If Venus had a primordial forward spin, the solar tides could not account for the present retrograde rotation. This has led some authors to propose the existence of other torques on the planet, notably of atmospheric origin (Gold, private communication (1964); MacDonald[6]). As the mass of the Venusian atmosphere is thought to be comparable with that of the Earth's oceans, such proposals seem quite reasonable. If the atmosphere is capable of pushing Venus through the otherwise stable synchronous state of rotation (with respect to the Sun), present control of the rotation of Venus by the Earth is difficult to understand.

In a previous communication[4], we discussed stable resonant spins for a planet in an eccentric orbit. We found that a necessary condition for capture into a resonance was the existence of a significant term in the tidal torque which would damp librations about the commensurate spin value. For Venus a similar condition must be met by the total additional torque T. As yet we have been unable to find any physical basis for the existence of such a term.

A refined measurement of the rotation period of Venus will be awaited with great interest.

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Detection of Hydrogen Emission Line 166α in M17

THE existence of recombination lines of highly excited states of hydrogen is well established through recent radio observations[1,2] of various galactic H II regions. This communication reports the detection and analysis of a new line $n_{167} \rightarrow n_{166}$ (1,424·736 Mc/s) in *M*17, which extends our previous results[1] to lower frequencies. This particular $n \rightarrow n-1$ transition lies closest to the well-known 21-cm hyperfine line of interstellar hydrogen. We also suggest a convenient notation for the various transitions.

Our data were obtained with the Harvard 60-ft. telescope equipped with a cavity maser 10-channel radiometer having a resolution of 80 kc/s. The antenna beamwidth is 52 min of arc, and its aperture efficiency is 0·38 at the frequency of operation. The total noise temperature of the system is approximately 100° K. The maser used in this investigation is essentially the same as that used by Lilley *et al.*[1].

Our profile for *M*17 is shown in Fig. 1. Using our observational results (Table 1), we obtain, in a manner completely analogous to that described by Lilley *et al.*[1], $T_e = 5{,}900 \pm 2{,}400°$ K, where T_e is the computed electron temperature. This result agrees satisfactorily with the previous[1] determination of $6{,}800 \pm 3{,}000°$ K and $5{,}500 \pm 2{,}400°$ K and with Hoglund and Mezger[2], who obtained $4{,}060^{+430}_{-380}$ ° K.

In Fig. 2 we have plotted all reported values for *M*17 of the observed linewidth versus wave-length of observation. These values fall nearly on a straight line as expected for purely Doppler broadening as suggested in Fig. 2. Thus, our present result agrees with the conclusion arrived at by Lilley *et al.*[1] that the linewidth can be entirely accounted for by thermal and turbulent broadening to $\nu \sim 1{,}420$ Mc/s.

Table 1. SUMMARY OF OBSERVATIONAL RESULTS

ν (Mc/s) = 1,424	$\Delta\nu_L$ (kc/s) = 200
T_A (°K) = 0·195 ± 0·030	$\Delta\nu_L$ (corrected) = 183 ± 60 (kc/s)
T_L/T_C = 0·83 ± 0·17 per cent	V (km/s) = 20 ± 7

The above quantities are defined in ref. 1.

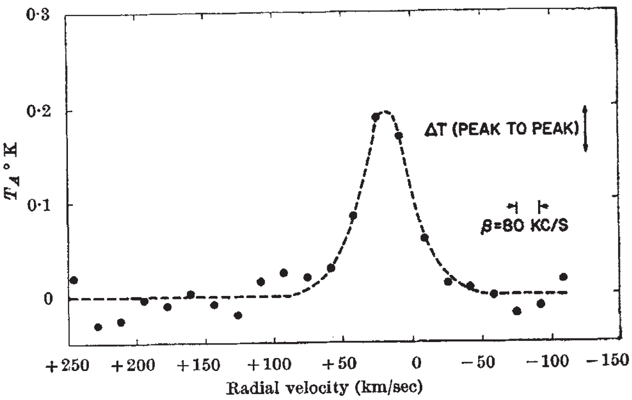

Fig. 1. Line spectrum for *M*17 (166α; f_0 = 1,424·736). The ordinate is antenna temperature. The abscissa is velocity with respect to the local standard of rest

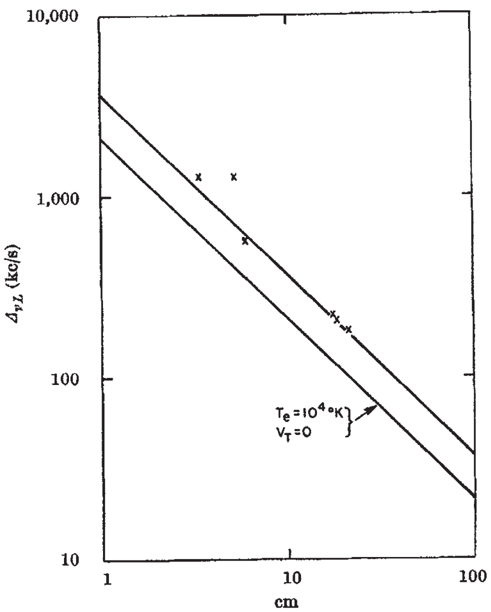

Fig. 2. Plot of linewidth ($\Delta\nu_L$) versus wave-length for all observed $n \rightarrow n-1$ lines in *M*17

We have also observed a region near *W*75 (ref. 3) and have obtained evidence for a line, although the signal-to-noise ratio is not sufficient for quantitative analysis.

To avoid cumbersome notation for future work on lines of excited hydrogen, we suggest a notation widely used in optical spectroscopy. For example, the $n_{167} \rightarrow n_{166}$ transition reported in this communication would be labelled simply 166α. The transition $n_{200} \rightarrow n_{198}$ would be designated 198β. The number represents the principal quantum number of the lower state, and α, β, γ . . . designate respectively transitions of type $n \rightarrow n-1$, $n \rightarrow n-2$, $n \rightarrow n-3$, etc. This notation is consistent with Lyman α (1α), Hβ (2β), etc.

The use of the line 166α (at 1,424 Mc/s) will enable the many hydrogen-line (1,420 Mc/s) systems around the world to examine both ground state and excited hydrogen.

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