ances. It is impossible at present to derive any conclusions as the depth of the solar convective zone from the lithium and beryllium abundances because of poor knowledge of the past history of the convective zone. The lead abundance is in reasonable agreement with a semi-theoretical prediction of the abundance by Clayton *et al.* [*Ann. Phys.* (N.Y.) **12**, 331, 1961] based upon a detailed analysis of the *s*-process for nuclear synthesis.

This work was done under auspices of University of Michigan Astronomy Department, Ann Arbor, Michigan, in partial fulfillment of Ph.D. requirements.

Color Separation of Giant and Dwarf Stars.

J. S. NEFF AND W. W. MORGAN, *Yerkes Observatory*.—An investigation is made of ultraviolet photometric combinations from the point of view of separating G-K giants and dwarfs. A favorable separation is found by the combination of narrow wavelength regions at the following locations: $\lambda\lambda 3330, 3700, 4680, 5500$.

Emission of Extreme Ultraviolet Line Radiation from Solar Centers of Activity.

W. M. NEUPERT (introduced by J. C. Lindsay), *Goddard Space Flight Center*.—A scanning monochromator, mounted as a pointed experiment on OSO-1, has been used for observation of the solar extreme-ultraviolet emission line spectrum in the spectral range from 50 to 400 Å. It is found that increases in ultraviolet fluxes over those observed from the quiet sun can be localized to plage areas existing on the solar disk. The development of these regions of enhanced emission (coronal centers of activity) can be traced through observations covering nearly three solar rotations. The enhancement of radiation from active regions varies from line to line in the spectrum depending upon the origin of the line in the solar atmosphere, the greatest flux increases being associated with the *Fe* xv and *Fe* xvi lines. However, the intensity ratio of *Fe* xvi to *Fe* xv is found to remain nearly constant in time, showing a slight increase only during an appearance of a group of active centers in the second and third months of their development. An electron temperature of 1.8 million degrees has been derived from the ratio of *Fe* xvi to *Fe* xv for a quiet sun (Zurich Provisional Relative Sunspot Number equal to zero). Observations are discussed in terms of a nonisothermal coronal model.

Plans for Coronascope II. GORDON NEWKIRK, JR., *High Altitude Observatory*.—One of the most outstanding problems of solar physics concerns the changes in the structure of the corona which may

occur during transient disturbances on the solar disk as well as during the development and decay of a solar active region. The high spatial and time resolution available on photographs from a balloon-borne coronagraph suggests the advantage that such an instrument has in investigating the shorter term transients. The longer term development of the corona is, of course, more advantageously studied from a satellite-borne coronagraph.

Since the sky at an altitude of 95 000 ft has a radiance of about 2×10^{-9} that of the mean solar disk in the near infrared, coronal photography to approximately 4 or 5 solar radii appears feasible. Since even the best coronagraph lens contributes a radiance of approximately 2×10^{-5} , the lens must be shielded from direct photospheric light by an external occulting disk. A simple external occulting disk allows a reduction of the level of instrumentally scattered light to approximately 10^{-8} . "Apodization" of the external occulting disk by one of several equivalent techniques allows the scattered light in the coronagraph to be reduced by another factor of 10. These apodization techniques are compared.

The Coronascope II optical system, scheduled for flight late in the summer of 1963, is explained. The program has received continued support from the Office of Naval Research while the burden of the balloon operations will be borne by the National Center for Atmospheric Research Balloon Flying Facility.

Photoelectric Spectrophotometry of Planetary Nebulae.

C. R. O'DELL, *University of California, Berkeley*.—Eleven planetary nebulae, representing a large range in temperature and density conditions, were observed with a photoelectric scanning spectrograph in the interval $\lambda 3648$ – $\lambda 10938$ Å with the 100-inch and 60-inch telescopes at Mt. Wilson. Accurate emission line intensities were found for each and the nebular atomic continuum was measured for two nebulae. Accurate corrections for interstellar extinction were made for seven nebulae from ratios of intensities of Balmer and Paschen lines arising from the same upper level. The data indicate that in several nebulae the effects of collisional excitation and large optical depth in *H*α are significant. The *He* I lines deviate strongly from recombination theory and this is thought to be due to collisional excitation to low triplet levels. The auroral transitions of S II were observed for the first time, the strongest being at $\lambda 10320$.

Optical Observations of the Radio Source 3C 273.

J. B. OKE AND M. SCHMIDT, *Mount Wilson and Palomar Observatories*.—The radio source 3C 273 has recently been identified with a star-like object of magnitude 12.6 and an adjacent thin wisp or jet.