19.02.05  On the Variable Inverse P Cygni Profile in Theta Ori C. PETER S Const, Joint Institute for Laboratory Astrophysics, Univ. of Colorado. - Theta Ori C, of spectral type O7V, is the brightest and hottest star in the center of the "trapezium." An inverse P Cygni profile (violet shifted emission and redward shifted absorption) has been reported in the line 4468 of HII by Conti and Alschuler (1971 Astrophys. J. 170, 325). A line with this profile implies infalling material above the photosphere. One spectrogram, taken at another time, showed a strong emission at Hb, also with violet displacement, although the absorption, if present, was blended with the nebular emission. Coude spectra taken subsequently at Kitt Peak showed first an undisplaced 4468 absorption line followed a few nights later by a gradually strengthening inverse P Cygni profile. It appears that the rate of infalling material is strongly variable over the time scale of a few days. Additional spectra obtained a few weeks later again showed an undisplaced absorption line, later to be followed by an inverse P Cygni profile. Other absorption lines in the visible region appear to be normal for an O7V star and do not vary. There is no evidence that the star is a spectroscopic binary. The velocity of the emission component of 4468 relative to other absorption lines in the spectrum, is about ~150 km/sec. When the emission is present, the absorption component velocity of 4468 is about +75 km/sec. The equivalent width of the emission component gets as large as about 300mA. Models to understand the spectroscopic behavior of 4468 will be discussed, along with the ramifications for this exceedingly young O type star and the Orion Nebula.

19.03.05  The Spectrum of RR Telescopii, A Study in Iron. L.H. Aller, R. Polidan, E. Rhodes, UCLA, and G.W. Wakes, AFRL, Hanscom Field. Observations of the nova-like variable RR Telescopii in May 1968 at Cerro Tololo Observatory reveal an unusually rich emission line spectrum dominated by lines of ionized iron, particularly those of the high excitation stage [Fe VII]. We also observed Fe II, Fe III, [Fe II], [Fe III], [Fe IV], [Fe V], [Fe VI], but found no trace of the coronal line, [FeK]. Permitted and forbidden transitions of other elements include Ni, He I, He II, [N II], N III, N IV, [O I], O II, [O III], O III, O IV, Ne II, [Ne III], [Ne IV], [Na IV], Mg I, Mg II, Si II, [S II], [S III], Ar, [Ar IV], [Ar V], [Ca V], [Ca VI], [K IV], Ca I, Sc I, Si I, Ti I, Ti II, Cr I, [Cr II], [Cr III], [Cr IV], [Cr V], V I, [V II], [V III], [V IV], Ni I, [Ni II], [Ni IV], Ni II, and [Sr II]. The level of excitation of this stellar spectrum seems to rise gradually with time; Only approximate line intensities can be obtained since it was not possible to calibrate the photometric measurements by photoelectric spectrum scans. Accordingly a proper quantitative approach to the interpretation of the line emissions cannot be made and we can do little better than propose a rough working model. It is suggested that a hot source with a surface temperature near 100,000°K illuminates a denser, more stratified shell. The [Fe VII], He II, O IV lines, etc. are produced in the innermost zones while the Mg I, [O I], [S II], etc. radiations are produced in the outermost zones. An alternative model of low temperature density, Blobs immersed in a hotter medium is possible.

19.04.05  The Spectrum of Nova Cephei 1971. J.D.R. Bahng, Northwestern Univ. - Photoelectric scanner measurements were made on Nova Cephei 1971 over a three-month period starting from the time when the nova was about 3 magnitudes below the maximum. During the early stage the spectra were characterized by the Balmer emission and a blend of N III lines near 4640 A in emission as well as Fe II emission lines near 5000 A. When the nova faded about 4 to 5 magnitude below the maximum, very strong emission lines of O III] appeared in addition to the Balmer lines and N III lines. The Balmer lines and N III lines showed a steady decrease in their strengths, while the [O III] lines, after making their appearance, remained fairly constant in strengths. The precise Balmer decrement can not be derived without an independent measure of interstellar reddening, but it deviates from the theoretical values. The deviation is in the same sense as found in diffuse and planetary nebulae.

19.05.05  Line Blanking in Arcturus - Statistical Descriptions of Observations. F. N. Edmunds, Jr., Univ. of Texas at Austin, and T. E. Morgan, State Univ. Coll., Oswego, N. Y. - Equivalent widths and, when possible, identifications have been collected or determined at UT Austin for roughly 10,000 spectral lines of Arcturus (K2IIIp) in the wavelength range λa 3600-25,000. Completeness and accuracy of this list, measured from the Griffin Atlas and infrared tracings of J. and P. Connes, are discussed. Two statistical descriptions of this line absorption have been formulated for line-blanking studies. The first is a two-dimensional breakdown of the line blanking coefficient for each 25 A interval (100 A in the