126 PARABOLIC ORBITS OF METEOR STREAMS

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The study of meteors as astronomical bodies began in the early part of the last century. The occurrence of the great showers of 1833 and 1866 showed the importance of the meteoric astronomy. When it was proved, soon after the latter appearance, that this meteor stream and Tempel's Comet of 1866 had the same orbit about the sun, the interest in meteors increased enormously. Though millions of meteors are swept up by the earth every twenty-four hours, still these little bodies also obey the law of gravitation, and, in obedience to this law, meteors pursue their orbits about the sun.

Astronomy is interested in proving the connection between comets and meteors, in investigating the distribution of meteoric matter in space with special regard to that near the earth's orbit, in finding the cause of the zodiacal light, and the action of meteoric matter as a resisting medium and as an absorber of light in space. Meteorology is interested in the study of meteor trains and meteor heights, because the former give us our only information about the velocity and directions of wind currents in the upper strata of our atmosphere, the latter certain information as to how high this atmosphere must extend.

To arouse interest in this subject the American Meteor Society was organized in 1911, and the results mentioned in this paper were worked out from the 2800 observations contributed by its members. These results appear in full in Volume 2, Part 4, of the Publications of the Leander McCormick Observatory of the University of Virginia. While the most important contribution to science was the 126 parabolic orbits of meteor streams, the most interesting result, undoubtedly, was the final proof of the connection of Halley's Comet and the η Aquarid meteors. These bodies were shown to follow orbits similar to Halley's Comet and present one of the best instances of the slow disintegration of such a body. The question whether radiants are stationary was studied in considerable detail, and a negative conclusion was reached, principally because motion was detected in the radiant point of the Orionid meteors, which are held to be the typical case by certain authorities. The tabular results of the paper are of interest to anyone who has even touched on the subject, showing as they do at a glance just what one can expect from a few hours' observation at favorable times of the year. The National Academy of Sciences at its annual meeting has granted

a small sum from the J. Lawrence Smith fund for the purpose of extending the work.

For observations of meteors a technical knowledge of astronomy is not necessary. Anyone interested as an amateur is invited to write to the Leander McCormick Observatory. Maps and directions for observing will gladly be forwarded. It is earnestly hoped that a large number of amateurs will assist us in the extension of this work.

THE BASAL SILURIAN FORMATIONS OF EASTERN NORTH AMERICA

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At the base of the Silurian system of rocks in the state of New York and in the Appalachian Mountains occurs the Medina sandstone. In tracing this formation from the gorge of the Niagara River northwestward into Ontario, the sandy phase of the Medina is seen to change gradually into a muddy one and finally into a limestone, as is the case on the Manitoulin Islands of Lake Huron. These early Silurian rocks of Ontario, known as the Cataract formation, have long been regarded as equivalent to the Clinton formation of New York, but are now known to hold the time of the Medina formation. In another direction, in Ohio, Indiana, and Kentucky, the basal Silurian strata, the Brassfield formation, are also seen to be the equivalent of the Cataract formation of the north.

The faunas of these three marine formations are quite different. The Medina sandstone has the smallest assemblage, with 22 species, while the Cataract limestones have at least 76 forms, and the Brassfield limestones 140 kinds of invertebrates. There are but 7 species in common between the Medina and Cataract, while the latter has 24 forms repeated in the Brassfield.

Each one of the three formations represents a different marine basin. The Medina is of the Appalachian province, is a sandstone formation, and finally invades to a slight extent the area of the Cataract. The Brassfield province lies in the main west of the Cincinnati axis, is of southern origin, with limestone-making seas, spreads also up the southern portion of the Appalachian province, and finally likewise invades slightly the area of the Cataract sea. On the other hand, the Cataract province spreads westward through the Saint Lawrence embayment, and finally, in eastern Ontario and northwestern Ohio, unites with the