

NOTES ON THE GREAT METEORIC STREAM OF 1913, FEBRUARY 9TH

SEEN IN CANADA AND THE UNITED STATES

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PROFESSOR CHANT, in the JOURNAL of the Royal Astronomical Society of Canada, for May-June, 1913, has given us an extremely interesting and valuable paper on the extraordinary flight of meteors witnessed across Canada and the United States on February 9, 1913. That meteoric exhibition seems to have been unparalleled in two respects *viz.*:—(1) Its multiple nature, consisting as it did, of a long procession of meteors. (2) The great length of its observed luminous flight extending over more than one-tenth of the earth's circumference.

I have been in the habit of watching the heavens since 1865 and have never noticed anything similar. There are meteors occasionally seen with multiple, crumbling heads and broad spark trains, but the wonderful stream of successive meteors seen on February 9 seems, like Saturn's rings, without a parallel.

Professor Chant has made some useful deductions concerning the real course of the meteoric stream, and of its height as it passed between the eastern border of Lake Huron and Buffalo, but the data, upon which he necessarily had to rely, are rather contradictory, and absolutely accurate results cannot be obtained from them. I have partially gone over the work again, and the results obtained exhibit a good general agreement with those derived by Professor Chant. I am, however, disposed to give the objects a rather greater elevation than that assigned by him. Taking the whole of the estimates of the altitude, I should ascribe a height of about 38 miles as the meteors passed over the region near Toronto. There are a few significant observations indicating the lower elevation mentioned by Professor Chant,

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but there are also a great number supporting the conclusion that the objects were decidedly more than 30 miles high. Several reasons support this, *viz.*:—(1) The great improbability that the stream could have prolonged its flight so far in a fairly dense region of air only 26 miles above the earth's surface. (2) The red or yellow, slow meteors, moving in horizontal flights, are usually more than 30 miles high, and generally between 56 and 40 miles. In cases of very slow fireballs, falling at a slight angle towards the earth, they frequently penetrate deeper, collapsing between 32 and 26 miles, and rarely go farther. I have computed the heights of a considerable number of meteors, moving in long horizontal paths and they have almost invariably been more than 40 miles above the earth's surface. The objects seen in February last may, however, have been abnormal in their elevation as well as in their distribution.

The data are of such a character that everyone studying them may derive a different result according to his interpretation of the records. The following remarks are, therefore, merely intended as independent views, and are in no sense offered in the light of criticism.

The mean height of the objects from many observations in the region between longitude 82° and 78° West was 38 miles. Some of the components seemed higher than others, and ranged, perhaps, up to 44 miles. But the observed differences in the apparent altitude of the meteors may have been possibly induced by considerable width in the stream rather than by actual differences in height of the particles.

The velocity was about 8 miles per second. The motion of the meteors was direct like that of the planets, and comets of short period.

If we adopt three minutes as the period occupied by the whole stream in passing a given spot, its length must have been 1440 miles. The earth was running away from the meteors at the rate of about 18 miles per second.

The observed path of the stream extended over 2,600 miles from N.W. of Mortlach, Saskatchewan, to E. of Bermuda.