

"Pendants Big and Small"

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Four Peaks looms on the skyline east of Phoenix, Arizona

Dominating the skyline east of Phoenix and Scottsdale, Four Peaks is one of the most recognizable of central Arizona's mountains. Locals consider it to be one mountain, so I won't say "Four Peaks are ...". It's one of Arizona's landmarks for which little pondering is required as to how it got its name!

Geologically, it is a piece of landscape art, and the way it formed is almost counterintuitive. You might think that the four summits we see so easily are big piles of rock that were molded into shape on top of the older, lower slopes. But that would be wrong! The rocks of those four summits were there first. Then the granite below was added!

How, you might ask, could that be? Well, the makeup of the Earth's crust is a complicated thing, and is not always what it seems. Geologic time, and the forces that have moved things around throughout the history of the world, always seem to combine to give us an interesting story.

If you drive out the Beeline Highway (SR87), by the time you are about 15 miles from Fountain Hills you will be near Milepost 200, and you will be looking at Four Peaks on your right (east). Even better, go to near Milepost 204 and turn onto the gravel road marked "Four Peaks", and you can get a few miles closer. You'll be able to see that the mountain is basically made of two rock formations. One is a continuation of the bedrock you may be standing on: granite. The other forms all four of the peaks. The dividing line between these rocks

is more or less where the slope breaks, just below the notches between the peaks.

About 1700 million years ago, during what we now call Precambrian time, our area lay on the edge of an old continent -- an area probably much like today's Gulf Coast near New Orleans. All of the sand and muck that came down the big rivers from the interior got dumped into a big basin, like the present-day Gulf of Mexico. There it piled up, got buried, eventually hardened, and was baked into thick, resistant layer or slab -- very hard rock we call *quartzite*.

Several hundred million years later (not really a long time in geologic terms) the immense forces that constantly reshape the Earth's surface crumpled the land and its many rock formations from side to side, pushing up great mountain ranges that actually extended all the way over to where today's Great Lakes are. Geologists give this little event a nicely sensual name -- the *Mazatzal Orogeny*.

During all of that pushing and shoving a lot of the rock below was very hot. Molten granite, in fact, and here's where the art work comes in. For whatever reason, in the area of the future Verde River valley, the underside of the above-mentioned quartzite slab was very unevenly shaped. Maybe it started out that way; maybe it got shaped by the pushing action of the molten rock, pulsing up from below. The result, in any case, was that monstrous chunks of the quartzite now hung *down* into the granite. Four of them.

Granite erodes away more easily than quartzite. It breaks down into crumbly rock grains, some of which those of us who hate mowing lawns use for landscaping around Phoenix. So the granite around the four big masses of rock slowly wore away, down, down, into rolling hills and slopes and surrealistically shaped boulders that make the Beeline such a scenic drive. The four big peaks towering above the trip to Payson even have a geologically technical name: *roof pendants* -- remnants of a much more vast layer of quartzite; a layer of one-time mud and beach sands and sea-side days gone by.

These big pendants give rise to little pendants -- sparkling, beautiful little pendants in the form of the vivid purple gemstones we call Amethyst, mounted into jewelry (yes, not only pendants, but ring stones, earrings, and all other wearable forms). You see, up there on

southernmost of those peaks, is one of Arizona's (and America's) treasures: the Four Peaks Amethyst Mine. Deep inside the quartzite, and way in the past, networks of fractures formed where quartz-rich solutions grew beautiful quartz crystals. Quartz is a mineral composed of silicon and oxygen, and the purple variety is called Amethyst. The crystals are now mined and cut into gems, which in this case are considered to be within the world's finest grade of amethyst.

You can even wear one -- a little pendant cut from a very big one!

Author's note: Besides being very inaccessible, the Four Peaks Amethyst Mine is on private property and is completely closed to the public.

--- Richard Allen

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