The Dousmanis, Sanders, and Townes expression must be multiplied by $(2J+1)/J$. This factor is 2.67 for the ground state of OH ($J=3/2$). Using recent experimental data on the dipole moment and the fine structure interaction constant of OH, the dipole matrix element is calculated for the case of intermediate coupling between Hund's cases a and b. The resultant A 's are: $0.1614 \times 10^{-11} \text{ sec}^{-1}$, $0.8895 \times 10^{-11} \text{ sec}^{-1}$, $0.9640 \times 10^{-11} \text{ sec}^{-1}$, and $0.1177 \times 10^{-11} \text{ sec}^{-1}$ for the 1612, 1665, 1667, and 1720 Mc/sec lines, respectively. The A value computed here for the 1667 Mc/sec line differs significantly from the value ($2.66 \times 10^{-11} \text{ sec}^{-1}$) given by Barrett (*IEEE Trans. on Military Electron.* **MIL-8**, 156, 1964). OH abundances computed with this earlier A value must be increased in the ratio $2.66 \times 10^{-11} / 0.964 \times 10^{-11} = 2.76$.

Temperature of Intergalactic Matter. ROBERT J. GOULD, *University of California, San Diego* AND WILLIAM RAMSAY, *University of California, Santa Barbara*.—The presence of a cosmic abundance of helium in the intergalactic medium is of considerable importance because of the associated strong cooling due to excitation of discrete levels in He and He⁺ through inelastic electron collisions. This cooling reaches a maximum at $8 \times 10^4 \text{ }^\circ\text{K}$ where the main contribution is due to electron collision-induced production of He⁺ Ly- α , and the cooling is almost two orders of magnitude larger than that for bremsstrahlung and radiative and dielectronic recombination in ionized hydrogen and helium. It can be shown that heating by a universal cosmic ray flux can maintain steady state temperatures in the gas of $1\text{--}5 \times 10^4 \text{ }^\circ\text{K}$ against cooling by electron collisions with H, He, and He⁺ for a cosmic He/H abundance and local hydrogen densities of $10^{-5}\text{--}10^{-4}$ particles/cm³. However, the relaxation time for hydrogen and singly ionized helium recombination is about 10 times the cosmic expansion time of 10^{17} sec for hydrogen densities of 10^{-5} cm^{-3} at these temperatures, while doubly ionized helium recombines in about $3 \times 10^{17} \text{ sec}$. Thus, unless intergalactic matter exists in "clouds" in which the hydrogen density is 10 times the usually assumed mean of 10^{-5} cm^{-3} , ionization steady state conditions may not exist. Moreover, for temperatures $> 2 \times 10^5 \text{ }^\circ\text{K}$ no process is effective in cooling the gas in a time less than 10^{17} sec , so that no quasi-steady state temperature can exist. However, due to the strong cooling by He⁺ at temperatures lower than $2 \times 10^5 \text{ }^\circ\text{K}$, an intergalactic gas at this temperature may be unstable to condensations, perhaps leading to the formation of galaxies or galaxy clusters.

Polarization and Extinction by Dielectric Cylinders and Graphite Flakes. J. MAYO GREENBERG, *Institute for Advanced Study, Princeton*.—Exact

calculations on dielectric ($m=1.33$) infinite cylinders oriented according to the Davis–Greenstein mechanism are performed. The variations of the wavelength dependence of extinction and polarization associated with different viewing angles relative to the magnetic field are presented. It is shown that reasonable representations of the wavelength dependence and amount of polarization are consistent with the wavelength dependence of extinction in a very natural manner. More approximate earlier predictions on the dependence of ultraviolet extinction on degree and kind of orientation are confirmed for nonspherical dielectric particles. A semiquantitative calculation of polarization by oblate spheroidal graphite flakes indicates some difficulties in predicting the correct wavelength dependence of polarization based on a graphite model for interstellar grains.

High-Altitude Profiles of the O I 5577 Å and 6300 Å Night Airglow Layers Derived from Rocket Photometry. IRENE S. GULLEDGE AND DONALD M. PACKER, *U. S. Naval Research Laboratory, E. O. Hulburt Center for Space Research*.—An Aerobee-150 rocket launched from White Sands Missile Range at 2230 h MST on 22 October 1965 carried five liquid-nitrogen-cooled photoelectric photometers with narrow-band filters to an altitude of 260 km. A measurement of an upper-level O I 5577 Å green line night airglow emission was obtained for the first time, and an intensity vs altitude profile has been derived. The peak green line intensity occurred at 248 km, and coincided with the maximum of the O I 6300 Å red line layer. Both these radiations were concentrated in layers about 80 km thick, whereas the lower green line layer was about 20 km thick, peaking at 100 km. Less than 10% of the total zenith intensity of the green line emission was concentrated in the upper layer. The profile of the 6300 Å layer measured at 2230 h was different from a profile obtained above Wallops Island on a flight at midnight, 16/17 January 1964. The latter was about half as thick, with maximum lying near 255 km.

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Existence of Helium³ and the Calcium Lines in the Atmosphere of the B4 P-Type Star 3 Centauri A. JOHANNES HARDORP, *University of California, San Diego*.—In the course of a model atmosphere analysis, computed profiles of the He I line at 6678 Å confirmed the existence of He³ that had been detected by Sargent and Jugaku in 1960. It was found that abundances can be well determined from He I lines. Inspection of a spectrogram of 3 Cen B proved the stellar nature of the *H* and *K* lines of Ca II despite