ROCKS AND MINERALS OF BAKEWELL

1 GEOLOGY

The Peak District consists of a plateau of Carboniferous limestone rock (consolidated from shells laid down in tropical sea 310 million years ago) with shale valleys round its edges and Millstone Grit (coarse sandstones laid down in deltas) forming escarpments east and west and large plateaux to the north. Old Bakewell is on the eastern edge of the limestone. Bakewell spread down to the shale valley and up towards Bakewell Edge (Wicksop or Manners Wood) formed of the Millstone Grit.

Millstone Grit is so called because it was used for making millstones for grinding corn. This photograph shows a partly- cut millstone. And grindstones for sharpening iron tools were made for the Sheffield steel industry.

In the showcase is White Watson's section from Buxton to the west, through Bakewell, and on to Bolsover on the Coal Measures to the east. It wasmade from the actual rocks. White Watson was nationally important as one of the geologists who first understood how rocks were laid down. He lived in the Bath House in Bakewell until his death in 1835.

This map shows the northern part of the limestone plateau outlined with a black line and the limestone dales cutting into it. Outside the limestone the Millstone Grit escarpments (edges) are shown.
From *The Story of Peak District Rocks and Scenery* by Trevor Ford.

2 SOILS

This side of the Wye Valley the limestone rock and glacial drift give a fertile brown soil which was cultivated in the extensive medieval open fields to the west. The river cuts through the shale which gives a clay soil ideal for pastures. The riverside meadows have fertile alluvium brought down by the river. Across the valley is a steep escarpment (edge) of Millstone Grit. Above the edges are peaty, acid soils, though some have been improved to make fertile pastures.

3 BUILDING MATERIALS

Go to the National Stone Centre near Wirksworth for more .

Limestone from this side of the valley made the random rubble field walls and the walls of most cottages (right on this photograph). Coursed limestone from Once a Week Quarry beyond Sheldon is used for some walls (left on this photograph).

Millstone Grit (gritstone) is a coarse type of sandstone also used for random rubble walls. It is easily cut to make the surrounds of windows and doors, quoins and the coping of the garden wall in this photograph.

Many of the buildings in the town centre are made of coursed gritstone. Ashlar walls have slim joints. The stone for Chatsworth House came from the quarries of Bakewell Edge. In the 19th century the edge was planted with trees to screen the disused quarries and is now called Manners or Wicksop Wood. The quarry workers presumably carved this head, one of two which can be seen close to the level path half way up Wicksop Wood.

Some quarries in the Peak provided roofing slates used on many older buildings in Bakewell. Thatch had earlier been a common roofing material. The last thatch in Bakewell was on a cottage near the foot of the churchyard but it was replaced early in the last century. When the railway came to Bakewell Welsh slate was brought in on a large scale.

SECTION OF A PARTLY LOADED LIME KILN

Limestone was burnt in kilns to make quicklime for mortar and also to spread on fields to make the soil less acid. The remains of small kilns can sometimes be found next to the little quarries scattered over the limestone plateau. Large kilns next to railways (such as at Millers Dale) produced lime for the chemical and steel industries.

Bricks were also brought in by rail but bricks were earlier made east of Bakewell. White Watson's 1811 book *The Strata of Derbyshire* refers to bricks made from clay formed from decomposing 'Aluminous Shale'. Bricks were used especially for chimneys. This Old House has bricks from both the Tudor (2" wide) and Georgian (2½" wide) periods. They are 50% shale, which is consistent with their source being below Bakewell Edge.

4 TUFA

TUFA ARCH IN THE RIVERSIDE GARDEN, BAKEWELL

This is a soft form of limestone formed where lime – rich water trickles over moss. It was popular for ferneries in Victorian and Edwardian times.

5 BLACK MARBLE

This was made into ornaments and also furniture and fireplaces. See the inlaid table top.

Black marble is not really a true marble but is limestone in the upper beds of the Carboniferous limestone darkened by bitumen from organic matter in the shale which used to overlie the limestone.

Black marble was mined and quarried near Ashford-in- the - Water.

In about 1590 it was used for fireplaces in Hardwick Hall and in about 1700 for the floor tiles in Chatsworth's Great Hall.

Henry Watson had a patent for the first water – powered marble mill near Ashford in 1748. He later built the marble mill at Bakewell (now Felicini's restaurant on the other side of the river downstream from Bakewell Bridge).

At a number of workshops black marble was inlaid with other rocks and materials to give (usually) floral patterns. See the display here and also in Buxton Museum and Art Gallery. Black Marble was at its most popular during late Victorian times when the widowed Queen wore black. When she died in 1902 there was a revolution in taste to brighter colours and the black marble industry dwindled.

