

MASS DISTRIBUTION AND BIRTH RATE OF CENTRAL STARS OF PLANETARY NEBULAE:  
COMPARISON WITH WHITE DWARFS, AND INFLUENCE OF SELECTION EFFECTS.

V. Weidemann  
Institut für Theor. Physik und Sternwarte  
Universität Kiel, F.R. Germany

The mass distribution of central stars (CPN) as derived by the Schönberner method (1981)  $M_v$  vs. age,  $v(\text{exp}) = \text{const}$ , for an enlarged local ensemble, as presented at the London Symposium, 1983, appears to be much narrower and more strongly peaked towards smaller masses than the one recently derived by Heap and Augensen (1987) (HA) using the same method, but IUE data and  $M_v(\lambda 1300)$  vs. age, corrected for individual  $v(\text{exp})$ . Whereas according to Schönberner 65% of all CPN have  $M < 0.64 M_\odot$ , HA find only 44% below the same limit. We demonstrate that this discrepancy is entirely due to the fact, that HA use Daub and  $0.9 \times$  Cahn/Kaler distances, whereas Schönberner used  $1.3 \times$  CK. We list a number of arguments which favor the larger distances, especially the recent work by Méndez et al. (preprint, 1987) ( $T_{\text{eff}}/g$  determinations) and investigations of Magellanic Cloud PN by Aller et al. (1987), Wood et al. (1987) and Barlow (1987) which all indicate a scale  $\geq 1.4 \times$  CK. If one uses Barlow's recalibration formula for optically thick PN, the distances for those - which mainly contribute to the massive CPN in the HA analysis - are increased so much as to remove most of them from the local ensemble. We thus obtain for the revised IUE ensemble 84% CPN with  $M < 0.64 M_\odot$ , in better agreement with results for white dwarfs (70%) (cf. Weidemann, 1987).

It is furthermore argued that agreement between PN and white dwarf birthrates can only be achieved if the PN distances are increased to above  $1.3 \times$  CK. We finally present CPN distributions in HR diagrams which are calculated with a galactic evolution program and demonstrate selection effects operating against high mass CPN and in favor of helium-burning CPN (details to be published elsewhere).

Aller, L.H., Keyes, C.D., Maran, S.P., Gull, T.R., Michalitsianos, A.G. and Stecher, T.P.: 1987, *Astrophys. J.* **320**, 159.

Barlow, M.J.: 1987, *Mon. Not. Roy. Astr. Soc.* **227**, 161.

Heap, S.R., Augensen, H.J.: 1987, *Astrophys. J.* **313**, 268.

Schönberner, D.: 1981, *Astron. Astrophys.* **103**, 119.

Weidemann, V: 1987, 2nd Conference on Faint Blue Stars, Tucson  
A.G. Davis Philip, D.S. Hayes, J. Liebert eds., in press.

Wood, P.R., Meatheringham, S.J., Dopita, M.A., Morgan, D.H.: 1987,  
*Astrophys. J.* **320**, 178.