Naval Observatory at Flagstaff, Arizona. The useful field of the Farnsworth tubes under test has a diameter of about 18 mm, which corresponds to 9 minutes of arc at the focus of the telescope.

The components of double stars were separated on the plate when the distance between their centers was 170 microns; this corresponds to an angular separation of 5 seconds of arc. It is important that the gap between the barrier film and the G5 emulsion should be very small so that the scattering of the photoelectrons by the barrier film will not result in a serious loss of image resolution. A gap of 40 microns has been successfully used at the telescope but attempts in the laboratory to improve the resolution by bringing the film into actual contact with the G5 emulsion by means of electrostatic deflection have given promising results.

A number of 30-second exposures were made on M36 with a tube of low sensitivity and compared with direct photographs of M36 secured on 103a-D emulsions. Microphotometer tracings indicated that the signal-to-noise performance with the image tube was roughly on a par with that obtained by short-exposure photography. The same image density would have been obtained in a one-second exposure if the cathode of the image tube had been of average sensitivity.

In order to avoid excessive background emission, the cathode of the image tube was cooled and accelerating potentials of 10 kv or less were used. Minor changes in tube design and more efficient cooling should permit the observer to extend the useful exposure time well beyond 30 seconds.

The Formvar-aluminum barrier films used in this application had a total thickness of 700 Å. Ford has made a study of the physical properties of self-supported films and has succeeded in making films which will withstand the high temperatures required in image-tube processing and which are strong, flat, uniform, and free of pinholes. The two tubes used in these experiments were operated for three days without substantial loss in sensitivity.

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Buscombe, William and Morris, Pamela M.
Southern stars of high velocity.

In connection with the choice of observing programs for the determination of radial veloci-

ties with the Zeiss spectrograph at the Newtonian focus of the 74-inch reflector, a finding list of southern high-velocity stars is being prepared for press.

Tangential velocities were first computed for all stars south of the celestial equator, for which reliable trigonometric parallaxes (i.e., $>0''.01$) are available. The stars whose space velocities (corrected for a solar motion component of 20 km/sec toward R.A. 270° , Dec. $+30^\circ$ relative to the nearby stars) exceed 60 km/sec have been included, plus the stars of which the corrected tangential or radial velocities separately exceed 50 km/sec.

Pending the procurement of more complete data, many stars are also listed for which the uncorrected proper motion exceeds $0''.5$ annually. They are chiefly included for the purpose of drawing attention to the gaps which must be filled in the observational data, before a complete statistical analysis of the kinematics of stars in the high-velocity groups can be made, extending to any limits fainter than visual magnitude 5.5.

No attempt is being made at the moment to introduce photoelectric measures of stellar magnitude, or revised spectral classifications, as those fragmentary data would detract from the homogeneity of the Harvard system of photographic photometry and Henry Draper catalogue types. The use of spectroscopic parallaxes has been expressly rejected, as these have proved unreliable in previous surveys, particularly for stars of abnormal population groups. Objects of types such as RR Lyrae variables, globular clusters and planetary nebulae, which obviously belong to Population II, are omitted.

Observers are invited to make available any relevant unpublished data on parallaxes, proper motions or radial velocities which may enhance the usefulness of the finding list, and spare future observers the unfruitful effort of duplicating their work.

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Cameron, A. G. W. Mechanism of neutron production in supernova explosions.

If the main energy source giving rise to the exponential tails in the light curves of Type I supernovae is the spontaneous fission of Cf^{254} , then nuclei of medium atomic weight in these stars must have captured an average of 200 or more neutrons. It has been suggested that in the