

**Pseudofossils****Fact Sheet**

An collection of pseudofossils. Image: QM, Adriana Bauer.

**Introduction**

Collecting rocks, minerals and fossils is a fascinating pastime. Fossils give us glimpses into the many forms of ancient life. Fossils are common and are found in a variety of shapes and sizes, but there are a number of common rock and mineral structures mistaken for fossils. These are called **pseudofossils** (false fossils). Some pseudofossils are very convincing and it takes careful observation and wide experience to tell the difference. The most common pseudofossils are concretions, septarian nodules, and dendrites. Sometimes simple weathering can produce a fortuitous resemblance to fossilised animals and plants.

**Concretions**

Concretions are structures in sedimentary rocks that are commonly confused with a variety of fossils. Concretions are sometimes called nodules, 'moonstones', 'dino eggs' and 'fossil nuts'. They are often confused with fossil shells, bones or plants. In order to understand what concretions are and how they form, it is necessary to know a little about how sediments bind together to form sedimentary rock.

When sediments are laid down small spaces between the grains are present. These spaces are known as pore spaces. Ground water can percolate through the sediment, carrying dissolved minerals such as calcite (calcium carbonate), quartz (silicon dioxide), iron carbonate, clays, iron oxide, or opal (not really a mineral). Some of these minerals are deposited in the pore spaces, cementing the rock together. Through this process known as cementation, a loose, unconsolidated sediment can quickly turn into sedimentary rock.



Concretion. Image: QM, Adriana Bauer.

Commonly, the cement grows from a central point that may be a fossil fragment or sand grain. As this process continues the cemented part of the rock may form in concentric bands and develop spherical or egg-like shapes. These are the concretions or nodules. Nearby nodules can join as they grow and form bizarre shapes. Their shape can also be influenced by the presence of fossils, structures in the sediment, and by the chemical changes in the pore waters. The concentric coloured bands in some concretions are caused by changes in the ground water during the cementation process.

Concretions and nodules are usually found because during formation of the rock, cementation changed. The nodules stopped growing. When the rock was eventually exposed the nodules were more resistant, whereas the surrounding rock was easily broken down.

**Septarian nodules**

Septarian nodules are concretions that have a series of radiating cracks, crossed by a series of concentric cracks to form a 'turtle back' appearance. Indeed they are commonly mistaken for fossil turtle shells.

These form in a similar way to other concretions, that is, by cementation, but in their case the cement minerals (clays) contain water. Other processes dehydrate the concretion to produce the cracks which are subsequently filled with another crystalline cement mineral. These nodules are more resistant to weathering than the surrounding sediments and remain behind after erosion of the surrounding rock.



Septarian nodule. Image: QM, Adriana Bauer.

### Cone-in-Cone structures

Cone-in-cone structures are very common in rocks throughout central Queensland and are commonly misidentified as teeth, fossil footprints, or shells. The structure takes its name from its appearance as upright circular cones superimposed into one another so that their edges are ridged and grooved. The cones are usually at right angles to the sedimentary layering or bedding. The ridges on the side of the cone become less pronounced near the apex. The material that forms the cement mineral is usually calcite or gypsum. Growth of fibrous crystals in layers results in vertical pressures in the rock causing small breakages. As pressure continues, the breakages overlap causing the stepped-cone structures. The cement minerals dissolve leaving ridges along the cone surfaces.



Cone-in-cone structures. Image: QM, Adriana Bauer.

### Dendrites

Dendrites are mineral growths that commonly are mistaken for plant fossils, particularly ferns. They are usually black with fine, complex branches. Dendrites form when minerals grow along a crack or joint surface in the rock. The minute mineral crystals grow end to end, forming delicately branched patterns. Common minerals that form dendrites are iron and manganese oxides.

Dendrites are usually more complex and less regular in pattern than plant fossils and they lack vein structures found in leaves. They also commonly occur over differently angled fracture planes in the rock, rather than the flat parallel strata normally associated with fossil fern fronds.



Dendrites. Image: QM, Adriana Bauer.

### Fortuitous shapes

Erosion by wind or water can produce unusual shapes in rocks, some of which bear a striking resemblance to fossils. The most common pseudofossils of this sort are 'foot prints' caused by small clusters of weathered indentations in the rock. Sometimes a rock has merely broken in such a way that it appears similar to a fossil.

The Queensland Museum frequently receives weathered and odd-shaped rocks that have been mistaken for fossilised bones, shells, whole animals, and even internal organs.



Weathering has produced a 'foot print'.

**Author:** Alex Cook & Julien Louys

Queensland Museum  
PO Box 3300, SOUTH BRISBANE QLD 4101  
Phone: (07) 3840 7555  
<http://www.qm.qld.gov.au/>