Solar Telescope Planned for Sacramento Peak.

RICHARD B. DUNN, *Sacramento Peak Observatory*.—A new solar telescope is planned for the Sacramento Park Observatory, Sunspot, New Mexico. The telescope configuration is as follows: Light from the sun passes through a quartz window to two quartz flat mirrors, all mounted in the turret. The turret is servo-operated in elevation and azimuth to track objects in different parts of the sky. Light from the turret passes through an iris that controls the size of the aperture and then passes downward inside a tube that extends approximately 130 ft to the table and an additional 200 ft below. The diameter of the tube from the upper portion of the telescope is 4 ft. Below table level the tube expands to 10 ft diameter. At the bottom of the tube the light falls upon a spherical objective mirror that reflects the sunlight 180 ft back up the tube, and forms an image of the sun at ground level. The approximate diameter of this mirror is 64 in. Its focal length is 180 ft.

The main mirror, or objective mirror, may be tilted to send the light through any of five exit windows. It is also tilted to correct for errors in tilt when the focus of the mirror is changed. The sunlight passes through the exit windows to auxiliary instruments that are mounted in a cluster around the center of the telescope at ground level. The entire optical system, including the space between the entrance window in the turret and the five exit windows is evacuated to eliminate turbulence inside of the telescope caused by sunlight heating the air. In order to control the rotation of the image, all the vacuum tubes and auxiliary instruments are rotated around a vertical axis by a servo motor mounted at ground level. This entire movable mass of 250 tons is supported on a mercury mass float.

Cross Correlation between Continuum Brightness and Radial Velocity Fluctuations in the Solar Photosphere.

FRANK N. EDMONDS, JR., *The University of Texas*.—Spatial coherence and phase analyses of the cross correlation between continuum brightness and radial velocity fluctuations in the solar photosphere have been completed for four high-resolution spectrograms obtained by R. Michard at the Pic-du-Midi Observatory, and from a time sequence of 60 spectrograms taken by J. W. Evans at Sacramento Peak Observatory. The latter set includes the low-lying *C* I line $\lambda 5052.16$, and its analysis is a joint effort with Dr. R. Michard and Dr. R. Servajean at the Observatoire de Paris—Meudon.

The results give mean cross-correlation coefficients for each set of 0.35 and mean, nearly anti-

phase coherences which are significant (>0.5) in wavenumber ranges that lie between 10^{-3} and $2.5 \times 10^{-3} \text{ km}^{-1}$. These results, together with earlier analyses (Edmonds, *Astrophys. J.* **136**, 507, 1962), indicate first that, in general, significant cross correlation does exist between continuum brightness and radial velocities fluctuations with scales less than 8000 km. Therefore, thermal-driven convection is an appreciable physical cause of the fluctuations. Secondly, there is considerable variation in behavior between different samples of solar photospheric inhomogeneities, these differences appearing in other statistical properties and in the tracings of the fluctuations.

That stronger cross correlation is not found is possibly understandable in terms of the recent discovery by Evans (to be published in *Astrophysica Norvegica*; also see abstract by J. W. Evans) that photospheric inhomogeneities may be strongly inclined to the radial direction. There are problems with this interpretation which arise from the small separation ($\lesssim 200 \text{ km}$) between layers of continuum formation and of line formation. An analysis of the effects of random shifts in position on the solar disk between radial velocity and continuum brightness fluctuations predicts that orientation could reduce the cross-correlation coefficient only to about 0.75 and reduce coherence correspondingly in a manner which increases with wavenumber. Also, temporal coherence and phase analysis (Evans, Michard, and Servajean, *Ann. d'Astrophys.* **26**, 368, 1963), provides a clearer picture as to the role played by oscillations (with periods around 300 sec) which are an important component of the radial velocity fluctuations but not of the continuum brightness fluctuations. These results, together with more recent power spectra computed by Michard and Servajean suggest that whereas the oscillatory component is dominant for optical depths $\lesssim 0.01$, it is still appreciable in continuum-forming depths $\gtrsim 1.0$.

Indicated Specular Degradation Rate for Aluminized Mylar Surfaces in Near-Earth Orbit from Recent Photometric Observations of the Echo I Satellite.

RICHARD H. EMMONS, *Goodyear Aerospace Corporation*.—Photometric measurements were made of the Echo I satellite with a visual comparison photometer on 1 March 1964 (Universal Time). The data, taken over a wide range of phase angles (143 to 32 deg) and normalized for slant range, are best fitted in illuminance versus Russell's phase function by a surface model that is 96% specular and 4% diffuse. This indicates that the actual specular degradation rate for aluminized Mylar surfaces in a near-earth orbit, due to the combined