growing rare alpines in deep fissures in the catalogue of his nursery in York in 1875. Fifty years later, B. Symons-Jeune built a massive, vertically stratified rock garden for the Chelsea Show of 1923, and explained the principles of steep stratification in his *Natural Rock Gardening* (1932). This professional landscape architect constructed geologically correct rock gardens, usually with gently inclined, horizontal stratification with a minimum of suitable crevices, and preferred planting common rock-garden plants in the open spaces around his bold features. I am obliged to him for many good ideas about landscape rock gardening and the appearance of a rock exposure. Symons-Jeune did not get permission to read his papers at the first International Rock Garden Plant Conference in London, but it was here that Swiss plantsman Henri Correvon explained his successful growing method for the most difficult high alpines in "layers of slate".

About forty years later, the principle of steep stratification appeared in *Rock Gardening* written by my friend Harry Lincoln Foster. It was probably this book which gave Josef Halda inspiration for laying his flakes into small rock exposures in which the layers are tilted from 30° to 45° with rounded shoulders known as "grannies". More recently we have seen crevice gardens constructed from thin slates by Josef Holzbecher, and the good designs of Vojtech Holubec and Ota Vlasàk using limestone, and their invention of granite formations with modified rules of steep stratification.

The conversion of horizontally stratified rock gardens into vertically stratified ones is moving slowly to the west. Harry Jans included crevice gardening in his lecture "Twentyfirst Century Gardening and Growing Techniques" for ALPINES 2001, and the well-known plantsman Dr John Good wrote about his current fascination for his crevice garden in North Wales. His conclusion is that, "*it enables me to grow many more plants outdoors in a wet climate than I could ever have imagined*".

GEOLOGICAL BACKGROUND

In the past, when we tried to build a rock exposure that appears natural, and to follow geological laws for horizontal stratification, or jointing with igneous rocks, we were in great trouble. With poor choice of suitable rectangular stones we had to control the height, back tilt and side tilt, primary joints, secondary joints and proper returns, in every bed or layer. On the contrary, geological laws for steep stratification, which are followed as rules for building crevice gardens, are simple. But before setting down the rules the

reader must understand the formation. The best way is to show a picture of genuine steep stratification and to explain its origin and the terminology.

My illustration (opposite above) is a large rock exposure in the Czech Karst (near Karlstein Castle). Incidentally, the sequence here is of international geological significance because the international division the Silurian and Devonian periods is placed between layers numbered 45 and 46. Readers will understand that sedimentary rocks of this sort were originally laid down in ancient seas, which is called horizontal stratification. In our example the layers of stone (strata) were then tilted and folded by strong tectonic forces into their present position. The broken part of the uptilted formation is seen as faces of layers (beds) with relatively similar thickness, having steep return down to ground level. The left part of the picture shows exposed bedding planes (sides of layers), forming miniature cliffs which are ascending to the left (or if you wish, descending to the right). Primary and secondary joints are not seen here. For all descriptions that follow in this article it is important to have a clear terminology for the faces of the blocks used: the relatively short fronts, or ends, of a particular layer are called here the FACES OF LAYERS and the long sides, the bedding or splitting planes, will be called SIDE-CLIFFS.

RULES for PLACING ROCKS

1. One layer, stratum or course, has to be the same width throughout its run in the crevice garden; all layers should be parallel to each other.
2. The dip, tilt or inclination of all layers is vertical or gently tilted towards the body of the formation.
3. Functional crevices should be a maximum of one inch wide.

ACTUAL PLACING OF ROCKS

The size of the pieces of rock available will make a difference both to the scale of the project that can be attempted and also to a number of practical aspects.

A. REALLY SMALL FLAKES. These are the easiest to obtain, they are cheap and cheerful, but their abilities to insulate are not as good as larger ones. You can make miniature crevice gardens in troughs with them and fill the top of old frames. If you stack them one above another – in each layer – to obtain deeper crevices, an old scree can be partly fortified with them. A few extra-

low ledges or one ridge copying the surface of the scree can be decorative and very functional.

B SMALL FLAKES. In a flat garden, after some excavation, you can prepare a couple of low mounds and cover them with standing layers of flakes. From the side-view the outcrop has two ridges under an imaginary low curve: miniature side-cliffs ascending step by step to the level of a ridge and descending to the lowest level at the opposite side. The faces of layers are gently tilted from the highest point to ground level in long returns.

C. SLABS AND FLAKES. Narrow slabs, on edge, give maximum height for minimum weight. They are placed first to erect a side-cliff at the highest point of an outcrop, or the side-cliffs of a series of ledges at different levels. They are well anchored into a mound and fixed with some wooden supports to a slightly back-tilted position. Later they are well supported by other layers behind them. To get the optical illusion of a solid cliff, we often overlap the slabs, hiding the vertical joints. Furthermore, two overlapping rocks can be of different thicknesses because overlapping places them in two or more different layers. To have natural returns of an outcrop in a flat site, the upper surfaces of the slabs in the side-cliff must be tilted down to follow an imaginary arc above the crevice garden. All layers behind them must be curved down in the same way. Every good design for a crevice garden incorporates variety in the pattern of layers and variety in the elevation. So in practice we pack narrow layers behind broader side-cliff slabs towards a layer of slabs which are forming a side-cliff at the opposite side of the outcrop. So, remember that it is natural and practical to have slabs forming the edges of ledges, and behind them layers from flakes.

When we work with igneous rocks we are invariably short of nice slabs with two parallel sides. Our tactic is to use good slabs only to create the sides of a block of rocks. First "a frame" is made, where longer sides, from slabs, are connected at their ends with courses of flakes. After that the inside of the block is filled with soil and covered with courses of smaller more irregular flakes.

D. CREVICES AND FISSURES. To keep all layers parallel, a string line is useful. Flakes selected for each longer layer are never all exactly the same width. To compensate for this failure one edge of each rock is placed directly under the string line concealing any irregularity of the opposite edge in the crevice, where it can be disguised by plants and stone slivers of surfacing. In