

LETTER TO THE EDITOR

"When Is a Variable Really a Variable Star?"

Many of you have had or will have the opportunity to suspect the variability of a star. For this reason I would like to share with you a rather strange problem that arose when Mr. Charles Townsend was referred to the AAVSO by Sky Publishing Corporation because he thought he had discovered an uncatalogued variable star.

As part of a photographic sky patrol program, he and his wife obtained multiple exposures on 29-30 August and 5-6 September, 1981, of a region in Delphinus. Each of their exposures revealed a M_B 11.5 star at the same position as a M_B 14 star in Hans Vehrenberg's Atlas Stellarum (1970 edition). He checked the third edition of the Falkau Atlas, also by Vehrenberg, and found an approximately 11th magnitude image of the object. This he took as evidence of the variability of the star, and asked AAVSO Director Janet A. Mattei to check the most recent General Catalog of Variable Stars and Catalog of Suspected Variables, which she did. However, no variable was located at the position Mr. Townsend had reported.

At this point, I was given the task of checking the Harvard College Observatory plate stacks, with the hope of determining the temporal behavior of the star, which was thought to be a long period variable. Using the photographic finding chart Mr. Townsend provided, I checked 193 plates spanning time periods from the early 1900's to October 1980, and found no variation whatsoever!! Unfortunately, due to a gap in the Harvard data, I was unable to examine the star's behavior in 1967, when the photograph for the Atlas Stellarum was taken. I was convinced, however, that it was unlikely that the star would have varied in 1967, since several sequences of plates taken on the same night over a period of several days indicated that it was not a short period variable, and it had shown no variation over longer intervals. Furthermore, when I examined the Palomar Sky Survey Prints, the star was not particularly red.

My next step was to check the Atlas Stellarum in Harvard's Wolbach Library. Using the Harvard-Groningen Atlas of Selected Areas to estimate the photographic magnitude of the star, I found that it was clearly about a M_B 11.5 star - not a M_B 14 star, which would be near the limit of the Atlas. Meanwhile, some of Mr. Townsend's friends checked their Atlas Stellarums, and also found a M_B 11.5 object. Further evidence came when Janet contacted Charles Scovil and requested that he check photographs at Stamford Observatory. He verified the star's constant nature. In his letter of September 20, 1981, Mr. Townsend concluded that his Atlas contains a single image reproduction defect, and he sent a copy of the page showing the star at approximately M_B 14.

Since his Atlas is the same edition as that at Harvard (December 1970), observers should be warned that when checking an Atlas Stellarum for the variability of a star, a reproduction error in single copies of the same edition has been discovered, and so to use more than one Atlas for confirmation. In view of this (hopefully) unusual occurrence, perhaps the definition of a variable star as given in a beginning astronomy text should be changed to read:

"Astronomers have designated as variables those stars which exhibit a measureable variation in their brightness or luminosity not caused by the fluctuations in our atmosphere", or in published atlases!

We wish to thank Mr. Townsend for bringing this problem to our attention, and suggest that if similar defects are found, AAVSO Headquarters be informed, so that a list of chart defects may be compiled.

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