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## Minerals of Charnwood Forest

Minerals have been found in and around Charnwood Forest over a long period; they are very diverse in type, and some are extremely rare. Encrustations of gold were found at Bardon Hill in the 1880s, although such small quantities did not quite precipitate the type of gold rush that was happening in Alaska at about that time. However, small grains of gold have been panned from streams in northern Charnwood Forest, so perhaps there is hope!

Not all minerals are precious, and some are very abundant; for example, *quartz* is found in many veins traversing the rocks. We also use the term 'minerals' to describe the individual crystals that make up rocks. These are mainly silicate minerals, and are best seen in coarse-grained igneous rocks such as the Mountsorrel *granodiorite* (Walk 6). To see unusual minerals in Charnwood Forest, however, the best places are the large quarries currently being worked for aggregate. Unfortunately, access is difficult for safety reasons, but sometimes there are supervised visits or open days, and some rare minerals have even been found on quarry spoil heaps.

**What are minerals?** Nearly every metallic item that we use today comes from minerals that have been dug from the ground. In their natural state, these minerals occur either as near-perfectly formed crystals, or as amorphous masses within rocks. They are important sources of metals such as iron, copper and lead and are usually made up of two or more elements; for example, the sulphide mineral galena (PbS) is a mixture of lead (Pb) and sulphur (S). Occasionally, metals occur in their metallic (native) state; while gold and silver are rare, native copper is commonly found in Charnwood Forest.

The exotic minerals generally occur in association with other, more common ones such as *quartz* or calcite, typically seen as veins in the Charnwood rocks.

**How are they formed?** We can seldom be entirely certain about this, because nature has many different ways of forming minerals. Some minerals were introduced into rocks from hot, metal-rich fluids that ascended from great depth in the Earth's crust. At higher levels, these fluids circulated through fractures in the rocks, forming vein minerals.

Some mineralising fluids were introduced during periods when the Earth's crust was undergoing compression and fracturing, for example during the Acadian Orogeny, explained in the introductory section of this booklet.

Other minerals in Charnwood Forest are found along or just below the Triassic unconformity (Walks 2 and 7). They may have been carried dissolved in fluids that percolated downwards from the Triassic strata, depositing them in fractures within the Precambrian rocks. But it is also probable that some of the mineralisation came from fluids migrating upwards through these fractures, which perhaps linked up with some of the large faults affecting the Charnwood rocks. The minerals were deposited close to the unconformity because the red Triassic mudstones acted as an impermeable cap to the mineralising fluids. Copper and vanadium minerals are seen close to the unconformity at Bardon Hill Quarry (see Page 17), and are concentrated in Precambrian rocks forming the floors of Triassic wadis.

In total well over 50 different types of minerals have been found in Charnwood Forest, and we have only illustrated a few of them here. To see more, visit the collections at Charnwood Museum in Loughborough and New Walk Museum in Leicester.

## Figures

(Figure 73) Quartz vein mineralisation in Whitwick Quarry.

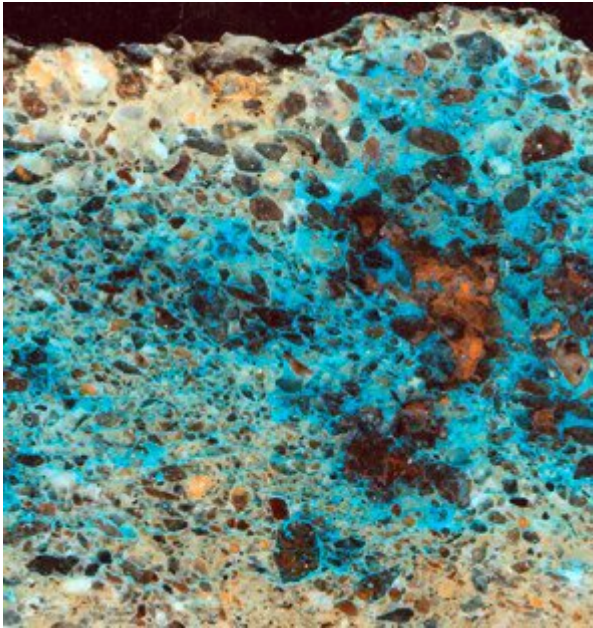
(Figure 74) Native copper and malachite (green-blue) impregnating Triassic sandstone, Whitwick Quarry.

(Figure 75) Typical pathways for mineralising fluids (yellow), towards the Triassic unconformity (red).

(Figure 76) Vanadium mineralisation from Bardon Quarry.



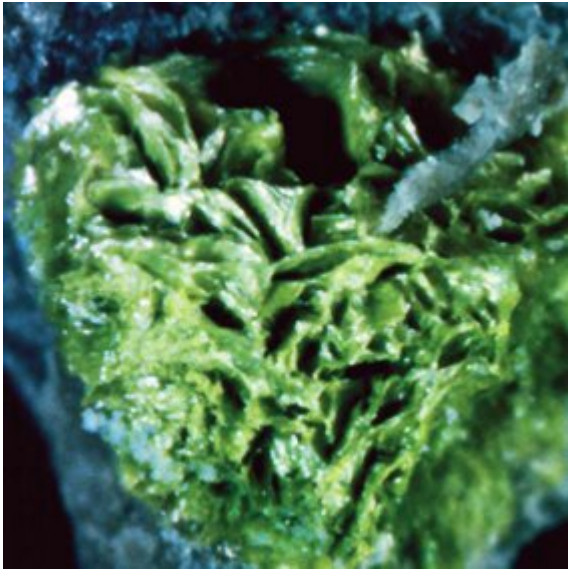
*Quartz vein mineralisation in Whitwick Quarry.*



*Native copper and malachite (green-blue) impregnating Triassic sandstone, Whitwick Quarry.*



*Typical pathways for mineralising fluids (yellow), towards the Triassic unconformity (red).*



*Vanadium mineralisation from Bardon Quarry.*