foil of a few micrograms per square mm thickness. The foil strips the ion of additional electrons and produces, with a high probability, an ion with residual electronic excitation. Upon decay of these states an emission spectrum is produced. The spectrum, moreover, shows a decay of intensity with distance downstream from the foil that is in general different for each emission wavelength. This fact offers in principle a means for directly observing the lifetimes of excited electronic states in atoms and under certain conditions the measurement of absolute oscillator strengths.

Our first experiments with C, N, and O species at energies of the order of 1 MeV yielded an emission spectrum that showed a remarkable similarity in the line intensities to the spectra of novae, encouraging us to feel that we have a new laboratory tool of considerable precision to investigate properties of spectra of importance in some types of astronomical objects.

A van de Graaff accelerator has recently been added to the facilities of the Department of Physics in Tucson, where experimental studies are being continued. The assistance of the staff of the Naval Research Laboratory and the use of their 5 MV van de Graaff accelerator is acknowledged in this work.

Recent Photometry of U Geminorum Stars.

GEORGE S. MUMFORD, *Tufts University*.—Since November 1963 additional three-color photoelectric observations of U Geminorum, EX Hydrae, and SU Ursae Majoris have been obtained with Kitt Peak's 36-in. Cassegrain reflector. Further, SS Aurigae, AH Herculis, and YZ Cancri have been monitored for periods of at least two hours in blue light.

Data on U Geminorum now extend over some 4800 cycles. Thus far the period appears constant. However, the single eclipse observed in November lasted about 5 min less than did the eclipses of January and April 1964.

EX Hydrae has undergone roughly 11 500 primary eclipses since the first was detected by Krzeminski (unpublished). More recent observations seem to indicate a small decrease in the period.

This project is being continued under a grant from the National Science Foundation.

Molecular Absorptions and Color Distributions over Jupiter's Disk. GUIDO MÜNCH AND ROBERT L. YOUNKIN, *Mt. Wilson and Palomar Observatories and Jet Propulsion Laboratory*.—Absorptions of NH_3 and CH_4 and energy curves of Jupiter have been obtained with a photoelectric scanning spec-

trometer at the 60-in. Mt. Wilson reflector. Spectrum scans at various parts of the disk and surface scans at fixed wavelength have been obtained with resolving powers around $10 \text{ \AA}$ in the range $0.55\text{--}1.1 \mu$. The behavior of individual lines or bands has also been studied photographically in Coudé spectra. Up to date the following results have been obtained: (a) The quadrupole H_2 lines of the (3,0) vibrational band do not show detectable variation in strength with longitude or latitude. (b) The zones have a bluer spectrum and show more limb darkening than the belts. (c) The absorption at the very strong band $\lambda 8892 \text{ \AA}$ (CH_4) increases markedly with latitude and appears stronger in zones than in belts. At the polar caps bright cusps are observed. (d) Absorption in the weak NH_3 $\lambda 6450 \text{ \AA}$ and CH_4 $\lambda 6190 \text{ \AA}$ bands is slightly weaker in belts than in zones, and at fixed latitude decreases in strength both towards the morning and evening limbs. This effect is well marked also in the lines of the NH_3 $\lambda 7900$ band.

From (a) it is inferred that, above the layers showing visual structure, there is sufficient gas to produce completely saturated H_2 lines, the strength of which, then cannot provide information about the relative abundance of H_2 with respect to other constituents. Result (b) suggests that, above the zones, Rayleigh scattering plays a larger role in the diffuse reflection of solar light than above the belts. The red color of the zones, relative to the sun, still indicates the presence of selectively scattering solid particles, which need not differ in chemical or physical composition from the particles forming the cloud belts. The higher effective layer for reflection in the belts is also indicated by (a). The polar brightening reveals the existence of an extremely high cloud cap, or possibly frozen CH_4 . Previous results of Hess agree qualitatively with (d). The intensity variation in longitude of the lines can be understood in terms of the pressure dependence of the absorption coefficient in lines arising by diffuse reflection.

Observations of the Intermediate Solar Corona Outside of Eclipse.

GORDON NEWKIRK, JR., AND DAVID BOHLIN, *High Altitude Observatory*.—On 5 March 1964 Coronascope II, a balloon-borne externally occulted coronagraph (Newkirk and Bohlin, *Appl. Opt.* **2**, 131, 1963) ascended to an altitude of 100 000 ft. During the $5\frac{1}{2}$ h of observing time, 118 photographs of the streamers of the white light corona from 1.8 to 5.25 solar radii from the center of the solar disk were obtained. Exposures of 33, 100, and 300 sec duration were made on I-N 35-mm film. The effective wavelength of this system was $8300 \text{ \AA}$. Photometric standards on each photograph allow analysis of the brightness of the coronal