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# Kildonnan and Eilean Thuilm, Eigg

([NM 495 870], [NM 483 913])

## Highlights

Kildonnan and Eilean Thuilm, Eigg are the site of Hugh Miller's Bone Bed, a famous and extraordinary occurrence in the Middle Jurassic of the Hebrides (Figure 6.3). Reptile bones were first found here in 1844 and 1845 and since then, bones of marine turtles, crocodiles and plesiosaurs have been found. This is unusual, as most other British Bathonian sites represent fully terrestrial situations.

## Introduction

Hugh Miller first found reptile bones in the Great Estuarine Group on the northern and eastern coasts of the island of Eigg in 1844 and 1845. The bone bed, now known as Hugh Miller's Reptile Bed, was relocated early this century by the Geological Survey fossil collector Tait (Barrow, 1908) and again in the 1950s, and several small collections of bones have been made since then. The bone-bearing horizons may be seen *in situ* at Kildonnan, while only isolated blocks containing bones have been found on the reworked raised beach opposite the small island Eilean Thuilm.

Hudson (1966) described the location, exposure and sedimentology of the Reptile Bed in great detail. The locality on the north coast, opposite Eilean Thuilm, is readily accessible from the settlement of Cleadale on the western side of the island, by crossing a shoulder of the main raised plateau between Guala Mhor and Leit an Aonaich. The eastern site is now reached in a rather different way from that described by Hudson (1966): it is best to descend the cliff further north from Kildonnan, at the field boundary near [NM 492 858] named Bealach Clith, where a well-marked path leads diagonally down the cliff northwards. The dolerite sill and the shelter rocks are still to be seen, as Hudson (1966) describes.

Hugh Miller visited Eigg in the Free Church yacht *Betsey* in 1844 and 1845. In 1844 he found reptile bones in loose blocks opposite the island of Eilean Thuilm at the northern tip of the island; he called this locality Ru-Stoir, a name which does not occur on any map. In 1845 he found the bed *in situ* on the eastern coast of the island about midway between the headland Rudha nan Tri Clach and the settlement of Kildonnan. Miller described the locality in his book *The Cruise of the Betsey* (1858). Miller's collections went to the Royal Scottish Museum, Edinburgh, where they remained unrecognized for nearly a century.

The Reptile Bed was referred to the Lower Shales of the Great Estuarine Series by Barrow (1908), who listed some of the fossils. Hudson (1962) established that the Great Estuarine Group was Late Bajocian and Bathonian in age and that the 'Lower Shales' were equivalent to the *Estheria* Shales of Skye. He designated the outcrop north of Kildonnan, which includes the Reptile Bed, the type locality of the *Mytilus* Shales, a lower subdivision of the Lower Bathonian *Estheria* Shales.

Hudson (1966) rediscovered the precise locations of the Reptile Bed and collected some reptile bones. Barney Newman also made collections in 1961 (Newman, *in* Persson, 1963), but these have never been described. Further collections were made by D.S. Brown (The University, Newcastle upon Tyne) in 1974–7, and these may be described in the future (D.S. Brown, pers. comm., 1993).

## Description

Harris and Hudson (1980) revised the stratigraphy of the Great Estuarine Group of the Inner Hebrides, and named the unit with the Reptile Bed the Kildonnan Member of the Lealt Shale Formation. The new name, Kildonnan Member, is directly equivalent to the older term *Mytilus* Shales. It falls in the lower portion of the Great Estuarine Group, near the base of the Bathonian (Hudson, *in* Cope *et al.*, 1980b). Hudson (1966) and Harris and Hudson (1980, p. 239; fig. 6, p.

237) identify the occurrence of two bone beds, the lower horizon being Hugh Miller's Bone Bed ('Reptile Bed') and the upper, occurring 12.5 m above, containing the remains of fish only ('Fish Bed').

The section of the Kildonnán Member exposed in patches on the wave-swept bench and beach is based on Hudson (1966), Harris and Hudson (1980, p. 237) and J.D. Hudson (pers. comm., 1993):

	Thickness (m)
9. Algal Bed	0.40
8. Limestones with <i>Placunopsis</i>	c. 2.00
7. <i>Unio</i> Bed	0.22
6. Shales with <i>Neomiodon</i> , etc.; includes Bivalve-Septarian Bed and Fish Bed	1.80
5. Shales with <i>Praemytilus</i>	c. 12.00
4. Complex Bed (sandstone with abundant phosphatic debris)	1.00
3. Shales with small <i>Praemytilus</i>	2.50
2. Reptile Bed, limestone	0.15
1. Shales with fish scales and <i>Praemytilus</i> (base not exposed)	3.00
Total	c. 23.07

The Reptile Bed is a very hard, dark grey, shelly sideritic limestone, only a few centimetres thick, which weathers to a deep red on the surface. It contains shells (abundant gastropods and rarer bivalves), as well as black, phosphatic fish scales, teeth and fin spines and black reptile bones. Some layers contain *Unio* shells which often have a nacreous appearance. The fish remains are noted as scales of *Lepidotus?* and teeth of *Hybodus*, *Acrodus* and *?Saurichthys apicalis* Agassiz (Miller, 1858; Barrow, 1908). Patterson (*in* Hudson, 1966, p. 275) confirmed one or two species of *Hybodus* from Newman's more recent collections. Some of Newman's non-plesiosaurian specimens appear to have come from a greenish marl, which is clearly not the Reptile Bed, but may be from a neighbouring horizon (D.S. Brown, pers. comm., 1993).

