

CARVING GRAND CANYON  
AND OTHER IMPOSSIBLE STORIES TO TELL  
by  
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Each year, about 22,000 people go on river trips through the Grand Canyon. As river guides we are lucky to take these paying guests, many of whom have expectations that vary between life changing experiences for some, to those who just want a thrilling, whitewater ride. Whatever their expectations, guests may think that their guides will be familiar with the various theories regarding how the canyon formed. However, it's never been easy for anyone, even geologists, to talk about the origin of the Grand Canyon because there is no simple answer to the question. However, several short aspects of the story can be used to help passengers (and guides) understand this difficult topic. The trick is to find the parts of the story that interest you and become familiar with them. A working knowledge of the basics of geology or of this particular story can help, but no matter - if the stories resonate with you, they'll resonate with them.

An example of such a story is the intriguing idea that when the Colorado River was born sometime between 80 and 90 million years ago, it went the other way. When the ocean last retreated from the area of the Grand Canyon, it left a blank landscape upon which an initial river system was established. This early river had its headwaters to the southwest and it flowed northeast - exactly opposite the flow of the Colorado today! As unbelievable as this part of the story may be, it's ironically the one part that most geologists can agree upon.

Another useful story pertains to the curious fact that most of the dry tributaries in Grand Canyon have carved side canyons just as deep. Examples abound: Kwagunt, Unkar, Horn, and Specter. These drainages, which have no permanent water, enter the main river at grade (at the same level) and are within canyons just as deep as the Grand. People will be amazed when you point this out to them. The reason for this unexpected relationship is that it's not water that carves canyons, but rather the material that is carried with it in huge floods - the gravel, cobbles and house-sized boulders. This is what chisels canyons.

Theories formulated by a host of "geology all-stars" are good sources of material too. I never let a trip go by without reciting word for word the immortal but ultimately flawed observations of Lt. Joseph Christmas Ives ("the region is, of course, altogether valueless..."). After telling this story, you can bring up the one about the very first geologist to ever view the

canyon, John Strong Newberry, who just happened to be traveling with Ives. He had a much more informed and favorable response to the canyon (“to a geologist, it is a paradise.....”). The larger lesson illustrated in this difference of reactions to the canyon is simply that perspective is everything! Use this story if people begin to whine on a hot hike.

You can describe how the river once went the other way - not only for its own shock value but also in order to tell how it eventually “turned itself around”. This one idea is the “rocky rapid” that has “snagged” many an attempt to tell the Grand Canyon story. But some things can be said about it. A northeast flowing river system may have remained upon the landscape in some form until about 17 million years ago. That’s when the San Andreas Fault was born. This pivotal event in the Grand Canyon story lowered the area to the southwest of the canyon and as it ripped open the Gulf of California, runoff became directed towards it. Perhaps the specific course of the Colorado River was already etched upon the landscape by this time; perhaps even some incarnation of the Grand Canyon was already carved. But by about 5.3 million years ago, the Colorado River was flowing southwest on the Colorado Plateau and into the Gulf of California.

The canyon became much deeper during the Ice Age, when large volumes of water traveled through the canyon. In combination with the lowering of the western canyon along the Toroweap and Hurricane faults, these huge meltwater floods scoured the bedrock. Perhaps only as recently as one million years ago, the Vishnu Schist and Zoroaster Granite were exposed, creating the three granite gorges. As the river’s track was deepened, other forces of erosion such as under-cutting and gravity made the canyon wider, revealing the spectacle we see today. Although you may be interested in other aspects of the story, those above could help you reach your greater potential as a storyteller. The important thing is to identify the stories you like and become familiar with them. There is much intrigue and mystery that will facilitate your telling of these origin stories and even though no one may ever know the specific details of how the canyon formed, we all remain humbled by the results! Admittedly, the story has been difficult to tell because it’s been difficult to decipher. But perhaps it will get easier as a wider audience shares in the discussion. Read “Carving Grand Canyon” and use whatever parts of the story resonate with you. Happy storytelling!