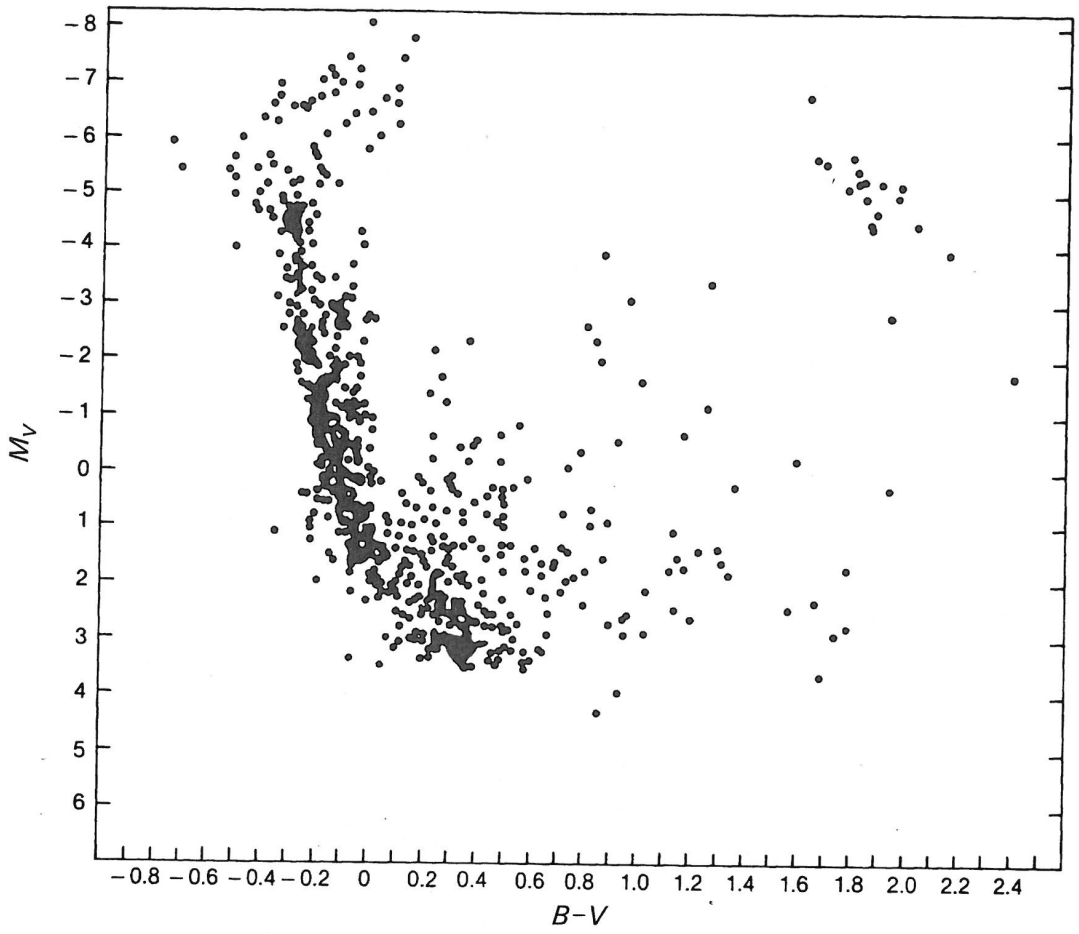

Figure 13.28 A color–magnitude diagram for the young double galactic cluster, h and χ Persei. Note that the most massive stars are pulling away from the main sequence while the low-mass stars in the middle of the diagram are still contracting onto the main sequence. Red giants are present in the upper right-hand corner of the diagram. (Figure adapted from Wildey, *Ap. J. Suppl.*, *8*, 439, 1964.)

within the cluster (the initial mass function; see Fig. 12.9), combined with the different rates of evolution during each phase. Therefore, star counts in a color–magnitude diagram can shed light on the time scales involved in stellar evolution.

As the theoretical cluster "ages," beginning with the initial collapse of the molecular cloud, the most massive and least abundant stars will arrive on the main sequence first, evolving rapidly. Before the lowest-mass stars have even reached the main sequence, the most massive ones have already evolved into the red giant region, perhaps even undergoing supernova explosions. These disparate rates of evolution can be seen by comparing Figs. 12.8 and 13.1 for pre-main-sequence and post-main-sequence evolution, respectively, together with their associated tables.