measurements indicate a flux level which would require that a black body subtending the same solid angle as Venus radiate at a temperature well in excess of 350°K .

*Naval Research Laboratory,
Washington, D. C.*

Meinel, Aden B. A report on the National Astronomical Observatory facility.

The grant of the substantial sum of \$279,000 in October 1955 by the National Science Foundation has enabled the N.A.O. project to begin a full-scale survey for the site location. At the present time the instrumentation to systematically study sites from 60-foot towers is completed. Five initial sites have been selected.

Design and construction is well along on the first telescope for this facility. This 36-inch telescope will be erected at a temporary site pending selection of the final site. It is planned to utilize this telescope in the final phases of the site survey to confirm the results of the smaller survey telescopes.

Phoenix, Ariz.

Menon, T. K. A 21-cm investigation of the Orion region.

The object of this investigation is a study of the distribution and motions of neutral hydrogen gas inside the giant $H\text{II}$ ring in the Orion region. The dimensions of this ring are of the order of 134×86 pc at a distance of 450 pc. The approximate coordinates of the center of the ring are $l = 173^{\circ}.5$, $b = -18^{\circ}$. The observational material consists of the profiles of the 21-cm line of neutral hydrogen obtained with the 24-ft radio telescope at the Agassiz Station of the Harvard College Observatory at every 3° in latitude and longitude.

From the available optical data it is shown that the $H\text{II}$ ring is unlikely to be the edge of the Strömgren sphere excited by the hot stars inside the region. The density 1.6 atoms per cc derived on the basis of the Strömgren-sphere assumption is too small to be reconciled with the minimum value of 5 atoms per cc derived from the 21-cm profiles. The total mass of hydrogen, both ionized and neutral, inside the ring is found to be about $110,000\odot$.

The asymmetry of the profiles for the central portion of the $H\text{II}$ ring indicates a large amount of hydrogen with negative velocity. This asymmetry can be satisfactorily interpreted on the

basis of a model in which the ring is assumed to be the edge of an almost spheroidal mass of hydrogen, the central portion of which is at rest and the outer shell is expanding with a velocity of the order of 10 km/sec. The mass of the shell then comes out to be about $50,000\odot$ and the thickness about 29 pc. On this basis it is shown that the hydrogen density decreases from the center of the ring outwards with a further increase in density inside the shell. It is suggested that the luminosity of the $H\text{II}$ ring itself is due to recombination after collisional ionization of the hydrogen atoms outside the shell by the expanding shell. On the assumption that the initial expansion began from the center of the ring, from considerations of momentum conservation it is found that the expansion interval is about 2.4×10^6 years. This is in agreement with the expansion interval found by Blaauw and Morgan for the two stars AE Aurigae and μ Columbae.

The radial velocities of the peaks of the 21-cm profiles for the latitudes -19° , $-17^{\circ}.5$ and -16° indicate that, after correction for galactic rotation, there is a systematic variation of the radial velocity across the region. The maximum and minimum of the radial velocities occur at the edges of the $H\text{II}$ ring at longitudes $167^{\circ}.5$ and 181° , respectively. The zero radial velocity occurs at longitude $173^{\circ}.5$ which passes through the center of the ring. In analogy with the rotation curves of external galaxies, the above radial-velocity variation across the Orion region is interpreted to be possibly due to rotation of the whole mass contained within the $H\text{II}$ ring. The maximum rotation velocity is then about 4.4 km/sec at the edge of the ring. On the rotation hypothesis the total mass of the Orion cloud is seen to be about $240,000\odot$.

*Harvard College Observatory,
Cambridge, Mass.*

Miczaika, G. R. and Lovell, D. J. A stellar photometer for the infrared.

In a stellar photometer for the infrared recently developed at the Harvard College Observatory a lead sulfide cell generates an ac signal corresponding to the stellar intensity alone by nutating the image on a specially designed cell. The amplifier outputs are synchronously converted by phase-sensitive detectors and fed through RC filters in push-pull fashion into a vacuum tube voltmeter with a chart recorder following. The