showed a relative displacement along the slit of $2''.1$ between the *UV* and *Y* images due to atmospheric refractive dispersion. I suggest that the low correlations between the structures Vassiljeva recorded at widely different wavelengths are the result of the atmospheric dispersion. This would cause her $0''.2$ sensitive spot to scan along parallel lines in different colors, the separation of which would increase with wavelength difference, and inclination to the vertical circle.

A Model Coronal Active Region Derived from

Recent X-Ray Measurements. K. EVANS AND K. A. POUNDS, *University of Leicester*.—Two plane crystal Bragg-type spectrometers were successfully flown on a sun-pointed Skylark rocket on 5 May 1966, obtaining four separate spectral scans in the wavelength band 11 to 25 Å. A previous list of the identified emission lines has already been published (Evans, K., Pounds, K. A., and Culhane, J. L., *Nature* **214** 41, 1967). In the present paper, a more complete analysis is reported, including the absolute flux values in each line. The emission components in each line arising from the dominant active region on the sun on the day of the flight are resolved and thus a model for the particular coronal active region is derived. This model is compared with concurrent radio and optical observations. Previously reported solar abundances of neon, iron, nickel, and oxygen are compared with values derived from the present results.

Relative Abundances of C, N, O, and Ne. C. Y.

FAN, G. GLOECKLER, AND J. A. SIMPSON, *University of Chicago*.—Our experiment on the IMP-III satellite has a mass resolution which makes it possible to determine unambiguously the charge of a cosmic ray nucleus in the charge range $1 \leq Z \leq 12$ and its energy in the range ~ 40 to 200 MeV per nucleon. The abundance ratios relative to oxygen for C, N, and Ne are 0.93, 0.23, and 0.16, respectively. For fluorine, the ratio is $< 10^{-3}$. The consequences of these measurements for propagation in interstellar space and the origin of cosmic rays are discussed.

One Micron Spectra of Several Carbon Stars.

THEODORE D. FAY AND THOMAS MORGAN, *Indiana University*.—The spectra of the carbon stars RY Dra and Y CVn have been photographed from 9800–10 800 Å, using infrared image intensifiers at a reciprocal dispersion of 40 Å/mm. We have measured the spectra on a Grant engine, recording plate density along the spectrum as a function of screw reading. The screw readings were converted to wavelengths from the standard wavelengths of a

Ne–Ar arc. Dr. Wyller has given us calibrated *I-Z* plates of Y CVn to check the above method.

To aid in the interpretation of these observations, we have computed synthetic carbon star spectra. Our program uses a simple isothermal slab model to compute the spectrum from a given relation between opacity and wavelength. The opacity is computed by adding the components due to all the lines of the ^{12}C and ^{13}C isotopes of the CN and C_2 radicals that occur within a small chosen wavelength interval (about 0.5 Å). The program gives a Gaussian profile to each line to account for the instrumental broadening. The wavelengths of molecular lines computed from the formula are: the (1,0), (2,1) and (3,2) bands of the red system of CN, and the (1,0) and (2,1) bands of the red system of C_2 .

Our program can vary the $^{12}\text{C}/^{13}\text{C}$ ratio, the CN/ C_2 ratio and the radial velocity to maximize the correlation between the computed and the observed spectra, in a 50 to 100 Å band. We find a correlation of about 0.4 for a pure CN model and about 0.3 for a pure C_2 model, per 100 observed points, although these correlations will depend somewhat on the regions of the spectrum considered. Typical correlations for a CN plus C_2 model are from 0.65 to 0.70. The correlation drops sharply if the radial velocity is changed from the optimum value. Our estimate of the $^{12}\text{C}/^{13}\text{C}$ ratio, 3.0 ± 1.0 , agrees with Wyller's estimate in Y CVn. The optimum CN/ C_2 ratio is 4.0 ± 1.0 , but the electronic *f* values are uncertain.

Possible sources of error and applications of this correlation are discussed.

Radiation and Physical Properties of the M87 Jet.

JAMES E. FELTEN, *University of California, San Diego*.—Existing observations of the jet in radio galaxy M87 are reviewed and compared with the consequences of various theories as to its physical structure. Many observational uncertainties remain, even in the optical band. If the optical electrons are produced at the nucleus and escape outward to the end of the jet, the ambient plasma must also move outward with mass velocity $\sim c$; streaming instabilities and the short lifetimes of the fast electrons preclude the possibility that they move in a stationary plasma.

Production of secondary electrons by a large proton flux provides a tenable model; the age of such a jet is $\sim 10^5$ yr, and a plasma density $\sim 200 \text{ cm}^{-3}$ is sufficient to maintain it this long against the internal cosmic-ray pressure. The equipartition field is $\sim 10^{-2}$ G. This model will be in conflict with Čerenkov-shower upper limits if the recently observed x rays are shown to be synchrotron radiation.