

were not very exactly recorded, but no material lengthening out could have occurred. Probably the meteors existed in nearly the same distribution before their immersion, and combustion in our atmosphere. The resistance of the air, and terrestrial attraction, would seem to have counteracted the effects of the earth's curvature, and to have kept the stream well in tow, at a pretty equable height.

The tail end of the stream certainly did not consist of the same objects all along the flight, but was formed of burning fragments peeling off from the leading meteors. At Toronto, Mr. H. D. Ashley says that the last four meteors were extremely dim, and that two of them, observed to rise in the north-west, became invisible before passing over. Several of the larger meteors of the group doubtless existed all along the observed flight, while the smaller, scattered particles at the end were reinforced by luminous debris from the leaders in numbers sufficient to compensate for disappearances.

The reports from Fort William, Richard's Landing and Bermuda give evidence that the height was 60 to 80 miles when passing near these places. At Thamesville the swarm was seen below Cassiopeia and the polar star. The distance between these is about 28 degrees and taking $42\frac{1}{2}^\circ$ as the altitude of Polaris, and that the meteors as shown in the sketch were as much as 12 degrees less, the resulting height must be 64 miles, the distance being 107 miles to the point on the earth underneath the meteors, and the altitude 30° . If we infer very considerable error in the proportions of the sketch and decrease the elevation to 25° we get a height of 51 miles, which seems probable.

As seen from Sudbury, about 190 miles north of the place under the southern point of the meteors' flight, they must have been quite 40 miles high, for there was a hill between the observers and the meteors which probably cut off fully 10° from the horizon.

At Winchester, some $5\frac{1}{2}^\circ$ east and $1\frac{1}{4}^\circ$ south of Sudbury, the distance was 221 miles, and the altitude said to reach 15° . Taking the altitude as only 10° the height would be 45 miles.

There is decided evidence that the meteors were higher in the air, in the earlier and later part of their visible display, than in the middle section of their flight but not very considerably so.

In deriving the mean height near the middle part of the stream, (Toronto region), I deducted one-third of the estimated altitudes. In some cases this may not be sufficient, for there is a general propensity to overstate the elevation. But in other instances it is certainly taking off too much, for the given altitude is probably just about correct, and there are several descriptions where the estimate is obviously too high!

I believe that reducing altitudes by one-half the estimated values is too great. The difference between 45° and 23° is enormous, and few observers of ordinary intelligence, and exercising a little care, could make such an error. If a number of people are asked to give the altitude of an object 30° high, they will often say 45° —but 23° is so obviously nearer the horizon than the zenith, that very few estimate it as midway.

At Caledon East special weight has been given to the statement that "the meteors went over, or nearly over, the belt of Orion." They may, however, very likely have passed above it, and some of them certainly did, for they were at different altitudes.

There were two observers at Bolton, a little farther from the meteors than the Caledon one, and the independent estimates of altitude are:—"Some of them died out just as they passed over, though they were not directly over me, but a little to the south-west." "They appeared in the western sky about four-fifths of the way up from the horizon."

At Jackson, further west, but at nearly a similar distance from the meteors they were said to have passed nearly over head, but a little to the south-east. These statements indicate a path far above the belt of Orion even allowing for excessive estimates.

At Parry Sound Mr. W. L. Haight and a companion fixed the elevation as 35° to 38° after going back and determining its position from their point of view. Taking the altitude as really only 22° the resulting height will be 51 miles.