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A REMARKABLE IAPIAZ TOPOGRAPHY IN THE
SOUTH OF CENTRAL MEXICO

At the western part of the State of Mexico, almost at the border with the State of Michoacan, 110 kilometers west-southwest of Mexico City there is a picturesque town: Valle de Bravo. It is located at one side of the bottom of a depression with more or less an elliptic shape and oriented southeast to northwest.

Just by the town at the lowest part there is an artificial lake, seven kilometers long and two kilometers wide as an average. This lake is part of one of the main hidroelectric systems in the country, the "Miguel Alemán".

The relief around the lake is mountainous with mostly moderate slopes.

Massive limestone is the base structure of a large area which includes the one mentioned here and volcanic material predominates at the surface. Near the lake metamorphic rock from old sediments is found.

In aerial photographs taken about 25 years ago it can be seen that before the dam was built the bottom was a cultivated flat plain. A small meandering river ran along the plain. Some other streams did not reach it and they ended in swallow holes.

There are also some springs which indicate the circulation of underground water in the region. One of them is two kilometers from the northwest end of the lake and about 100 meters below its level. Another one is north of the lake and somewhat above its level.

Beside the lake there is a hill of massive limestone locally known with the name of "La Peña". On top of this hill there is a well developed lapiaz topography.

All these characteristics make us think that the lapiaz is on the hum of a polje whose evolution was interrupted by volcanism.

Even though as it can be seen, this region has some very interesting aspects in its morphology, this paper will deal only with the lapiaz topography.

The main lapiaz forms are striae on the outer surface of the rocks. These striae are parallel among them and sometimes very uniform. They generally measure two to three centimeters wide and run vertically. Where the rocky surface is smaller or where a step is formed, two or more striae can get together and form a bigger one, on the contrary, if the surface increases, the crest between two striae can branch in two.

The mechanic action and chemical dissolution of the rain water can be clearly seen on the striated rocks, that have a hole on the top where water accumulate and is dislodged by a lateral enlarged stria, or by several that have united forming a bigger one. /Photo 1./ In some of the rocks a well defined drainage system can be seen.

The limestone besedes being massive is intensely fractured and the water that penetrates in the vertical fractures accumulates in the bottom where it produces a stronger dissolution on the sides. The evolution of these fractures divides the rocks forming two isolated ones. /Photo 2./

Along the bedding planes small cavities and holes are formed by dissolution, which are alined even if the rocks have remained isolated one from the other.

The top of the hill is constituted by a series of truncated pinnacles, which are scarce further down.

The pinnacle shown on the picture /Photo 3./ is hollow with a lateral entrance in which aproximatly 10 persons could fit standing up.

It can be noticed that some of the walls of the rocks are very thin, in others the interior is hollow so that if the rock is hit gently with a metallic piece, a short and weak sound, similar to a bell is produced.

Some of the rocks have cilindric holes of different sizes in them, which leads us to suppose that they where made by stalks and roots of plants that do not exist any more.

It is evident that dissolution process which has left all these forms is not recent.

The vegetation that is now found there is rachitic and the shrubs break the rock as they grow. Only between their roots small dissolution is found, but it is not sufficient to leave space for them to grow.

This indicates that besides a lack of organic acids, the air does not have the necessary elements as an abundant precipitation and great quantities of carbon dioxide, given by the plants, to help dissolve the rock.

On the other hand such a superficial modelling as the one given by the striae cannot be too old. It is possible that the last phase of development of the dissolution phenomenon and the formation of striae took place during the pluvial epochs of the Pleistocene and that the forms have preserved after wards under a layer of sediments. The characteristics of the hill are those of an exhumed relief. This is due to the scarce development of debris at the base, the lack of gullies in them and the breaking of the slope that limits it with the flat part. Besides the upper part which is more exposed to weathering is the one which presents destruction in the lapiaz forms.