



Reading the rocks — the second in a series about geology all around us

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The tradition of using local stones for building adds to the richness of our culture and society. Sedimentary rocks are by far the most common type of building stone used. They normally formed in shallow-water conditions and it is not surprising that closer inspection often reveals fossils incorporated in them. The type of fossils present can indicate the age of the stone as well as the environment in which it originally accumulated.

One of the geologically youngest of our sedimentary building stones is the Oligocene Bembridge Limestone (Quarr Stone) of the Isle of Wight. It is crowded with fossils, especially fresh-water gastropods. Examples can be found in the walls of Quarr Abbey (Isle of Wight) and the White Tower of the Tower of London.

Paludina Marble is known by a number of names but is not a true marble (which is a metamorphic rock) but a hard limestone. It accumulated in a freshwater lake during the early Cretaceous and takes its name from the abundant fresh-water gastropod *Viviparus sussexiensis* (formerly known as *Paludina*) that makes up much of the rock. Paludina

Marble can be seen in a number of churches in Kent and Sussex, such as at Ulcombe, Tenterden, Biddenham and Smarden.

Perhaps the most famous of the fresh-water limestones is the early Cretaceous Purbeck Marble, which is quarried from



Jurassic oysters in Portland Stone used to construct the plinth of King Charles I statue in Trafalgar Square, London.

a few thin, fossiliferous limestone beds in the Isle of Purbeck, Dorset. It too is crammed with the small gastropod *Viviparus*, and has been cut, shaped and polished for columns and fonts since at least the Middle Ages e.g. Salisbury and Lincoln Cathedrals.

Bivalves such as *Plicatula*, *Protocardia* and trigoniids, which lived in the warm shallow seas during the accumulation of the Upper Jurassic Portland Stone, are frequently seen weathering out of it. This white stone became very fashionable throughout the country after Sir Christopher Wren used it to rebuild St Paul's Cathedral and other London churches, following the Great Fire of London. Portland Roach is a particularly shelly horizon with bivalves and gastropods, including *Aptyxiella portlandica*, the famous 'Portland Screw'.

Jurassic limestones are well known building stones. Barnack Ragstone

quarried near Stamford, is used extensively in Peterborough and Ely cathedrals. This coarsely shelly limestone, or rag, formed in turbulent marine conditions that caused the shells to be broken down into fragments. Another famous example is Bath Stone from the Cotswolds, an oolitic, shelly limestone that also formed in high energy, marine conditions. The broken shells add to the texture of this beautiful creamy stone.

Numerous churches in the Vale of Belvoir have been constructed of the Lower Jurassic Marlstone Rock. This orange-brown ironstone and sandstone contains pockets of fossils such as marine brachiopods (*Lobothyris* and *Tetrarhynchia*) and bivalves (*Chlamys*, *Modiolus*, *Oxytoma*, *Protocardia* and *Pseudopecten*).

The Carboniferous limestone of Britain is rich in fossils and because of its hardness can be highly polished and is used for decorative effect in many buildings. Limestones containing crinoids ('stone lillies') such as the Monyash Marble from Derbyshire, and Dent Marble from Yorkshire, are two examples. The Frosterley Limestone from County Durham is also a Carboniferous limestone, but in this case it is full of the coral *Dibunophyllum*. When seen in a polished face, the numerous cross-sections of solitary, horn-shaped corals, produce a particularly appealing ornamental stone which can be seen as columns in Durham Cathedral.



Casts of bivalves and brachiopods in a wall constructed of Northampton ironstone, Towcester.