1981 Date (UT)	V	α	r	Δ	V(1,α)
June 29.07	9.6	24.8	2.03	1.28	7.5
July 1.05	9.6	24.3	2.02	1.26	7.5
2.05	9.6	24.1	2.02	1.25	7.6
8.05	9.4	22.5	2.01	1.19	7.5
Aug. 2.12	8.7	12.2	1.95	0.98	7.3
3.01	8.5	11.7	1.95	0.97	7.1
11.13	8.4	7.1	1.93	0.93	7.1
12.05	8.4	6.5	1.93	0.93	7.1
23.00	7.6	0.5	1.91	0.90	6.4
23.91	7.6	1.1	1.91	0.90	6.4
25.95	7.7	2.4	1.90	0.89	6.6
26.93	7.7	3.0	1.90	0.89	6.6
27.91	7.6	3.7	1.90	0.89	6.5
31.90	7.7	6.2	1.89	0.89	6.6
Sep. 5.90	8.1	9.4	1.88	0.90	7.0
18.92	8.6	17.0	1.86	0.94	7.4
22.90	8.7	18.5	1.86	0.95	7.5
Oct. 2.91	9.0	23.0	1.84	1.00	7.7
20.86	9.3	29.1	1.82	1.14	7.7
27.91	9.3	30.6	1.81	1.19	7.6

Table I.
Visual Observations of 18 Melpomene

properties of the surface. The slope of the linear portion is called the "phase coefficient" and its value is related to the asteroid's albedo. The linear least squares best fit slope for the data in Table I with $\alpha > 7$ degrees gives a phase coefficient of 0.028 ± 0.002 mag/deg. This line is plotted in Figure 1. Bowell et al. (1979) list Melpomene as an S-type asteroid and the mean phase coefficient for S-types is 0.029 mag/deg (Bowell and Lumme 1979). Thus the visual observations reported here yield a phase coefficient which is in excellent agreement with that of a typical S-type asteroid. If the line in Figure 1 is extrapolated to 0 degrees phase angle, a V(1,0) magnitude of 6.88 is obtained. This is in fair agreement with the 6.61 value from Bowell et al. (1979).

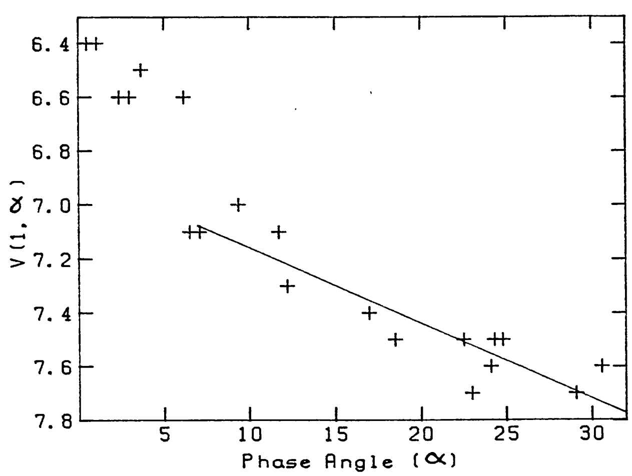

Figure 1.
Phase Curve for 18 Melpomene

References

Bowell, E. and Lumme, K. (1979). "Colorimetry and Magnitudes of Asteroids". In Asteroids (T. Gehrels, Ed.), pp. 132-169. Univ. Arizona Press, Tucson.

Bowell, E., Gehrels, T., and Zellner, B. (1979). "Magnitudes, Colors, Types, and Adopted Diameters of the Asteroids". In Asteroids (T. Gehrels, Ed.), pp. 1108-1129. Univ. Arizona Press, Tucson.

BOOK REVIEW

Solar System Photometry Handbook
Edited by Russell M. Genet
Willmann-Bell, Inc., Richmond, Virginia, 1983
208 pages, $17.95

In the past, photoelectric photometry was an art practiced only by professional astronomers who had access to expensive, custom-made equipment. Recently, however, relatively inexpensive photometers have appeared commercially, thereby providing amateurs the opportunity to obtain photometric observations of various astronomical objects. The professional, however, has a thirty year head-start over the amateur, and many amateurs may wonder if there is anything left for them to do with a photometer on a small telescope. If this is the case for you, then this is the book for you! The book is loaded with discussions of just what opportunities remain for amateur photoelectric photometry of solar system objects.

The book consists of a preface, two forewords, and ten chapters, each written by a different individual covering a different aspect of photoelectric photometry. Eight chapters cover photometry of just about anything in the solar system you can imagine: asteroids, comets, planets, planetary satellites, the sun, and the moon. Two of the chapters are devoted to discussions of the equipment needed to perform the observations covered in the other eight chapters. The foreword by Dunham is practically a chapter by itself, full of information about various kind of occultation observations. Don't skip over this useful portion of the book!

