

"Time Travel & Other Everyday Things"

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Ferruginous quartzite (dark rocks) in Phoenix Mountains, Phoenix, Arizona

When I was young, growing up on the brown, flat Cretaceous rocks of central Montana, I used to fantasize about dinosaurs. It's what got me into geology in the beginning, I guess. I was taken by the idea that where they roamed was right *there*, in the *same physical space* I was in at the time. Just about eighty million years earlier is all. Maybe a Tyrannosaurus Rex had actually walked across the ground occupied by my bedroom!

People tend to visualize scenes from the distant past as though they were necessarily somewhere else. In space, I mean. But there were alien landscapes *right here*, just not *now*. This idea is conveyed in H.G. Wells' classic novel "The Time Machine", now recently made (actually remade) into a movie. The movie does horrible justice to the original story, but you get the idea by watching the Time Traveler in his machine, sitting in one spot, with the "hours-days-years" odometer rolling on in a blur. He starts the machine and his journey through time in his laboratory in London. At one point (in the book) he "lands" in a rhododendron garden looking over the River Thames, surrounded by alien structures; in another scene he is on a barren beach in the distant future, watching a dying red sun setting into a future ocean of dead, spent waters. All those scenes occur in the same *place*.

Back to Phoenix and *now*, in which the landscape is far different from way back *then*, let's say, in Precambrian time, for example. Take a drive on SR 51, the Squaw Peak Freeway, where it cuts through the

Phoenix Mountains, just to the northwest of Squaw Peak, and you will see what I mean. If you are going north, look off to the west (left) just after you have passed the Northern Avenue Exit; if you are going south start looking west (right) about the time you get to the Exit ramp. If you like to walk, you can park in the Dreamy Draw area, and approach this area from one of the trails in the Phoenix Mountains Preserve, a city park.

About half a mile away, up on the east slopes of those rugged rocky peaks you will see dark brown, almost black areas of broken up rocks and rubble. Some of this rock forms a pointed outcrop just at the south end of that set of hills, and is also visible elsewhere in the Park. There are a few houses (with great views of the Valley, to be sure) to the north of these rocks, near a saddle.

What you are looking at are the remains of ancient, submarine hot springs -- very ancient, and very submarine, from the bottom of an ancient ocean. These rocks have the wonderfully technical name of "ferruginous quartzites" and the hot springs that formed them erupted, seethed, and bubbled about 1700 million years ago, at the bottom of a vast sea whose only occupants were life forms so primitive that you would have needed a microscope to get their names. The hot springs were rich in iron, and those iron minerals give the rocks their current color.

The Phoenix Mountains are made of a section of the earlier crust of Earth where the rocks were formed in an environment somewhat like that off the coast of present-

day Japan. If you were to walk from the freeway in Dreamy Draw over to Shaw Butte (about 4 miles), you would be going right down through rock section (now standing on end, basically), that shows the whole evolution of that environment. If you were going to strap yourself into Wells' Time Machine, and dial up, say, April 10, 1,700,000,000 BC, you had better already be wearing your deep-diving equipment!

Our planet's crust is in constant motion. The shapes of the land masses we know today are as ephemeral as the shapes of clouds in the sky. The continents move about relentlessly, literally floating on top of more dense

fluid rock below. Heat from deep within the Earth sets huge convection currents into motion, causing continental rocks above to glide about, sometimes crashing and fusing together, sometimes splitting into new shapes, all of it happening all of the time, just in too slow of a fashion for us to grasp easily.

Our journey through time would take us to the edge of one of these land masses, where heat from the gargantuan convection cell below has broken through, boiling the waters, and creating a primordial soup in which early life prospers.

--- Richard Allen

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