HELPER, H. L. On the velocity field of the nearby interstellar hydrogen.

This is a progress report upon the analysis of the 21-cm survey for $|b| \geq 20^\circ$, undertaken at the Department of Terrestrial Magnetism, Carnegie Institute of Washington, and reported upon previously (Erickson, Helfer and Tatel 1959). Rough agreement between Shain's local magnetic pole of the Galaxy (Shain 1957) and the crudely defined pole of the high-latitude interstellar hydrogen suggests that the distribution of the interstellar gas is quite dependent upon the local magnetic field and that the possibility that the velocity-distance relation for the gas is different from that of the stars cannot be ignored.

As reported previously, the high latitude 21-cm line profiles give evidence of significant large-scale structure. Accordingly, a solution for the velocity-distance relation of the nearby gas was attempted. Including only first order terms one may write for the radial velocity:

$$V(l, b) = a + sR,$$

where R is the distance and

$$s = K + \cos^2 b (C + B_1 \sin 2l + B_2 \cos 2l) \\ + (A_1 \sin l + A_2 \cos l) \sin 2b,$$

$$a = W_1 \cos l \cos b + W_2 \sin l \cos b + W_3 \sin b.$$

Using subjective estimates of the peak or center of line-profile velocities, solutions for the relative ratios, $K:C:B_1:B_2:A_1:A_2$, were determined from the seven available values of (l, b) for which $V(l, b) + V(l + 180^\circ, -b) = 0$. The preliminary values are: 1.000, -0.820, -0.311, -0.182, +0.743, -0.322, in the order given above. The figures quoted are probably already influenced slightly by the occurrence of second order terms, their influence being evident in the observations taken at $b = \pm 20^\circ$.

The values of W_1, W_2, W_3 , determined from the value of $V(l, b) - V(l + 180^\circ, -b)$ at the aforementioned zero points, are found to be 1.24 km/sec, 2.62 km/sec, -1.60 km/sec, respectively, but these values are quite crude. If accepted literally, this would suggest that the circular velocity of the local gas is about 3 km/sec faster than that of the stars.

The coordinate system used is that defined by the Lund Tables (Ohlsson, Reiz and Torgård 1956) with galactic center at $l \sim 327^\circ, b \sim -1^\circ$, and the velocity scale origin is the local stellar standard of rest, as given by the Lund Tables (MacRae and Westerhout 1956). This work was

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HERBIG, G. H. Observations and an interpretation of VV Puppis.

VV Puppis was discovered by Van Gent in 1931 and for a time was the variable star of shortest known period, 100 minutes. It differed from other ultra-short-period RR Lyrae-like stars, however, in that the rise to maximum light was much slower than the subsequent decline. It was also found that the light curve of VV Puppis frequently varied in shape, and that there was a slow change in the mean brightness of the system.

The mean (or minimum) brightness faded slowly in the years following discovery until in 1948-49 the star was found at a minimum m_{pg} near 17.0. Observations by Thackeray, Weselink, and Oosterhoff at that time showed that the variations would sometimes cease for a considerable interval; there was one period of 18 days—over 200 cycles—when no variation above minimum light was observed. The peculiarity was compounded by the fact that when the light variations of VV Puppis resumed after an inactive interval, the maxima would again occur on the linear ephemeris that had held since discovery.

This latter fact pointed to the possibility that VV Puppis might not be a case of pulsation but rather of orbital motion, despite the curious light curve which is quite unlike that of an ordinary eclipsing variable. Spectroscopic observations made with the Crossley reflector in late 1958 (the star was about 1 mag. brighter than in 1948-49) demonstrated that VV Puppis is certainly not an RR Lyrae star: there is a hot continuum running well into the ultraviolet and the spectrum is dominated by strong emission lines of H and $HeII$. No absorption spectrum can be seen. The displacements of the emission lines vary through a large range in the 100-minute