Insider's Look at Grand Canyon

Webisode #29 – Interview with geologist & author Wayne Ranney Transcript

Ranger Patrick: Welcome to another webisode of Insider's Look at Grand Canyon. I'm Ranger Patrick and today's webisode is not taking place in the Grand Canyon, it's actually at the Museum of Northern Arizona. My guest today is Grand Canyon author, trail guide, and geologist Wayne Ranney. Wayne, welcome to the show.

Geologist Wayne Ranney: Thank you very much, Patrick. I welcome you to the Museum of Northern Arizona in Flagstaff, where this new exhibit, *Ancient Landscapes of the Colorado Plateau*, will help visitors to the Grand Canyon understand the rocks they're looking at.

Patrick: Well, I'm really excited to go over this exhibit with you. And I hope folks that listen to this podcast will stop by and see this exhibit. How long is it going to be here?

Wayne: The exhibit will be up at least through August of 2010, and likely, it will be up a little longer than that. Maybe up until Christmas 2010. So, if you're on your way to the South Rim of the Grand Canyon…(*unintelligible*).

Patrick: You know, you've already written a book, *Carving Grand Canyon*, but this exhibit is about ancient landscapes. Who did you co-write that book with?

Wayne: I'm the co-author with one of my former professors at Northern Arizona University, Ron Blakey. So, people who visit the Grand Canyon are, by and large, looking at a record of Earth history when they look into the walls of the Grand Canyon. Ron Blakey has studied the layers in Grand Canyon, Sedona, Utah, Colorado, and by putting many different studies…(*unintelligible*)…ancient geography was when the rocks in the Grand Canyon were laid down.

Patrick: You know why I'm really excited to interview you, is because I take your book, that you co-wrote with Ron, and I bring it on my Cedar Ridge hike, so that the ancient landscapes that you talk about- I can show those contact points to the visitors…(*unintelligible*)…and we bring it all together. I actually show the visitors your book. So, could you walk myself and our audience here through this hallway and through your exhibit and tell us a little bit about, you know, the layers, which is what Grand Canyon's all about.

Wayne: Well, I'm very pleased to hear that you use that on the trail. That is one of the uses of the book that we had hoped…(*unintelligible*)…beautiful rocks on the Colorado Plateau and the Grand Canyon. They could look into this book and see into the past. So, our exhibit here in the museum is laid out in a chronological way. We start with the oldest layers, as geologists always do, and we work our way up towards those layers that are the most recent in time. And in the main hallway here, the Katherine Chase Hallway, where the exhibit is…(*unintelligible*)…layers are exposed on this one wall that faces to the south and people will be able to see the evolution of the landscape as the Grand Canyon rocks were laid down.

Patrick: Let's go to that first layer.

Wayne: 525 million years ago. This is when the first horizontal layer of strata was put down in the Grand Canyon. We call it the Tapeats Sandstone. And, on every single one of Ron Blakey's maps, you're going to see the modern-day state lines and the modern-day county lines in every state. And that allowed to know where a specific place is in the modern landscape relative to the ancient landscape that's depicted. And when you look here on this panel, what you can see is an ocean just

about where the Grand Canyon is. And there's a shoreline and it was along that shoreline that the Tapeats Sandstone was laid down.

Patrick: Nice…(*unintelligible*)…how this whole book thing came together?

Wayne: Well, that's an interesting story because in 1979, I was one of Ron Blakey's students. And I took a historical geology class from Ron. I became interested in a historical view of the earth and I developed a career with it. I was a former park ranger at Grand Canyon, worked down at Phantom Ranch. I became a river guide then professionally, and that's when I became interested in writing about geology. So, I saw Ron Blakey at a professional conference and he was having trouble getting his book of maps published and I approached him and said, "Why don't we work together. I'll write the text, you're maps are already made." These are beautiful maps and people love them.

Patrick: So, some people write their books from a sort of technical standpoint- it's for other geologists. Some people, it's just sort of a picture book, and things like that. Where does your book lie for the public and for professionals?

