Five-Color Photometric Measurements of Near-Earth Satellites. RICHARD H. EMMONS AND RAYMOND J. PRESKI, *Goodyear Aerospace Corporation*.—A comparison of the recent five-color photometric measurements of the Echo I and Pageos I satellites indicates that the near-earth space environment only very slowly degrades the specular reflectance of aluminized Mylar surfaces. The Echo I satellite surface reflectance throughout the *UBVRI* spectral region has changed by less than 2% in its 7-yr orbital history. The *B*–*V* color index values obtained for the Echo I and Pageos I are 0.648 and 0.659, respectively; i.e., each within 0.02 mag of the accepted solar values. The *U*–*V* values were 0.828 and 0.810, which are in excess by more than 10% of the solar value. This is due to non-grey body conditions in the *U*-band region; the normalized *U*–*V* color index is quite close to values obtained by others. Photometric measurements were also performed on the Echo II satellite, and results indicate that this satellite presently has a specular component of reflectance far in excess of conventionally made laboratory measurements. This suggests a possible space environmental effect on the exterior amorphous phosphate coating. Broad-band *UBVRI* plane polarization measurements have also been performed on the three satellites and show that all three satellites tend to follow a theoretical curve for evaporated aluminum.

The NASA Mobile Satellite Photometric Observatory, which has a 24-in., 4 axis-mount telescope, was used for the observations. The broad-band *UBVRI* spectral regions are similar to those of the Lunar and Planetary Laboratory of the University of Arizona; standard stars used for calibration and comparison purposes were taken from catalogues published by this institution. The observations were performed during the summer of 1966 at Palomar Mountain, California, and on the desert floor near Yuma, Arizona, during early 1967. Results obtained from this series of observations have shown that useful information on the effect of the space environment on various types of materials and/or coatings can be reliably and accurately determined with the use of passive ground-based techniques.

This research was conducted with the financial support of the NASA-Langley Research Center.

Star Sightings from Manned Spacecraft. D. C. EVANS AND L. DUNKELMAN, *Goddard Space Flight Center*.—Mercury and Gemini astronauts have reported on the difficulties of seeing stars in the daytime. There have been a few examples of daytime star sightings. E. P. Ney and W. F. Huch (*Science* **153**, 297, 1966) analyzed the circumstances under which their zodiacal light photography experi-

ment was conducted on Gemini V, and determined that first- and second-magnitude stars were seen during daytime. We have recently analyzed star sightings by the Gemini VI crew (Stafford, T. P., Schirra, W. M., and Grim, D. F., Mid-Gemini Program Conference, pp. 283–279, NASA SP-121, 1966; Roach, F. E., Dunkelman, L., Gill, J. R., and Mercer, R. D., *ibid.*, pp. 115–323) during their acquisition and rendezvous with Gemini VII. From Gemini VI, stars as faint as 4.5 mag were observed by day.

We feel that the difficulties frequently experienced by astronauts in seeing stars from orbit can be completely explained by physiological optics, glare on the window surfaces, and ambient light level in the cockpit. It is not necessary to introduce a spacecraft corona (Newkirk, G., *Planetary Space Sci.*, to be published) as far as star sightings are concerned. A table of the circumstances of day and night star sightings from Gemini VI as a function of solar position and time for dark adaptation is discussed.

Solar Granules in the Ultraviolet and Yellow.

JOHN W. EVANS, *Sacramento Peak Observatory*.—Studies of rms vertical velocities in the solar atmosphere, evidenced by local Doppler shifts in Fraunhofer lines, show a marked dependence on both line strength and the wavelength region. The rms velocities increase towards the ultraviolet, and with increasing line strength (i.e., with height in the solar atmosphere). This is a report of an investigation to determine whether the detail of photospheric granular structure also varies between widely separated wavelength regions.

The observational material consists of four pairs of spectrograms showing good spatial resolution along the slit. Each pair consists of a short length of the spectrum centered at $\lambda 3954$ (*UV*) and another at $\lambda 5888$ (*Y*) exposed simultaneously. The spectrograph slit was carefully oriented perpendicular to the horizon, parallel to the small displacements caused by differential atmospheric refraction. Each *UV* frame was traced perpendicular to dispersion by a digital microdensitometer at five continuum wavelengths, and each *Y* frame at three wavelengths.

The cross correlations between the four pairs are 0.85 ± 0.02 , and we conclude that the granular structure at $\lambda 3954$ is very nearly identical with that at $\lambda 5888$. This result directly contradicts that found by Vassiljeva (*Solar Phys.* **1**, 16, 1966) from photoelectric scanning across the solar disk with a sensitive spot $0''.2$ in diameter. She found that the correlation rapidly decreased with wavelength difference, and had a value of only about 0.1 for a span of 1900 Å. The Sacramento Peak spectrograms