As one might expect from a multiple-author book, the level at which each chapter is written does vary. For example, the chapter by A'Hearn on photometry of comets is clearly aimed at the professional astronomer and only the most advanced amateurs. The chapter by Binzel on photometry of asteroids, on the other hand, describes observations that can be carried out by the beginning amateur photometrist. The readability of the other chapters, especially the ones covering the equipment, depends to large degree on the level of experience the reader has in those subject areas. Another item to watch out for is inconsistent notation from author to author. In chapter one, the Greek letter 'alpha' is used to represent phase angle, while in chapter two, the Arabic letter 'i' is used for the same quantity. Neither author is wrong; such notation differences are common from one branch of a field to another.

Of particular interest to readers of the Minor Planet Bulletin are the chapters written by R. P. Binzel and A. W. Harris on photometry of asteroids and asteroid occultations, respectively. Binzel's chapter covers observations of lightcurves, colors and phase functions. Transformation of observed magnitudes and colors to a standard system, such as the Johnson system, is not covered, however, and I was a little disappointed to not find any references provided on the subject. Anyone contemplating such work would do well to have another reference book handy, such as Software for Photometric Astronomy, by Silvano Ghedini, also sold by Willmann-Bell. Of course, the classic reference on the subject is the chapter by Hardie in Astronomical Techniques, but this book might not be as easy to acquire. On several occasions, the author mentions that certain observations can be done without a filter. I would recommend the use of an ultraviolet blocking filter in those situations, however, as a matter of good practice. The use of such a filter will eliminate some second-order effects that might otherwise limit the precision of the data. Speaking of second-order effects, if pulse-counting equipment is used and high count rates are encountered (say 0.1 to 1.0 MHz and higher), the first step in the reduction procedure (Section V) should be correction for pulse overlap (also known as dead time). If one sticks to objects of asteroidal brightness on small telescopes, however, the effect can be ignored unless one is shooting for very high precision. High precision will be needed for program number three (page 1-4): rotational color variations. It should be mentioned that the observer will need to correct for lightcurve induced color variations for the rapid rotators. For example, if the brightness of an object is changing 0.01 mag per minute (such as 216 Kleopatra can), and the time difference between the V and B measurements is five minutes, one can introduce a 0.05 mag error in the B-V color. This error will change sign if the order of the filter measurements is interchanged, or if the slope of the lightcurve changes sign, thus artificially producing a rotational color variation of 0.1 mag amplitude! Yes, even professional astronomers have been known to incorrectly claim large rotational color variations because of this effect, so beware! If you're just starting out, I would recommend having a more experienced person check your reduction procedure, just to be on the safe side.

Harris' chapter begins by stating one of the most compelling reasons for observing asteroid occultations: they are fun to observe! His writing style goes on to convey the sense of excitement that asteroid occultations provide. They can also be quite frustrating (I have been involved in several occultation expeditions and have yet to witness a single event!), so be prepared to have multiple encounters with Murphy's Law. Much has been learned from recent occultations, and Harris' advice regarding placement of visual and photoelectric observers, as well as the other aspects of observing an occultation, should not be taken lightly. It will certainly take a lot of self-discipline to position oneself in a location where the probability of seeing an event is small.

Electronically inclined amateurs may wish to construct their own equipment. This book has two chapters to aid in that task. J. L. Hopkins discusses the construction of low-speed equipment and P. C. Chen discusses high-speed equipment. Readers with little or no background in electronics might feel a little intimidated by the frequent use of acronyms in Hopkins' chapter: PEP, DIP, MECL, and TTL are some examples. It is common practice to spell out an acronym the first time it is used in a paper, but many find their way into papers without being spelled out by simple force of habit. Sometimes the author assumes that everyone in the audience is familiar with particular acronyms. (A random person on the street may know what NASA is, but what about CTIO, for example?) More emphasis seemed to be given to the construction of the electronics rather than the photometer head itself, so if you really want to start from scratch, you might want to obtain some sample designs from others who have built photometer heads.

Cosmetically, the book is well-printed with a type size that should present no difficulties to keen-eyed astronomers! My copy arrived very well-packaged and undamaged. The book has soft covers which have a tendency to curl outward under conditions of high humidity, but keep it on the shelf when not in use and it should stay in pretty good shape. Of course, no book is "complete" without some errors, and this book has its share. For example, in Table 1-1 the reader will find two asteroids with the name Iris, numbers 7 and 42. Number 7 is the real Iris; number 42 should be Isis. Also in that same table, the adopted spellings of asteroids 194 and 387 are Prokne and Aquitania, respectively. On page 1-10, the reference to Section IV should be a reference to Section VI. I ran across at least a dozen other typographical errors, but none that critically affect an equation or the understanding of a sentence. In conclusion, if you are looking for something new to do and would like to enter the exciting world of solar system photometry, this book would represent an excellent addition to your library.

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