Unit 10 GeoMation: Climbing the Canyon

At the bottom of The Grand Canyon, deep in its channel, flowing out of the page towards you is the glorious Colorado River. And next to the river, there are rocks that were sediments. They have been lava flows and other things. They have been bent in the heart of a mountain ranges. They have been intruded by granite. They have had the heck beat out of them.

And on top of them, there is an unconformity-- an erosion surface. Sitting on top of that erosion surface, there are various sedimentary rocks-- things that formed on the edges of a sea interbedded with lava flows. There are many erosion surfaces within that pile of sedimentary rocks.

And that is an immense pile of sedimentary rocks that has been dropped down by faults. If you actually try to measure the thing, you find that you get some thickness, and then you walk along the layer, and then you measure some more thickness. And the total thickness is actually about two miles of sediments in pile. And then on top of that, there is another erosion surface. That was the Grand Canyon Supergroup in that two-mile pile.

Sitting on top of this, the sea came in, and you end up with the Tapeats Sandstone, and you get the Bright Angel Shale, and you get the Muav Limestone. And then sitting on top of that, there was erosion, there are deep channels in places that were cut on top. And in those channels, one goes in and finds little bits of pockets of the Muav Limestone sitting in there. The sea had come in. The sea goes out, the sea comes back and puts in the Muav. It goes out and erodes again, and then you get the giant Redwall-- the great, massive Redwall.

And the top of that is also eroded. And it has some channels. And it wasn't until the 1980s, when, really, helicopter geology came in, that people realized that, in fact, some of those channels have little bits of limestone in them called the Surprise Canyon. The sea had gone out, it came back and put that down, it goes out, and there's erosion again.

And then sitting on top of this, we get the great rocks of the Supai. The Supai is ocean sediments-- limestones-- to the west, and it is a delta. It's up on land to the east. It's about four different units, and there's an erosion surface that goes at the end of each of those different units of the Supai.

The Supai then gave way to the mighty cliff of the Coconino. This is the sand dune rocks. This is the one that has all the beautiful tracks in it and so on. And on top of that, there's another erosion surface. Then there's sort of a mix of land and sea sediments that's known as the Toroweap that makes it a bit of a slope. And it has an unconformity and erosion surface.

And then sitting on the top of this is the cliff of the Kaibab Limestone, which gets up to the villages where you can go as a tourist. But this, in turn, slants down to the north. And underneath that, you're going to find Zion way up there, and then you're going to find Bryce, and so on, up through the giant pile of rocks.