by Johnson with which is associated a rotating sector which occults half the light. Therefore the results correspond with those of a 14-inch telescope using a DC amplifier. The recording was made by the conventional constant deflection method with a time constant of two seconds. For the majority of the observations a diaphragm of 25" diameter was used, although it became necessary unfortunately to use one of 50" when the objects passed beyond the visibility limit and the centering became a matter of luck.

The resulting measures of the planet Pluto, reduced to the UBV system of Morgan and Johnson, are as follows:

Date (mean)	V	B-V	U-B
1954 May 6.2 UT	14.50	0.81	0.29
Average deviations:	$\pm .02$	$\pm .03$	$\pm .05$

The three observations which form this set of means were made on May 5.2, 6.2, 7.2 and for each color the time used per observation was about 15 minutes of which about half was on sky and half on the planet.

Observations of the eclipsing system RV Lyn were made through the range 13 to 15 visual magnitude and 13 to 16 blue magnitude.¹ The average deviations at the different brightness levels are consistent with those of the Pluto measures considering that the observations were 3 minute rather than 15 minute readings. At $V = 15$ and $B = 16$ the average deviations were about $\pm .06$ magnitude.

It is felt that with an offset device, a smaller diaphragm, refrigeration of the multiplier, and a DC amplifier, measures may be carried to beyond 16 magnitude with reasonable precision in reasonably short times. An integrating device might also be of value in eliminating some of the uncertainties of reading a noisy tracing.

1. *Pub. A. A. S.* 10, 13, 1939 and *A. J.* 51, 200, 1945.

Lowell Observatory,
Flagstaff, Ariz.

Heeschen, David S. Investigations of the 21 cm line in the section of the galactic center.

A number of interesting features have been found from observations of the 21 cm line in the section of the galactic center. The region is heavily obscured by the Ophiuchus dark nebulae complex, and a general positive correlation between the amount of obscuration and the number of neutral hydrogen atoms is found. However, there appears to be no correlation between the

variations in the optical absorption and the variations in the total number of hydrogen atoms over small areas of sky within this section.

At high and intermediate latitudes a strong positive correlation is found between the mean random cloud velocity derived from the line profiles and the radial velocity of the lines relative to the local standard of rest. It is suggested that this may be due to systematic motions along the line of sight, which would both broaden and shift the line.

The profiles near the galactic plane show a complex nature, with double peaks and asymmetries, which in this direction cannot be due to galactic rotation. Two possible models suggest themselves.

In the first model, we assume the existence at low latitudes of several superposed hydrogen clouds at different distances from the sun. These clouds would presumably have similar physical characteristics, but have different mass motions relative to each other. When the observed optical depths throughout the line are corrected for the effects of random motions, two distinct peaks, with a separation of about 10 km/sec in radial velocity appear, suggesting two principal cloud systems. The peak with the greater radial velocity decreases most rapidly with galactic latitude and corresponds presumably to the more distant of the two cloud systems. Each peak has a long tail, which may be due to unresolved hydrogen clouds. This first model suggests strongly that there are systematic deviations from pure circular motion in the hydrogen clouds.

A second possible explanation consists of a model in which a "cold" region of hydrogen lies in front of a "hot" region of hydrogen, thus producing an absorption effect. Line profiles closely approximating those observed may be derived from this model. We have assumed a temperature of 120°K for the hot region. The best representation of the observed profiles is then obtained with a temperature of 40°K in the cold region and random cloud velocities of about 14 km/sec and 3 km/sec respectively in the hot and cold regions. The hydrogen density in the cold region is less than one-tenth of that in the hot region. This cold region may be the region between our own spiral arm and the next inner arm towards the galactic center.

The radial velocities of the lines near the plane at $l = 332^\circ$ differ systematically from those at $l = 327^\circ$ by about 6 km/sec. If this difference is due to galactic rotation, the mean distance of the