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THE END-TRIASSIC MASS EXTINCTION EVENT; A. Hallam, Department of Geological Sciences, University of Birmingham, Birmingham B15 2TT, UK.

The end-Triassic is the least studied of the five major episodes of mass extinction recognised in the Phanerozoic, and the Triassic-Jurassic boundary is not precisely defined in most parts of the world, with a paucity of good marine sections and an insufficiency of biostratigraphically valuable fossils; furthermore the record of magnetic reversals across the boundary is poorly known. Despite these limitations it is clear that there was a significant episode of mass extinction, affecting many groups, in the late Norian - the youngest Triassic stage - and the existing facts are consistent with it having taken place at the very end of the period. The best record globally comes from marine strata. There was an almost complete turnover of ammonites across the T-J boundary, with perhaps no more than one genus surviving (1). About half the bivalve genera and most of the species went extinct (2), as did many archaeogastropods, notably taxa that had been of major importance in the Paleozoic. Many 'Paleozoic-dominant' brachiopods also disappeared, as did the last of the conodonts. There was a major collapse and disappearance of the Alpine calcareous sponge - scleractinian coral reef community, with the sponges being especially severely affected (3). Among terrestrial biota, a significant extinction event involving tetrapods has been recognised (4). While the plant turnover was less marked the North Atlantic region experienced a major change from a Lepidopteris to a Thaumatopteris flora at or very close to the T-J boundary, with few species in common (5).

With regard to possible environmental events that may be postulated to account for the extinctions, there is no evidence of any significant global change of climate at this time, though the paucity of relevant data means that such a possibility cannot be rigorously discounted. The existence of the large Manicouagan crater in Quebec, dated as about late or end-Triassic, has led to the suggestion that an impact event might be implicated (4), but so far despite intensive search no unequivocal iridium anomaly or shocked quartz has been discovered in key sections. On the other hand there is strong evidence for significant marine regression in many parts of the world and, in Europe at least, an extensive spread of marine anoxic bottom water at the beginning of the Jurassic (2). It is proposed therefore that the likeliest cause of the marine extinctions is severe reduction in habitat area caused either by regression of epicontinental seas, subsequent widespread anoxia during the succeeding transgression, or a combination of the two. Extinctions among the terrestrial biota are more difficult to account for, though they may relate to a climatic by-product of sea-level change, such as increased seasonal variation of temperature at the time of maximum regression. The extent and rapidity of the sea-level changes remains uncertain, as does the underlying cause, but it may be significant that the Triassic-Jurassic transition is marked by substantial volcanicity both on the North Atlantic margins and in southern Africa, suggesting possible mantle control.

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