Constellation Aquarius. He thought the shower was active about that time, and wondered if there were any connection between it and the Comet.

The thanks of the Meeting were then unanimously accorded to Mr. Michie Smith for sending the photographs and to the writers of the papers.

Mr. Tomkins then read a short note on the observations which could be made at the total eclipse of the Moon which is to take place on the morning of the 17th November, explaining the phases of the eclipse by means of a diagram. Attention was directed to the behaviour of any stars that might be occulted, the appearance of the bright rays of Copernicus, Tycho and Proclus as the shadow passed over them, and also in the shadow, the presence of any abnormally bright or dark spots in the shadow, the detailed observation of one or two rays selected by the observer, the colour of the eclipse, and the regularity or otherwise of the shadow.

The Meeting was then adjourned until the 29th November 1910 at 5 p.m.

Meteors.

BY THE DIRECTOR OF THE SECTION.

The phenomena of this branch of Astronomy are most interesting and by no means unimportant. They may be conveniently divided into three classes: *namely*, (1) Aerolites, (2) Fireballs, (3) Shooting Stars. Of these three classes, aërolites, meteorites or meteoric stones, are rare, but not so rare as to prevent sufficient evidence being produced that such occurrences happened from time to time. Indeed there are observations from which we can legitimately conclude that from time to time masses of stone of different sizes and generally of considerable weight passed through space and were precipitated upon the Earth's surface. The circumstances attending the fall of aerolites are not always the same. Generally the fall is attended by a loud detonation; but it must not be concluded that every detonating meteor is an aërolite.

Now we come to the second class, *namely*, Fireballs. They are occasionally of great brilliancy, appear suddenly, and are usually noiseless. Their form is generally pear-shaped. The slow moving Fireballs generally evolve trains of sparks, but the swifter class project streaks of phosphorescence upon the sky, and these features sometimes linger for many minutes after the first appearance. Many Fireballs have formed the subjects of computation as to their distances, sizes and velocities, but the peculiar nature of these phenomena and their unexpected appearance lead

us to consider such results as only approximate. It has been found that the average heights of Fireballs are less than those of Shooting Stars, and from some recorded cases, it appears that the relative results seem to be somewhat as follows :—The heights of Fireballs at first appearance, at mid-course and at disappearance, were 69, 49½ and 30 miles ; whereas those of Shooting Stars were 80, 67 and 54 miles respectively. It may not be out of place to say here that the same method of observations will apply both to Fireballs and Shooting Stars, and that there are certain Meteor showers which apparently yield a large proportion of Fireballs.

Now we come to the third class, *i.e.*, that of Shooting Stars. Formerly Shooting Stars were considered to have an atmospheric origin and to be due to the combustion of inflammable gases exhaled by the earth. But now this theory has been rejected. They are now considered to be of celestial origin, pursuing orbits similar to comets and grouped into streams containing in many cases an immense assemblage of particles. They become visible to us on being inflamed by friction with our atmosphere, into which they rush with planetary velocity and are instantly consumed and reduced to imperceptible dust. Every clear night a certain number of Shooting Stars are visible. When the air is transparent, the moon absent, and the stars shine brightly, about 8 or 10 may be noticed every hour. The hourly average is greater in the morning hours and during the last half of the year. On some nights we may see a shower of falling stars, and the shower in certain years is very dense. It is held that these little bodies are not scattered uniformly in space, but are collected into distinct groups which travel, as comets travel, in elliptical orbits round the Sun, and what we call a shower of meteors is due to the earth breaking through one of these groups. Two of the important showers are encountered in August and November. They are respectively Perseids and Leonids. I would refer those interested in the history of these showers to the work of Mr. Denning of Bristol. The Shooting Stars in a particular shower seem to radiate from a particular point in space, *i.e.*, if their directions of motion are all projected backwards they intersect in one region, and this is the radiant point of the shower. Eighty-eight radiant points are mentioned of the principal meteoric showers of the present year, and of these nine are important.

For the observation of direction a Star Chart is essential, and the observer must know at least the constellations in which the radiant point of the shower he is observing is situated. The method of observation is to have a straight rod in the hand, and when a meteor is seen, to hold it against the sky along the path where the meteor has appeared. This

will then give a good indication of the stars near which the tract is to be charted, and when these have been thus determined, the path can be recorded in the chart or note-book. For this the chart will have to be lighted in such a manner that the light may not blind the eyes, and a bicycle lamp with a shade will be found useful. For the other details, such as magnitude, colour, etc., I suggest a regular form such as the following:—

*Name of Observer*_____ *Place*_____.

Date.	State of the sky.	Time. H.	Time. M.	No. of Meteor.	Colour.	Whether it left a tail or not.	Swift or slow.	Remarks.
				1 2 3 4 etc.				

The radiant points of these are in the constellations Quadrans, Lyra, Aquarius, Perseus, Orion, Leo, Andromeda and Gemini.

The remaining four important showers of the present year are Orionids of 18th to 20th October, Leonids of 14th to 16th November, Andromids of 17th to 23rd November, and Geminids of 10th to 12th December. The first, *i.e.*, Orionids: it is a rich shower occurring every year. The R. A. and Dec. of the radiant point are 92° and + 15°, *i.e.*, 2° east of Orionids. The meteors are swift with streaks. The second, *i.e.*, Leonids: it has the radiant point with R. A. 150° and Dec. + 22°. The meteors are swift with streaks. The third, *i.e.*, Andromids: it has the radiant point with R. A. 25° and Dec. + 43°: the meteors are very slow with trains. The fourth, *i.e.*, Geminids: it has the radiant point with R. A. 108° and Dec. + 33°. It is a rich annual shower of swift short meteors.

Lastly, we have to consider what observations are to be made in connection with meteors. In the first place we may simply count the number of meteors that are visible, noting the time during which they were watched. This will give us the relative frequency during different parts of the night and during different parts of the year. But not less important are the observations of the directions of motion, the duration of visibility, the magnitude and the colour of the meteor, together with any peculiarity that may be noticed in connection with it.