On the Electron Temperatures of H II Regions. B. ZUCKERMAN, PATRICK PALMER, H. PENFIELD, *Harvard College Observatory*.—Measurements of the electron temperatures (T_e) of H II regions using the $n\alpha$ radio recombination lines of hydrogen have yielded values of T_e that are, on the average, a few thousands degrees less than values obtained optically. To obtain T_e from the radio lines the relevant energy levels were assumed to be populated according to local thermodynamic equilibrium (LTE) at the temperature of the free electrons. It has been suggested, however, that there are small departures from LTE populations which result in a slight

maser effect. Taking this into account yields electron temperatures in agreement with optical values.

We have used the 140-ft telescope of the National Radio Astronomy Observatory to study the 109α and 137β lines (frequencies 5008.923 and 5005.033 MHz, respectively) in the sources Orion A, M17 and NGC 2024. On the basis of this study we conclude that the energy levels taking part in the radio transitions are not populated according to LTE and, hence, the previous electron temperatures obtained from the radio lines assuming LTE populations do not represent real temperatures in the nebulae.