AGB TO WD

This test is to show how a 0.54 $M_\odot$ AGB star can be evolved into a white dwarf, that subsequently cools peacefully for a few Gyr. Therefore, the test should be cut off when center gamma reaches 160 (`gamma_center_limit = 160`).

The model starts near the end of the star's AGB phase and loses only a small percentage of it's mass, and does so within the first 50,000 years, approximately (figure 1), through a strong solar wind. The effect of the drop in solar wind can be seen in the evolution of the radius of the star (figure 2). The contraction of the star slows down, indicated by the kink, which lines up with the drop in solar wind.

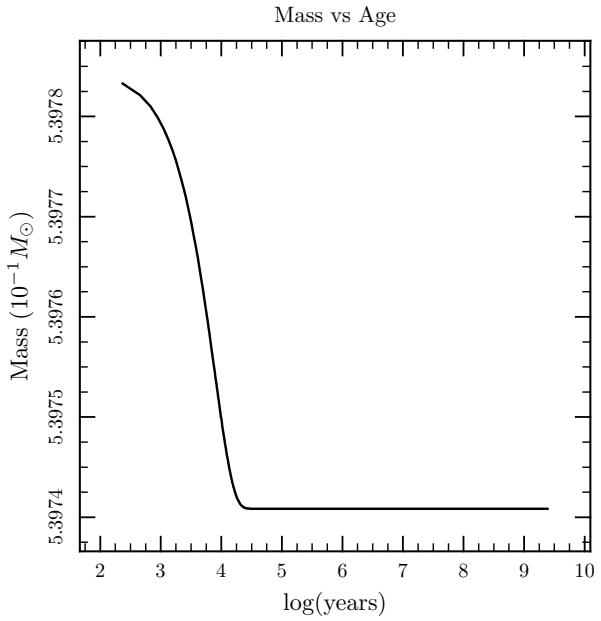

Figure 1: Mass vs Age plot shows mass loss through solar wind for first 50,000 yrs

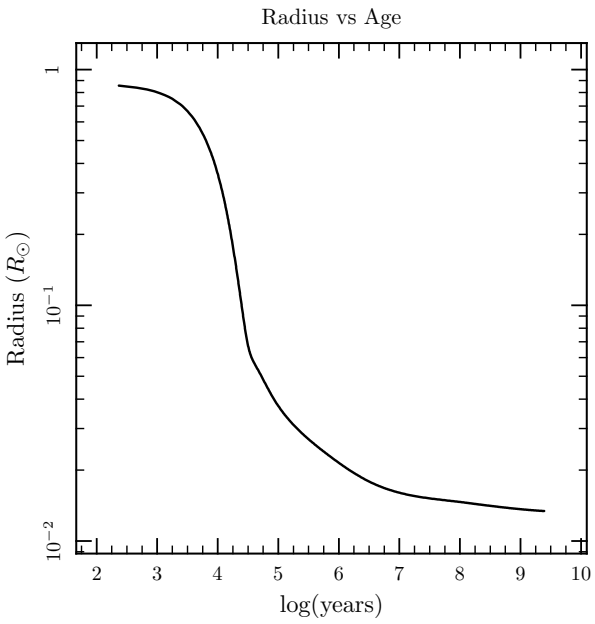

Figure 2: The kink in the plot lines up with drop in solar wind

The plot the the left (figure 3) shows the major burning rates, in log(erg/g/s), against the age of the model. Again, we can see a decrease in all of the burning rates at approximately 50,000 yrs. This happens because the star begins to cool, even though the temperature at the surface has increased (figure 4) due to hot inner burning shells being exposed from mass loss by solar wind.

