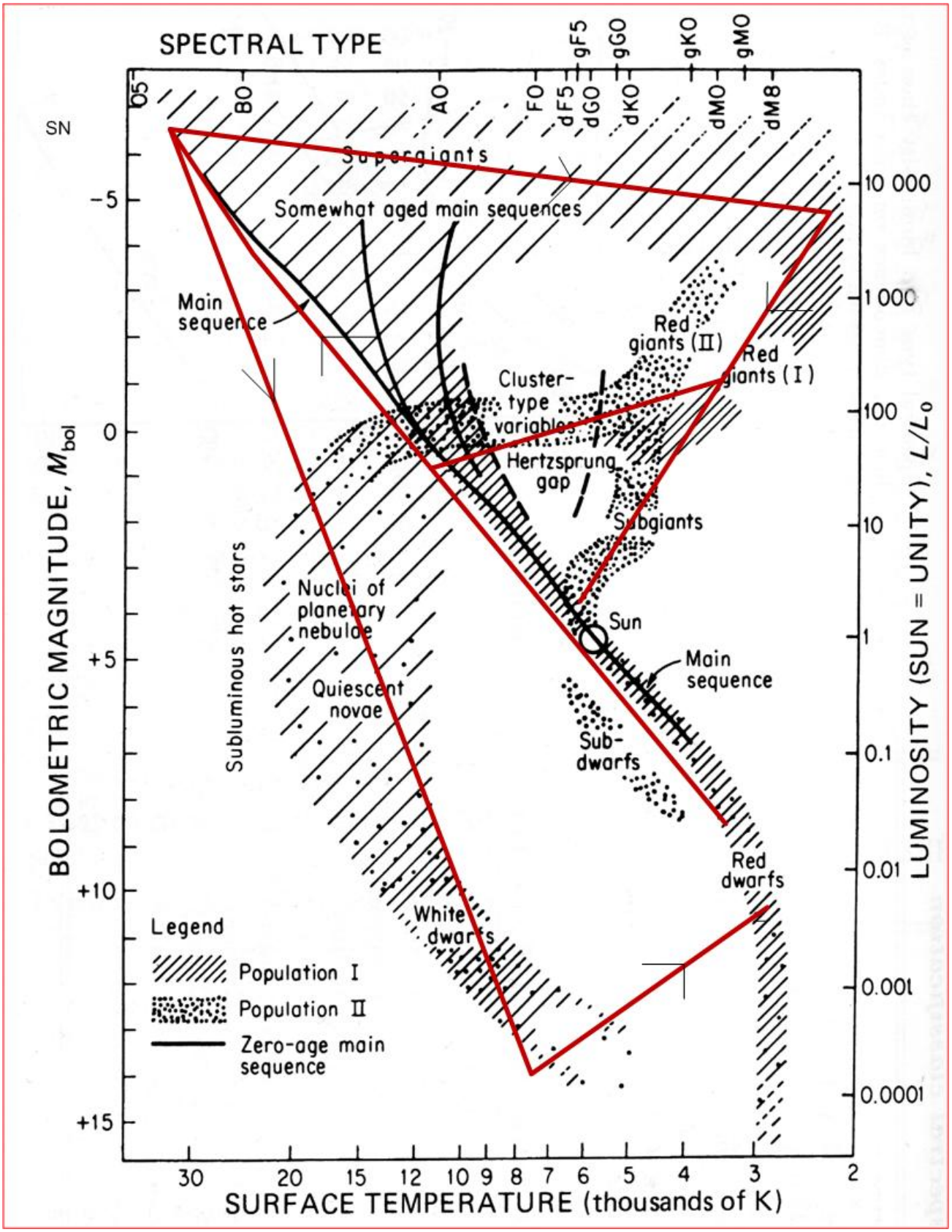

Adapted from M. Zombeck*, Handbook of Space Astronomy and Astrophysics, 3rd ed*. (Cambridge, UK: Cambridge University Press, 2007), p. 102. The red lines have been *added* to show the star paths according to the Reciprocal System.. Here, on the Main sequences, stars *accrete more mass than they lose*, and so they move UP the Main Sequence. When they reach the O5 or higher spectral class, they explode as a Supernova Type I. This results in a White dwarf-Red giant *pair* or a set of planets and a Red giant (if the explosion wasn't strong enough to create a White dwarf). Eventually, the White dwarf *expands* back to the

Main sequence, and the Red giant *contracts* back to the Main sequence, either on the *constant growth line* (higher) or the *constant mass line* (lower). (If planets were created, they expand to obtain gravitational equilibrium.) The sequence of the number of stars, at each cycle, if planets are not created, is 1, 2, 4, 8. It's probable that after the fourth cycle, the isotopic mass limit is reached, and the stars of a multiple star system explode as Supernovae Type II, creating a nebulae (whose matter is eventually absorbed into other stars) and pulsars (which usually leave the site of the explosion). The predecessor star to the Sun exploded 4.6 billion years ago, as a Supernova Type I, after being on the Main sequence for about 10 billion years. Prior to that it was a smallish dust cloud and then a smallish Red giant, then a Red dwarf, and then began to slowly move up the Main sequence. Our Sun will explode in about 5.4 billion years from now. Originally the Sun was simply a nebula, then a Red giant, then it contracted back to the Main sequence, but *lower* than where it is now; this explains the so-called "Faint-Young-Sun Paradox." Note that stars on color-magnitude diagrams given in textbooks may actually be in *different* cycles. Also, it's not too difficult to distinguish between Red dwarfs which were previously White dwarfs, and Red dwarfs which were originally Red giants; the former have much *higher density*, like Proxima Centauri, which has a density of 62 g/cm^3. Most of the stars in our local region are in the second cycle, and so many have planets (if they're not binary). Most of the stars in globular clusters are in the first cycle, and thus *young*. Novae result from eruptions of White dwarfs as their centers have higher pressure; they have an *inverse density gradient*, but by the time they reach the Main sequence, this switches back to the normal density gradient. A planetary nebula is a White dwarf with ejected incoming material (which will eventually form the Red giant). There are no Black dwarfs in the Reciprocal System, and no "heat death" for the universe. Pulsars leaving the Galactic plane emit radio waves; those that do not disappear into the cosmic sector come back down toward the Galactic plane, emitting x-rays.

last revised: 04/06/2017