TIMES OF MINIMA AND PERIOD CHANGES OF ECLIPSING BINARIES AS A PROGRAMME FOR SMALL TELESCOPES

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Investigations of times of minima in eclipsing binaries give us important clues concerning a number of quite different and frequently unrelated phenomena such as the apsidal motion, mass-loss, mass-transfer or gravitational radiation. It is hard to over-estimate the importance of these relatively easy observations. However, simple statistics show that much remains to be done to assure proper data for even a moderate--size sample of eclipsing binaries. Here we present essential results of such statistics made for stars brighter than 12 magnitude in minima (this limit assumed arbitrarily as accessible to small-telescope observers).

For selection of stars brighter than 12 magnitude in minima we used the 3-rd edition of the General Catalogue of Variable Stars with its three Supplements. These stars were checked for entries of times-of--minima in the Card-Index Catalogue of the Cracow Observatory (unpublished). These data were supplemented by visual minima published by B.B.S.A.G., A.A.V.S.O., B.A.V., and others. In addition a collection of about 20 thousand minima and corresponding O-C curves for W UMa systems (Z.Glownia,unpublished) was used.

The number of eclipsing binaries in both hemispheres was:

N: $\delta > 0°$	549 systems
S: $\delta < 0°$	539 systems
Total	1088 systems

of which

Algol-type (EA)	670 systems
Beta Lyrae-type (EB)	269 systems
W UMa-type (EW)	125 systems
unknown type (E)	24 systems

The ephemerides are better established for northern systems: those published in the Rocznik Astronomiczny Obserwatorium Krakowskiego, International Supplement (SAC) are available for:

N: 398 systems (72 percent)
S: 280 systems (52 percent).

The amateurs provide a large fraction of minima for all 1088 systems and again the difference between hemispheres is rather obvious:

J. B. Hearnshaw and P. L. Cottrell (eds.), Instrumentation and Research Programmes for Small Telescopes, 301–302.

N: 374 systems (68 percent)
S: 112 systems (21 percent)

An additional difference is in the uniformity of observations. If we divide the stars according to the year of the last observed minimum, we see a striking lack of recent observations of southern stars. In addition, for 40 percent of southern stars (and for 24 percent over the whole sky) we have no data at all!

THE LAST OBSERVED MINIMUM
(photoelectric or visual or photographic)

Years	Northern systems		Southern systems	
	number of stars	percent	number of stars	percent
1984-1985	172	31	28	5
1981-1983	170	31	45	8
1971-1980	91	17	123	23
earlier than 1971	69	13	127	24
lack of minima	47	8	216	40

Two additional comments:
1. Only for about 85 binaries have minima been observed systematically (photoelectrically and visually) during the recent 30 years, this mostly being work of amateurs; the contributions of professional astronomers have been rather small.
2. The secondary minima, which are very important for apsidal-motion investigations, and stars with amplitudes less than 0.4 mag. are not observed by amateurs. These very important gaps should be filled by photoelectric observations.

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