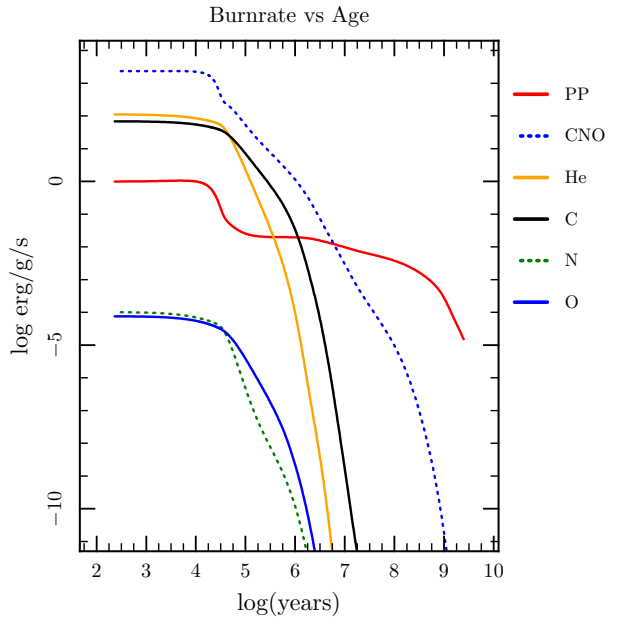

Figure 3: Burning rates drop as shells are exposed from mass loss and lose heat

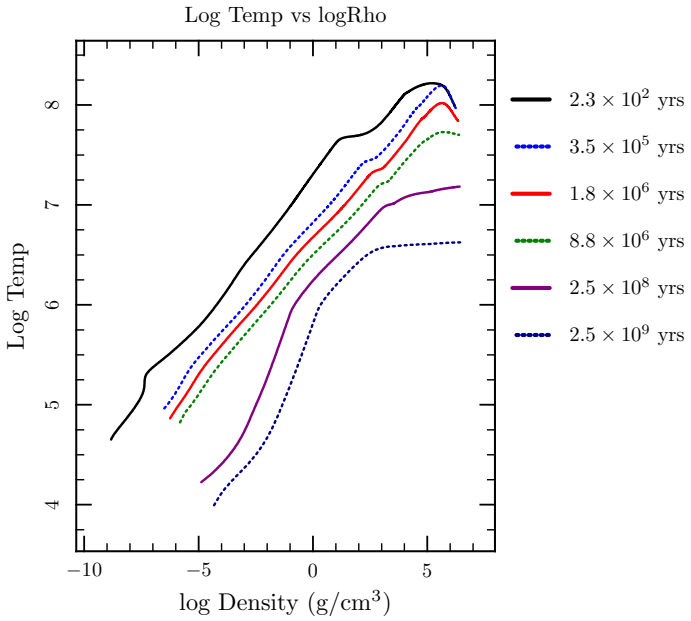

Figure 4: LogT vs LogRho profile at several ages, show temporary increase in temperature near surface

A more clear view of the initial increase in effective temperature is shown in the HR-diagram to the left (figure 5). On the right is an abundance profile (figure 6). (Note: The Ne20 shown here actually represents Ne22, this is because `MESA` is using a simplified nuclear reaction network.)

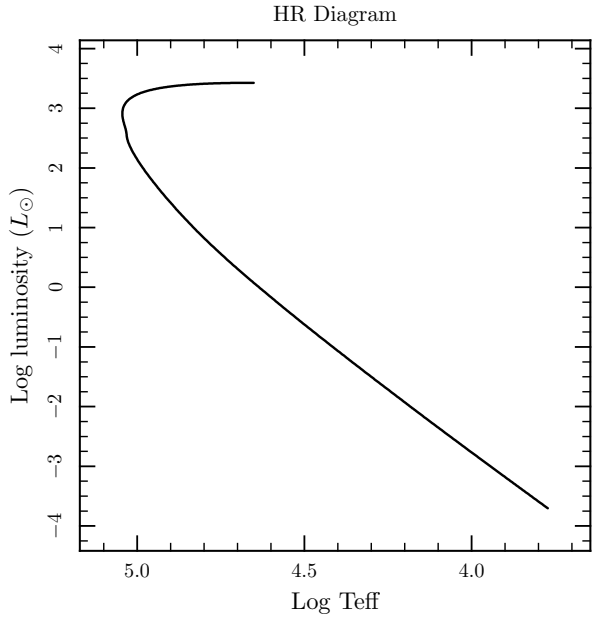

Figure 5: HR-diagram shows temporary increase in effective temperature from exposing hot burning shells