## Fauna

The reptiles from Hugh Miller's Reptile Bed have never been described fully or figured, but various details may be gleaned from the literature and other sources. Miller (1858) recorded crocodylian ribs and many plesiosaur bones from the northern locality and plesiosaur bones from the eastern locality. Barrow (1908) listed a ?crocodylian tooth, a ?dinosaur vertebra and other reptilian remains from the northern shore, and a pterosaur bone, reptilian vertebra and other bones from the eastern shore.

Newman (*in* Persson, 1963, p. 22; *in* Hudson, 1966, p. 275) noted turtles, crocodylians, turtles and plesiosaurs in his collections, a fauna confirmed by D.S. Brown (pers. comm., 1993), but Brown stresses that the Reptile Bed itself apparently yields only plesiosaur remains and fish remains. The plesiosaur material includes skull elements, vertebrae, ribs, pelvic and limb elements. None of these remains was found associated, although Martin (1985a) noted an articulated plesiosaur specimen from Eigg (noted as 'Mull' in his account). Newman considers that two kinds of plesiosaurs are present. The reptile collections are located as follows: Miller Collection (NMS); Newman Collection (BMNH R8159–61, and unnumb.); Brown Collection, Newcastle upon Tyne, Dental School (temporary). Brown (pers. comm., 1983), lists the known reptile remains as:

1. ?crocodylian elements (Newman Coll.; Brown Coll.);
2. ?turtle bones (Newman Coll.; Brown Coll.);
3. plesiosaur: vertebrae, ribs, limb and girdle elements, several teeth and disarticulated skull bones of an elasmosaur, a long-necked form, rather like the Late Jurassic *Muraenosaurus*.

## Interpretation

Hudson (1962, 1966) suggested that the Great Estuarine Group was deposited in shallow lagoons with variable, but generally low, salinity. Harris and Hudson (1980) noted desiccation cracks and algal stromatolites at several horizons which demonstrated that the lagoons at times dried out, or had extensive marginal mud flats. The rarity of *in situ* plant remains further suggested that, during Great Estuarine Group times, the Inner Hebrides area never became a fully vegetated land surface. The Reptile Bed could have originated as a winnowed shell and bone concentrate on the lagoon floor. The abundant and well-preserved *Unio* shells cannot have travelled far, and they suggest that the water could have been almost fresh at times. Dispersed reptile bones and fish remains are to be accounted for by slow rates of deposition rather than by long-distance transport.

Vertebrate remains, consisting mainly fish teeth and scales, are common throughout the Great Estuarine Group, but only in the Kildonnan Member of the Lealt Shales on Eigg are they concentrated to form bone beds, and it is only at this location that the bones of marine reptiles are found in any abundance.

## Comparison with other localities

The most closely comparable localities to Hugh Miller's Reptile Bed occur on Skye in units of the Great Estuarine Group:

1. 'Vertebrate Beds' with reptile bones in the upper part of the Kilmaluag Formation (formerly called Ostracod Limestones) near the top of the Great Estuarine Group, on the northern side of Glen Scaladal, Elgol ([NG 519 165]; Harris and Hudson, 1980, pp. 244–6, who give the map reference in reverse). Waldman and Savage (1972) noted true mammals and therapsids (*Stereognathus hebridicus*) from 'marlstone bands' at their unspecified locality UB 7111, which is essentially the same site ([NG 520 157], fide Evans and Milner, 1994). Also the site of Waldman and Evans's (1994) choristodere skull, from a location on the shore just north of Glen Scaladal.
2. Kilmaluag Formation (?) on the shore and cliff south of Glen Scaladal 'at a small promontory of limestone about 100 m South of Carn Mor' Q.D. Hudson, pers. comm., 1982 — ?the promontory at [NG 519 154] (Andrews, 1985, p. 1135).
3. Hudson and Morton (1969, p. D29) noted a plesiosaur from the Berreraig Sandstone (Late Bajocian) near Rigg, Trotternish [NG 521 566].
4. Andrews and Hudson (1984) reported a single large cast of a dinosaur footprint from the Lonfearn Member of the Lealt Shale Formation, beneath the cliffs south of Rudha nam Braithairean [NG 526 625], Trotternish, Skye.
5. Martin (1985a, p. 162) notes six ichthyosaurs from the Great Estuarine Group of the Isle of Skye. No more locality information given.

Elsewhere in Britain, plesiosaur remains are rare in the Bathonian. A plesiosaur humerus (CAMSM J5736) has been found in the Cornbrash (Callovian) of Scarborough (?exact locality), and several plesiosaur teeth, vertebrae and limb bones are known from the Stonesfield Slate (Mid Bathonian) of Stonesfield, Oxfordshire (BMNH, CAMSM — see Stonesfield report). Occasional teeth and isolated bones ascribed to plesiosaurs have been noted from several other localities in the Bathonian of Oxfordshire, Buckinghamshire and Cambridgeshire, but none of these matches the more extensive remains from Eigg.

## Conclusions

The two localities of Hugh Miller's Reptile Bed on Eigg are historically important, and they have yielded small collections of identifiable reptile bones. The sites are still accessible, depending on how storms have moved the loose boulders on the beach, and the Reptile Bed is readily identifiable, but thin. The sites are better documented than their approximate equivalents on Skye. There are no comparable formations outside the Hebrides. These are the best Bathonian sites for marine reptiles and an important intermediate between the well-known Early and Late Jurassic marine faunas, hence their national importance and considerable conservation value.

## [References](#)



*(Figure 6.3) Hugh Miller's Bone Bed on Eigg, showing collecting operations in 1972. (Photo: R.J.G. Savage.)*