

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 496

Konkoly Observatory
Budapest
1970 December 12

RESULTS OF THE STUDY OF 3806 VARIABLES IN AND ABOUT THE
MAGELLANIC CLOUDS

(presented at IAU, Brighton)

1. Three thousand and five hundred and seventy one stars were announced by the Harvard College Observatory in the time interval from 1889 until 1953. Two hundred and thirty five new variables I found during my work with Mrs. Gaposkin on the Clouds from the year 1960 while making more than two million observations on some 4000 plates. We found that 483 announced variables are probably not bona fide variables and they were discarded.
2. The distribution of the variables in and about both LMC and SMC finally accepted by Mrs. Gaposkin and myself in reference to eleven classes of variability in light was published in 1970. (See No. 420, Inform. Bull. Comm. 27 of IAU).
3. Employing an accurate formula for 85 eclipsings in both Clouds I determined many individual moduli. The mean moduli for the Clouds are
 18.38 ± 0.02 for LMC and 19.15 ± 0.03 for SMC
The corresponding distances and diameters, the latter, of course, as seen on the Harvard Bruce plates are:
47.4kps and 6.9kps; 67.79kps and 5.8kps.
4. With these moduli I derived the Absolute Period-Luminosity Relation for 2244 Cepheids equally divided between two Clouds. For the SMC: $M = -2.12 - 2.24 \log P$. For those of the LMC the relation is very much alike; for the W Virginis stars it runs parallel 2.40 below. For the Long Periodics it is less explicit yet still definite. These relations are explicitly for the maximal brightness of the lightcurve and not for any other brightness which I find from the point of view of application are inferior to that adopted here. This P-L relation I'd call the "First Cosmic Law" or Miss Leavitt law.
5. My Topography of the LMC brought forth 34 bright regions or "Ridges", not senselessly called associations, in contrast to the surrounding regions embracing the whole Cloud of lesser density of stars. Many interesting and may be significant interrelationships between these Ridges, Coils and Variables are indicated.

6. The two-dimensional distribution of all 3323 Variables leaves little doubt that the "TILT" of both Clouds scarcely can hold the ground. At least not in its conventional sense.
7. Out of many hundreds of Miniclusters (the small and the smallest clusters of stars hitherto practically unknown and not attended though perhaps they form a fundamental background of the Clouds), I found partly serendipitously partly with intention that at least twenty of them have variables of all sort making them, at least temporarily, a new kind of stellar formations, a new sort of denizens.
8. Turning to account the formulae for the Cepheids, RR Lyrae and Eclipsings I was able to place 119 Variables of both Clouds, hitherto a puzzle as a "Surplus" in their proper and accurate perspective. They all with a few exceptions are located between the Clouds and the Milky Way forming "silver cords" suggesting or recommending the stellarly physical connection between these starry families MW, LMC, SMC probably reminiscent of NGC6027.
9. If No.8 is correct however/imperfectly and deficiently presented then the "strange" findings of Miss Cannon years ago and the very recent ones of Fehrenbach and Duflet in reference to "Foreground stars" are no more strange but "natural".
10. Two thousand five hundred and forty seven periods of Variables were determined in this work independent of the old work at the HCO with an exception of using the announcement and identification. Three fifths of the periods are quite new, the rest redetermined to a higher accuracy.
11. In historical sense our work constitutes a finalizing of a probably most expensive astronomical project at the HCO and certainly the longest project for it began in the very beginning of modern astronomy and lasted 81 years, one month and seven days counting the end the date of my signature of this article. The project is undoubtedly also the greatest ever emprized by a single observatory.

December 1, 1970

SIRGAY GAPOSHKIN
Harvard College Observatory