

Variable Star Observing: Visual versus CCD

Discussion Session - 1999 March 30

Jan Hers

e-mail: janhers@pixie.co.za

The suggestion for this discussion was made as the result of the advice given to variable star observers by an American astronomer that the time had come for them to stop making visual estimates and from now on to concentrate solely on CCD measurements. The question is: is this sound advice?

A number of people took part in this discussion, but as there was no one to take notes it is not possible to give a detailed summary. However, there was general agreement on the following:

Advantages

The obvious advantages of CCD measurements are:

- (a) fainter stars measurable; shifting the present visual limit of about mag. 15 down another 2, 3 or 4 places.
- (b) higher accuracy; magnitudes measurable to 2 or 3 decimals.

As to (a) it follows that there will be a tremendous increase in the number of stars that can be measured with existing small telescopes (say 50 cm aperture and smaller). The present position is that – of the many variables for which charts are available – many are very poorly observed, or not observed at all. If their number is greatly increased, the likelihood of their being satisfactorily observed becomes

even less. Seen from this angle, therefore, amateur variable star observers may well find themselves in the same position as some of their colleagues in the past, e.g. computers of occultation predictions, or those sketching planetary surface details, who have seen their work made completely redundant by new technology. But the visual observer still has, and probably will continue to have, one tremendous advantage: he can work very much faster than his colleague with the heavy equipment.

However, recent developments in the automatic measuring and recording of large numbers of variables seem to be exceptionally promising, and although the area of the sky at present being covered is still minute, we can certainly expect that to improve in time. But the possibility of continuous all-sky coverage is certainly some distance in the future. It will almost certainly turn out to be a professional activity, with amateur assistance only in a few exceptional cases.

As to (b), it now becomes practical to measure variables of very small amplitude, less than a magnitude. This too will increase the number of variables that can be observed, and probably open up new avenues of research, although we might perhaps wonder what the actual requirements might be for such big quantities of data.

The third instalment of papers delivered at the ASSA Astronomical Symposium, 1999 March 29–30, South African Museum, Cape Town.

All in all, such changes are bound to lead to an exceptional information explosion, and the method of handling it will probably be very different from what we have today. The problem of getting the right information to the right people at the right time will become a computer problem. And will the results in the case of unexpected events, the discovery of a nova, or the outburst of a dwarf nova, be as satisfactory as they are today? Automatic recording equipment will also be subject to the vagaries of the weather.

Disadvantages

But now the disadvantages. It is all very well to suggest that all visual observers should graduate to CCD observing, but to many of the present observers this would mean a complete change in outlook. Some, but by no means all, might be technically inclined, and able to build their own equipment, but others will have to settle for commercially available equipment, which in the USA might cost about \$4000 (not including the telescope), and in South Africa this would represent a fantastic amount of money. Anybody willing and able to spend an amount like this would

like to have a guarantee that he would get the equipment to work successfully, and even then might not be sure that it was money well spent.

Professionals in the USA and Japan seem to be able – probably with the best possible equipment – to produce a very high output, but amateur experience has shown that making accurate CCD measures is very time consuming, and that their output – in stars measured per hour – is considerably less than with visual observations.

Conclusion

Maybe all this will become simpler in future, but in the meantime our advice to observers – and especially new observers – should be that CCD measures are most important, and will receive every encouragement, but that visual observations are as vital as ever. In fact, it is the dedicated visual observer who can every now and then find himself at the right place and at the right time to make that vital observation on which so much depends. And remember that an observation not made, can never be repeated, and is an observation lost forever.