Limestone Rock In Derbyshire's White Peak

The rocks of the Carboniferous period starting with the oldest (lowest) are; Limestone Rock, the Edale Shales, Millstone Grit and the Coal Measures. The only rocks missing locally (the Hope Valley area) are the Coal Measures.

The most abundant and most interesting of all these rocks is Limestone. Read on and find out how interesting it really is.

Using the most up to date measuring techniques the Carboniferous Limestone of the White Peak of Derbyshire is estimated to be about 350 million years old. (2010). It is made from the limey shells, bones and secretions of marine life. Creatures living in ancient semi-tropical seas obtained calcium (lime) from the sea water to make their shells, bones, and limey structures. When these creatures died they sank to the sea floor where they were gradually compressed and cemented together to make limestone rock. Some of these sea creatures retained their shape and we see them as fossils.

The steep sloping fronts of the hills on the south and west sides of the Hope Valley including Mitchill Bank, Cow Low, Long Cliff and Treak Cliff are all that is left on the surface of a great reef. These reef limestones are very rich in the fossilised remains of sea creatures, some are very rare, others very common, like crinoids, plant-like creatures that lived on the sea bed about 350 million years ago. They varied in size, up to about a metre high. Crinoids were very easily damaged by wave action so we see an abundance of broken stems but very rarely a complete fossilised crinoid.

All this exotic life could only exist in the semi-tropical seas somewhere near the equator. At this time we were a tiny bit of a huge area. Continental Drift is responsible for us being where we are today. The huge continent including Britain has been drifting northwards for over 300 million years.

Early geologists calculated the Carboniferous Limestone in Derbyshire to be about 600 metres thick. In 1971 a borehole was drilled in Stoney Middleton Dale proving the limestone rock to be about 1800 metres thick. There are similar fossils to those already mentioned at that depth.

The area of the limestone rock of the White Peak is roughly 40 km long, 15 km wide, and 1.800 km thick. Very roughly the surface area is about 600 square km.

This converts to about 600,000,000 square metres. Multiply by the depth of the limestone, 1800 metres. This gives us a colossal total of 1,080,000,000,000 cubic metres of limestone rock.

There is about 3 tonnes of limestone rock in a cubic metre. This means in the White Peak there is somewhere in the region of 3240,000,000,000 tonnes of limestone rock. Just imagine the countless billions of sea creatures that must have lived and died to make this mass of limestone rock.

After the limestone rock had been laid down it was covered over to a great depth by Edale Shale, Millstone Grit and the Coal Measures. Volcanic activity taking place deep underground forced up a great mass of rock and creating what became known as the Derbyshire Dome. During this process the hard limestone rock was split and cracked creating large faults.

Into these faults from remote volcanic sources came minerals in solution, probably in extremely hot water. As the solutions cooled, some of the minerals would crystallise forming the rich mineral veins found in the Derbyshire Dome, often referred to as the Derbyshire Orefield. Historically Galena (lead ore) was the most valuable. Today the most valuable mineral is fluorspar, (Calcium Fluoride) modern name fluorite

Again using the most up to date methods (2010) geologists calculate the mineralization of the Derbyshire Dome took place about 290 million years ago.

It is well known that rainwater is continually dissolving away limestone rock. Most of the dissolved limestone is near the surface Geologists calculate this solution erosion is lowering the surface of the White Peak about 30cm every 5,000 years. If this calculation is correct and no changes occur, in about 30 million years there will be no limestone left!

Derbyshire limestone is very pure, about 98% of it is soluble in rainwater. The 2% remaining is left as clay. Because of its purity Derbyshire limestone is very useful in industry and for many things we use every day: here are a few of them; We use it for making roads, we build houses with it, we fertilize the land and our gardens with it, we smelt iron and make cement with it, we use it in bleaching powder, soap, paper, in the paint and glass industries. It is also used to make calcium carbide from which acetylene gas is made.