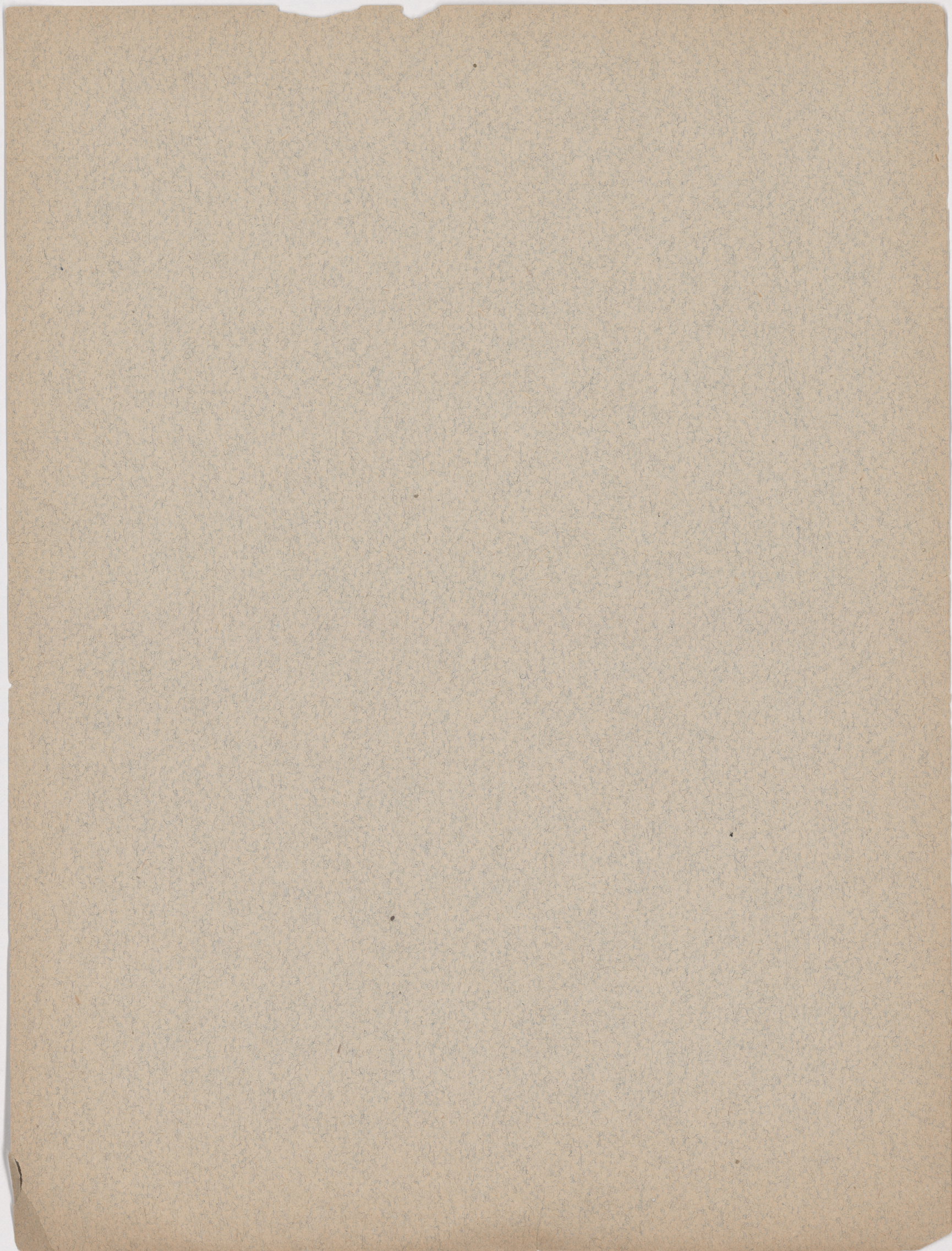


Mode of Occurrence of Remains of Land Animals  
in Erect Trees at Jeffers, N. S.

J. W. Dawson



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VEGETABLE PALMS

## ABSTRACT.

*On the Mode of Occurrence of Remains of Land Animals in Erect Trees at the South Joggins, Nova Scotia.*

By SIR J. WILLIAM DAWSON, LL.D., F.R.S., etc.

(Read May 29, 1891.)

