

LIMESTONE PAVEMENT

Although limestone rocks occur all over the world, limestone pavement is only found in places that were covered by ice during the last ice age. Therefore it is thought that pavements owe much of their existence to the weathering and removal of overlying rock and soil by ice sheets. The role that humans played in the formation of limestone pavements is still being debated. It is clear, however, that bare limestone was exposed in some parts of the Burren before the last ice age (e.g. eastern Burren, Carran depression), but in other places, a soil cover persisted for several thousand years after the ice age ended.



Some beds of limestone are more likely to form pavements than others: (1) beds that don't contain many joints (fractures), (2) beds that are more resistant to dissolution by rainwater (because they are made of purer limestone), and (3) beds that are mechanically stronger (because they were hardened by geological processes). Approximately 20% of the Burren is limestone pavement, with an additional 30% consisting of a combination of pavement and rendzina (an organic-rich, calcareous soil). In the Burren, the most pristine pavements occur near the boundary between the limestones and overlying shales.

Limestone dissolves in rainwater and so all limestone pavements in the Burren show signs of dissolution. The most common dissolution features are grikes.

GRIKES

Grikes are vertical or near-vertical fissures in limestone pavement. Initially, the limestone contains only microscopic fractures or cracks. Rainwater seeps into the cracks and dissolves the limestone along the crack, making it wider. By the time you can see it with the naked eye, it is called a grike (or scailp). Grikes can be up to 80 cm wide and 2 metres deep. The grikes divide up the limestone pavement into blocks called clints. Most clints are 1- 5 m² in area.



Other common dissolution features in limestone pavement are kamenitzas (bolláns) and runnels.

KAMENITZAS

Kamenitzas are small, shallow, round, flat-bottomed depressions or pools on the surface of limestone pavement. They are usually a 5 - 30 centimetres wide. They form as the limestone is dissolved by standing water. The limestone does not contain any microscopic holes that let water drain through, and so any water (from rainfall) will sit in hollows on the limestone surface. This water dissolves the limestone underneath, enlarging the hollow.



Fig. 1. Kamenitzas.

RUNNELS



Fig. 2A: Vertical runnels along the side of a grike.

Runnels are channels formed where water drains from a clint, but unlike river channels (which are formed by erosion), runnels are formed as the water dissolves the limestone as it drains off the surface. Runnels occur both on the surface of the limestone, and along the vertical sides of grikes. On the surface, the runnels can develop a branching pattern, and often appear to start at a kamenitza or link up several kamenitzas. Runnels are usually 5 - 15 cm wide, but can be wider along the grikes.

As runnels and kamenitza continue to become larger over time, the limestone pavement becomes more dissected or broken up over time.



Fig. 2B. Horizontal runnels on the pavement surface.



Fig. 2C. Dissected pavement that has been affected by dissolution for a long time.

Lastly, the sides of the clints (as seen on the walls of the grikes) often show lots of horizontal notches. This results from faster weathering of weaker bands in the limestone than others. You can see these notches in Fig. 2A.