
Fossils and palaeontology

Fossils are the preserved remains of animals and plants. Commonly only the hard skeletal parts or shell of an animal, or the most durable portions of a plant, are preserved as fossils, although exceptionally the original soft tissue may be replaced. The imprints in soft sediment of soft-bodied animals such as jelly-fish and worms may be preserved. The trails, tracks, burrows and feeding traces of a variety of animals are commonly preserved as trace fossils, as are the burrows and casts of worms.

Palaeontology is the study of ancient life. It is an essential tool in geology for the purposes of correlation, strata identification and establishment of sequences. Palaeoecology, the study of the associations of coexisting fossil species, enables interpretation of ancient environments. Palaeoecology offers one of many links between geo- and bio-diversity: it has been estimated that the vast majority of biological species recognised by science are extinct.

Fossils in County Durham and their wider importance

Many of the principal fossil groups are represented within the sedimentary rocks of County Durham. Included are trilobites, brachiopods, graptolites, crinoids, corals, ammonoids, gastropods, bivalves, fish, amphibians, reptiles and plants.

Detailed lists of the fossils recorded from the county are quoted in many of the literature references cited in the bibliography.

Fossils from several parts of County Durham have considerable significance beyond the county.

The graptolites identified within the Ordovician slates of the Teesdale Inlier give important insights into the nature and evolution of rocks of this period in Great Britain.

The county's Carboniferous rocks contain a variety of fossils which provide valuable evidence for contemporary environments and ecosystems across Northern England and Europe. Of particular note are the coral-rich Frosterley Marble and the sponge-rich Chaetetes Band, both within the Namurian Great Limestone. Beds rich in the fossil alga *Girvanella*, within the Dinantian limestones have considerable importance for regional correlation.

Quarter Burn, the type locality for the Quarterburn Marine Band, taken as the base of the Coal Measures in North-East England lies in County Durham. The county's Coal Measures rocks have also provided important clues to the rich flora of Carboniferous times, including a number of remarkable petrified logs of Cordiatae, an early ancestor of the modern conifers, found in 1996 in opencast coal workings near Great Lumley. The fossilised stump of a Coal Measures tree is a well-known feature in Stanhope Church Yard.

County Durham is internationally renowned for its succession of marine Permian rocks, parts of which have yielded a wealth of extremely important vertebrate and invertebrate fossils.

The Marl Slate is locally rich in well-preserved fish, especially species of *Palaeoniscus*. Fine examples have been recovered from several sites in the east of the county. Middridge Quarry, which has yielded bones of the Upper Permian reptiles *Protosaurus*, and *Adelosaurus* together with the amphibian *Leptosaurus*, is regarded as Great Britain's finest Upper Permian reptile locality. The site has also provided Britain's most diverse assemblage of Upper Permian plant fossils, including the best British examples of the conifer families Ullmanniaceae and Majonicaceae, together with what may be the earliest British example of cycad foliage. The quarry is designated as an SSSI and GCR site. *Protosaurus* has also been found at Quarrington Quarry. Part of a skeleton of *Coelurosaurus*, a reptile believed to have been capable of gliding flight, and one of only a handful of such specimens known from Europe, was discovered in 1978 in the Marl Slate at Eppleton Quarry, Hetton-le-Hole. Now within the City of Sunderland, Eppleton was then part of County Durham.

The Upper Permian barrier reef, present within the Ford Formation of the Magnesian Limestone of North-East England, has produced a rich and varied invertebrate fauna of international significance. Included are numerous brachiopod, bivalve, nautiloid and bryozoa species, together with rarer examples of echinoids and corals. Good exposures of the reef occur in County Durham, notably in the Easington and Blackhall areas. Some of the most fossiliferous localities, well-known from museum collections and publications, lay within the county when most of the collections were formed: these localities today lie within the City of Sunderland.

Threats

Collecting of fossils within the county is not currently perceived as threatening the scientific value of any sites, though inadvertant damage to key sections may result from inappropriate or careless use of these sites by educational or other groups. Careful and systematic recovery of fossils from certain geological units, for example the Marl Slate, in working quarries or temporary sections, has revealed much material of very great scientific significance.

The progressive deterioration of abandoned quarry faces, together with the risks of quarries being filled or landscaped may pose a threat to some important fossil localities.

Conservation

SSSIs or Durham County geological sites with important fossils are listed under Ordovician, Carboniferous and Permian rocks.

Museums with significant holdings of County Durham fossils are listed under Geological Archives.

Selected references

Benton and Spencer, 1995; Burgess and Holliday, 1979; Cleal and Thomas, 1996; Dunham, 1990; Dunham and Wilson, 1985; English Nature, 2000; Johnson, 1958, 1961, 1970, 1995; Johnson and Dunham, 1963; Mills and Holliday, 1998; Mills and Hull, 1976; Smith, 1970, 1981, 1994, 1995; Smith and Francis, 1967; Taylor et al. 1971.

[Full references](#)