The remarkable section of coal-formation rocks at the South Joggins, in Cumberland County, has long been known as one of the most instructive in the world; exhibiting as it does a thickness of 5,000 feet of strata of the coal-formation in a cliff of considerable height, kept clean by the tides and waves, and in the reefs extending from this to the shore, which at low tide expose the beds very perfectly. It was first described in detail by the late Sir W. E. Logan,<sup>1</sup> and afterwards the middle portion of it was still more detailed by the author, more especially in connection with the fossil remains characteristic of the several beds and the vegetable constituents and accompaniments of the numerous seams of coal.<sup>2</sup> It was on occasion of a visit of the author in company with Sir Charles Lyell, and in the pursuit of these investigations, that one of the most remarkable features of the section was disclosed in 1851. This is the occurrence, in the trunks of certain trees imbedded in an erect position in the sandstones of Coal-mine Point, of remains of small reptiles, which, with one exception, a specimen from the Pictou coal-field, were the first ever discovered in the carboniferous rocks of the American continent, and are still the most perfect examples known of a most interesting family of coal-formation animals, intermediate in some respects between reptiles proper and batrachians, and known as Microsauria. With these were found the first known carboniferous land snails and millipedes. Very complete collections of these remains have been placed by the author with his other specimens in the Peter Redpath Museum, and the object of the present paper was to take advantage of the meeting of the Royal Society in Montreal, in order to exhibit these specimens and to illustrate the precise mode of their occurrence and entombment.

A forest or grove of the large ribbed trees known as Sigillariæ, was either submerged by subsidence, or, growing on low ground, was invaded with the muddy waters of an inundation, or successive inundations, so that the trunks were buried to the depth of several feet. The projecting tops having been removed by subaerial decay, the buried stumps became hollow, while their hard outer bark remained intact. They thus became hollow cylinders in a vertical position and open at top. The surface having then become dry land, covered with vegetation, was haunted by small quadrupeds and other land animals, which from time to time fell into the open holes, in some cases nine feet deep,

<sup>1</sup> 'Report Geol. Survey of Canada,' 1844.

<sup>2</sup> 'Journal London Geological Society,' vol. X, pp. 1, et seq., 1853, "Acadian Geology," pp. 156, et seq.

and could not extricate themselves. On their death, and the decomposition of their soft parts, their bones and other hard portions remained in the bottom of the tree intermixed with any vegetable debris or soil washed in by rain, and which formed thin layers separating successive animal deposits from each other. Finally, the area was again submerged or overflowed by water, bearing sand and mud. The hollow trees were filled to the top and their animal contents thus sealed up. At length the material filling the trees was by pressure and the access of cementing matter hardened into stone, not infrequently harder than that of the containing beds, and the whole being tilted to an angle of  $20^{\circ}$ , and elevated into land exposed to the action of the tides and waves, these singular coffins present themselves as stony cylinders projecting from the cliff or reef, and can be extracted and their contents studied.

The singular combination of accidents above detailed was, of course, of very rare occurrence, and in point of fact we know only one set of beds at the South Joggins in which such remains so preserved occur; nor is there, so far as I am aware, any other known instance elsewhere. Even in the beds in question only a portion of the trees, about fifteen out of thirty, have afforded animal remains. We have, however, thus been enabled to obtain specimens of a number of species which would probably otherwise have been unknown, being less likely than others to be preserved in properly aqueous deposits. Such discoveries on the one hand impress us with the imperfection of the geological record; on the other, they show us the singular provisions which have been made in the course of geological time for preserving the relics of the ancient world, and which await the industry and skill of collectors to disclose their hidden treasures.

There is evidence in coprolitic matter on some of the surfaces within the trunks, and also in certain trails on these surfaces, that some of the imprisoned animals lived for a time in their subterranean prisons; that they crept around their walls in search of a way of escape, and that the larger animals fed on smaller species entrapped along with them.

Specimens and photographs were exhibited of two species of *Dendroperon*, belonging to the group of Labyrinthodontia, and of species of *Hylonomus*, *Hylroperon*, *Smilroperon*, *Fritschia*, etc., belonging to the group of Microsauria; also two species of *Pupa*, remains of several species of Millipedes and fragments referred to Scorpions.<sup>1</sup> For detailed descriptions of the animals reference was made to the author's "Acadian Geology" and "Airbreathers of the Coal Period," and to his memoir in the 'Transactions of the Royal Society of London,' 1882, and to recent papers in the 'London Geological Magazine,' 1891.

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<sup>1</sup> These specimens are now in the collections of Sir W. Dawson, deposited in the Peter Redpath Museum.