

## Pavement Palaeontology

### Stop 1: Royal Society of Edinburgh building, 26 George Street

**Stone type:** Portland Stone, Upper Jurassic (Tithonian: c. 150 million years old)

**Palaeontological interest (Hand lens recommended):** Fragmentary fossil material in the lime mudstone (micrite) that played a role in providing nucleation sites for the ooids that formed the sediments that were then further cemented by calcite, giving rise to the oolitic limestone that is known as Portland Stone. The stone has excellent properties for cutting and carving.

Fossils are often very fragmentary but spectacular material does emerge from the Portland quarries (<http://www.southampton.ac.uk/~imw/portfoss.htm>) Snails (gastropods), with aragonitic shells, were common. During the diagenesis, the aragonite would dissolve, leaving spiral voids in the rock called 'Portland Screws' by the quarry workers.

The Grade A-listed building is a rare example of the use of Portland Stone as a façade in Edinburgh. Portland Stone is also used as a facing stone in George Square on the University of Edinburgh Main Library.

### Stop 2: City of Edinburgh Council HQ, Waverley Court East Market Street

**Stone type:** Bavarian Gold, Upper Jurassic (Tithonian: c. 150 million years old)

**Palaeontological interest:** The limestones, from the upper parts of the famous Jura quarries in Bavaria have a similar invertebrate fauna (ammonoids, belemnites, bivalves, sponges) to that seen in the Solnhofen. The limestones are not lithographic limestones (*Plattenkalk*), so do not provide the same exquisite detail but are nonetheless spectacularly fossiliferous.

This particular limestone is very popular for the façade of buildings in colder climates due to the open pore structure, which allows the stone to expel moisture.

### Stop 3: Where 'Save the Fishes!' began on East Market Street

**Stone type:** Caithness Flagstone, Spittal Mains Quarry (A&D Sutherland), Middle Devonian (c. 385 million years ago)

**Palaeontological Interest:** The scientific importance of the fossil fishes from the Old Red Sandstone was recognized by Hugh Miller and Louis Agassiz in the 19<sup>th</sup> century. The deposits of Lake Orcade have provided many specimens and been the subject of intensive study. Ken Shaw of EGS found a fine specimen here in the spring of 2012 that set off a palaeontological rescue operation documented in the *Edinburgh Geologist* by Dr Tom Challands.

[http://www.edinburghgeolsoc.org/edingeologist/z\\_54.html](http://www.edinburghgeolsoc.org/edingeologist/z_54.html)

Many of the specimens we have found since are of lesser scientific importance and have been left in place in the pavements for people to find.

#### **Stop 4: The Scotsman Steps/ Work No. 1059 by Martin Creed (2011)**

**Stone type: Limestones and marbles of 104 different types.**

- Step 10: Morocco Brown (ammonoids, orthocones) Early Carboniferous (c. 350 million years ago)

**Palaeontological Interest:** Several of the steps are richly fossiliferous. Some are covered with many examples of the same fossil group (taxon) (high abundance, low richness), while others have many different fossil groups but fewer individuals of each group (lower abundance, high richness).

#### **Stop 5: Predator and prey: Fish remains outside the National Museums of Scotland, Chambers Street**

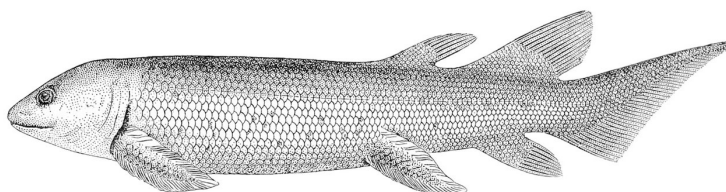
**Stone type: Caithness Flagstone, Spittal Mains Quarry (A&D Sutherland) (c. 385 million years ago)**

**Palaeontological Interest:** A number of fossil fish specimens and fragments offer a glimpse into the ecosystem of the vanished Devonian Lake Orcadie Caithness paving slabs. It is possible to see examples of smaller lungfish, *Dipterus*, and the much larger lurking predator *Glyptolepis*. To get a clearer picture of life in Lake Orcadie, you can visit the “Beginnings’ gallery in the basement of the museum, where there are large models of the fish and their environment.

A blue tint can be observed on some specimens, due to calcium phosphate in the skeleton being converted to vivianite, a secondary mineral, which often replaces bone and teeth in wet, oxygen-poor environments, especially in iron-rich freshwater.

(<http://www.snh.org.uk/pdfs/publications/earthscience/FossilFishofCaithness.pdf>).

Within the National Museums you can view more Devonian fish discovered by Hugh Miller, visit the *T. rex* or see more examples of the richly fossiliferous Bavarian Gold Limestone, already seen at Stop 2, in the main hall.



Reconstruction of *Dipterus* from Lankster, E.R. Guide to the Gallery of Fishes ([http://commons.wikimedia.org/wiki/File:Dipterus\\_valenciennesi1.jpg](http://commons.wikimedia.org/wiki/File:Dipterus_valenciennesi1.jpg))