STELLAR EVOLUTION AS EVIDENCED BY MEMBERS OF OPEN CLUSTERS NEAR THE TURN-OFF FROM THE MAIN SEQUENCE

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In many ways, this paper can be thought of as an introduction to that of Nissen's, and others, which contain high quality, new data for open clusters, particularly for work that includes observations of stars near the turn-off from the main sequence.

The comparison of observed data for stars in open galactic clusters with the predictions of theoretical models has always been one of the most fruitful methods and constraints in developing our understanding of stellar evolution. In most cases, the stars in the clusters have the same age, same chemical composition, and other properties, while differing in stellar mass, and hence in surface temperature and in the relative state of evolution on and away from the main sequence.

In most cases in the past, the comparisons have been made on the basis of (mostly) smoothed sequences drawn onto the diagrams of observed parameters such as magnitude and color. The general fit, main sequence turn-off location, gaps, etc. have all been useful in fits. Recently, improved observational accuracy and the quantity of photometric and other data allow a detailed comparison for individual stars. While problems remain (adequate corrections for or elimination of the effects of variable reddening, nonmembership, etc.), potentially we can learn much from the effort to fit all member stars, whatever their location on such diagrams, into the existing theories.

Analysis of data for stars on the main sequence, and those not so far above the turn-off, offers considerable advantages relative to brighter, more evolved stars. There are less problems due to evolutionary changes on stellar structure. Problems still do exist, of course: the question of membership, binaries, and the fact that the stars are fainter and observational error generally larger.

Due largely to new techniques, the potential for new and better data is great, and the future looks very exciting - it's the age that Schatzmann called "High Precision Astrophysics" earlier in this meeting. New telescopes and new instruments, wider wavelength coverage,

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from the X-ray through the UV to the near and far infrared. We are getting more photons, better detectors, multiplexing, and improved data handling and reductions particularly. We will be working fainter, on more objects, and with better accuracy.

Now we even hear of 4 and 5-m telescopes being called "small", or back-up, instruments. Meanwhile, due to improved detectors and the technology, our existing small (1-m class or so) telescopes are becoming "large" telescopes. It's a new world, and should greatly improve our understanding of Stellar Evolution.