SCIENCE

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BRILLIANT AURORÆ OF 1892.

BY LEWIS SWIFT, ROCHESTER, N. Y.

THE months of June and July of the current year will long be remembered as having afforded three interesting auroral displays, one of them being of unrivalled splendor and intensity. Of all the newspaper descriptions of them which I have read, not one

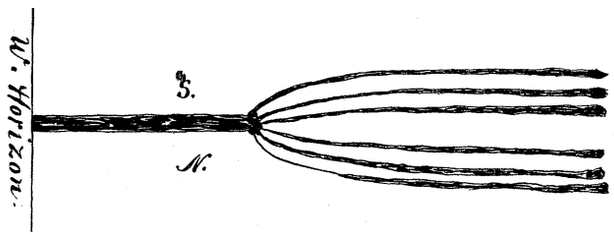

FIG. 1.

portrays them as seen from the flat roof of the Warner Observatory with an unobstructed horizon. Two of these exhibitions I consider unique if not unexampled.

On the evening of June 16, just before midnight, turning my eye from the telescope, a bright narrow beam of light was seen extending from the western horizon to an elevation of some 50°, at right angles to the magnetic meridian, and, of course, parallel with its equator. Here it divided into six parallel bands or branches, like six gigantic fingers of an outstretched hand, which continued to 5° beyond Alpha Cygni, or to a length of more than 60°, when they all sharply ended (Fig. 1). After a visibility of about twenty minutes it slowly disappeared, and was the only sign of aurora observed during that entire night.

Again, at early twilight on the evening of July 16, a portion of a faint auroral band some 15° in length was observed just south of Alpha Aquilla, having on the south side two, and on the north,

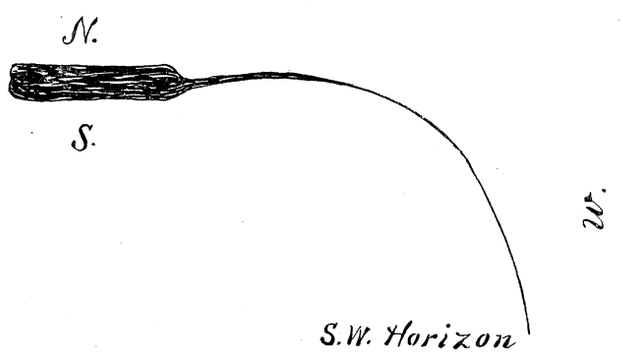

FIG. 2.

one short, narrow band close to, though not touching, the principal one. This, being so far south, was of itself an uncommon occurrence, and, as twilight deepened into night, a slender stem not exceeding 15° in width issued from the western end and gradually lengthened, curving to the south-west and south until, like a mighty sickle, the band serving for a handle and the curved ray for its cutting blade, it reached nearly to the south-western horizon (Fig. 2). It lasted about a half-hour, growing brighter and longer as twilight increased, when it quite suddenly disappeared. Immediately after, a rosy cloud and tinted streamers appeared in the north west, and the grandest auroral display of the century commenced.

During thirty five years of out-door night work I have never seen any auroral phenomena at all resembling these two instances, and would much like to know if these appearances were witnessed by other observers elsewhere

A perfect auroral exhibition consists of at least ten distinct phenomena. It is very seldom, however, that all or even a majority of the requisites are present at any one display. They are here named in the order of their most usual appearance: 1, evenly diffused light in the north; 2, a dark arch whose apex is in the magnetic meridian; 3, streamers; 4, luminous patches, especially in the north-west, sometimes of a red color, often for a long time stationary; 5, colored patches and streamers; 6, merry dancers; 7, corona in the magnetic meridian and equator, the point where the streamers seem by perspective to converge; 8, streamers issuing south from the corona, occasionally extending to near the southern horizon; 9, curtains, with frilled, wavy edges, apparently suspended from the sky; 10, narrow luminous bands, often reaching from the eastern to the western horizon, always at a right angle to the magnetic meridian, but seldom, if ever, coincident with its equator.

As seen from this station by myself, my assistant, and a friend, all of the above features, save the hanging curtains, were simultaneously visible.

That there is a connection between the aurora and sun-spots is quite generally conceded, though denied by some eminent authorities. We know that auroræ frequently occur when no spots are visible on the sun, and that sun-spots are often seen when auroral exhibitions, either boreal or austral, are entirely absent, but to this the advocates of the theory make answer to the former that sun-spots may have been on the other side of the sun, and, to the latter objection, that there may have been auroræ visible only in the Arctic or the Antarctic regions, or in both. But there is need of further confirmatory evidence by the general co-operation of astronomers in the collection of enlarged data for the establishment, modification, or complete rejection of the prevailing theory that sun-spots, auroræ, and terrestrial magnetism are intimately connected.

Intelligence has just reached me that the famous display of July 16 was also witnessed from the southern hemisphere on a scale of grandeur comparable to our own. This simultaneity of the phenomena at both terrestrial poles suggests the question whether this is always the case.

When the writer was a lad, in perhaps the year 1834 or 5, the sky being densely cloudy and the ground covered with snow, he saw at eight o'clock one evening every visible object, especially the snow and sky, suddenly assume a bright crimson red. He wonders if any reader of *Science* recalls that memorable spectacle which appalled so many people. He does not remember to have ever seen an explanation of the ghastly phenomenon from any country where the sky was cloudless, but it was, doubtless, caused by an extraordinarily tinted aurora.

BIOLOGICAL NOTES FROM NEW ZEALAND.

BY GEO. M. THOMSON, DUNEDIN, N.Z.

A VERY interesting feature in connection with the flora of New Zealand is the rarity of those plant structures which are correlated with the presence of mammalia. If we except the spiny *Aciphyllas*, there is not a single species of plant peculiar to these islands which shows any contrivance either for distribution by, or protection against, mammals, even where other species of the same genus are so modified in other parts of the world. *Aciphylla* is a