Unit 11 GeoClip: Agate Chucks

All right, so what do you make of this, Irene?

I don't know. We see some different rocks here in the sandstone.

Yeah.

So I was wondering what they were.

Well, they're beautiful aren't they? Look at that, nice shiny ones. Those are agates. If those were sitting out here in the open, you could take them out, and cut them, and polish them. Make little earrings or pins or something out of them. And they're the same material as petrified wood. That's cool.

What kind of material is that exactly?

It's little crystals of quartz. You get these big crystals that people like to go oom about. Well, these are just lots of little tiny crystals of quartz. Silica. And they're sitting here in a sandbar from a river. This is a sandstone as you correctly identified, and we can see there's little cross bedding in it. But these cross beds are not the giant ones of a wind blown sand dune. These are the little curving ones of a river. And a river that can carry rocks like this. So we're sitting in a river.

Now, what do you make of them? Here somebody has broken this one. But what do you make of the sides like this?

You can sort of see that they're rounded.

They're rounded. And where do you suppose they got that?

Water flowing over them and particles hitting them?

Bouncing of particles hitting them, bouncing along in the river. But are they really rounded?

No, some of the edges are sharp. We see a sharp edge here.

Some of the edges are sharper. So they've been transported a little distance in a river. If you take one of these and go a long ways in a river, it gets really round. So these things have gone a little ways in a river, but not real far.

Now do you remember, the rivers are coming from the south pretty much along here, a little bit from the south and east, sort of going this way. Do you remember what's behind this? What rocks are we going to see when we drive 20 miles south of here?

We see some more sandstones.

It's the same stuff. We're in the Chinle from way north to here to way south of here. These haven't been carried very far, so they have to have come out of the Chinle. And then they were washed along and they were put back into the Chinle. So these are things that weren't really old when the river picked them up because they're coming out of basically the same beds. They have to have been formed right in these rocks that are around us. Probably very near the surface very quickly after muds were put down, and then they were picked up again and moved a little ways. And then put back down here. They're coming from slightly older rocks but not much because there's a little of this, but not too much difference.

So now, what can we say? This is the same stuff as the petrified wood. And we can see just by looking at this and what we know about the rocks, that this had to be forming right in the muds where the petrified wood formed. What does that tell us?

I think it tells us that there was a lot of silica.

Where is it getting silica?

Well, this area was once in a tropical area.

A tropical area. Do you remember--

Volcanoes.

Volcanoes. Down south of us here there's big volcanoes, and they're putting out glass. And volcanic glasses are often really full of silica. And they're full of silica. A glass is something that didn't have time to make a crystal. So the atoms in there are messed up, and they really want to dissolve and re-precipitate as crystals, the little crystals that make this up. So there's lots of volcanic glasses, and they're dissolving in the ground water. And then the ground water is taking that and putting them back down. And when it can, it puts it in a tree, and it makes a petrified log. If there's no tree to put it into, it will take a little spot. It'll take a worm burrow. It will take dung. It'll take whatever it can find and put it down and make agates and other things.

And so this is telling us that the hard water deposits here were going to be silica. They're going to be little crystals of pretty agate, and they'll go wherever they can go on. And so the petrified wood, it's an accident. But it's an accident that was waiting to happen. There's a reason why it's here.