The D3 Chromosphere, Coronal Holes, and Stellar X-Rays. HAROLD STROBEL, Hole Obs. The solar chromosphere at the limb seen in D3 is an irregular bright band 1000 km thick with a dark band 1000 km thick beneath. The D3 chromosphere has coronal holes at the north and south poles.

We demonstrate how the D3 emission, as well as the ultraviolet He I and II lines, can be explained quantitatively by photoionization by coronal back-radiation. The value of scale height times density at the base of the layer is $5 \times 10^7$. The chromospheric He emission or absorption is weak in coronal holes because there is no coronal back-radiation.

Based on this model an estimate is given of the X-ray flux from stars with He $\lambda 10830$ absorption lines.

**N2**

Ultraviolet Observations of the Chromosphere of Two M-Supergiants. A. F. BERNAT and D. L. LAMBERT, University of Texas at Austin. The Princeton satellite Copernicus has been used to search for chromospheric indicators in Betelgeuse ($N2(Als)$) and Antares ($N2(Als)$). The MgII h and k emission lines were detected in both stars on scans with a resolution of $0.4 \,\AA$ and a peak signal-to-noise ratio of $\sim 7$. A search for additional lines in Betelgeuse gave negative results; these lines included FeII $\lambda 2381$, 2395, 1145, OI $\lambda 1302$, CII $\lambda 1335$, C0 $\lambda 1087$, NII $\lambda 1085$, and CIII $\lambda 977$.

The MgII lines are highly self-reversed, the h lines are asymmetric, the k lines show a strong asymmetry. Results of modeling these lines and the CaII H and K profiles will be discussed.

**N3**

Recent Balloon Observations of the Chromospheric Mg II Lines Near 2800 A. Y. Kondo, T. H. Morgan, NASA Johnson Space Ctr., J. L. Medisette, Houston Baptist U., D. R. White, NASA Johnson Space Ctr. - Spectrophotometry of seven stars was performed with the Balloon-borne Stellar Spectrometer on the night of 9-10 October 1974. The experiment was conducted as a part of a continuing program (Kondo et al. 1972, Ap. J., 176, 153) to investigate the Mg II lines near 2800 A. From this report we shall discuss the chromospheric emission lines observed in e Peg ($N2(Als)$), $\alpha$ Tau ($K5III$) and a Ori ($N2(Als)$). The resonance doublet absorption at 2795 and 2802 A in a Tau show asymmetry in both components, while, in a Ori, only the 2795 A component shows a marked asymmetry confirming earlier work by Kondo et al. Also to be reported are the results on a Cyg (A2ia), the unusual spectrum of W, the large scale mass flow from the outer regions of the star reported earlier by Lamers based on lower resolution data obtained with the 559 experiment.

**N4**

Evidence for a Chromosphere in Vega. Françoise Fraderie and Eduardo Simonneau, Institut d' Astrophysique, Paris and the University of New York, Jr., Princeton University Observatory. - Intermediate resolution ultraviolet scans of the spectrum of a Lyrae have been made with the telescope-spectrometer on board the satellite Copernicus. We have compared the observed flux distribution with the results of two different classical LTE model atmospheres calculations, and we find that the models, which adequately fit the flux distribution in Vega between 5900 and 13500 A, fail by more than a factor of 10 to account for the strength of the observed blue wing of the Lyman-$\alpha$ line. The observed red wing is also considerably stronger than predicted by the models. Qualitative arguments are presented which show that the consideration of non-LTE effects would probably increase the discrepancy between theory and observation, and that the enhancement of the wings of Lyman-$\alpha$ in Vega is therefore, best explained by the assumption of some non-radiative source of heating in the outer layers of the star. This research has been supported in part by National Aeronautics and Space Administration Contract NAS5-1810.

**N5**

Ultraviolet Observations of Capella from Copernicus. A. K. Dupree, Center for Astrophysics, Harvard College, and S. A. O. - a Aurigae (Capella) is a double star system of late spectral type (G5 III and G0 III) that may be expected to show chromospheric and coronal emission. The Princeton ultraviolet spectrometer on the Copernicus satellite was used for a preliminary study of this system on 18 October 1974. A region of 10 A centered on Lyman $\alpha$ was observed at 0.2 A resolution; a 1 A region centered on O VI was observed simultaneously. A prominent feature of these spectra is the profile of Lyman $\alpha$ with a central reversal and a full width at half maximum intensity of 1.7 A. The maximum of the Lyman-$\alpha$ line profile is at least an order of magnitude stronger than any other emission feature from 1210 A to 1290 A and corresponds to a flux at the Earth of $\sim 2$ photons cm$^{-2}$sec$^{-1}$. Intensities of and upper limits to other emission lines will be presented in conjunction with theoretical models.

**N6**

Emission Lines In The Wings of H and K Ca II. R. Z. Stencel, University of Michigan Observatory. - A survey of the theory and observations of the line emission appearing in the wings of H and K Ca II is presented. Detailed center-to-limb variations of two of these three selected line pairs of the seventy-three identified emission features in the Ca II 3969-3933 and 4267-4247 range 3900 to 4600 A are shown to agree with Cantwell's radiative interlocking scheme (1971, Astron. and Ap., 10, 64), whereas an Fe II line at 3965, MgII departs strongly from prediction. A few of these line emission lines can be seen in emission across the entire solar disk as well as in flares, and evidence for these emission lines in stellar spectra plus a report on a systematic search for these lines among bright late type stars is also presented.

**N7**

Stellar Upper Photosphere Models Based on the Ca II K-Wing, II: The Coherent Scattering Approximation. T. R. ATREAS and J. L. LINSKY, Joint Institute for Laboratory Astrophysics, University of Colorado and National Bureau of Standards, and A. A. SHINE, Laboratory for Atmospheric and Space Physics. - We discuss a method for inferring the temperature vs. mass column density (g/cm$^2$) structure of a stellar upper photosphere based on calibrated profiles of the Ca II K-line wings. This method differs from that previously presented (Shine and Ayres, Bull. Am. Astron. Soc., 5, 453, 1973) in that we have relaxed the assumption of a thermalized wing source function (complete redistribution limit; $S_{\text{wing}} = 4P_{\text{em}}$), and instead solve a simple coherent scattering problem frequency by frequency allowing for coupling to the local thermal field through the "incoherent" processes of subordinate radiative transitions and pressure broadening. We find for three cases studied in detail (the Sun, Arcturus, and Procyon) that our straightforward analytic formulation agrees very well with extensive numerical calculations based on "partial redistribution" using a two-level approximation for Ca II. Our initial calculations suggest increases over previous estimates (i.e., Paper I) of the temperature minima of the Sun, Arcturus, and Procyon of 100-200 K, and a shift in $\Delta T_{\text{min}}$ (K) by as much as a factor of two.