to one side of the nucleus almost exactly along the slit so that we have here a distinction between the direction along the tail of the comet and away from it.

This spectrogram shows many very fine features in the visual and red regions. These have not yet been measured but I hope that I shall have the pleasure of cooperating with Dr. P. Swings in the discussion of this material.

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King, Ivan. The effect of stellar encounters on a velocity distribution.

Since the theory of the time of relaxation shows that stellar encounters can play an important part in the evolution of certain stellar systems, it is of interest to find an equation which describes the detailed change in a velocity distribution as a result of stellar encounters. Using the analogy between this problem and the problem of Brownian motion, Chandrasekhar¹ has derived a differential equation which gives the change in the velocity distribution in terms of the mean and mean-square velocity change produced by encounters. This equation, like its analogue in the theory of Brownian motion, depends on the assumption that in a time short compared with the time of relaxation the total change in the motion of a star can be considered the resultant of a great number of small changes.

It is shown that for certain stellar systems, among them the Pleiades, this assumption is not satisfied. A more general theory is developed which will apply to these systems; the theory given reduces to Chandrasekhar's theory when the assumption mentioned above is satisfied. In the Pleiades the correction terms contribute about a fifth of the total effect.

1. *Ap. J.* **97**, 255, 1943; *Rev. Mod. Phys.* **15**, 1, 1943.

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Liller, William. Radio detection of meteors at 3.5 megacycles.

Observations of meteor bursts at a frequency of 3.5 megacycles are being recorded at the Physics Department of Harvard University under an Office of Naval Research contract. The primary purpose of this program is to compare the results obtained at a low frequency with the findings of other workers who have used much higher frequencies. The present report concerns

a statistical analysis of 160,000 meteor bursts recorded during the last part of 1946 and most of 1947 by J. A. Pierce of the Cruft Laboratory with a non-directional, 3.5 megacycle transmitter. The reflections were all recorded photographically. The analysis was conducted in conjunction with the Harvard Photographic Meteor Program sponsored by the U. S. Navy Bureau of Ordnance.

An examination of the diurnal meteor burst frequency curves clearly shows the presence of a secondary maximum at about 1800 L.M.T., which Eckersley, using a frequency of 7.59 megacycles, also observed in 1938. In addition, there is a slight increase of E-layer ionization at the same time. The rapid decrease of radio-wave absorption at the time of sunset evidently causes these maxima. This absorption also pushes back the time of primary maximum of the meteor burst frequency to as early as 0300 L.M.T. during the summer months, but in the winter, this peak is reached at almost exactly 0600 L.M.T., the theoretical time of maximum. At this time, during the winter, there is little absorption and measurements are fairly dependable. The great daylight meteor streams observed by British physicists are only partially visible, as, soon after the radiants rise, the absorption becomes so strong that the showers almost completely disappear.

The Perseids and the Orionids were the two strongest showers observed despite the fact that some of the best days of the Perseids went unobserved. The Leonid and Taurid showers also showed up quite well, although the Leonids were not completely observed either. There appears to have been an increase in the sensitivity of the apparatus near the time of the Taurid maximum, and therefore the maximum rate found for the Taurids is probably too high. Neither the Geminids nor the Quadrantids reached expected strength.

It was found that the strength of a shower at 3.5 megacycles is strongly dependent upon its velocity (third to seventh power), although the data collected up to this time are insufficient to confirm this relationship precisely. The velocity effect may, in part, be explained by the lower atmospheric density encountered by the faster and higher meteors; mean free paths are greater while recombination and attachment processes are slower for faster meteors.

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