

Limestone scenery in the Clapham area

Rocks which are exposed at the surface are subjected to the effects of air, water and constantly changing temperatures, all of which attack the rocks. This attack, which causes the rocks to disintegrate (break up) or dissolve, is known as weathering. Weathering can be classified into two types - chemical weathering and physical weathering. Examples of both of these can be seen in the Clapham area.

Chemical Weathering

Chemical weathering is especially effective in limestone areas, such as is found to the north of Clapham on the slopes of Ingleborough. It produces a unique landscape known as karst scenery. The rock is permeable, which means that water rarely stays on the surface, but can pass through it by ways of cracks in the rock. The cracks form in the limestone horizontally (bedding planes) and vertically (joints), and water which enters these cracks sets up a process of chemical weathering called carbonation.

Carbonation takes place when carbonic acid attacks limestone rocks, which are largely composed of calcium carbonate; in effect, the acid dissolves the rock. It begins as rain falls through the air and absorbs carbon dioxide. By the time it reaches the ground, the rain has become a weak carbonic acid. The "dissolving" action of the acid on the limestone rocks is a very slow process which takes tens of thousands of years.

Physical Weathering

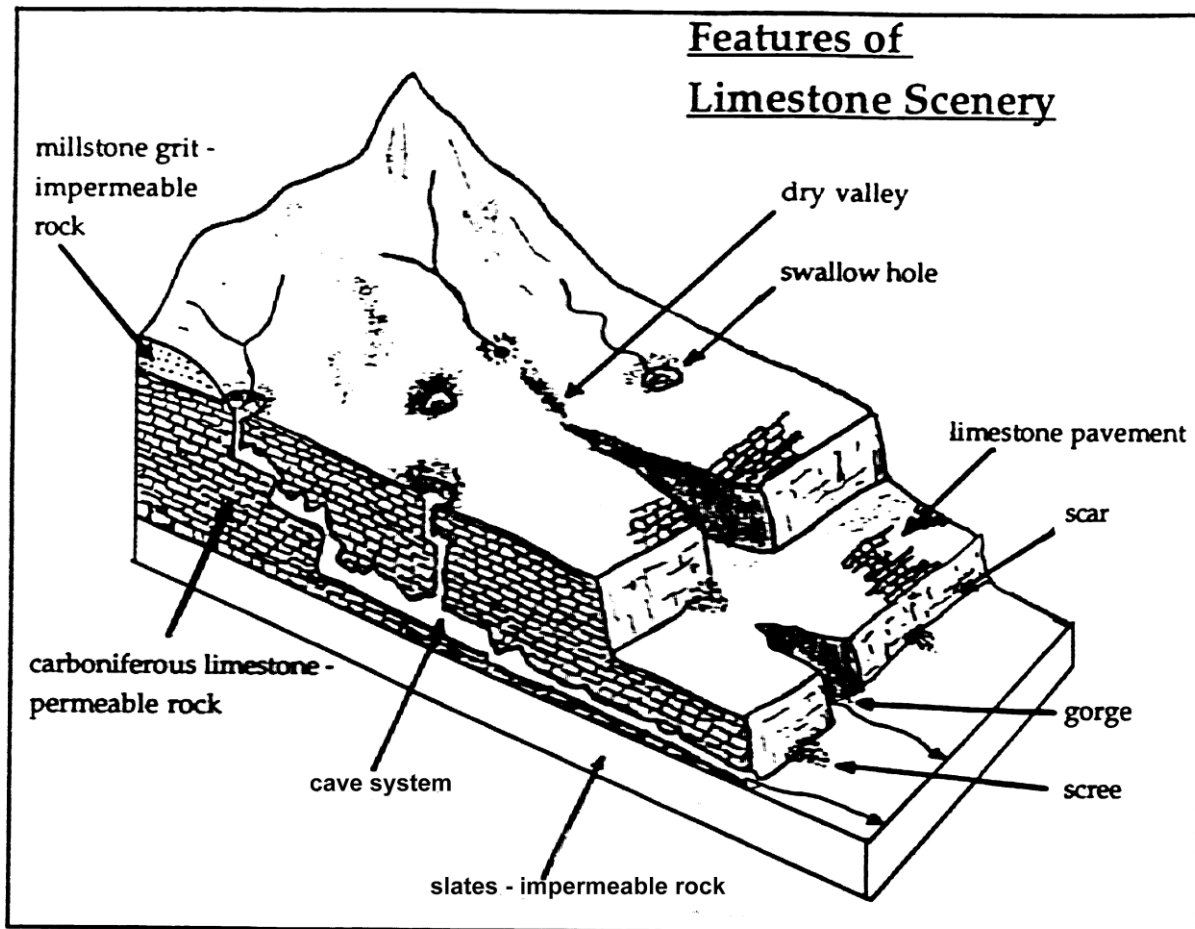
A common type of physical weathering is that produced by frost action. The effects of such action are visible at various sites in the Clapham area.

Frost action is effective in rocks which have joints in them and, as mentioned above, the limestone rocks found around Clapham are formed in such a way that many cracks are present within them. Water enters these cracks, freezes, and as it does so, it expands. The repeated pressures set up by this expansion eventually, over long periods of time (perhaps tens of years), force the rock apart and the rock is shattered into smaller pieces. Where this process takes place on exposed limestone cliffs, the rock debris collects at the bottom of the cliff. This collection of rock debris is called scree.

Karst Scenery

The effects of this weathering produce the kind of landscape features shown in the diagram overleaf.

