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From the Editors

O Time and Change!*

The ages of meteorite craters and meteorites, laboratory chondrule experiments and dike systems in the Sudbury structure dominate the articles in the 1993 June issue of *Meteoritics*. One of the crater articles, Koeberl *et al.*'s extensive work on the age of the Roter Kamm crater in Namibia, is discussed in Richard Grieve's editorial below. The other crater paper is by Wichman and Schultz who discuss the dikes around the Sudbury structure and compare them with those associated with the Haldane and Schrödinger structures on the Moon. In this ingenious way, they estimate sizes for the original Sudbury structure. Their work is represented on the cover of the present issue, which also serves to stress again *Meteoritics'* interest in publishing papers on lunar science.

Both our dating papers primarily concern terrestrial age, a topic which takes on new significance in the context of concentration mechanisms—in the Antarctic and in other locations—and the possibility that there is secular variation in the nature of the extraterrestrial material coming to Earth. This latter idea is one that will not die. It was originally discussed in the first half of the 19th century by some of our most illustrious forebears, and it is with us still. The major argument against such highly focussed fluxes of material concerns the randomizing effects of orbital interactions acting over the lifetimes of these objects, but occasional heterogeneities apparently do exist as evidence of some of the more recent fragmentation events. In the present issue Jull *et al.* use Accelerator Mass Spectrometry to determine ^{14}C activities in US meteorites including most of those included in Boeckl's pioneering beta-counting measurements of 1972. A typical lifetime of meteorites in this region of earth is much larger than previously thought, 10–15 ka instead of 3.5 ka. This is not the only change brought about by the new ^{14}C data. Another is that the natural thermoluminescence (TL) *vs.* ^{14}C age correlation of Sears and Durrani (1980) now appears much stronger, as shown by Benoit *et al.* in this issue.

The main thrust of the Benoit paper is that the meteorite TL theory, produced over a decade ago by McKeever (1980), seems to work very well in explaining how natural TL levels decay at a variety of terrestrial environments; they considered Antarctica, the Prairie States of the US and the Saharan Desert regions. The traditional difficulty for the application of natural TL to terrestrial age determination was that decay rates were not known, but this is no longer a problem. Apparently, one needs only a decent meteorological map and McKeever's theoretical curves.

Chondrules remain one of the greatest enigmas in meteorite studies and one of the most powerful weapons in the arsenal are the laboratory simulation experiments. In this issue, Jones and Lofgren compare silicate charges which have been cooled 2–100 °C/Ma and some which have subsequently been annealed at 1000–1200 °C with one of the major chondrule types in ordinary chondrites. The olivine zoning suggests that the experimental cooling rates are in the same range as for natural chondrules, but the lack of low-Ca pyroxene in the natural chondrules implies a prolonged low-temperature annealing episode for the natural materials. Another major issue in chondrite studies is whether the heating suffered by most chondrites occurred during their initial formation or subsequently; the Jones-Lofgren results seem to indicate the latter.

With the spectacular pictures of Gaspra from Galileo, with the radar images of Toutatis and Castalia, and with the current (albeit sometimes controversial) interest in near-Earth asteroids, asteroid studies remain close to the center of attention. This issue's Invited Review presents arguably the most thorough summary of current knowledge of asteroid composition and underscores a major quandary of modern inner solar system research; while about half the main-belt asteroids are C chondrite-like in composition and half are igneous, these types of material are rare among the meteorites falling to Earth. Conversely, asteroids with the compositions of the major meteorite classes reaching Earth (the ordinary chondrites) are rare among the asteroids. After more than two decades of grappling with this, the quandary is more, not less, Gaffey *et al.* argue. More and more it seems that most of the material is coming to Earth from a very limited number of parent objects. In fact even the major igneous meteorite class (the basaltic achondrites) may ultimately be sampling a single asteroid, as Binzel and Xu (1993) argue in a recent issue of Science.

The Notes in *Meteoritics*—narrowly focussed papers on specific topics—range from a report of two rare minerals in ordinary chondrites, a newly fallen regolith breccia, a new interpretation for the structure of meteoritic carbynes, three new descriptions of H chondrites from Saudi Arabia, and some thoughts on the coincidence that 13 out of 26 basaltic meteorites fell during a recent, 15-year interval of time.

Finally, a few organizational comments are in order. This is the first issue of *Meteoritics* to be entirely set in the editorial office. This single change allows us to increase the size of our journal by almost 35% to meet the increasing submission rate. All the authors and associate editors are to be thanked for their patience and cooperation as we grappled with the new procedures. Secondly, Council voted at its 1993 March meeting to publish *Meteoritics* six times a year starting in 1994. This is, of course, a fine tribute to all the authors, reviewers and associate editors whose hard work is making *Meteoritics* such an exciting journal to be editing at the present time.

Derek W. G. Sears
Editor

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* John Greenleaf Whittier, in his 1866 poem "Snow-Bound".