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General Discussion III: Chemistry and Self–Pollution Mechanisms

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Abstract.
Round table 3 was devoted to the origin of chemical anomalies found in a significant fraction of stars in GCs, but not in field metal-poor stars of similar metallicity. Formerly a hot topic was if such anomalies, studied only in giant stars, bright enough to allow reliable abundance determinations, were generated in the course of the evolution of the star, or inherited at the birth of the star. The ESO Large Program led by R. Gratton has demonstrated, without ambiguity, that the most famous of these "anomalies", the O-Na anticorrelation, was already present in turn-off (TO) stars, therefore already there at the birth of the star.
This does not preclude that some modifications occur along the red giant branch, as described for example already in Charbonnel (1994), but those are well identified and do not include the O-Na anticorrelation, but affect mostly ^{12}C,^{13}C, ^{14}N and Li.* More recently, models including rotation in the evolution (see for example talks by Charbonnel and Weiss at JD 4) have been produced. The most promising process for explaining the O-Na anticorrelation is the hot-bottom-burning process (HBB) in TP-AGBs, Ventura et al. (2001). The problem remaining is the transfer of the processed matter to an unevolved star. Here, several routes exist, and so far no consensus has been reached on those which are dominant.
Roundtable 3 was expected to supply a live discussion between the proponents of the various ideas emitted on this subject. Unfortunately, in the time allotted, the only thing which appeared possible was to suggest tests for evaluating the coherence of the various proposals, against the widest set of observational constraints. For example, the HBB produces an enrichment in helium, potentially affecting the isochrones. Very accurate observations could try to detect this side-effect. Transfer of mass from an AGB to an unevolved companion is an efficient way of pollution. But it is then expected that the remaining binary shows a variable radial velocity (unless the pair has been disrupted afterwards...). At the other extreme, the mass loss of AGBs may have been large enough to have produced a second generation in a GC (see F. D'Antona contribution). But let us leave their role to our participants...

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References

Charbonnel, C. 1994, A&A , 282, 811
Ventura, et al., 2001, ApJ, 550, L65

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