electric study of the color magnitude relation in NGC 7492 shows it to be peculiar when compared with northern clusters of similar physical appearance. In fact, its high negative color excess, -0.20 , is largely due to the presence of two bright stars of intermediate color, and a concentration of stars of similar color along the giant branch. Since NGC 7492 resembles neither ordinary clusters, nor the nucleus, it is tempting to regard the southern clusters as intergalactic objects.

The northern clusters are NGC 4147, 5053, 5466, M 3, and M 53; here better data are available, although, as for the southern clusters, radial velocities are incomplete. Conclusions drawn tentatively are that the distribution of globular clusters north of $+50^\circ$ is not random, and that M 53, NGC 5053, 5466, and possibly M 3, form a statistically significant physical group of clusters. The distance and radial velocity of NGC 4147 exclude it from the group, and it may be intergalactic. The first indications of the group appear in Baade's studies of variables in M 53 and NGC 5053. At his suggestion, the author is measuring colors of stars in NGC 5466 and M 53 in order to obtain improved distances. However, the grouping is evident if the distances derived by Shapley are used, in spite of later changes in the zero point of the period luminosity law for classical Cepheids. The zone of avoidance for the northern clusters seems a real phenomenon, although its significance is lessened by the tendency for the clusters to form a physical group. Whether or not the group of clusters should be regarded as related to the galactic nucleus, or as intergalactic, may be decided when improved distances and radial velocities become available for NGC 5053, 5466, and 4147.

*Goethe Link Observatory,
Indiana University,
Bloomington, Ind.*

Dennison, Edwin W. Isophotometry of extragalactic nebulae.

One very useful observation for the investigation of the characteristics of extra-galactic nebulae is a quantitative measure of the distribution of light in a nebular image. This datum can be given in the form of equal intensity curves or isophotes. Because the University of Michigan microphotometer can draw isophotes rapidly and with high accuracy, it can contribute much to the research of extragalactic systems. Two of the nebulae, NGC 3379, E-O according to Hubble,

and NGC 3384, SBa, have been studied in some detail. The plate material consisted of one 200-inch plate from the Mt. Palomar Observatory and two plates taken with the 24-inch H. D. Curtis Schmidt at the University of Michigan. Isophotal contour maps were drawn from each plate. Each isophote was essentially elliptical in form, although the contours are not all similar.

The ellipticity, one minus the ratio of the minor to major axis, of each isophote was plotted as a function of the major semi-axis. For NGC 3379 the contours are nearly circular for the extreme inner and outer regions of the nebula, but the major part of the nebula has contours with an ellipticity of 0.14. This observation suggests that the nebula should be designated as E-1. In the case of NGC 3384 the ellipticity was 0.30 for a major semi-axis of $2''$, nearly 0.00 for a major semi-axis of $17''$, and essentially constant at 0.50 for values of the major semi-axis of $50''$ and larger. The largest observed value of the major semi-axis was $240''$ for NGC 3379 and $200''$ for NGC 3384.

The second method of analysis was to plot the logarithm of the surface brightness of the nebula against the logarithm of the major semi-axis. The agreement between the present work and that of Hubble is very good for most of the nebula, but the surface brightness is significantly less than that predicted by Hubble's analytic relation for values of the major semi-axis larger than $160''$.

For NGC 3384, the early barred spiral, the intensity distribution was entirely different from that of an elliptical galaxy, although the isophotes were elliptical. The largest change in intensity gradient occurs at about $100''$ from the center, which is far outside of the bar structure. Thus the differences between elliptical galaxies and early barred spirals appears to be a fundamental difference in structure throughout the entire nebula.

*University of Michigan,
Ann Arbor, Mich.*

Fleischer, Robert and T. J. Lauroesch. Reciprocity-law failure for in-focus images.

Rotating sectors have often been proposed as neutral filters for photographic photometry. The possibility of systematic errors due to the existence of the intermittency effect has been an argument against their use. The sector may be thought of as reducing the average intensity of the light, or alternatively as reducing the total time of exposure with a fixed intensity of light.