JOURNAL CLUB

John Cowan
University of Oklahoma, Norman, Oklahoma, USA

An astronomer invites you to contemplate the history of some of the oldest stars in the Universe.

Much of my work is an attempt to determine what kinds of stars formed and what types of element synthesis occurred when our Galaxy was very young. This means that I am particularly interested in a class of stars referred to as 'carbon-enhanced metal-poor'.

The composition of a star reflects the properties of the interstellar medium at the time it formed, which evolves as generations of stars come and go. Metal-poor stars were born early in the history of our Galaxy, before dying stars enriched the interstellar medium with heavy elements. The fact that some of these metal-poor stars are carbon-enhanced provides insight into the types of stars that came before them.

Recently, one group reported that around 20% of metal-poor stars are carbon-enhanced (S. Lucatello *et al. Astrophys. J.* **652,** L37–L40; 2006). A previous study had produced a lower figure (J. Cohen *et al. Astrophys. J.* **633,** L109–L112; 2005), prompting a battle between the competing groups. But both papers agree that more metal-poor stars are carbon-enhanced than are younger, high-metallicity stars.

To me, this is one of the most interesting and compelling results to come from the study of such stars. Massive stars — with at least 10 times the mass of the Sun — produce carbon most efficiently, so this gives us a clear indication that massive stars, although very rare today, were much more common early in the history of the Universe.

The differences between the studies' numbers may lie in how the authors define a carbon-enhanced star, or could be a matter of statistics. I look forward to future papers that address these issues — and perhaps continuing controversy.