospheric electrical discharges, announced the occurrence of such phenomena. The flashes, unattended by electric storms, were of distant origin, as their effects were always feeble, and yet they were always as distinct as those having an origin in some distant thunderstorm. Phenomena of this kind are better observed in a wooden house than in a brick one, because the salts of iron or other substances in the bricks effectively screen the X-ray effects from an observer, and he receives only what reach him through the windows. For a similar reason a tin roof or other metallic covering destroys the value of a station for any observer. And there are other precautions that will be obvious to any person acquainted with X-rays who wishes to witness the X-ray effects of atmospheric discharges.

By accumulating a number of observations of such flashes of distant origin, unattended by electric storms, I was able to arrive at two inductive inferences regarding them:—

- (1) For the most part they centre around the morning maximum of the aurora, or rather the time when such maximum might be expected, two or three hours before sunrise.
- (2) They are coincident with a falling barometer, or just after a fall but not with a rising barometer: in other words, they belong to periods when the station of the observer is in the front of a cyclone, *i.e.*, when cirro-stratus clouds, an indispensable condition of the aurora, might be seen if daylight permitted their observation. These frequent, though distant, electric discharges in the atmosphere, of which the X-ray effects continually arrested my attention at the times when the morning auroral maximum would occur if the same conditions existed as in the evening, probably belong to the class of phenomena commonly known as sheet lightning, when it is viewed as an ordinary optical phenomenon.

Paulsen's cathode theory of the aurora came forward about the time when the chief characters of these phenomena began to force themselves upon me in the course of numerous observations, along with the development of the same theory by the excellent work of Messrs. Stormer and Birkeland in Norway,