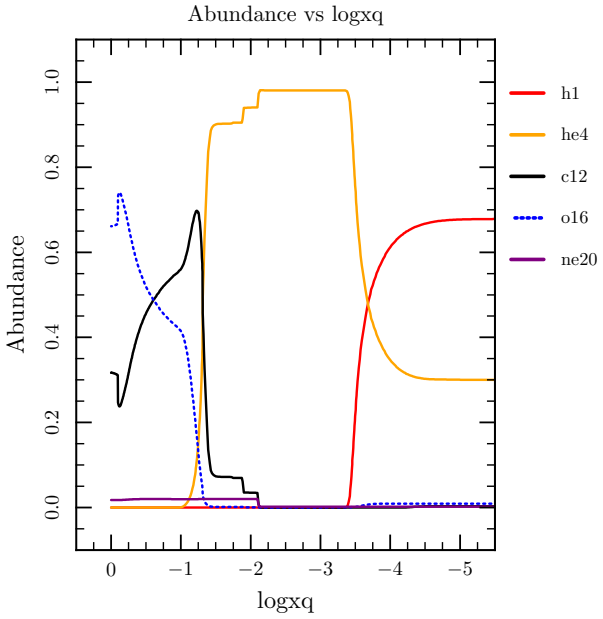

Figure 6: Abundance profile

This final plot (figure 7) shows a few internal `MESA` variables, such as the size of the time-step, the number of zones, and the number of retries against the model number in order to give some understanding of how hard `MESA` is working throughout the run and where some areas of problems/interest might be.

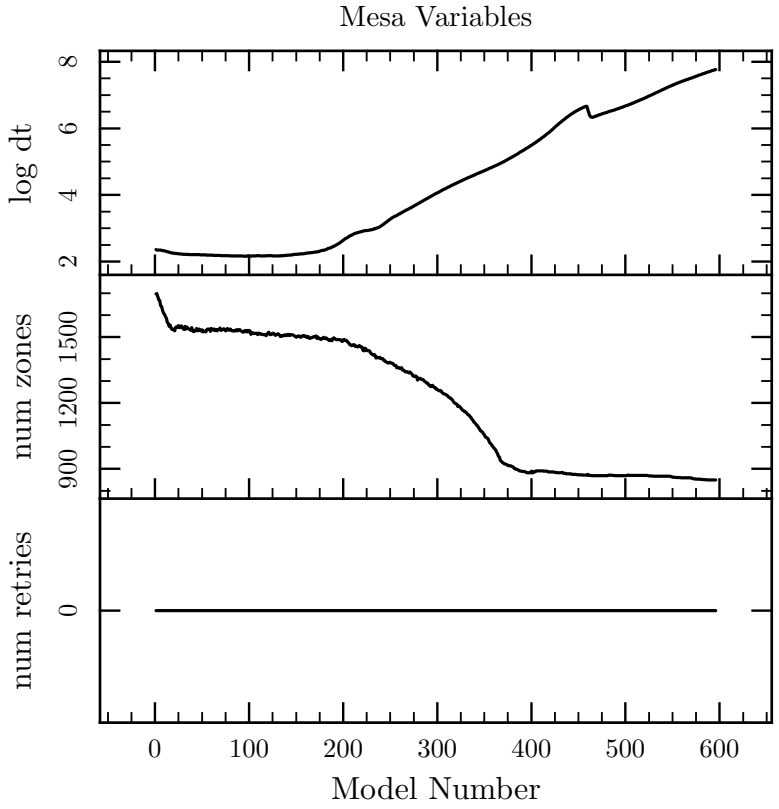

Figure 7: `MESA` variables plotted against model number show how hard `MESA` is working