An exceptional eclipsing binary was found during this investigation. It is the bluest of several hundred stars whose color was determined; it is also with a small association of the nebula. The color, light curve, and period of this eclipsing variable permit us to conclude that it is either a star of O or early B class. From 72 observations the following basic data were derived: $\text{Min} = \text{JD}2433978.653 - 4.8050E$, $M_v = 20^m20$, $m_1 = 21^m08$, $m_2 = 20^m47$, $k = 0.578$, $r_1 = 0.381$, $i = 84^\circ 85$, $R_1 = 14.40$, $M_1 = M_2 = 29.60$, $M_{v,1} = M_{v,2} = -4.01$. The light curve is β Lyrae type; spectrum: O9 (assumed from the color). The star was used in estimating the distance of the nebula, found to be $980\,000 \text{ pc} \pm 300\,000 \text{ pc}$.

High-Resolution Ultraviolet Solar Spectrum Extending to 2200 Å. D. L. GARRETT, J. D. PURCELL, AND R. TOUSEY, *U. S. Naval Research Laboratory*.—A photographic solar spectrograph covering the range 2000 to 4000 Å with a resolving power of more than 50 000 was flown in an Aerobee-High rocket on August 29, 1961 to an altitude of 185 km. The instrument used a 73-line/mm echelle, crossed with a fluorite prism to separate orders, arranged as a Littrow. Stray light was reduced to a low level with a prism predisperser in front of the slit. The resolution, both in laboratory and flight, was limited by the lens, a quartz-lithium fluoride achromatic triplet, of 40-cm focal length and 44-mm diameter.

Twelve exposures were made and recovered. Useful spectra extend to about 2200 Å, a limit set by the residual stray light. Over the region 2988 to 3629 Å, covered by the Göttingen Solar Atlas (Bruckner, G., *Photometric Atlas of the Near Ultraviolet Solar Spectrum, 2988–3629 Å*, Göttingen University Observatory) using a 21-ft grating spectrograph, the traces of the rocket spectrum and the Atlas are nearly identical, both in resolving power and intensity. A preliminary comparison with the 1928 Revision of "Rowland's Preliminary Table" indicates that all lines of intensity -1 or greater and most of the -2 lines are present.

Qualitatively, the spectrum shortward of 2988 Å appears similar to the spectrum longward. There are in the new spectrum, however, more broad lines with a narrow central core than occur to longer wavelengths. Appearing in the 87th order, the third components of the MgII lines, 2795.523, 2802.698 Å, are well recorded. Although the instrumental half-width was 0.03 to 0.05 Å, positions are definite to about 0.01 Å. Wavelengths can be established by reference to the many lines of FeI and II .

Interstellar Abundance of the Hydrogen Molecule. ROBERT J. GOULD, *Cornell University*.—The various processes which determine the concentration of molecular hydrogen in HI clouds have been inves-

tigated. As has generally been assumed, the only mechanism for the formation of H_2 which could lead to an appreciable molecular concentration in a time less than the age of the galaxy is that of association on interstellar grains. However, the photodissociation process considered by previous investigators (Kahn, F., *Mém. Soc. Roy. Sci. Liège* (4) 15, 578, 1955; McCrea and McNally, *Monthly Notices Roy. Astron. Soc.* 121, 238) to limit the molecular concentration seems to have been overestimated. The oscillator strength for this process, which involves a (forbidden) transition between the two Heitler-London states, is found by simple perturbation theory to be of the order of 10^{-10} . The photodissociation rate calculated with this f value is five orders of magnitude less than the value previously assumed for the process. As a result, there is a gradual buildup of the molecular concentration in HI clouds until the clouds, through their random motion, pass near a bright star whereby the molecules are photodissociated by ultraviolet photons of energy greater than 14.5 eV. Under these conditions the mean concentration of H_2 in the clouds can be estimated from the observed distribution of cloud velocities and the distribution of Strömgren spheres. Taking a "typical" region of interstellar space to consist of a uniform distribution of Strömgren spheres of radius 10 pc, which fill 10% of the medium and assuming the clouds to have a grain density of about 10^{-25} g/cm^3 the fraction of hydrogen which should have associated to molecular form turns out to be roughly 10–20%. It has been assumed that the recombination coefficient γ for association on grains is close to unity. A smaller value of γ would reduce the mean molecular concentration accordingly.

Observations of Venus at 4.3 mm. C. R. GRANT AND H. H. CORBETT, *Radio Astronomy Branch, U. S. Naval Research Laboratory, Washington, D. C.*—The first radio observations of Venus by Mayer, McCullough, and Sloanaker in 1956 yielded a brightness temperature of approximately 585°K for 3.15 cm wavelength, and subsequent measurements by several groups of observers have indicated the brightness temperature to be approximately the same for longer wavelengths up to at least 21 cm. However, observations at shorter wavelengths, first by Gibson and McEwan at 8.6 mm for the 1958 conjunction, and by Kuz'min and Salomonovich at 8 mm for the 1959 conjunction, indicated that the brightness temperature is lower at these shorter wavelengths and lies in the 300° to 400°K range.

In order to extend the measured spectrum to substantially shorter wavelengths, a receiver was developed for measurements at 4.3 mm during the period surrounding the April 11, 1961, conjunction. With