

The Tree Hollow Fauna of Joggins: Ockham's Razor Fells the Pitfall Theory¹

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In their discovery paper of tetrapods found within the upright trees at Joggins, Nova Scotia, Lyell and Dawson enunciated three possible explanations for their entombment: the tetrapods may have been washed in after death, entered via some 'crevice' in the trunk, or fallen into partially buried, hollow trunks. The latter scenario, the 'pitfall theory', was favoured by Dawson and has been portrayed widely in texts on the history of life. Nominally eleven tetrapod taxa are present, representing three amphibian or reptiliomorph orders and earliest known amniotes, comprising the richest fossil record of terrestrial tetrapods from the Carboniferous. These co-occur with detritivorous invertebrates (pulmonate gastropods and millipedes), and putative insects. Scenarios that potentially explain the occurrence of the tetrapods include: accidental entry, including pitfall and being washed in; temporary, opportunistic use (including by predator); and denning. These have been weighed against salient aspects of their taphonomy, including among others their entry prior to substantial infilling, disarticulated skeletons, and their ubiquitous association with charcoal. Insight into the role of wildfire is provided by the recent discovery of an *in situ* tetrapod-bearing lycopsid with a notched, charred base consistent with a fire scar. Such fire scars provide an important entry for modern tree hollow fauna. Of the scenarios scrutinized, the most parsimonious is that the tetrapods utilized the lycopsid hollows as dens; compelling analogues are found in the tree hollow fauna of modern forest biomes. The seasonal climate and temporal shifts to seasonal drylands may have exerted ecological pressure on the Joggins fauna to avail themselves of tree hollows, and quixotically may also have provided the solution via fire scars. Rather than hapless victims of their environment, the tetrapod fauna at Joggins record the earliest hollow tree guild, adapted to the lycopsid trees and prevailing ecological pressures of the 'Coal Age' landscape.

¹In North American Paleontology Convention, Halifax, Nova Scotia, Programme and Abstracts. *Paleobios*, Museum of Paleontology, University of California, Berkeley, v. 25, p. 28.

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