Review

Meteor-Astronomical Universal Laws of Atmospherical Precipitation by Hugo Melzer, published in 1957, pp. about 100 including figures, extensive tables, references, two supplements and the original version in Spanish.

It is encouraging to find in the author's investigation a confirmation and further development of E. G. Bowen's interesting but disputed hypothesis that at many stations all over the world there are simultaneous rainfall maxima on specific dates every year associated with the prominent meteor showers, which enter the earth's upper atmosphere from time to time. Bowen regards these meteor showers as source of rain stimulating nuclei in the form of fine dust which take about 30 days to reach the cloud tops and facilitate precipitation.

Dr. Melzer in his study of the totalized daily rainfall pattern of Latin American stations with reference to Bowen's diagrams has provided ample evidence of the occurrence of rainfall maxima correlated with epochs of meteor showers, allowing for a lag of 30 days. The use of totals involving various countries, however, gave rise to a marginal spread of some 3 days in view of the different procedures and timings adopted in recording rainfall by these countries. In order to eliminate these and other extraneous effects and pin point those due to meteor showers, the author has evolved a new technique which utilises the daily rainfall figures for a large number of years for individual stations. The daily rainfall values for the stations concerned are tabulated against successive years in rows and the five highest values are marked out in each row (that is for each year). By graphically joining these values of each year with the corresponding values of successive years, he obtained a series of curves, which he calls 'quasi-conics' because of their similarity to conic sections. The author has shown that the 'quasi-conics' drawn for different stations of the world are identical in shape and dimensions but subject to slight shifts which could be accounted for by the geographical co-ordinates and altitude of the stations.

The 'quasi-conics' bring out the course taken by the principal and subsidiary rainfall maxima in successive years, and may help by extrapolation, in providing long term forecasts. Where these 'quasi-conics' cross each other the effect is more pronounced.

To explain the above arrangement of rainfall peaks along 'quasi-conics' the author has likened the meteor stream to a bicycle tube with the rain stimulating matter concentrated in shells over the surface. The section of the tube is elliptical and grows with time with the result that with every return of the meteor swarm the new positions of the shells assume a tree ring structure.

Thus the nucleating effect of the meteor stream will be manifested as rainfall peaks only where the shells are encountered by the earth. According to the author, the quasi-conics are the "geometrical locus of the intersection points of the ever-growing zodiacal light matter shells, called, 'CZ-coats' of the meteoric dust component influential to rainfall, with the ecliptical orbit".

The book is mostly devoted to the development of the above idea with suggestions for future programme for the confirmation of the various postulates. The author has also indicated how from a study of these 'quasi-conics' it may be possible to find a clue to the presence of invisible meteor streams some of which are associated with unknown comets.

The hypothesis propounded by the author holds promise, but one may not agree with him in the use of the term "zodiacal light matter" to identify meteoric dust. As is well known zodiacal light matter consists of interplanetary dust (left as debris by defunct comets) as well as electrons. The meteor streams augment the brightness of zodiacal light but otherwise do not seem to have any direct connection.

Section 7 of the book deals with the manner in which the meteor dust nuclei can stimulate precipitation and how the ideas could be utilised in artificial rainmaking. The speculative nature of some of the suggestions, for instance, the accumulation of ions of hydrogen and oxygen of the atmosphere around meteoric dust (charged by photoelectric effect) to form adequate condensation water nuclei, requires quantitative treatment.

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