by Jacchia. This modified formula has been also used in the general analysis of the Super-Schmidt physical data, which will be published soon.

For all meteors the quantity $\gamma A \rho_a v^2 a^{-1}$ (proportional to $\rho_m r_\infty$) has been computed from each deceleration. Then a weighted average has been taken for every meteor, by using a weight p defined as

$$p=10\,\psi\left(\frac{a}{\text{p.e.}}\right)\times\psi(N-3)\times\left(\frac{m}{m_\infty}\right)^{1/2}, \quad (13)$$

when

$$\psi(x)=\tfrac{1}{2}\,[1+\text{erf}\,(2.5\log x-2.1)]; \quad (14)$$

p.e. is the probable error in the deceleration a; and N is the number of shutter breaks used in the least-squares solution (which contains 3 unknowns) for determining a. Then, by means of the weighted average values of $\gamma A \rho_a v^2 a^{-1}$, I have computed τ_p/ρ_m^2 for each meteor to which a weight $w=(\Sigma p)^{1/2}$ has been assigned for the final analysis. I have put w into this form because, since the results obtained for meteors with many decelerations are somewhat more reliable than those obtained for meteors with only two decelerations, we must attribute a larger weight to them. Taking $w=\Sigma p$ would overweight the slow meteors, which are generally longer, and the final analysis would be biased. Calculations with different weights have been done to investigate how much the chosen system of weights affects the final results. The result was that the analysis of the Super-Schmidt meteors is only slightly affected by the system of weights. This was to be expected because of the general reliability and homogeneity of Jacchia's Super-Schmidt material. For small-camera meteors, the inaccuracy in the determination of the deceleration varies the weights p from less than 0.01 to about 9, and the choice of the weight system is, conversely, very important.

The quantity τ_p/ρ_m^2 varies with the velocity $\bar{v}$ of the meteor. We shall attribute this variation uniquely to τ, i.e., we shall assume that the meteor density ρ_m does not depend systematically on the velocity. Of course there is no reason why the meteor density should vary continuously with the velocity. Nevertheless, we must consider two different circumstances that, if ignored, would affect the conclusions, perhaps remarkably. The first is the possibility that some among the very slow meteors may be of asteroidal origin; in this case the value of τ_p/ρ_m^2 in the region of the lowest velocities would be smaller and our determination of n overestimated. It is easy enough to obviate this difficulty by taking out of the analysis all the meteors that show a difference from the average larger than the expected scatter in the values. Naturally, some meteors will be clearly suspected of having different densities, but it is a difficult task to decide whether or not certain others should be excluded.

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The second circumstance to keep in mind is Jacchia's (1958) discovery of the difference in fragmentability between the meteors of the Jupiter family and the long-period meteors. This difference leads us to think that the different fragmentation may correspond to a difference in density between the two groups. This hypothesis is corroborated by the fact that long-period meteors begin to appear at a height that on the average is about 4 km greater than that of short-period meteors (Jacchia, 1963). Therefore the sporadic meteors have been divided in two groups according to their aphelion distance in order to search for a difference in the averages of the τ_p/ρ_m^2. Such a difference has actually been found, and we will see that taking it into account changes n appreciably, because one group is concentrated toward the low velocities and the other, toward the high velocities. Obviously this difference could be caused either by a variation of τ_p resulting from differences in chemical composition or by different densities or by a variation of both these qualities. However, the well-established current ideas on the cometary origin of meteors and on Whipple's (1950, 1951) icy-comet model lead us to conclude that the difference must be ascribed to the density only. In fact, according to Whipple's theory, short-period comets evaporate faster, which means that short-period meteors should come from the inner core of their parent comets, while the long-period meteors should come from more