solution for the masses of the individual components, as follows:

$$\text{K star} \quad \mathcal{M} = 1.2 \mathcal{M}_{\odot}$$

$$\text{Variable} \quad \mathcal{M} = 0.8 \mathcal{M}_{\odot}$$

The position of the K star on the H-R diagram suggests that it is very similar to the K giants of M 67. Applying Sandage's (1957) evolutionary tracks to this object, one deduces that its mass is $1.2 \mathcal{M}_{\odot}$, which agrees with the formal solution of the data described above.

From a discussion of the errors involved it is concluded that the mass of the long-period variable is definitely greater than $0.4 \mathcal{M}_{\odot}$, and while no upper limit can be assigned free from all doubt, there exists a high degree of probability that the mass of the variable is less than $2 \mathcal{M}_{\odot}$. This result is to be compared with the mass $13 \mathcal{M}_{\odot}$ previously supposed on the basis of the mass-luminosity law.

The mass $0.8 \mathcal{M}_{\odot}$ for the long-period variable is consistent with Deutsch's (1957) work on Mira, and leads to close agreement with the pulsation constant $P(\rho)^{1/2}$ predicted from theory.

Since the K companion is similar to the K giants of M 67, it is concluded that the long-period variables, stars of periods about 300 days, are old objects.

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Hodge, Paul W. and Rinehart, John S. High-altitude collection of extraterrestrial particulate matter.

Collections and identification of air-borne extraterrestrial dust have begun. Dust has been collected on millipore filters with a particle collector recently designed by the authors. Nine jet aircraft flights have been completed, at heights ranging from 20,000 to 55,000 feet and filter exposure times have ranged from 18 to 204 minutes. All filters have been examined with a high power microscope. The sizes of about 10,000 particles have been measured and the physical appearance of each noted. Preflight contaminating particles have been positively identified and eliminated from the counts. About 1000 particles greater than 5 microns in diameter were collected on a filter exposed for one hour at 50,000 feet. Of these, many are transparent particles which appear to be of terrestrial origin since

they are much more abundant at lower altitudes. A number of dark, shiny metallic particles are believed to be extraterrestrial in origin because (1) their abundance does not change rapidly with altitude as do all other types of particles, (2) their appearance is compatible with such an origin and (3) some are relatively large in size. This work is being continued, partially supported by Air Force Cambridge Research Directorate under Contract No. AF19(604)-1901.

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King, Ivan. Expansion versus contraction in the evolution of a star cluster.

During its evolution a star cluster is subjected simultaneously to expansive and contractive influences. In a loose cluster the expansive influences are dominant, and the consequent expansion accentuates this dominance. Spitzer (1958) has shown that under such circumstances the lifetime of a cluster is short. On the other hand, the evolution of a dense cluster is dominated by the contractive influence of the ejection of stars. This process also accelerates itself, and again the lifetime of the cluster is sharply limited (King 1958).

The present paper treats a cluster of intermediate density, where both expansive and contractive influences operate simultaneously. Application of the virial theorem and the law of conservation of energy leads to differential equations for the rates of change of the number of stars n and the cluster radius R . As is to be expected, the analysis shows that loose clusters become looser and dense clusters become denser. The dividing line is characterized by a certain value of the ratio R^3/n . The dependence on R is so strong that there is practically a critical radius, which varies only as the ninth root of n . For a given n the critical radius characterizes the cluster in which the expansive and contractive influences remain most closely balanced. This cluster has a longer life than any other with the same initial number of stars. There is thus an upper limit to the lifetime of a galactic cluster. Furthermore, numerical calculations show that the balance between expansive and contractive influences is so extremely unstable that it is all but impossible for a cluster's lifetime to attain that idealized upper limit. The practical upper limit is thus even lower; it is about 10^9 years for a cluster containing 100 stars and 5×10^9 years for 1000 stars. The critical radius in either case is a little over a parsec.