

INVESTIGATIONS OF A VARIABLE PLANETARY NEBULA,
THREE PERIODIC, AND A NEW SUSPECTED
VARIABLE IN SAGITTARIUS

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Abstract

Long-term and short-term variations, possibly periodic, were observed in the planetary nebula, V3811 Sgr. Extensive observations of the RR Lyrae-type star, V509 Sgr, and the two long-period variables, GP Sgr and V510 Sgr, indicated only minor revisions in period. A close companion to GP Sgr shows evidence of short-term variation although no periodicity has been established.

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Bond (1976) lists V3811 Sgr among stars common to the Catalog of Galactic Planetary Nebulae and the General Catalog of Variable Stars. Using an independent set of comparison stars, I measured this on approximately 600 NA plates and 260 Harvard plates of the A, B, and MF series, 1924 - 1976, and found a magnitude variation from approximately $14^m.5$ to $15^m.4$ (pg). A plot of magnitude estimates against Julian Day on a scale of 200 days to the inch showed some evidence for a long-period variation on the order of 600 days, which agrees fairly well with the tentative period of 650 days derived here by Diana Welch in 1967. An argument could also be made for a secondary variation spanning four days, from data plotted at ten days to the inch.

The published periods for V509 Sgr and V510 Sgr were updated, with measurements from Harvard and Nantucket plates taken between 1924 and 1976. The GCVS ephemeris for V509 Sgr was found to be still valid, while the best correction to the period of V510 Sgr was only 0.1 day, making the period 167.9 days. Two close companions of the latter star made measurements difficult; a large scatter at minimum of the light curve is probably due to confusion with one or both of these.

For GP Sgr, the published period is 256.5 days. This did not adequately represent the new observations. The possibility of a changing period was carefully investigated. However, after combining the newer observations with early estimates by Hoffleit, dating back to 1899 on Harvard plates, the best overall period is 257.5 days, for the interval 1899 - 1976.

In re-estimating the period of GP Sgr, I initially misidentified it with a nearby star on the finder chart. The faint star did seem to show a variation of from one to two magnitudes; so after the identification problem was resolved, I measured it along with the known variable. I tried to find my suspected variable in the GCVS and the Catalog of Suspected Variable Stars, but nothing seemed sufficiently close to GP Sgr. (A finder chart is shown in Figure 1). A plot of magnitude estimates against Julian Day showed no evidence for long-period variation; however, what seemed to be large scatter on night runs of three or more plates seemed to indicate short-term fluctuations on the order of 0.2 day, but no period was found. I estimate the range at $15^m.2$ to $16^m.8$ (pg).

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REFERENCE

Bond, Howard E. 1976, Publ. Astron. Soc. Pacific, 88,192.

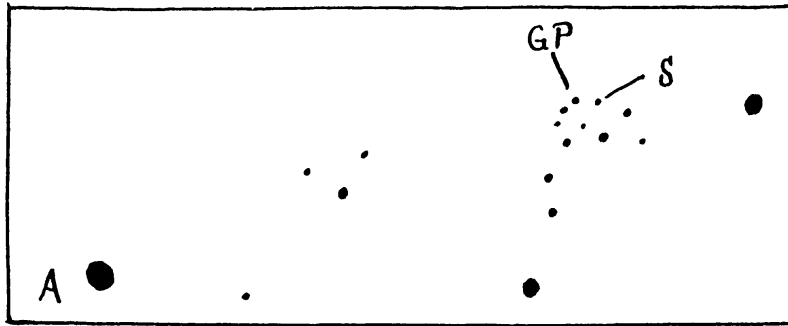


Figure 1. Finder chart for GP Sgr and the suspected variable, marked S. Star A is CoD -24°14244. Chart approximately 100'x20', South at top.