This is based on *Derbyshire Black Marble* by John Michael Tomlinson Peak District Mines Historical Society Special Publication no. 4, 1996, and articles in Bakewell & District Historical Society's Journal.

6 CHERT

This is another black rock occurring in the upper layers of the Carboniferous limestone. It was formed in the same way as flints formed in chalk by silica from fossils precipitating into nodules. Like flint it is very hard (too hard to be scratched by a knife) and was used by stone age people for making sharp tools.

Ground calcined flint was used in the manufacture of white earthenware pottery as early as

1700 to try to emulate Chinese pottery. But bits from the granite or iron used for grinding added impurities. In 1772 Josiah Wedgwood, the famous potter from Staffordshire, described using chert from Derbyshire as it is as hard as flint and comes in big enough blocks to grind flint.

FLINT MILL TO GRIND FLINTS USING LARGE CHERT BLOCKS AS 'RUNNERS' AND CHERT PAVERS

Flint mills can be seen at Cheddleton, near Leek, and Etruria in the Potteries. Chert was also made into millstones for corn mills, being so hard (like French burr millstones) that grit didn't get into the flour. Waste chert was used for building rubble walls. There were several chert mines in Bakewell, the largest being at Holmel near Lumford. Some have very extensive tunnels. The industry was at its peak in 1908 when 4600 tons were produced from Derbyshire by over 200 men. By 1968 chert had been superseded by steel ball mills.

The big blocks of chert were taken over the southern Pennines on wagons (with up to 10 horses to drag them up hills on the new turnpike roads); by canal (when the Cromford Canal opened in 1793) and then by railway when it reached Bakewell in 1863.

SECTION OF A CHERT MINE SHOWING HOW THE CHERT BED WAS UNDERCUT TO ALLOW BLOCKS TO FALL

This information is from *Hard Times, A History of the Derbyshire Chert Industry*, by Gordon Bowering and Roger Flindall, reprinted from The Bulletin of the Peak District Mines Historical Society, Vol. 13, no. 8 1998

7 VEIN MINERALS

The following is an explanation of the way in which minerals are concentrated in veins in *The Story of Treak Cliff Cavern and Blue John Stone* by Trevor Ford.

Long thought to be a by-product of concealed volcanic activity, the minerals of the Derbyshire lead mines are now regarded as having been formed as by-products of the conversion of sea-floor sediments to sedimentary rock – the process called diagenisis. Traces of lead and fluorine are present in some shellfish and corals. Tests in the lime-sediment environment of the Great Barrier Reef have shown that, as these organisms become buried by later sediment, they are partly dissolved in accompanying buried sea water. Lead and fluorine can become concentrated. With the passing of long periods of geological time such sediments are deeply buried and subject to great pressure. They may be squeezed sideways to migrate , perhaps for hundreds of miles, into up-warped areas of the earth's crust such as the Pennines. Here, if sulphur is available, it reacts with the lead to give galena, whilst fluorine reacts with calcium to give fluorspar (calcium fluoride). These minerals crystallise in any available cavities such as fault fractures.

Blue John is a special variety of fluorspar with bands of colour ranging from the deepest blue to white. Such colouring is almost unique to Treak Cliff near Castleton. The cause of the colour in the blue bands is controversial. According to some mineralogists it is due to hydrocarbons trapped in the crystals as they grow. Others argue that traces of radio-activity interfere with the arrangement of the atoms in the growing crystals, causing distortions which affect the passage of light and thereby produce colours.

OLD LEAD MINES FOLLOWING A MINERAL VEIN

LEAD MINING

Some of the mineral veins (or rakes) can be followed for long distances because of the signs of lead mining. Rare, lead - tolerant plants grow on some. Some of these veins have been worked more recently for calcite, barytes and fluorspar which are used in a number of products.

Lead mining was an important industry in the White Peak from Roman times to the 19th century and lead mines were recorded in the (much larger) Bakewell parish in Domesday.

Apart from a piece of galena (the commonest lead ore) we do not cover the very interesting history of the industry because it is well covered at the Mining Museum at Matlock Bath.

BLUE JOHN

This is a type of banded fluorspar found only in veins near Castleton and is still mined and made into ornaments there. It was used in the middle of the 18th century by Henry Watson at Ashford marble mill, by Matthew Boulton (of Boulton and Watt fame) in Birmingham and by the architect Robert Adam at Kedleston Hall near Derby. The name may come from the French bleu jaune (blue yellow). Another explanation is that Cornish miners who began working the Derbyshire lead mines in the 1740s called it *blodon* an old Cornish word for a flower, bloom or blossom.

Many examples of Blue John ornaments can be seen at Buxton Museum and Art Gallery.