

**The Carboniferous Joggins section reconsidered:
recent paleoecological and sedimentological research**

J.H. Calder¹, M.R. Gibling², A.C. Scott³ and D.M. Skilliter⁴

¹*Nova Scotia Department of Natural Resources, P.O. Box 698, Halifax, Nova Scotia B3J 2T9, Canada*

²*Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3H 3J5, Canada*

³*Department of Geology, Royal Holloway, University of London, Egham, Surrey TW20 OEX, United Kingdom*

⁴*Department of Geology and Geophysics, Boston College, Chestnut Hill, Massachusetts 01267, U.S.A.*

The Upper Carboniferous section exposed on the Joggins shore is one of the world's classic terrestrial coal-bearing sequences, yet the details of its depositional setting and paleoenvironment have long remained elusive. Recent research into the paleoecology of the fossil forests reveals that the lepidodendrid forests grew as incipient or established mires on interdistributary plains. These fossil forests are renowned for the invertebrate and especially tetrapod fauna that occur within the lepidodendrid trees, found in the mid nineteenth century by Sir William Dawson and Sir Charles Lyell. Examination of these specimens, now in the collections of the British Museum, London and Redpath Museum, Montreal, shows a ubiquitous association with fossil charcoal. Fire scars, reported here for the first time from the

fossil record, provided tetrapods with access to the interior of the trees. The occurrence of the reptiles and amphibians within the basal trunks of fire scarred trees predated infilling of the trunks. These observations, combined with the requirements of amphibian and early amniotic eggs and the analogue of a modern hollow tree guild, strongly suggest that the animals preferred the trees as dens rather than falling victim to pitfalls as long supposed. The lycopsid trees were entombed and if not earlier killed by fire, were smothered by swiftly deposited sand and mud deposits when distributary channels flooded. Disturbance adapted calamites persisted, however, assisted by adventitious growth. Prohibitive conditions for lycopsids and calamites alike are recorded by sharp-based sandstone bodies and planar laminated mudrocks

deposited in deeper water. Current graduate thesis research by DMS suggests that strata associated with persistent, basin-wide fossiliferous limestones may reflect rare but widespread transgressive signatures within the basin fill. The paleoecology of the associated fauna, which includes ag-

glutinated foraminifera, spirorbids, limulids and cartilaginous ray-like fishes and sharks, indeed may have been more akin in the Carboniferous to their "normal" fossil record of estuarine and marine affinity than previously thought.