Steady-state populations for pure hydrogen have been computed for dilute Planck radiation fields, for hydrogen densities ranging from 10^{14} to 10^{16} cm^{-3} and for election temperatures ranging from 7000 to 30 000°K. By successively adding bound states it has determined that six bound states are sufficient to calculate the populations of the first five bound states to an accuracy of 0.1%.

1417 Mc/sec Observations of M31. JOHN W. LEIBACHER, *Harvard College Observatory* (Introduced by A. E. Lilley).—M31 has been observed with the maser-equipped Harvard radio telescope at 1417 Mc/sec. The low-noise temperature of the radiometer permitted the detection of the halo of M31 over a region $3.5 \times 8^\circ$. The integrated value of the flux density was found to be $(68 \pm 17) \times 10^{-26}$ W m^{-2} cps^{-1} . Comparing this with the 408 Mc/sec flux density of Large, Mathewson, and Haslam (*Nature* 183, 1250, 1959) gives a spectral index of -0.58 ± 0.13 . This value should be compared with the spectral index obtained from the flux determinations at 408 and 158 Mc/sec (Hanbury, Brown, and Hazard, *Monthly Notices Roy. Astron. Soc.* 119, 297, 1959) of -0.38 ± 0.11 . Brightness temperature profiles along the major and minor axes at 408 and 1417 Mc/sec have been compared; and the 1417 Mc/sec data have been smoothed and compared with the 38 and 178 Mc/sec data of Baldwin and Costain. Both of these comparisons of the distribution of emission show no significant differences in the distribution of intensity across M31, and are thus in agreement with the results of Costain and of Adgie and Smith for the Galaxy.

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On the Nature of the Wolf-Rayet Phenomenon. D. NELSON LIMBER, *Yerkes Observatory*.—The basic observational data pertaining to the Wolf-Rayet phenomenon have been reviewed with particular reference to the Wolf-Rayet component of V 444 Cygni. The validity of the conventional interpretation in terms of the radial ejection of matter at high speeds has been re-examined. The conventional interpretation appears to be inadequate on a number of independent counts.

An alternate interpretation of the phenomenon in terms of a forced rotational instability consequent to contraction in a post-main-sequence evolutionary stage is put forward. This latter interpretation appears to account for many of the available observational data in a much more satisfactory way than does the conventional one and does not appear to be inconsistent with any of the data studied thus far.

Spectrum of Coherent Electron Waves in the Solar Corona. J. M. MALVILLE, *University of Michigan, Radio Astronomy Observatory*.—The interaction between density fluctuations of an electron stream and longitudinal waves carried by the plasma through which the stream is passing can lead to an effective conversion of kinetic energy into energy of electron oscillations. Using simple energy considerations the steady-state amplitudes of coherently excited electron waves are calculated. To take account of the bandwidth of the oscillations a Gaussian profile is used for the rate of transitions from the free to trapped electron energy states. Assuming Rayleigh scattering for transforming the longitudinal waves into transverse waves, the radio-frequency spectrum is calculated for an electron stream with a velocity corresponding to type-III bursts. A turnover in the spectrum is predicted near 50 Mc/sec. Between 70 and 140 Mc/sec the slope of the spectrum agrees reasonably well with Wild's (Wild, J. P., *Australian J. Phys.* 3, 541, 1950) statistically determined spectrum of type-III bursts. The frequency of the turnover and the slope of the spectrum are critically dependent upon the temperature gradients in the corona. It is suggested that type-III bursts first become visible at frequencies corresponding to the steep temperature gradient in the chromosphere-corona transition region. This work was supported by National Aeronautics and Space Administration.

Precision of the Estimates Relating to the Selection Factor of Galaxies. ALLAN H. MARCUS, *University of California, Berkeley*.—A catalogue of galaxies for which the criteria of selection depend essentially on only magnitude and type is characterized by a "selection factor" $\Phi(m, t) = \text{probability that a galaxy of type } t \text{ and apparent magnitude } m \text{ will be included in the catalogue}$. Neyman and Scott suggested (*Handbuch der Physik* 53, 416, 1959) the approximation $\Phi(m, t) = \text{Gaussian probability integral from } (m - \alpha_t)/\beta_t \text{ to infinity}$, where α_t and β_t are parameters. Subsequently (Neyman and Scott, *Astron. J.* 66, 148, 1961) maximum likelihood estimates of α and β were published for eight types of field galaxies, together with estimates of mean absolute magnitude M_0 and dispersion σ_M . However,

Type	M_0	σ_M	α	σ_α	β	σ_β	ρ	n
E0—E3	−18.0	1.02	12.0	0.4	1.13	0.12	−0.94	83
E4—E7	−17.0	1.33	10.9	0.9	1.30	0.22	−0.95	28
SB0	−18.5	0.58	11.4	0.8	1.10	0.23	−0.94	21
SBb	−18.7	0.86	11.2	0.7	1.10	0.21	−0.94	26
S0, S0p	−17.0	1.25	11.7	0.5	1.10	0.13	−0.94	66
Sa, Sap, Sab	−18.4	0.82	11.9	0.4	0.90	0.13	−0.92	51
Sb, Sbc	−17.9	1.05	10.8	0.4	1.10	0.12	−0.94	77
Sc, Scp, SBc	−16.7	1.28	11.6	0.2	0.75	0.08	−0.90	94