THE INFLUENCE OF WR LIKE STELLAR WIND MASS LOSS RATES ON THE EVOLUTION OF MASSIVE CORE HELIUM BURNING STARS.

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SUMMARY. Evolutionary computations of massive close binaries (MCB) including the effects of stellar wind (SW) and convective core overshooting predict that all massive primaries with ZAMS mass larger than 10 $M_\odot$ start their core helium burning phase (CHeB) as bare helium cores; the hydrogen rich layers are removed on a timescale of the order of 10^4 yrs as a consequence of Roche lobe overflow (RLOF). The CHeB remnant after RLOF resembles closely a zero age CHeB star and its further evolution is entirely independent from its binary nature. Similarly as has been done previously by Vanbeveren and Packet (1979, *A.&A.***80,** 242), I have performed a phenomenological study on the evolution of massive hydrogen less CHeB stars including the effect of SW mass loss using updated $\dot{M}$ determinations of van der Hucht et al. (1986, *A.&A.* **168,** 111). The SW mass loss rate formalism used in the computations is based on the following requirements:

a. according to the theory of radiation driven winds, I looked for a relation $\dot{M}=aL^b$,

b. there are (only) two WR+OB binaries for which a reasonable good estimate of the mass of the WR component is known and which are also included in the updated $\dot{M}$ list of van der Hucht et al. (1986), i.e. V444 Cyg and γ^2Vel . The WR mass can be transformed into a luminosity using the M-L relation of hydrogen less CHeB stars proposed by Vanbeveren and Packet (1979); this gives us values for a and b (within some uncertainty margin of course),

c. the observed WN/WC number ratio of WR stars with a detected OB type companion $\approx$1.2; varying a and b leads to different predicted WN/WC ratios when the $\dot{M}$ formalism is applied in an evolutionary code.

The resulting relation which reproduces as closely as possible the foregoing requirements is given by

$$\dot{M}=3.2\ 10^{-13}\ L^{1.5} \quad (L \text{ in } L_\odot,\ \dot{M} \text{ in } M_\odot/yr)$$

The evolutionary computations then reveal the following conclusions:

1. all primaries of MCB's with initial mass between 10 $M_\odot$ and 80 $M_\odot$ (possibly up to 100 $M_\odot$) end their life as stars with mass between 1.4 $M_\odot$ and 8 $M_\odot$ respectively,

2. all primaries with initial mass larger than 40 $M_\odot$ end their life as a WO star.

K. A. van der Hucht and B. Hidayat (eds.),
Wolf-Rayet Stars and Interrelations with Other Massive Stars in Galaxies, 555.