Wayne: That's what really makes *Ancient Landscapes of the Colorado Plateau* a unique book. We have found in the fifteen months it has been published that both professional geologists and the general public who just visit the Grand Canyon find it useful. A regular person can look at this book and understand all these ancient landscapes left behind this strata. And a professional geologist can look at it and get their concepts across to other professional geologists by using these images that are contained inside the book.

Patrick: And what I like to let folks know is that the layers of Grand Canyon, long before the Canyon was actually carved down, that this was the edge of North America, the western edge. No California, no Nevada. Could you take us a few more panels down and share another unique layer of Grand Canyon stratigraphy?

Wayne: Sure. If we move on down here from 525 million years ago, the next panel…(*unintelligible*)…100 million years down to about 415 million. It shows the landscape when rocks in the Grand Canyon were either eroded away before we got here or they were never deposited at all- this is a geologic feature called an unconformity- but what we see is the early Pacific Ocean. It was complete ocean out to the west and North America existed to the east from this point of North America right here. All of this land that we call California, Nevada, Oregon, Washington was added onto the continent during the age of the dinosaurs. And so, we did not yet have land in that part of the world.

Patrick: I think I remember the term 'accreted terrains'. Is that the correct term?

Wayne: That's correct- accreted terrains. And before these terrains came in from the west and collided with North America it was just blue ocean from the Grand Canyon region on out to the west.

Patrick: Well, I don't want to everybody to get all the layers here. I want them to come here, see this exhibit, or see your book, and use it at the Grand Canyon…(*unintelligible*)…and take the last two layers and show us what's going on with that.

Wayne: Well, here we're standing in front of two panels called Permian Two and Permian Three and it takes us from a time period from 285 to 270 million years ago. And it was during this time that the upper four layers of the Grand Canyon were deposited. And starting with the Hermit Formation, then the Coconino Sandstone, then the Toroweap Formation, and finally, the caprock at Grand Canyon, the Kaibab Limestone or the Kaibab Formation. And you can see how the geography just very gradually changed between these four formations, because remember, we're only looking at about 15 million years…(*unintelligible*)…will notice in these panels is that the landscape has not changed a great deal from one formation to the next, yet it changed just enough that a different kind of sediment was left behind and that's how modern geologists are able to give these formations their unique names.

Patrick: So, in all these layers and being a ranger at Grand Canyon, like you have been, you know, we've got these great sandstone layers, limestone layers, mudstone layers, could you just give our audience a sum-up of, okay, we were at the edge of North America, what was making those changes to make those different layers?

Wayne: Well, that's a good question, Patrick. What changes actually allow…(unintell)…the climate changes. So, we talk about the Coconino Sandstone. We're looking at a rock unit that was deposited in a Sahara-like desert. The unit immediately above that is the Toroweap Formation and it shows evidence of being deposited along a shoreline. Well, if you study those formations just slightly away from the Grand Canyon, what you see is the Coconino Sandstone, from the Permian, was actually very close to an ocean. And what happened is, the climate changed a little bit, the seawater went up, and the Toroweap Formation began to come in. There's another thing that comes into it and that's the tectonics of the area. It will either lift the land or cause it to down warp and if you start to change the elevation of the land, then the seawater can have river deposits, or these sand dune deposits from wind.

Patrick: Well, this has been great stuff, Wayne. I really appreciate you taking the time out to come and share with us your exhibit. I hope folks come and get to see it. Would you be willing to join me in the Canyon, maybe this summer and explore this a little bit further with our audience?

Wayne: Absolutely. It'd be my pleasure to walk to Cedar Ridge and we can look and see some fantastic rock outcrops just in that first mile and a quarter, going down into the Grand Canyon.

Patrick: Well, folks, I hope you enjoyed this podcast and I look forward to sharing with you more geology from Wayne Ranney. Again, Wayne thanks for joining us on the show. We'll catch you folks on another Insider's Look at the Grand Canyon.