Clapham : a locality in the Yorkshire Dales



impermeable rock - water unable to pass through (eg the Pre-Cambrian slates found beneath the carboniferous limestone)

permeable rock - water can pass through by way of cracks (eg the carboniferous limestone common to the Clapham area)

dry valley – a valley formed by stream erosion, before carbonation had enlarged joints sufficiently for water to flow underground (eg the valley to the north of Ingleborough Show Cave)

cave system – a network of underground passages formed by the process of carbonation widening the joints and bedding planes within the limestone (eg the network of passages which link Gaping Gill to Ingleborough Cave)

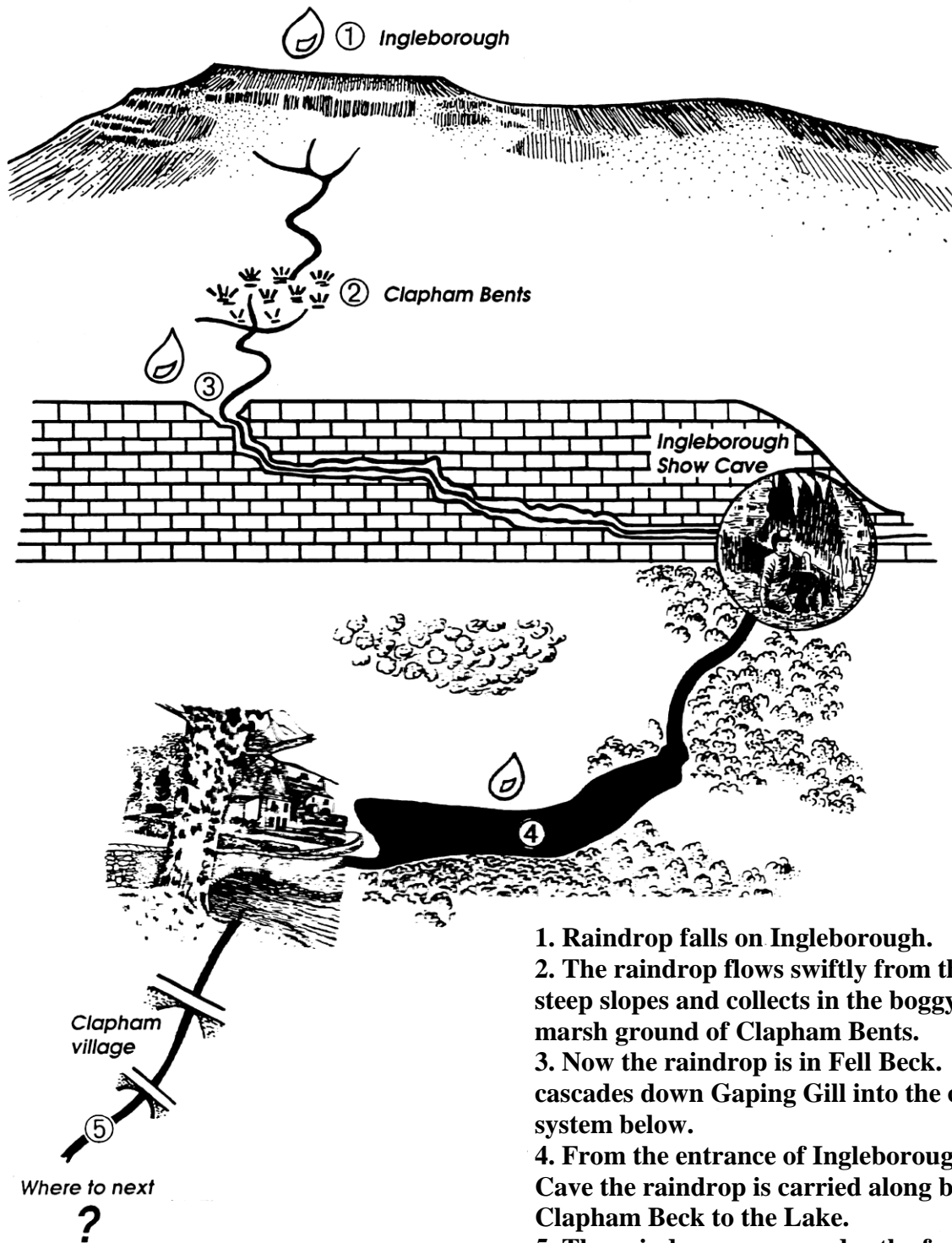
swallow hole(or pot hole) a vertical shaft formed where a joint has been enlarged by very active carbonation (eg Gaping Gill)

limestone pavement – an area of exposed limestone blocks (clints) separated by deep cracks (grykes); the soil was removed by the action of moving ice sheets during the "Ice Age" (eg found on the Allotment)

scar - a cliff formed by a band of limestone which is harder and therefore more resistant to weathering; or by the process of faulting along lines of weakness in the earth's crust (eg Robin Proctor's Scar, formed as a result of the North Craven Fault)

scree - pieces of rock shattered by frost action found at the base of steep slopes or cliffs (eg at the base of Robin Proctor's Scar)

The Journey of a raindrop from the top of Ingleborough to Clapham village



1. Raindrop falls on Ingleborough.
2. The raindrop flows swiftly from the steep slopes and collects in the boggy marsh ground of Clapham Bents.
3. Now the raindrop is in Fell Beck. It cascades down Gaping Gill into the cave system below.
4. From the entrance of Ingleborough Cave the raindrop is carried along by Clapham Beck to the Lake.
5. The raindrop passes under the four bridges of Clapham.