23.05.07 The Emission-Line Spectrum of N 49, a Supernova Remnant in the Large Magellanic Cloud. D. R. OSTERBROOK and R. J. DUFOUR, Washburn Observatory - Spectrograms of the nebula N 49 were obtained at CTIO, using the 60-inch telescope and image-tube spectrograph at a dispersion of approximately 195 A/mm. The plates were calibrated for spectrophotometric measurements, but the present paper describes only the line identifications and their preliminary qualitative interpretation. Typical nebular emission lines of H I, [O III], [O II], [N II], [Me III], [S II] are strong and indicate a relatively low average level of ionization. He I λ6587, 4711, 4026, 6678 and He II λ4686 indicate an approximately normal He abundance and only slight ionization to He II. The typical fainter nebular lines [Fe II] λ5270, 5363 of multiplets (1f) and (3f) are also present, while [Fe II] λλ2378, 4414, 5159, 5526, 4815, 4244 of multiplets (7f), (19f), (20f) and (21f) are relatively strong. [Fe II] λλ2559, 3954, 6555, 6633 are reported by Benisek, and in addition [N I] λλ2000, [Ni I] λλ6562, 6571 (seen as a wide blend at our dispersion) indicate the presence of a large region in which N II is mostly neutral but T is comparable in order of magnitude with the temperature in typical H II regions. This agrees qualitatively with the predictions of abovemention models, but is incompatible with photoionization models.

23.06.01 A Flux Density Scale for Microwave Frequencies. William A. Bent, Univ. of Mass. - Accurate flux density measurements at the thermal radio sources of the 1961 Cambridge survey have been made at centimeter wavelengths relative to the KPM absolute flux density scale based on Cas A and at millimeter wavelengths relative to absolute brightness temperature measurements of Jupiter and Saturn. The absolute spectrum of 3C287 thus defined has the form: S = 2.68 × 10^{-4} T^{1/2} M_\odot Hz^{-1} cm^{-2}, and ties together two formerly independent flux density scales. With an accuracy of about 3%, this spectrum of 3C287 can be used to calibrate antennas having beamwidths between 1 and 6 minutes of arc at microwave frequencies above 7 GHz, where other methods of absolute calibration are much less accurate.

23.07.09 The Linear Polarization of Cassiopeia A at Wavelengths of 9.8 and 11.1 cm. G. S. DOWNS, Jet Propulsion Laboratory, and A. R. THOMPSON, Stanford University - Observations of the brightness distribution of the linearly polarized component of the radiation of Cassiopeia A were made using interferometers at Stanford and at the NRAO. The Stanford observations were made at a wavelength of 9.8 cm and provided a synthesized beamwidth of 1.6° × 2.7°. The observations with the NRAO interferometer were made at 11.1 cm and provided a beamwidth of 8.1° × 9.3°. Because the increases in the antenna spacing of the NRAO interferometer are greater than the critical interval for Cassiopeia A, a small part of the brightness distribution at 11.1 cm wavelength is missing. The polarized emission in Cassiopeia A is concentrated in the main ring of the source but is irregular in distribution with the largest concentration in the northwest. The maximum polarized brightness at 11.1 cm wavelength corresponds to a degree of polarization of approximately 5%. A comparison with published results at other wavelengths shows that Faraday depolarization reduces the polarized radiation to half the intrinsic value at a wavelength of approximately 7.5 cm. The mean values of the rotation of the position angle of the polarization vary more rapidly as a function of L^2 at wavelengths shorter than 6 cm than at longer ones. These data appear to be best interpreted in terms of a nonlinear rotation with L^2 which occurs within the source together with a linear component of about -35 radians m^2 which may be attributed to the interstellar medium. The rotation and depolarization within the source can be explained by a model with a radial magnetic field and a thermal electron density of 2 cm^-3.

23.09.10 A Possible Mechanism for Energy Release in Quasars and Seyfert Nuclei. JOHN G. RATHER, N.R.A.D. - The dense star cluster model of compact energetic objects is examined for new ramifications. It is found that a fraction of the cluster members are white dwarfs or neutron stars with large magnetic fields, collisions with the atmospheres of evolved giants and/or normal stars which will magnetize the stellar objects. The electric fields associated with the dH/dt which occurs when the magnetic objects impinge upon a planetary atmosphere are very large, giving rise to copious pair production. The colliding objects may encounter each other repeatedly, rather than only once as in Colgate's theory, thus greatly prolonging the life of the quasar. Mutual collisions of objects with large magnetic fields are also considered. The coincident radiation of gravitational waves and electromagnetic pulses is discussed. If the various evolutionary processes give rise to a background interstellar gas having density 10^{-11} < n < 10^{-10} atoms per cm^3, the short wavelength variability of objects such as 3C287 and 3C454.3 can also be explained.

23.10.10 A Physical Model of Line Formation in QSO's. J. D. Scargle, Lick Obs., and C. B. Tarter, Lawrence Livermore Laboratory, U. of Calif. - We assume that the center of the QSO is a point mass of luminosity L_b surrounded by an envelope of clouds (total mass < M_\odot). The ionization and temperature structure are calculated (Tarter, in preparation) with a code which also calculates as a function of radius the outward force due to