ing on the magnitude of α the longitude of perihelion will either oscillate about the position of Jupiter's perihelion or show a continuous positive motion. The vast majority of the asteroids fall in the latter group.

In all cases where $\tilde{\omega}$ exhibits a mean motion, $d\tilde{\omega}/dt$ is a minimum when $\tilde{\omega}$ is in the direction of $\tilde{\omega}_J$ and a maximum when $\tilde{\omega}$ is in the opposite direction. The ratio of the maximum and minimum velocities depends on α .

If we take a sufficiently long time interval after an initial arbitrary distribution, a most probable steady state distribution will occur, the probability of finding an asteroid with $\tilde{\omega}$ in a given interval being inversely proportional to $d\tilde{\omega}/dt$ in that interval.

Probability distribution curves have been computed and are compared with the observed curves.

Preliminary Report on a Statistical Analysis of the Lick Galaxy Counts. DAVID LAYZER AND MAY KAFTAN-KASSIM, *Harvard College Observatory*.—The spatial distribution of galaxies may be related to a continuous probability density $P_3(r, \theta, \varphi)$ which is a statistically homogeneous and isotropic random function of position (*Astron. J.* **61**, 383, 1956). The distribution of galaxy images on the celestial sphere is then related in an exactly analogous way to a two-dimensional probability density $P_2(\theta, \varphi)$, defined as a weighted integral over depth of $P_3(r, \theta, \varphi)$. Galaxy counts give information directly about P_2 , but only indirectly about P_3 . We have accordingly undertaken to analyze the Lick galaxy counts of Shane, Wirtanen, and Mayall along the following lines: (a) calculate the mean lagged products of the corrected counts in 5°-wide galactic-latitude zones; (b) for each latitude zone construct a smoothed autocorrelation function; (c) calculate the corresponding Fourier transforms (spectrum functions); (d) by allowing for differential galactic absorption and for the effects of finite cell size, derive the spectrum function associated with $P_2(\theta, \varphi)$; (e) find what this information implies about the spectrum function associated with $P_3(r, \theta, \varphi)$.

We have completed all steps but the final one in this program. The two-dimensional spectrum function appears to be rather flat in the limited wave-number region about which the data contain useful information. Consequently, the angular correlation distance of the counted numbers—a quantity that played an important part in the analyses of Neyman and Scott and of Limber—actually depends chiefly on the size of the cells used for the counts, rather than on any property of the spatial distribution. The Lick counts do not, therefore, contain useful information about correlation distances or mean cluster diameters in physical space.

They do contain information about a limited part of the clustering spectrum. Information about other parts of the clustering spectrum can come from analyses like the present one of galaxy counts to different limiting magnitudes and with different cell sizes.

Abundance of Metastable Hydrogen Molecules in the Interstellar Medium. J. M. MALVILLE, *Radio Astronomy Observatory, University of Michigan*.—Populations of the ground and metastable states of molecular hydrogen are calculated for a variety of conditions in the interstellar medium. The effects of trapping on interstellar grains are considered. Interactions between the molecules and the grain crystal lattice tend to decrease the population of the metastable state and also may increase the rate of photodissociation of H_2 . It appears unlikely that conditions exist in the interstellar medium where the abundance of metastable molecular hydrogen is sufficient to account for the observed equivalent width of $\lambda 4430$. For the radiation field of Lambrecht and Zimmerman, but optically thick in the Lyman continuum, $N_H = 10 \text{ cm}^{-3}$, and $T = 100^\circ\text{K}$, the population of the metastable state of gaseous H_2 is approximately $10^{-20} N_H$. The population falls to $2 \times 10^{-25} N_H$ for a radiation field thin in the Lyman continuum with 10^4 less dilution.

High-Resolution Photography of the Moon with Very Short Exposure Times. E. P. MARTZ, JR., *Jet Propulsion Laboratory*.—Very short exposure time photographs of the moon have been secured with 10 000 ASA film and long focal length, large-aperture telescopes in an effort to negate the image blurring effects of astronomical "seeing." With the 60-inch aperture, 300-ft focal length McMath solar telescope at Kitt Peak Observatory exposure times of the order of 0.01 sec were employed near the terminator at first quarter moon. Surface resolutions comparable to the best photographs secured to date with conventional techniques on the 100-inch reflector were secured on three nights with very poor seeing conditions at Kitt Peak. The improvement with 0.01 sec exposure over photographs taken with 0.02 sec exposure was very marked due to the "freezing" of the seeing image. With a 16-inch Cassegrainian reflecting telescope operating at Table Mountain Observatory under somewhat better seeing conditions, at 150-ft equivalent focal length, lunar surface resolutions near the theoretical limit of the telescope were secured with 0.03-sec exposure time on 10 000 ASA film whereas 0.13-sec exposures on slower 3000 ASA film were definitely