in maintaining the high surface temperatures. However, Model B is also consistent with less extreme albedos for single scattering, provided the cloud layer has a diffuse vertical distribution.

Photoelectric Observations of the Occultation of Stars by the Moon. KARL D. RAKOS (introduced by John S. Hall), *Graz University, Graz, Austria* (Presently at Lowell Observatory).—The author has made observations of the change in intensity of the light from stars as they disappear behind the dark limb of the moon. Two different methods have given very encouraging results. In the first, the starlight after passing through a 10 sec of arc diaphragm in the focal plane of a 42-in. telescope, was chopped 6000 times per second by a rotating mirror. The corresponding pulses from a 13 stage EMI 6256 S/A photomultiplier were individually fed to a differential amplifier and integrator and displayed on an oscilloscope. The cathode ray tube face was photographed with a camera using a continuous film motion of 25 cm/sec at right angles to the time axis of the oscilloscope and with a sweep speed which was 2 msec/cm.

In the second method the stellar intensity was recorded with a differential amplifier, oscilloscope, and camera but without chopping the light beam. The first method has the advantage that the telescope can be guided during the measurement; however, half the available light is wasted. The second method does not have this disadvantage, but demands better tracking and better control of the time constant of the electronic equipment.

The present observations have shown that one can obtain a significant number of measures of good accuracy with a telescope of only moderate size.

During a single year one might expect the following distribution of stars to be occulted by the moon:

Magnitude limits	No. of stars
<5.0	19
5.0–7.5	40
7.6–8.5	60

About 20% will be occulted twice or more per year.

For almost all stars brighter than fifth magnitude the angular diameter can be determined with an accuracy of better than 5%. For stars between magnitudes 5 and 7.5 the accuracy is strongly dependent upon the spectral type. The stars fainter than 8th magnitude can be considered to be point sources but can still be successfully used to determine the statistical frequency of close double stars and for an investigation of the roughness of the lunar surface.

The present measurements show that the moon's limb can be considered to be smooth—that is, undulations between 3 and 150 ft very seldom

appear. Successive occultations of the same star should provide important information regarding possible limb effects.

The minimum apparent transition in brightness during an occultation lasts about 20 msec. For a telescope of moderate size, the observational accuracy for stars fainter than magnitude 8.5 is influenced by the statistical variation of the photocurrent due to the relatively small number of photoelectrons per second. The sky brightness is unimportant for stars brighter than 6th magnitude; for stars fainter than the 7th magnitude, observations unaffected by sky brightness can be made up to 7 days after new moon. Atmospheric fluctuations did not, in general, influence the measurements at all since they are relatively slow. Only if the duration of the occultation is longer than 0.1 sec, which very seldom happens, would this be the case.

Distribution of Dwarf Galaxies in the Virgo and Fornax Clusters. GIBSON REAVES, *University of Southern California*.—Surveys of dwarf elliptical galaxies in the Virgo cluster (*Astron. J.* **61**, 69, 1956; *Publ. Astron. Soc. Pacific* **74**, 392, 1962) show their areal distribution (projected on the plane of the sky) to be strikingly similar to that of the normally bright galaxies in the cluster. By contrast, inspection of Hodge's plot (*Publ. Astron. Soc. Pacific* **72**, 188, Fig. 1, 1960) showing the distribution of 12 dwarf ellipticals in the Fornax cluster suggests that in it the degree of association is not nearly so close as in Virgo. Some results from a new survey of Fornax based on Palomar Observatory 48-in. Schmidt plates are reported here. Fifty-one early-type dwarfs were found over an area including the Fornax cluster and its surroundings; the areal distribution of these dwarfs is much less closely associated with that of the normally bright galaxies than is the case in Virgo.

The closeness of the association of dwarfs with normally bright galaxies may be quantitatively expressed by the median of the projected distances from each dwarf galaxy to the nearest normally bright cluster member r . This is compared with the median of the projected distances from each normal galaxy to the nearest normal galaxy R . The ratio R/r is a measure of the closeness of the association of dwarf with normal that is independent of the density of the cluster.

	r	R	R/r
Virgo	130 kpc	130 kpc	1.0
Fornax	140	80	0.6

Since for both clusters, $r \geq R$, the hypothesis that these dwarfs are satellites of individual galaxies is untenable. These data may also be cited as evidence indicating that the evolutionary age of the Fornax cluster is greater than that of the Virgo cluster.