RR LYRAE VARIABLES IN BAADE'S WINDOW

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In his pioneer study of the RR Lyrae variable stars near NGC 6522, in the relatively unobscured window close to the galactic center ($l = 0.9$, $b = -3.9$), Baade (1963) was limited by the high zenith distance of the galactic center as seen from Palomar, and suggested that southern hemisphere observations would be of value. Subsequent studies of the region have been based on the variables found in Baade's original search. Southern hemisphere plates were taken by Hartwick et al. (1972), and their re-analysis of a sample of Baade's variables showed many periods to be in error. They did not, however, search the plates for new variables. Plaut (1973) re-analyzed all the variables but no search for new variables was done.

B. Blanco and V.M. Blanco have obtained a new set of 82 plates with the 1.5m telescope at CTIO on 7 nights, including series on successive ones. Blue and visual plates were alternated to permit a redetermination of absorption in the region as well as an analysis of mean B or V magnitudes. A new search for RR Lyrae variables is now in progress. In order to optimize the selection of plate pairs for blinking, the Monte Carlo method was used. The blinking of the first three plate pairs has confirmed that the method strongly favors the discovery of RR Lyraes.

The uniformity of obscuration is also being examined. The area selected by Baade for his statistical study appears not to be of uniform transparency. However, there does appear to be an extension or wing of relatively uniform and high transparency that extends the window toward the galactic center. This new wing is being searched along with the original area. After blinking only three plate pairs, the rate of discovery is as follows:

	No. vbles.	Area (sq. arc min)
Original window	17	483
Wing	10	176

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Thus there seem to be at least as many if not more variables per unit area in the wing. Of the ten in the wing, four were not previously known. The photometric sequence in this region is being improved, in view of the existence of appreciable differences between the photoelectric sequencies which have been derived previously by Arp (1965) and by van den Bergh (1971). The discrepancies are significant after mag 16.0 in both B and V, thus affecting the maximum of the period-frequency distribution, found by Baade to be around $m_B = 17.5$.

We are using neither the random sky method used by Arp nor the fixed preselected sky-regions used by van den Bergh. (See also Oort and Plaut 1975). Instead, at least two sky areas near each star are being individually matched as closely as possible to the area around the program star in question, in order to minimize the effects of the inevitable contamination by background stars in this very crowded region. The use of TV acquisition techniques at the 4m telescope is being supplemented by sensitometric analysis of stellar images on direct plates and by 2-dimensional photometry of the field with a vidicon detector. Similar studies in two other galactic nucleus "windows" (Sgr I and II) (Oosterhoff et al., 1967) are also being initiated.

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DISCUSSION

Bok: It is not generally known that on his last big night of observing (at Mount Stromlo Observatory, on the 74-inch telescope) Walter Baade took 12 one-hour plates of his "window". I was his night assistant on that night, along with Gerrit Oom. Walter Baade told me that he planned to give the plates to his collaborator Henrietta H. Swope.

van den Bergh: The "Wing" of Baade's window is closer to the galactic center than is NGC 6522. Its high surface brightness might therefore be due both to high stellar density and to relatively low absorption.

Kerr: Quantitatively, how much of a "window" does this region provide? I once did a sweep across the region in the 21-cm line, and did not find much variation in the HI column density in crossing the "window".

van den Bergh and Feast: Photometry of Mira variables show that $A_V \sim 1.6$ in the Baade window, in good agreement with van den Bergh's value.

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