HIDDEN CLUSTERS IN THE SOUTHERN MILKY WAY

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At visual inspection of objective-prism plates of Milky Way regions one frequently detects pairs or sometimes higher multiples of spectra which are so similar in appearance and so close together that they form a conspicuous configuration for the eye. A statistical analysis shows that the observed occurrence of this phenomenon, down to a certain limiting magnitude and up to a certain value of the angular separation of the components, considerably exceeds the expected one - if it should be considered as produced entirely by random coincidence. Therefore it is reasonable to assume a physical explanation behind this sort of agglomeration. According to the working hypothesis it is essentially a part of very loose or star-poor clusterings which do not show a sufficiently high degree of contrast against the surrounding galactic stellar background to be discovered "directly". The phenomenon might thus be comparable to an optical multiple system, although it is produced by members of a physical cluster of some kind. In connection with a large survey of the Southern Milky Way, carried out at the Stockholm and Uppsala observatories, several thousands of such coincidences have been registered. About a hundred of them have been subjected to a special investigation, intended to give an answer to the question about their physical interpretation. Although the methods have been neither very rational, nor always point-to-point reliable, the scrutiny has shown pretty well that an overwhelming majority of the "candidate" objects do reveal stellar clusterings of various types. In fact, it has been possible to distinguish between at least four more or less well-defined types of objects in the shape of stellar clusterings. 1. *Relatively ordinary clusters*, a few of which are already known or even well-known. The "rediscovery" is then some sort of a confirmation of the working hypothesis. 2. *Very loose clusterings*. 3. *Extremely small and star-poor clusters*, possibly cluster remnants. 4. *Multiple systems with extreme separation between the components*, maybe the ultimate stage of a cluster in disintegration. The relative frequency of the four interpretations in order will approximately be: 1 - 20%,

James E. Hesser (ed.), Star Clusters, 121–122.

2 - 35%, 3 - 20%, 4 - 10%. In addition, there is also a certain admixture of spurious objects without astrophysical interest.

With consideration to "false" coincidences, rediscovery of known clusters, etc. one may establish that roughly 50% of the "candidate" objects do represent a physical stellar clustering of some kind. It is highly probable, however, that the number of clusterings without revealing coincidences is larger than the detected ones. Hence, we may suspect that the true frequency of physical clusterings in the Milky Way is considerably higher than the one we have counted upon thus far. It may exceed it by an order of magnitude or even more.

REFERENCES

Loden, L.O.: 1977, *Astron. Astrophys. Suppl.* 29, 31.
Loden, L.O.: 1979, *Astron. Astrophys. Suppl.* 36, 83.

DISCUSSION

BOK: Would any of these sources show up on an IR survey?
LODEN: I don't know; I'd be glad to do an IR survey.
BOK: Craine is now doing one that goes quite far to the infrared. It is quite practicable now to make one with IV-N hypersensitized plates that go much further into the infrared.
FEAST: I'm sorry, but I missed something you said; how do you decide when a cluster really exists? With photometry? Or is it spectroscopy you're doing? How do you decide on the reality?
LODEN: We haven't done any spectroscopy, because we don't have access to spectroscopic telescopes. We have done *UBV* and *uvby*-β photometry and compared the results.
BURKI: Have you an idea of the types of the stars that are in the clusters and what is the estimated total mass of one cluster?
LODEN: You mean the spectral type?
BURKI: Yes.
LODEN: The spectral types have a maximum, a pronounced maximum, at early A, and I think they are rather massive stars, most of them; and for the small clusters there is a considerable fraction of the mass in these stars. But I talked about the suspicion that the small clusters, the micro clusters, constitute an ultimate stage of a cluster in disintegration; and I think that the further that disintegration has progressed, the more concentrated the more massive stars become to the center.