

SOME RESEARCH PROGRAMMES INTO GALACTIC STRUCTURE AT THE GALACTIC CAPS
UNDER WAY AT THE ROYAL GREENWICH OBSERVATORY

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The R.G.O. has a continuing programme to investigate both the density and motions of the stellar content of the solar neighbourhood. Gaps in current knowledge are wider for the fainter stars which are found in proportionally greater numbers near the galactic poles. Our approach divides naturally into two questions: (i) What are the proportions of red dwarfs to giants at each apparent magnitude? and (ii) What are the corresponding total numbers of red stars?

Question (i) was first tackled by a narrow-band photometric search for M dwarfs (Jones 1973). This approach is continuing and a progress report has been delivered (Jones 1976). To push the search deeper 41 stars in the South Galactic Cap (mostly fainter than $V = 15$) selected by P.S. Thé from a survey with the Lembang Schmidt as being M2 or later were observed with the Robinson-Wampler Scanner on the 150-inch A.A.T. The Na D lines, CaH and the band at $\lambda 5500$ tentatively identified by Pesch with CaOH have been measured. Column density calculations of CaOH for giants and dwarfs of different temperatures support Pesch's identification. Nearly all the stars are dwarfs but only seven appear in proper motion catalogues, (Thé and Staller 1974). At the galactic caps most stars brighter than $V = 12$ are giants and fainter dwarfs. The transition zone is only 10-14.

Question (ii) is being tackled in an observational programme begun in 1976 March. V and I plates of SA 57 and the North Galactic Pole field have been taken with the Palomar Schmidt. To date 2 V and 2 I plates of SA 57 have been measured on GALAXY, after a search on an I plate. Sequences in V, R & I have been set up in both fields with the 60-inch Infrared Flux Collector on Tenerife, running from 7 to 17 in V and 7 to 16 in I. There were 60 standards available to calibrate the GALAXY measures of SA 57 and they fitted with r.m.s. errors of ± 0.08 (both V plates) and ± 0.11 (both I plates). In 21 square degrees we found 1590 stars brighter than $V = 17$ and $I = 16$ and redder than $V-I = 10$. (about K4 on the main sequence). Estimating their distances photometrically (Uggren 1975, Sanduleak 1965) we find 0.055 stars per cubic parsec. The figure would be materially increased by the

inclusion of one further red star beyond the limit of the V sequence. Of course, this one star has a Poissonian uncertainty of one.

The Oxford Astrographic Zone crosses the North Galactic Cap. Plates covering 64 square degrees and extending over 70 years are being measured for proper motion. In addition repeat plates of the POSS were taken on the same run as the photometric plates and proper motions will be measured for all faint red stars.

All these programmes are team efforts and their results will be published either by the RAS or the RGO.

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