Comparative Spectrophotometry of Selected Areas on the Lunar Surface. GEORGE V. COYNE, S.J., *Georgetown College Observatory*.—During the months September 1961 to January 1962, a Wadsworth spectrograph, giving a reciprocal dispersion of 4.9 Å/mm on the normal to the grating in the first-order spectrum, was used to obtain spectrograms of selected areas on the lunar surface. Identification of the observed areas was accomplished by photographing the slit-plane image of the moon at the time the spectrograms were taken. The spectrograms were measured on a recording microphotometer in a direction transverse to the dispersion at approximately every 100 Å in the spectral range 4380 to 6835 Å with a bandpass of 9.3 Å. These measurements provide a densitometric profile across the observed lunar regions in which various small areas can be identified. From these profiles comparative spectral energy distribution curves of one area with respect to another are constructed. The results are given in the form of a color-contrast function defined as follows:

$$CE_{a,b}(\lambda) = (m_{\lambda} - m_{5500})_a - (m_{\lambda} - m_{5500})_b,$$

where the subscripts a and b refer to different areas of the lunar surface and m_{λ} , m_{5500} are the magnitudes for the wavelengths λ and 5500 Å, respectively.

In general, the curves show a smooth but non-monotonic variation with wavelength. The maximum values of $CE(\lambda)$ lie between 0^m15 and 0^m20. The lunar maria are more homogeneous in blue light (below 5500 Å) than in red light (above 5500 Å). On several curves, and notably for lunar areas near the edges of maria, there are humps resembling luminescence bands observed by Dubois (*Publ. l'Obs. l'Univ. Bordeaux Ser. A*, No. 13, 1959) for various areas of the lunar surface. These bands are centered at approximately 5050, 5200, and 6100 Å. They are about 500 Å wide and have an amplitude varying from 0^m03 to 0^m18 above the smooth curve on which they are superimposed.

Variable Star Search in M53. JAMES CUFFEY, *Goethe Link Observatory*.—In order to provide a complete survey of variables in the globular cluster M53, including stars of small amplitude, all the resolved images on the 100-inch reflector plates have been measured with an iris photometer.

The expected increase in sensitivity over the blink-microscope technique has been realized, and in addition to rediscovery of the known variables, 4 new variables were found, plus 12 probable variables, and 30 suspects. Most of the suspects have small amplitudes approaching the limits of detectability set by the probable error, ± 0.03 mag., of measurement.

In the discovery survey, 620 images were measured on 30 plates; the stars showing the highest residuals, regarded as possible new variables, were then measured on 40 additional plates. Analysis of the residuals related to apparent magnitude reveals an interesting tendency for stars in the immediate vicinity of the absolute magnitude of the cluster variables to show less variability than stars a magnitude brighter and a magnitude fainter. Further measures for light curves are in progress.

Emission of Hydromagnetic Waves from Sunspot Umbras. ROBERT E. DANIELSON, *Princeton University Observatory*.—Linearized equations describing convection in the presence of a magnetic field predict overstable oscillations in sunspot umbras. No such oscillations have been observed, however. The equations which predict these oscillations have boundary conditions which allow only standing wave oscillations. It is suggested that these are not the correct boundary conditions to use. More physically realistic boundary conditions would allow the convective layer to emit hydromagnetic waves.

The critical equivalent Rayleigh number for the emission of hydromagnetic waves has been computed for various magnetic field strengths using these new boundary conditions. The equivalent Rayleigh number in sunspot umbras seems to exceed the critical equivalent Rayleigh number. Thus it appears possible that a significant nonthermal flux of hydromagnetic waves is emitted by sunspot umbras. Such a flux is consistent with the fact that higher velocities are observed in sunspots than in the normal photosphere. It might also account for the missing energy in sunspots.

This work is part of Project Stratoscope, which is sponsored by ONR, NSF, and NASA.

Statistical Analysis of Jupiter's Decameter Radiation 1950–1961. JAMES N. DOUGLAS, *Yale University Observatory*.—Observations of Jupiter's decameter noise storms furnished by all observers in the period 1950–1959, by Yale and High Altitude Observatory in 1960, and Yale in 1961 have been combined to form an observation time series for statistical analysis. No evidence for a change in the previously announced average period ($9^h55^m29^s37^{\pm}0^s13$) is found.

Slow variations in this period totaling 0^s4 could have been detected but were not. Autocorrelation studies provide a measure of the average intrinsic duration of a Jupiter noise storm, as well as demonstrating the nonindependence of the three significant regions of activity. Cross-correlation studies with various solar and geomagnetic indices, together with significance tests, are described.