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## 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 the AONB

Many of the principal fossil groups occur within the sedimentary rocks of the AONB, including trilobites, brachiopods, graptolites, crinoids, corals, ammonoids, gastropods, bivalves and plants. Detailed lists of the fossils recorded from the AONB are quoted in many of the literature references cited in the bibliography.

Internationally important assemblages of invertebrate fossils have been recovered from the Ordovician and Silurian rocks of the Cross Fell Inlier.

The area's Carboniferous rocks contain a wealth of fossils of both animals and plants. All offer important clues to the environments in which these rocks were deposited. Of particular note are the Chaetetes and Frosterley bands in the Great Limestone. These are notable for the abundance of especially well-preserved fossils of sponges in the former, and solitary corals in the latter see Carboniferous rocks, above, and Frosterley Marble, below).

The well-known fossilised cast of a large Carboniferous tree stump, complete with its root system, recovered from a quarry near Edmundbyers and now preserved in Stanhope Churchyard, is an especially fine example of such a large plant fossil.

The Quarterburn Marine Band, exposed in Quarter Burn near Egglestone, is a bed rich in marine invertebrate fossils, which marks the base of the Coal Measures in north-east England (see Carboniferous rocks, above).

Many of the Carboniferous sandstones contain striking examples of trace fossils, especially those of worm or mollusc trails. A bed, especially rich in such trace fossils, is exposed near Coalcleugh. A spectacular example of such a trail, present in a block of sandstone found near the Scordale mines, has been mis-identified as an early stone carving.

### Wider importance

Some of the fossils from the area are of national or international significance. They are particularly important in the identification and correlation of the Ordovician and Silurian rocks of the Cross Fell Inlier. Pus Gill, the historical type section for the Pusgillian Stage of the Ordovician, is the type locality for several fossil species, including the brachiopod *Trematis corona* Davidson, and several species of trilobite including the trinucleid *Tretaspis duftonensis* Dean. It is of key importance in the correlation of the Dufton Shale Formation and for international correlation of the standard British chronostratigraphical units at the Caradoc-Ashgill boundary.

The road cutting in the Ordovician Dufton Shale Formation at Melmerby is the type locality for an ostracod and several trilobite species. Swindale Beck is the type locality for six trilobite species.

Beds rich in the fossil alga *Girvanella*, within the Dinantian limestones have considerable importance for regional correlation. Similarly, the beds rich in sponge and coral fossils, the so-called Chaetetes and Frosterley bands within the Great Limestone are also of great significance.

The fossilised tree stump now in Stanhope Churchyard is an especially fine example of a Carboniferous tree.

The Quarterburn Marine Band, taken as the base of the Coal Measures in north-east England, is exposed in Quarter Burn, near Eggleston.

## Conservation issues

The impact of the collecting of fossils on the area's geodiversity is not known. However, as a European Geopark, the collecting of fossils within the AONB is strongly discouraged, except at supervised sites and for specific research projects. Inadvertent damage to key sections may result from inappropriate or careless use of these sites by educational or other groups.

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

Careful curation of fossils collected from the AONB within museums, both local and national, is important in safeguarding this important aspect of the AONB's Earth science heritage.

## Selected references

Arthurton and Wadge, 1981; Burgess and Holliday, 1979; Challinor, 1971; English Nature, 2000; Mills and Hull, 1976; Stone et al, 2010; Trotter and Hollingworth, 1932.

## Figures

(Figure 56) Fossilised stump of a Namurian tree, preserved in Stanhope Churchyard © B. Young, BGS, NERC.

(Figure 57) Trace fossils found at Scordale, probably formed small molluscs or worms around 320 million years ago. ([See PDF](#)).

## [Full references](#)



*Fossilised stump of a Namurian tree, preserved in Stanhope Churchyard © B. Young, BGS, NERC.*