Nova Mensae 1951 was abnormally faint, probably due to absorption by a small dust cloud.

For eleven bright galactic novae the corresponding relation is

$$M_0 = -10.9 + 2.3 \log t_3. \quad (2)$$

With a distance modulus of 18.6 mag. for the Magellanic Clouds, the two lines coincide exactly. For these galactic novae the light curves have been well observed, but some uncertainties in the adopted absolute magnitudes remain, especially in the allowance for interstellar absorption. Since the fast novae are intrinsically brighter, observational selection favours their detection at greater distance from the sun, where a larger correction should be applied for absorption. Since the slopes of relations (1) and (2) agree exactly, there is strong support for the assumption that a moderate value of the mean absorption coefficient, such as $A_{pg} = 0.8$ mag/kpc, can be used near the galactic plane.

Since the novae which reach the highest luminosity at maximum decline more rapidly, their mean absolute light curve must intersect that for the slower, fainter novae, and in fact this occurs at about 14 days after maximum, when

$$\bar{M}_{14} = -5.2 \pm 0.1 \text{ (p.e.)}. \quad (3)$$

The mean apparent magnitude of the novae in the Clouds at this stage is

$$\bar{m}_{14} = 13.4 \pm 0.2 \text{ (p.e.)}. \quad (4)$$

Hence the apparent modulus is 18.6 ± 0.2 (p.e.). This result is independent of any assumed luminosity for RR Lyrae variables, and comparatively free from photometric uncertainties.

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Cook, A. F. On the constants of the physical theory of meteors.

A method has recently become available for determining the mass of a meteor. Meteor trains occur largely in a stably stratified region of the atmosphere characterized by increasing temperature with increasing height. Convection, therefore, will not occur. Turbulence induced by shear in the horizontal wind fields is anticipated. Its magnitude in a particular case can be estimated from the observed irregularities in the horizontal wind field. On March 8-9, 1954, a train was photographed from both stations of the Harvard Meteor Expedition in New Mexico, both films

showing several images. The reductions on the meteor were carried out under the direction of Dr. L. G. Jacchia. The velocity was 72 km/sec. The reductions for the train were made by Mr. R. L. Hughes. From the horizontal wind field random vertical velocities of ± 10 m/sec were to be expected. A systematic downward velocity of some 30 m/sec with the random component superimposed was the actual result. The only reasonable explanation appears to be a residual coasting velocity representing the momentum of the ablated meteoric matter.

A lower limit can be set upon the ablation rate from the meteor by assuming isothermal diffusion and viscous transfer of momentum. The ambient atmospheric temperature is assumed. The result is quite insensitive to the process assumed for producing the train luminosity, whether it be two-particle or three-particle encounters. In estimating cross sections, atomic nitrogen was taken to be the active agent. From this lower limit on the ablation rate and the observed intensity of the meteor, an upper limit on the luminous efficiency may be established. This limiting value is introduced into the known observed constants entering the equations for meteoric deceleration and intensity. An upper limit on the density of the meteoroid is deduced. Then a lower limit on the size of the meteor can be found and compared with the mean free path, relative to the meteor, of an ablated atom. The meteor dimensions prove to be definitely larger so that a gas cap and attached shock wave may be anticipated. The corresponding drag coefficient from ballistic theory and experiments is

$$\Gamma = 0.5 \pm 0.1.$$

The upper limit on the density was initially evaluated with $\Gamma = 1$ to get an extreme maximum value. The value corresponding to the above drag coefficient is 0.05 ± 0.02 gm cm.⁻³ This result is to be compared with a value from cosmic abundances and Whipple's comet model communicated privately to the author by Professor Whipple, i.e., 0.3 gm cm.⁻³ with an uncertainty of multiplication or division by the factor 4. The upper limit found in this work, is thus close to Whipple's lower limit. A flattened average shape of the meteoroid might serve to reconcile the two densities, since the value quoted here corresponds to a spherical shape. It appears desirable to assume that molecules which are not homonuclear occur in the mixture of atmospheric and meteoric gases left behind the meteor. These molecules can then radiate at low temperatures