(*b*) I should warn against the temptation to draw the spiral arms of our Galaxy within 3 kpc of the Sun. For the time being I would prefer to plot spiral concentrations without putting in the arms.

McCuskey. The density of early A-stars in longitudes l^{II} 120° to 130° amounts to about 0·4 per 10^3 cubic pc; in the Carina region it is only about 0·3 per 10^3 cubic pc. There is, therefore, a higher concentration near 300 to 500 pc in $l^{II} \sim 125°$ than in Carina at 500 to 1000 pc.

Schmidt-Kaler. I have noted in my picture a segregation of objects of different type. It seems to me that a similar segregation can be noted for the late B-stars and the A-stars in Dr McCuskey's picture. This segregation is in the same sense, the youngest objects being at the outer edge of the spiral feature for the local arm as well as for the Orion-Puppis spur. The results of F. Becker and Bok in Carina confirm this.

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14. MOVING GROUPS AMONG YOUNG STARS

O. J. Eggen

The space motions of several hundred A-type stars brighter than visual magnitude 5·5 clearly show the presence of four or five moving groups of stars among stars younger than about 5×10^8 years and in the solar neighborhood. The values of V (i.e. the vector of the space motion directed with galactic rotation) for members of a group have a dispersion of only 1 or 2 km/sec but the values of U (i.e. the vector of the space motion directed away from the galactic center) show a spread of nearly 20 km/sec.

The peculiar A-type stars (A*p*), have been divided into two classes; (1) those bluer than $B - V = -0^m.10$, which are all 'Mn' or 'Si' stars and (2) those that are redder than $B - V = -0^m.10$, which are mainly 'Cr-Eu' or 'Sr' stars. These two classes of stars populate almost mutually exclusive halves of the (U, V)-ellipse with the stars in class 1 being mostly members of the Hyades and Pleiades groups and many of the class 2 stars belonging to the Coma Berenices and Sirius groups. The F and G type stars in clusters containing A*p* stars of the 'Mn' or 'Si' types show no ultra-violet excess with respect to the Hyades cluster stars whereas those in clusters containing 'Cr-Eu' or 'Sr' stars show an ultra-violet excess of $0^m.03$ or more. F and G type companions to A*p* stars confirm this result.

The B-type stars near the Sun populate the same region of the (U, V) diagram as the A*p* stars bluer than $B - V = -0^m.10$ ('Mn' and 'Si' stars).

https://doi.org/10.1017/S0251107X00019350 Published online by Cambridge University Press

The mass-luminosity relation for the stars falling in the region of the (U, V)-plane occupied by the B-type stars and the A*p* stars bluer than $B - V = -0^{m}.1$ (which is also the region occupied by the Hyades and Pleiades groups and by stars showing no ultra-violet excess with respect to the Hyades) is displaced from the mass-luminosity relation followed by other stars. This displacement may be caused by a large difference in the hydrogen to helium ratios.

These results indicate that the Hyades and Pleiades group stars, and all objects with the same chemical composition may have been formed from the same gas cloud and have not wandered more than 1000 pc from the distance from the galactic center at formation. All other stars which are now in the solar neighborhood but spend most of their lifetime at greater distances from the galactic center, have an appreciably different hydrogen to helium ratio. These later stars include the Sirius and Coma Berenices groups, as well as the Sun.

15. PREVIOUS REGIONS OF STAR FORMATION DERIVED FROM STELLAR MOTIONS

B. Strömgren

For several years it has been a goal of investigations of young stars to derive, for individual stars, the places of formation from the combination of knowledge of space motions with that of stellar ages.

Properties of the space motions of young stars have been discussed in the previous paper by O. J. Eggen. I would like to discuss questions of age determination for main-sequence B and A stars, particularly with a view to the application of the ages to the calculation of places of star formation.

For B stars, the combination of *UBV* photometry and hydrogen-line photometry yields relatively accurate determinations of the location in the Hertzsprung-Russell diagram. Extensive hydrogen-line photometry for B stars has been carried out in recent years—photographically by Petrie at Victoria, and photo-electrically by Crawford and collaborators at Kitt Peak National Observatory. For A stars later than A1 four-color photo-electric photometry in bands of intermediate widths serves the purpose satisfactorily in the case of unreddened stars, while reddened A stars are dealt with through the combination of four-color photo-electric photometry and Hβ photometry. For A0 and A1 stars the situation is at present somewhat less favorable. However, relatively accurate location in the Hertzsprung-Russell diagram is possible on the basis of Hβ photometry combined with determinations of $(B - V)_0$, either from measures of $B - V$ in the case of unreddened stars, or for reddened stars from MK classification or measures of further photometric indices.

The theoretical investigations of tracks of evolution through the hydrogen-burning phase for B and A stars which were carried out by Kushwaha, Henyey LeLevier and Levee, Haselgrove and Hoyle, and others, led to a calibration of the Hertszprung-Russell diagram in terms of stellar mass and stellar age. In collaboration with Mr T. Kelsall, I have recently reconsidered the age-calibration problem on the basis of evolutionary tracks computed by Kelsall using improved tables of opacity and energy generation. I would like to summarize some of the results which have a bearing on the accuracy of age determination for B and A stars.

It is well known that the curves of equal age in the Hertzsprung-Russell diagram lie relatively close together in the part of the main-sequence band which is near the zero-age line, while they open up in a way favorable to the accuracy of age determination in the upper half of the main-sequence band. My remarks today pertain to the case of B and A stars in this part of the Hertzsprung-Russell diagram.