their shape so that we can ignore the possible variations of A during the meteor life and accept the value $A=\left(\frac{9\pi}{16}\right)^{1/3}=1.21$ corresponding to a spherical shape. This value is usually employed in Harvard's work. The effect of fragmentation makes useless any search for a better approximation. We shall discuss this effect later.

The last quantity to be considered is the drag coefficient γ. This quantity is not well known. The results yielded by an interpolation formula worked out by Baker (1959 a and b) on the basis of the theory of Baker and Charwat (1958) for the drag coefficient in the transitional flow region do not agree with recent experimental results (Maslach and Schaaf, 1962). Baker's formula shifts the transition from the free molecular flow to continuum flow to heights greater than the reality. A. F. Cook (1963, private communication) has given another expression for γ in the form

$$\gamma=0.55[1+8.3\times10^{-5}(r\rho_a)^{-1/2}], \qquad (12)$$

where r, the equivalent radius of the pellet, and ρ_a are expressed in cgs units. This equation applies only to compact bodies, like meteorites and asteroidal meteors.[5] The use of equation (12) for the Super-Schmidt meteors shows that many of these are still in free molecular flow, although the hypothesis that these meteors are single compact bodies is certainly wrong for most of them. For better consideration of the effect of fragmentation, we will assume that all the Super-Schmidt meteors are in free molecular flow. We will therefore use $\gamma=\gamma_F=1.1$, the value generally assumed for satellites in free molecular flow (Cook 1959; Jacchia 1964). This value is also used in the general analysis of the physical data of the Super-Schmidt meteors (Jacchia, Verniani and Briggs, unpublished).

If we make the extreme assumption that equation (12) may also be applied to the Super-Schmidt meteors, considered as single compact bodies, we obtain from the observational data a value of n only slightly smaller than that obtained by assuming $\gamma=\gamma_F$. The difference is about 15 percent, which is very reassuring, since it means that if γ is not exactly what we have chosen, the reliability of the final result is not affected.

The data employed for the analysis are those of the 413 Super-Schmidt meteors precisely reduced by Jacchia (astronomical data published by Jacchia and Whipple, 1961; Jacchia, physical data not yet published). The old Harvard small-camera data have been used separately, although their accuracy and homogeneity is much poorer than that of the Super-Schmidt, to provide a basis of comparison for larger masses and lower heights. For these meteors, which are generally very bright, we have used Cook's expression (12) for γ.

The quantities involved in the computation of τ_p/ρ_m^2 are variously affected by observational errors. The velocities and the heights are quite reliable. The error in the velocity for about half of the Super-Schmidt meteors is of the order of 0.1 percent. The small-camera meteors are also generally accurate in v to better than 1 percent. The decelerations, on the other hand, are not so reliable; the probable error may differ widely from meteor to meteor. This is particularly true for small-camera meteors, whose probable errors range from 0.01 to 10 times the value of the deceleration itself. Also, the reliability of the probable error varies greatly, depending on the number of breaks used to compute the deceleration. The integrated brightness is generally more reliable when t is near the beginning time t_B, because of the uncertainty in the interpolation to zero of the intensity curve at the end of the detectable trajectory. The lower reliability of the values of τ_p/ρ_m^2 computed from data near the end of the trajectory is augmented by the effects of fragmentation, which affects equation (8) by increasing the cross-sectional area A. Hence it is clear that, to do a correct analysis, we must use a suitable system of weights, which will take all these factors into account. In his analysis of the small-camera data for determining the atmospheric density as a function of the height Jacchia (1952) solved the same problem. Therefore I have used here a slightly modified form of the weight function introduced

[5] In equation (12) γ tends to infinity when $\rho_a\rightarrow0$. Therefore, when equation (12) yields a value greater than $\gamma_F=1.1$, it is understood that γ must be taken equal to γ_F.