fully combined area and spectral scanning in investigations of planetary nebulae.

The polarimeter is of the two-channel type developed by Hiltner (*Astron. J.* **57**, 13, 1952). A three-element Wollaston prism is used to obtain high image quality and the electronics include pulse counting and a multichannel analyzer.

A scanning mechanism is used to drive a polished stainless steel plate with its aperture always in the focal plane of the telescope. The plate is tilted so that the observer can watch with an eyepiece both the image and the motion of the aperture. Any one of a number of polished plates, each with a different aperture, is available for use with different types of objects. The scanning motion is linear over 300° of the cam rotation; the light is cut off by a shutter during the 60° flyback. The position angle of the scanning mechanism and eyepiece can be set independently of the polarimeter at angles of 0° to 180° .

Polarization observations in different colors have been made of nebulae, stars, planets and the moon. For small objects, in addition to the object, both the sky background and the dark current are recorded during each scan; an important advantage in studying objects fainter than the sky background. A 1-sec scan period and an amplitude of 1 min of arc are used with integration times of from 30 to 900 sec.

The polarimeter can also be used in one of two possible modes as a sensitive scanning colorimeter.

This equipment has been developed with support of Air Force Contract No. AF 19(628)-4070.

Orion Nebula: Polarization of O'Dell's and Hubbard's Five Areas at 4210, 4655, 4860, 5007, and 5445 Å. RICHARD C. HALL, *Northern Arizona University Observatory*.—Observations of areas in the Orion Nebula which approximate the areas studied spectrophotometrically by O'Dell and Hubbard (O'Dell and Hubbard, *Astrophys. J.* **142**, 591, 1965) have been studied photoelectrically for linear polarization using interference filters at 4210, 4655, 4860, 5007, and 5445 Å. Small instrumental corrections were made for each filter which were derived from nightly observations of unpolarized stars. An average of five measures of each area in each filter was obtained with the University's 24-in. reflecting telescope which was operated at $f/25$ with an effective f ratio of 65 at the filters. Consideration of the results and the probable errors in percentage and position angle for each area permits the following summaries: Area I: the continuum (4210, 4655, and 5445 Å) is polarized about 8% and the lines (4860 and 5007 Å) about 2%; Area II: the continuum is polarized about 2% and the lines are unpolarized; Area III: the continuum

is polarized about 3%; 4860, less than 1.4%, and 5007, 2.8%; Area IV: the continuum is probably unpolarized; 4860 is polarized 3.8% and 5007, 10.7%; Area V: 4210, 4655, and 4860 are polarized about 9.7%; 5007, 12.5% ($\pm 0.5\%$); and 5445, 19.5% ($\pm 5.2\%$).

All planes of electric vector polarization are perpendicular to radii which originate at the Trapezium. Corrections to the "line" filters for the continuum have not been made. Nevertheless, the lines probably show an increasing proportion of polarized (i.e., scattered) light beyond Area II (5007) or Area III (4860) indicating the transitions for these radiations originate in the innermost regions. The polarization in Area V shows an increase toward longer wavelengths similar to that found in reflection nebulae.

This research was supported in part by the Office of Naval Research under contract N00014-67-C-0192.

Photometry of the Cygnus VI Association. R. H. HARDIE, *Dyer Observatory*.—This heavily obscured association has heretofore suffered from piecemeal and inhomogeneous photometric studies, in spite of its prominence in recent discussions of absorption and reddening phenomena. L. C. Lawrence and V. C. Reddish (*Publ. Royal Obs. Edinburgh* **3**, 280, 1965) have even claimed that their photographic photometry is more accurate than the photoelectric work done by previous observers, and reveals significant errors in the latter.

About 30 of the brightest stars have been measured photoelectrically at the Dyer Observatory, at least three times each, with independently established zero points and thorough control of system transformation and extinction. The results are a homogeneous set of magnitudes and colors which agree, only for the brightest stars, with most of the previous photoelectric work. In the case of the fainter stars, Lawrence's and Reddish's findings are fully substantiated, as it is evident that the previous photometry for them is highly inaccurate. A weighted mean of all available reliable measures is in preparation for further investigation.

Matter and Antimatter in the Universe. E. R. HARRISON, *Goddard Space Flight Center*.—It is shown that baryon inhomogeneities in the early high-density universe can account for the origin of galaxies. If N is the number of baryons in an element of volume V , and ΔN is the conserved baryon number in V , the space varying compositional inhomogeneity is $\Delta N/N$. As the universe expands the inhomogeneity is amplified by baryon pair annihilation and $\Delta N/N \rightarrow \pm 1$. This process