to Ne^{20} by the so-called α -process of Burbidge, Burbidge, Fowler, and Hoyle (*Revs. Modern Phys.* 29, 547, 1957).

Motions and Compositions of G Dwarfs. GEORGE WALLERSTEIN, *University of California*.—The galactic motions of G dwarfs of known composition are discussed. When the stars are plotted in the Haas-Bottlinger diagram with the metal abundance as parameter, both metal-rich and metal-poor stars are found with the circular velocity, but all stars with large velocities with respect to the local standard of rest are distinctly metal poor.

If the Haas-Bottlinger diagram is again used, this time with the ratio of the α -elements (Mg , Si , Ca , and Ti) to iron as the parameter, a clear division is seen. All the α -rich stars are high-velocity stars whose perigalactic distances are about $\frac{1}{2}$ or less than the distance from the sun to the center of the Galaxy. All metal-poor stars with velocities near the circular velocity have a normal ratio of the α -elements to iron. Such a separation is taken to mean that the high-velocity stars were formed in their present orbits rather than having been scattered out of circular orbits.

An analysis of the motions perpendicular to the galactic plane shows that the velocity dispersion increases steadily for stars of increasing metal deficiency.

Propagation of Energetic Solar Particles. CONSTANCE WARWICK, *National Bureau of Standards*.—Data are compiled for 52 polar cap absorption (PCA) events and 14 events in which solar particles of relativistic energies were detected at ground level (GLE). In particular, evidence is sought that these particles are guided along magnetic lines of force joining the earth and the sun, curved because of solar rotation. In this case, one expects particles to reach the earth more frequently and more promptly from flares located in the sun's western hemisphere. For ground-level events, a strong western excess is found, with arrival of particles at the earth delayed by a shorter time after western flares. Particles of lower energy, associated with PCA, fail to show this effect. PCA events without GLE occur most frequently with central flares, without significant western excess. Delay times are shorter for central flares than for western flares, with no significant east-west difference. Thus, PCA data are inconsistent with guidance in an extensive curved solar field. Particles in both energy ranges show considerable increase in delay time with approach toward maximum of the solar activity cycle, but only GLE decrease in frequency of occurrence, relative to other forms of solar activity, near maximum.

Investigation and Elimination of Systematic Errors in Measures of Solar Flares. CONSTANCE WARWICK, MARION W. HAURWITZ, AND C. E. HOFF, *National Bureau of Standards*.—More than 26 000 reports pertaining to about 15 000 solar flares were received from 51 observing stations during the IGY. Identification of reports referring to the same flare was made by an electronic computing machine, on the basis of reported beginning time and position, using an iteration method to form a group of reports, in which the values from each report are consistent within certain limits with the mean values for the whole group. Consideration of frequency distributions of importance and of apparent area gives information on the following: (1) existence of systematic errors in mean values of importance and area, dependent on flare position, and on which stations contributed to the reports; (2) consistency of mean importance with IAU recommendations and with measured area for central flares; (3) definition of a scale of importance, based on measured area and position, that is homogeneous across the disk and defined at all parts of the disk; (4) determination of the magnitude of systematic differences between the importance scale used by each observatory, and the scale determined by the mean of all reports from all stations for central flares; (5) determination of the systematic differences of each station's scale of area from the scale determined by all stations, at each central distance. Correction of each reported value of importance and area for the differences found in (4) and (5) gives final mean values of these quantities that are free from systematic errors dependent on flare position and beginning time.

Alignment of Long Cylindrical Satellites by the Earth's Magnetic Field. RAYMOND H. WILSON, JR., *NASA Goddard Space Flight Center*.—Very long cylindrical metallic satellites, having length-to-diameter ratio of several hundred, and spinning about the stable axis normal to the geometrical, are especially susceptible to rotational disturbance by torques due to eddy-currents induced by, and reacting with, the geomagnetic field. This is due to their large area-to-mass ratio for longitudinal sections, and to eddy-current torques being proportional to sectional areas parallel to the exciting field. Thus, using formulas confirmed by other artificial satellite measurements [Wilson, *XIth International Astronautical Congress* (Springer-Verlag, Vienna, 1961), Vol. I, 525–536], it can be shown that the mean spin-relaxation time, with random distribution of axes for the copper cylinders of Project West Ford, 1.77 cm in length and 0.0028 cm in diameter in a polar orbit 2200 km above the ground, would be about six days. This would mean a damping from two rotations per sec-