

## B (2). LOCAL STRUCTURE: WORK IN HIGH LATITUDES

The potential possibilities of research in Kapteyn's Selected Areas at intermediate and high latitudes, where magnitudes and proper motions are already available, could be fully exploited if a more accurate spectral and luminosity classification would become available, especially for the later type stars. The purpose of work on faint stars in these latitudes is manifold. At the highest latitudes the improved data can serve for a new determination of the density distribution and of the force perpendicular to the galactic plane as a function of the distance  $z$  to the plane,  $K(z)$ . The limiting magnitude may be set here at  $m = 13.0$  (photographic). At intermediate latitudes one would hope to find the correlation between the density at some distance above the galactic plane with the density in the plane. Here the limit should be set at 13.5 or 14.0, so that G and K giants can be reached up to distances of 2 to 3 kparsecs from the Sun.

Another important problem is the velocity distribution parallel to the galactic plane as a function of the distance  $z$ . For this study we need accurate photometric distances and proper motions. Problems like the deviation of the vertex as a function of  $z$  or, more generally, the detailed study of the velocity distribution for stars of different populations might in this way be attacked.

The spectral classifications may also provide more information on the physical characteristics of the stars at large distances from the galactic plane. The necessary luminosity determinations can be based, perhaps, on accurate multi-colour photometry as described in the preceding sections.

Work at high latitudes was reported by various participants at the conference. Parenago mentioned work by Artuchina on the proper motions of 1000 stars in a region of 25 square degrees up to the 15th magnitude, indicating that it might be possible to determine the percentage of stars belonging to various sub-systems by studying the velocity distribution at different distances from the galactic plane.<sup>1</sup> This work, however, also showed the need for accurate proper motions for much fainter stars. Münch, at Mount Wilson Observatory, in collaboration with Haro, is observing spectra of the stars in Malmquist's catalogue of colours and magnitudes in a field of 100 square degrees. Spectra are being obtained with the 200-inch telescope for the stars which are picked out as G and K giants.

Harris, at the Yerkes Observatory, has measured photo-electric colours with the 82-inch McDonald telescope for stars in an area of 35 square degrees. Classifications in this region have been made by Nassau. Münch has also observed spectra of the blue stars near the galactic pole found by Humason and Zwicky and found that a large percentage of the bluest stars does not show H lines and has at the same time other abnormalities. This survey may be the basis for further investigations of these stars.

Most of these investigations have not, however, a direct bearing on the problems described above in connexion with the stars' motions. For these and also for the study of the general density distribution, the work should undoubtedly be concentrated on the Kapteyn Selected Areas. It was decided at the conference that the co-ordination of efforts for various types of measurements in the high and intermediate latitude areas will have to be organized by the continuation committee. It will have to decide first on the choice of the Selected Areas, and next consider and co-ordinate the proper motion work (which possibly will have to be organized by the commission for the Astrographic Catalogue), the radial velocity work (possibly by Fehrenbach's method), multi-colour photometry and spectral classification. In this connexion it is important to notice that a survey of slit spectra for stars brighter than photographic magnitude 12.0 in some high latitude Selected Areas has been undertaken by Miss Roman with the 82-inch McDonald telescope.