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# The Triassic red beds of the Moray Firth Basin, north-east Scotland

## Introduction

The relative ages of the stratigraphical units of the Permo-Triassic of Morayshire (Figure 2.2) have long been debated. Initially, all the buff-coloured sandstones were regarded as part of the Old Red Sandstone, and probably Late Devonian in age. Finds of reptile bones and footprints raised some doubts, and the issue was hotly debated in the mid-19th century. By the 1890s, most workers accepted a Permo-Triassic age (see also Chapter 2).

A rich reptile fauna was found in quarries around Elgin and Lossiemouth, in what is now known as the 'Lossiemouth Sandstone Formation'. These have long been regarded as Late Triassic in age, but there has been some debate about their exact age. They were first compared with faunas from the Keuper of Germany, especially those of the Stubensandstein, and that suggested an early to mid Norian age (Walker, 1961; Warrington *et al.*, 1980; Benton and Walker, 1985). However, wider comparisons suggest that they are more clearly equivalent to faunas from the upper part of the Maleri Formation in India, the upper part of the Santa Maria Formation of Brazil, and from the Ischigualasto Formation of Argentina, with which they share the rhynchosaur genus *Hyperodapedon*. The Ischigualasto Formation is dated radiometrically as younger than 228 Ma, from an ash band at its base, and hence is mid to late Carnian in age. The aetosaur *Stagonolepis* may be shared with the Lower Petrified Forest Member of Arizona, which is dated biostratigraphically as late Carnian (Tuvanian Substage). This is equivalent to the Adamanian land vertebrate faunachron (Lucas and Hunt, 1993) and the *Rutiodon* Assemblage Zone (Lucas, 1998).

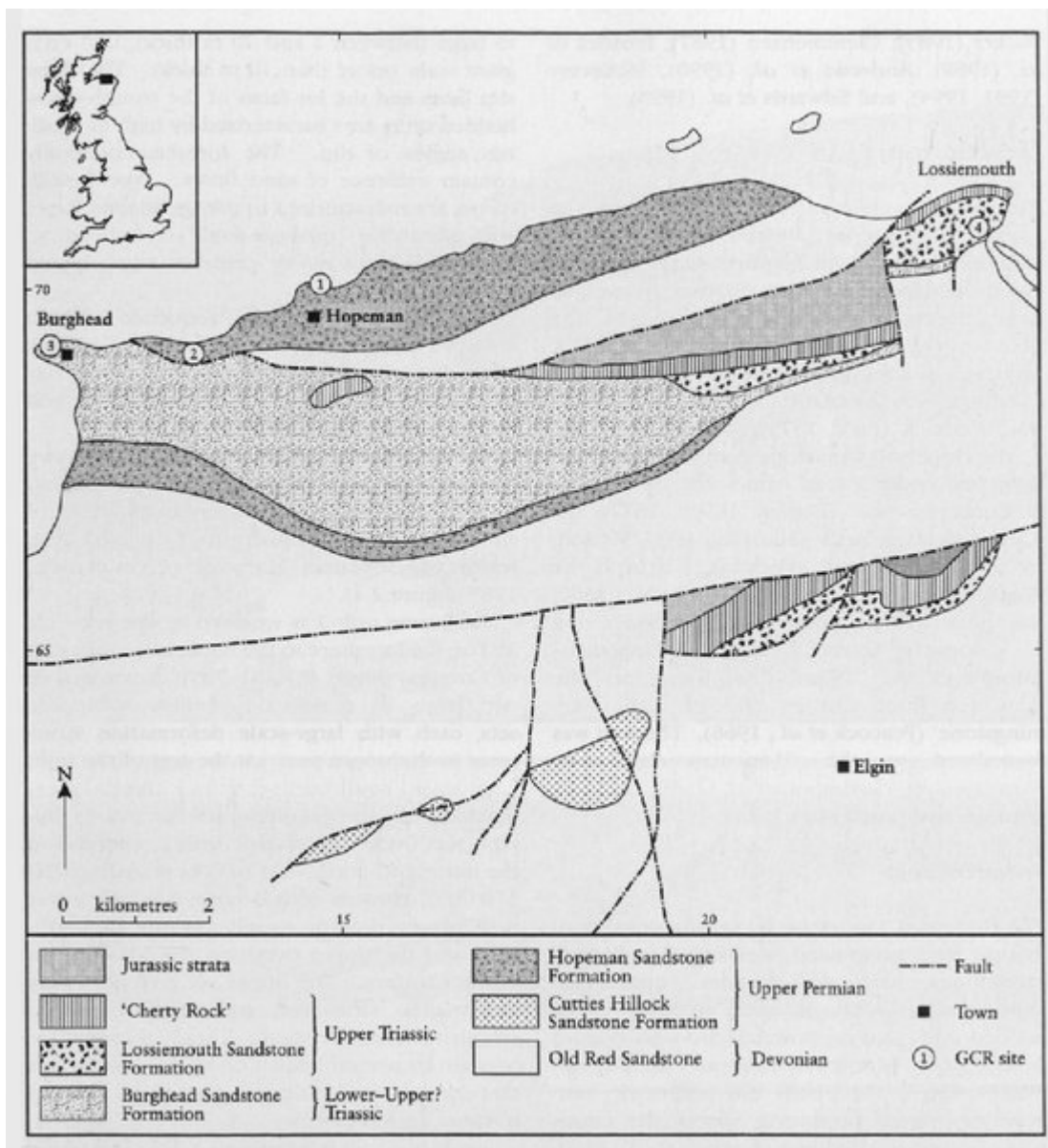
The geology of the Triassic succession of the Moray Firth Basin has been described by many authors, for example Duff (1842), Mackie (1897, 1902a,b), Watson and Hickling (1914), Weston (1948), Peacock *et al.* (1968), Williams (1973), Peacock (1977), Benton and Walker (1985), and Gillen (1987). The Permo-Triassic of Morayshire is, in addition, merely a small onshore expression of a major basin beneath the Moray Firth (Frostick *et al.*, 1988; Andrews *et al.*, 1990).

Two GCR sites have been selected to illustrate the Triassic rocks of the Moray Firth Basin: Burghead and Lossiemouth, type locations for the Burghead Sandstone Formation and for the Lossiemouth Sandstone Formation respectively.

[Burghead, Morayshire](#)

[Lossiemouth shore and quarries, Morayshire](#)

[References](#)



(Figure 2.2) The distribution of Permo-Triassic sediments around Elgin, Morayshire. GCR sites are: (1) Clashach-Covesea (Permian); (2) Masonshaugh Quarries (Permian); (3) Burghead (Triassic); (4) Lossiemouth (Triassic). Based on Peacock et al. (1968) and Benton and Walker (1985).