

VISUAL TECHNIQUES FOR FAINT  
OBSERVATIONS WITH SMALL TELESCOPES

ERNST H. MAYER  
Barberton, Ohio

This paper is designed for the variable star observer who uses a telescope in the aperture range of 3 to 10 inches. The assumptions shall be made that the observer's eyesight is normal and that the instrument is of good optical quality and mounted in a stable manner. Furthermore, it shall be assumed that the observer has had some experience in variable star observing and that his observing conditions are sufficiently good to allow him to see fifth magnitude stars or fainter with the unaided eye on clear, moonless nights.

The program of such an observer typically will comprise stars whose brightness can drop below 13<sup>th</sup> magnitude and well into the so-called "Inner Sanctum" range.\* Why is it then that so many observers fail to observe in this range?

The major obstacle seems to be that the "established" magnitude limits of the instrument used are accepted as such. However, prejudice should never stifle an observer's ambition and curiosity. According to the experience of the author it is possible to reach below 15<sup>th</sup> magnitude with a six-inch reflector under good seeing conditions.

Good seeing is required for the high magnifications necessary for these very faint observations. The other requirement is application of averted (indirect) vision if at all possible. Lack of sufficiently bright stars in the immediate vicinity of faint variables can, at times, make faint observations difficult. In most cases, however, the star field itself represents no problem although it may be necessary to view the field from different angles in order to observe under optimum conditions.

It is true that very faint estimates can require considerable time and effort. It helps to check on almost trivial things like correct focus, cleanness of the optics, comfort of viewing, and exact location of the variable. It is also a good idea to view the field in a "sweeping" fashion and to relax the eye from time to time. In other words, try every possible means to obtain either a positive or a high-quality negative estimate of the variable. It must be remembered that a tired observer is not certain to be successful. Furthermore, if circumstances do not allow very faint observations the observer should try again under better conditions.

A quick glance at light curves shows that the maxima are usually well observed while the minima are insufficiently observed. It will take a concerted effort by many observers to improve this situation. The quantity of observations alone is meaningless if the quality is lacking, as has been pointed out many times. In addition, only high quality observations can provide the long-lasting satisfaction that motivates an observer to continue the work for a long time.

\* By AAVSO definition, positive estimates of 13<sup>m</sup>.8 or fainter, or negative estimates fainter than 14<sup>m</sup>.0 constitute "Inner Sanctum" observations.