specifiable limit. The OH absorption lines, though narrow except in the direction of the galactic center, are smooth in profile.

We find OH emission in W3, W49, W51, W75, Ori A, NGC 6334, and Sgr B₂, not all of which lie in the plane. The Australian observers, who first observed Sgr B₂, report OH emission in a number of additional southern sources. OH emission appears to be strongly associated with intense H II regions. Our observations are inadequate at present to permit a decision on the hypothesis that all H II regions show OH emission. The emission lines of OH are complex, being composed of a multiplicity of sharp spikes. Observed intensity ratios within the quartet of emission lines are totally unrelated to any ratios predicted theoretically on the basis of thermodynamic equilibrium. So great is the departure from theory that in our original announcement of OH emission we postulated an unidentified microwave line blending with "normal" OH. We now believe that the emission does arise solely from OH, but that the emission arises by a process that departs radically from thermodynamic equilibrium and involves population inversions among some energy levels.

In the source W51 we observe the lines at 1665 and 1612 Mc/sec (which cascade from the same upper level) to have the same intensity. Theoretically we expect an intensity ratio of approximately 5:1. Moreover, the lines have profiles of very different form. Differences in profile are well exhibited by emission lines in W49.

Sharpness of the emission spikes is notable. Features of half-width of the order 1 kc/sec or less are present in the line and indicate $T_{\text{kin}} < 13^\circ\text{K}$ and that there must be no turbulence in the gas. The temperature of the exciting H II sources, on the other hand, are $\sim 10^4^\circ\text{K}$.

Investigation of the antenna pattern as derived from individual sharp features within a single line shows that such features originate in emitting regions of small angular extent, less than 3 to 5 min of arc in diameter. These small emitting regions appear to be located around the peripheries of the H II optical objects with which they are associated.

Preliminary Mass Determination of μ Cas.

PETER A. WEHINGER, *The University of Michigan Observatories*, AND SUSAN WYCKOFF, *Warner and Swasey Observatory*.—The components of the astrometric binary μ Cas have been resolved visually with the 84-in. reflector at Kitt Peak National Observatory by P. Wehinger. Preliminary measures of the separation and position angle were found to be $0''.83 \pm 0''.13$ and $109^\circ \pm 3^\circ$, respectively. The magnitude difference between the two components was estimated to be at least 3 mag. Combination of these

relative measurements with the published photocentric orbit of μ Cas (*Astron. J.* **69**, 471, 1964) results in the following masses: $m_A = 0.75\odot$, $m_B = 0.20\odot$. Because it is a subdwarf, μ Cas is also of astrophysical interest. Dennis (*Publ. Astron. Soc. Pacific* **77**, 283, 1965) has derived an interpolation formula relating the mass, luminosity and chemical composition. Using his predictions it is possible to estimate the He abundance of μ Cas A.

Some Problems in Current Research of the Magellanic Clouds.

A. J. WESSELINK (introduced by D. Brouwer), *Yale University Observatory*.—The mass center of the Large Magellanic Cloud as indicated by studies of both optical and radio radial velocities disagrees with the so-called optical center. (Feast, M., Thackeray, A., and Wesselink, A., *Monthly Notices Roy. Astron. Soc.* **122**, 433, 1961). This mass center is a full degree north of the "bar," the area where the bulk of the stars are shown on photographs. The discrepancy is probably due to absorption, which distorts the optical picture of the system.

The average reddening of Cloud members in either cloud is very small ($< 0^m10$ in $B-V$). This has been interpreted as due to small dust content despite the presence of much neutral H. However, it can be shown that the average absorption in the blue and at any magnitude would be smaller than 0^m5 even in a Cloud that is optically thick. (Wesselink, *Monthly Notices Roy. Astron. Soc.* **122**, 509, 1961). The full dust content of the SMC is further evident from counts of extragalactic nebulae (Wesselink, *Monthly Notices Roy. Astron. Soc.* **122**, 503, 1961).

There are two selection effects, which have major consequences in variable star studies.

- (a) The discovery chance decreases markedly towards the plate limit.
- (b) The discovery chance decreases with increasing background density of the field stars.
- (a) may affect the mean period luminosity relation. It is possible that the difference between the P-L relations found for the two Clouds are a consequence of (a).

Frequency distributions of periods are strongly affected by these selection effects. It is found that the most frequent period becomes smaller when the plate limit is extended to fainter apparent magnitude. Although presently very few field RR Lyrae's are known in either Cloud these stars may turn up in large numbers in future faint surveys with powerful telescopes.

In the outskirts of the Clouds the variable stars are found of shorter period than are discovered in