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The Great Unconformity Day Trip (20180524)

When I first heard the term "great unconformity" I thought it was the kind of title that I might aspire to. However, after buying a tract house in suburbia I've pretty much sacrificed my unconformist credibility.

But then I learned that this was actually a geology term.

A basic tenet of geology is that when you find layers of rock, older rock is on the bottom and newer rock is higher up. Relative dating, radiometric dating (analyzing the nuclear decay of radioactive elements found in some types of rock), analysis of fossil records and other techniques help geologists determine how old different rock layers are. These techniques and analyzing the regional extent of those layers have helped geologist understand the land-building that occurred millions and billions of years ago.

An "unconformity" occurs where there is a significant time gap between two layers of rock. These generally represent a period where either there was no land-building or the rate of erosion outpaced any land-building. Unconformities that represent gaps of a few million years are fairly common.

There are a couple unconformities in the world that represent gaps of tens to hundreds of millions of years – even more than a billion years.

The best known of these is Powell's Great Unconformity that underlies a chunk of the western US. It is visible at the bottom of the Grand Canyon, where the underlying metamorphic and igneous Vishnu Basement Rocks meet sedimentary Tonto Group and Grand Canyon Supergroup layers. The gap between these layers spans as much as 1.2 to 1.6 billion years in places.

Nevada's Basin and Range Province was created as large blocks of the earth's crust in what is now Nevada cracked apart and tilted, resulting in what are now the state's many mountain ranges. Layers of rock are routinely visible on the face of these blocks that tilted up.

Frenchman Mountain on the east side of the Las Vegas Valley is the result of one of these tiltings. Located on the (major earthquake threat) Frenchman Mountain Fault, its west face has tilted upwards and now rises almost 2000 feet above the city's eastern suburbs.

And – it turns out – an easily accessible segment of Powell's Great Unconformity is exposed here.

The Great Unconformity. Pretty cool, don't you think?

On the right are the Vishnu Basement Rocks. On the left are layers of the Tonto Group, and in particular the Cambrian Period (Paleozoic Era) Tapeats Sandstone. The time gap between these layers represents 1.2 billon years of missing geological history.

A natural arch is visible across the highway.

A hiking trail leads from the Great Unconformity up to this view of the Las Vegas Strip with the Spring Mountains in the distance.

And in the hazy distance is another famous Vegas geological feature.

As those big blocks of Nevada's earth crust broke apart and tilted up, some of them got pushed up on top of other blocks, what's called a thrust fault. One consequence of this is that we now have older rocks on top of younger rocks.

There is a series of thrust faults that run across the western US, with one of the most visible and easily accessible of these being the Keystone Thrust Fault. Just to the west of Las Vegas, Red Rock Canyon National Conservation Area's Calico Hills consist of 180 million year old colorful Aztec Sandstone. The grey limestone of La Madre Mountain that towers behind the Calico Hills was deposited between 250 and 500 million years ago.

Not part of my day trip today, but here's an older picture I took of the La Madre Mountain and the Calico Hills during a flight to Vegas:

So if you ever find yourself stuck in some Las Vegas hotel for a weekend wondering what the heck is there to do in this town, I'd like to suggest that you check out both the Great Unconformity and the Keystone Thrust Fault.

(Of personal note… A few years back I learned that a thrust fault resulted in a layer of older shale ending up on top of younger limestone at Craighead Quarry, near Dailly, Ayrshire, Scotland. Analysis of rock layers and fossils found at the quarry helped support the now generally accepted theory of plate tectonics in geology – and geologically connect this part of Scotland to Ireland and North America. This is personally interesting because my great great grandfather was born at Craighead.)

Back to my day trip…. After leaving the Great Unconformity I continued east towards Lake Mead National Recreation Area, but I stopped when I came across a turnout for Rainbow Gardens Area of Critical Environmental Concern. It's a hiking area, but I just made a photo stop here.

There's a stretch along Lake Mead I hadn't driven along before, so that was my plan before heading to Boulder for a late lunch. The lunch was made later when I stopped to check out the Wetlands Trail.

This is the Wetlands Trail. Wetlands, you ask? Keep in mind that this is the Mojave Desert.

And actually there is a ribbon of wetlands that indeed lines the Las Vegas Wash as it approaches Lake Mead.

Las Vegas Wash reaches Lake Mead's Las Vegas Bay.

The Las Vegas Wash is the main drainage for the Las Vegas Valley, and it picks up the treated wastewater from the city of Henderson. It actually flows through pipes underneath artificial Lake Las Vegas (built as a resort and upscale residential area), but the builders of Lake Las Vegas acquired water rights in less drought-ful times, so that lake gets its water from Lake Mead.)

View of Lake Mead from one of the scenic overlooks along Lakeshore Drive. Much of this would have been underwater had 20 years of drought not lowered water levels at Lake Mead.

This ended my sightseeing. Off to Boulder for lunch.

What? No petroglyphs, you ask?

I didn't see any petroglyphs on this day trip – and I wasn't expecting to. But for those of you who think a road trip report without pictures of petroglyphs is like a day without sunshine, I'll throw in an old picture of one of my favorite petroglyph panels.

The Big Foot Panel, McConkie Ranch site, near Vernal, Utah (2011)