the facilities of the observatory at my disposal. I have benefited immensely from many discussions with all of them.

Results from the Occultation of Regulus by Venus, July 7, 1959. DONALD H. MENZEL AND G. DE VAUCOULEURS, *Harvard College Observatory*.—Teams of observers from the Harvard and Smithsonian Observatories, stationed at Madrid, Le Houga, Merate, Catania, Beirut, Shiraz, and Bloemfontein obtained visual times of ingress and egress of Regulus. Photoelectric light curves at ingress were recorded at Le Houga and Bloemfontein. Analysis of the visual observations, supplemented by published data from six European and two South African stations, has yielded the differential geocentric coordinates of the center of Venus with respect to Regulus on July 7, 1959, at 14^h24^m00^s U.T.

$$\alpha(\text{Regulus}) - \alpha(\text{Venus}) = -9''111 \pm 0''013 \text{ p.e.,}$$

$$\delta(\text{Regulus}) - \delta(\text{Venus}) = -0''342 \pm 0''012 \text{ p.e.}$$

The difference between observed (U.T.) and computed (E.T.) times of mid-eclipse is $-28^{\text{s}}00 \pm 0^{\text{s}}40$ (p.e.). If U.T. - E.T. $\approx -34^{\text{s}}$ for 1959.5, a provisional correction to the ephemeris data is $O - C \approx +6^{\text{s}}0$.

The radius of the atmospheric shell corresponding to half-intensity was $14''403 \pm 0''007$ p.e., or, at unit distance, $8''500 \pm 0''005$ p.e. If the optical radius is $8''41$ (ephemeris value), the corresponding altitude z_0 is 65 km above the top of the cloud layer.

Analysis of the photoelectric observations by the theory of differential refraction yielded the scale height at this altitude $H(z_0) = RT/mg$, and its variation with z in the range $|z - z_0| < 20$ km, viz.,

$$H(z_0) = 6.8 \pm 0.2 \text{ p.e. km,}$$

and

$$(1/H)(\partial H/\partial z) = +0.010 \pm 0.002 \text{ p.e. km}^{-1}.$$

If the acceleration of gravity is 860 cm sec^{-2} , and the mean molar mass $\bar{m} = 42.5$ ($\text{CO}_2 = 0.90$, $\text{N}_2 = 0.09$, $A + \dots = 0.01$), then $T(z_0) = 297 \pm 10$ p.e. °K and $\partial T/\partial z = +3^{\circ} \text{ deg km}^{-1}$.

The pressure at z_0 is 2.6 ± 0.13 p.e. dynes cm^{-2} , the mass of gas above z_0 is $3.0 \times 10^{-3} \text{ g cm}^{-2}$, the reduced thickness 1.7 cm.

The observed pressure at z_0 is consistent with an atmospheric model in which the pressure is 160 mb at the top of the cloud layer.

The Automatic Machine Computation of Curves of Growth. JOSEPH PAUL MUTSCHLECNER, *The Observatory, University of Michigan*.—A program has been developed to provide for the automatic computation of curves of growth on an IBM 704 digital computer. The curves of growth so produced are to

be used in the investigation of the solar abundance of a number of elements of special interest. The observational material for this program consists of spectral intensity tracings in the regions of the most suitable lines of each element. The tracings were obtained at the McMath-Hulbert and Mount Wilson Observatories for three or four values of $\mu (= \cos \theta)$ on the solar disk for each line.

The theoretical equivalent widths required in the curves of growth for each line are obtained by the straightforward procedure of first predicting the line profile for preset conditions and then integrating the profile over wavelength. The major features of the program are: (1) Any desired model atmosphere may be used; (2) either two or three stages of ionization may be considered; (3) the appropriate partition functions are read in explicitly for each depth; (4) the turbulent velocity is read in explicitly for each depth; (5) the line broadening may be assumed due to any desired combination of radiative damping, van der Waals interactions, and electronic or ionic quadratic Stark effect; (6) the program can yield equivalent widths for either selected values of μ or for the total flux; (7) the ionization and excitation temperatures may differ from one another at each depth if so desired.

Although all these features are not required for the particular problem at hand, they have been incorporated in order to provide a more general program applicable to other problems such as the study of line profiles and the determination of stellar abundances.

Backscatter of Cosmic Rays by the Sun's H_{II} Sphere. G. A. NEWKIRK, J. W. WARWICK, AND H. ZIRIN, *High Altitude Observatory, University of Colorado*.—The phenomena of the cosmic-ray storm following the flare of February 23, 1956, have been explained by Meyer, Parker, and Simpson as due to a field-free cavity around the sun surrounded by a magnetic barrier outside the earth's orbit. This cavity was supposed to be produced by a constant "solar wind" of 500 particles/ cm^3 moving at 1500 km/sec.

Several reasons are given to demonstrate the incompatibility of the constant "solar wind" with theory and observation.

The sun is surrounded by a sphere of ionized hydrogen at least several astronomical units in diameter, followed by a transition region of roughly the same thickness. The H_{II} region is much hotter than the H_I region outside. If the outer H_I region is permeated by a galactic magnetic field, pressure balance ensures that there is virtually no field in the H_{II} region and a magnetic shell at the transition region. This shell would produce the observed reflection of solar cosmic rays.