of the CCD: instant gratification. If we don't like the image we can delete it and try again very quickly. An even greater advantage is sensitivity, technically referred to as "quantum efficiency". The fastest photographic films have quantum efficiencies of about 1%, meaning that 99 of every 100 photons of light that strike the film are not recorded/detected! On the other hand, the best CCDs, have efficiencies exceeding 90%.

Your experiments will involve measuring the magnitudes ("brightnesses") of the stars in a clusters, both artificial (Figure 8.1) and real (Figure 8.2). This is an illustration of photometry (literally meaning "measuring light"), an application for which the CCD is especially well adapted and widely used by present-day astronomers. Much of what we know about stellar evolution and the lifetimes of stars is derived from photometry of star clusters, which are compact groups of stars born at nearly the same time in a small volume of space.

A second part of the experiment illustrates astrometry, the measuring of positions. Until modern times astronomy consisted largely of astrometry, recording the positions and movements of stars and planets. For example, this is important for measuring the orbits of these celestial bodies, which then enables the calculation of other fundamental quantities, such as masses. The CCD also provides an accurate way to measure the relative positions of stars in a cluster.

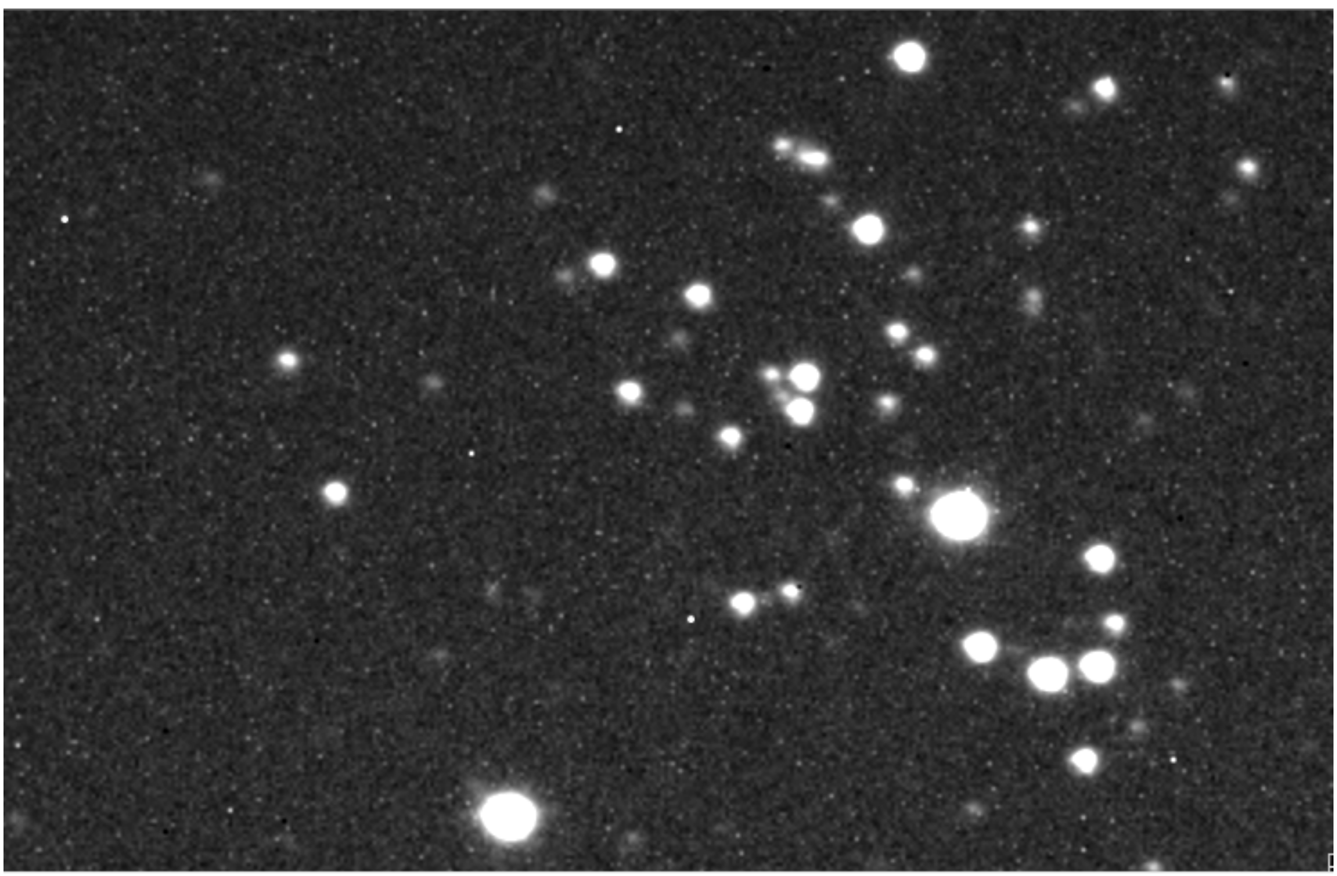

Figure 8.2: This is an optical image of the H-Cluster that we'll be using for our analysis.