TECTORIC PETRAMETER

By Esther Posner

Geologists study the Earth to learn our planet’s natural history. But the reason behind the planet’s birth still remains a mystery. Won’t you join me on a very special journey through geologic time? Four billion, six hundred million years have passed so please don’t mind me if I move somewhat fast through the story. Rocks are the geologist’s inventory of information. They give us clues to their formation. Ever since its creation, the Earth has been dynamic and constantly changing. All of our panoramic views are always rearranging themselves ever so slowly over time.

The oldest slice of time is called the Precambrian which is broken into three, beginning with Hadean, and as you can see, our Earth is thought to have been covered by a sea of magma! Could you have handled it? A bombardment of meteorites also hit and continue to hit our planet.

The Archean came next and it was a blast. Tectonic plates were smaller and they moved pretty fast. In an enthusiastic flash of ash, volcanic islands smashed together. I don’t know whether it’ll bring you to tears or in paradise if you please, but the reason behind the planet’s birth is this coral’s tropical preference. A topical reference to form what today we say was Pangaea. An important idea to keep in mind is that Earth’s crust, climate, and chemistry rearranged their growth roamed both the sea and the land.

The last third of the Precambrian is called the Proterozoic, which means “before life”, but now we know it is not true because early Earth creatures occupied the ocean blue. But there was no life on land, no plants or trees, so the brisk breezes and bleak rains drained the land of its debris. And although it may seem ironic, tectonic forces broke apart and set micro-continents onto separate courses that would collide and divide again and again. Our friend, the Earth, is always changing and rearranging its crust.

It must have been a strange sensation for the Earth to experience a global glaciation. A planet of ice! A real snowball Earth! But it may have been this climate catastrophe that eventually gave birth to complex critters who began to grow once the snow began to go away. After three billion years of single-cellular life, multi-cellular life was here to stay! Sometimes more than other times.

A planet of ice! A real snowball Earth! But alas, Pangaea would break and move some land mass began to break itself free, including our friendly amphibians who terrorized the mafic floor. More and brand new oceans formed their shores and their daughters, “Kids, stay away from the squids.” Quite forbidding were the cephalopods, ancestors of octopi, who terrorized the trilobites who were living nearby. And all I can say, with a heavy sigh, about the end of the Ordovician day is that almost everything would die.

Although somewhat covered by frost, all life was not lost. And without too much grief, the Silurian boomed with reefs. Corals like colonies spread throughout the seas including our friendly Hexagonaria, commonly called Petoskey. A topical reference for Earth’s geographic change is this coral’s tropical preference, which means that Michigan was latitudinally rearranged! Warm waters flowing below the equator, in paradise if you please, while the land was slowly filling with trees. This was new!

Vascular plants made their biologic debut and fish with jaws joined the sea life stew.

Now if you visit the Smithsonian stage, you’ll see fish fossils of Devonian age for the Devonian was the Age of Fish. Don’t you wish you could have a dish of that fish?!

Some had vertebrae the size of flagpoles while sharp-toothed sharks patrolled. Coal was just beginning to form on land as plant life continued to expand and even the fish began to stand! Amphibians appeared queerly and in their growth rotated both the sea and the land.

Now it’s time to get down with the Coal Swamp Stomp! Tap your feet to the beat of the formation of peat like a plant plantation soaking up the bright heat. Earth’s two massive continents began to creep their massive way into each other to form what today we say was Pangaea. An important idea to keep in mind is that Earth’s crust, climate, and chemistry change slowly over long periods of time.

This is what rocks tell us—and sometimes in rhyme.

The Permian Period is the final chapter in the myriad of curious details from the Paleozoic—and what a stoic time. Pangaea was in full form and environments were transforming, informing its living inhabitants of an upcoming storm. Ninety-six percent of all life ended up succumbing to it—but don’t be too forlorn. Life would certainly be reborn in a brand new form.

Following the distinctly disturbing extinction of Permian life, the rebirth of the Triassic seemed enthusiastically fantastic. In fact, the Mesozoic was quite heroic for all the reptile fans and dinosaurs began to span the grand land mass. But alas, Pangaea would break and move some more and brand new oceans formed their mafic floor. Did anyone hear the roar of that shrew? Our planet’s first mammals made their hairy debut in the terrific Triassic.

Now when I say Jurassic, you think Jurassic Park. But let’s embark a little deeper and shed some light into this dark. Birds first flew in the skies above and frogs and salamanders also made their debut show. Just like a glove, the coasts of Africa and South America fit perfectly and in the Jurassic, this land mass began to break itself free.

*Author’s Note: The word queerly is used in a purely non-derogatory way as in the traditional definition of the word meaning strangely or oddly.

The author performing her poetic timescale in Centennial Hall at the University of Arizona. 

Photo Credit: Marty Pepper

KABOOM!!! Did you hear that?! It sounded like an explosion! Life in the Cambrian was filled with multi-cellular motion. We now enter the notion of time that is called the Paleozoic – and what a stoic time. Shelly sea life occupied the oceans and trilobites were in their prime. In came the seas and drowned up lots of land and even Michigan was underwater and didn’t look much like a hand.

In the Ordovician, the seas may have seemed interesting for fishing, but the most important event that began to expand was the emergence of plants and mold on the land. Life still flourished in the serene waters and marine parents probably cautioned their sons and their daughters, “Kids, stay away from the squids.”

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forming a narrow but expanding sea that would eventually be the Atlantic Ocean. Blessed be.
The Cretaceous was sensateous with a chalky aftertaste. We can learn a lot from the dinosaur bones encased in rock as Earth’s clock ticks on and on, as life continues to be drawn to spawn until everything’s gone. Hey, don’t yawn at the writing on the wall! An exciting mass extinction is so enthralling! All in all, destiny may be stalling the final blow but at the end of the Cretaceous, as we’re beginning to know and act more philosophic about, an impact and catastrophic route caused the Earth to react. And the fact of the matter is the matter of fact. Dinosaurs eventually died out and they never came back.

But have no fear! That mass extinction occurred 65 million years ago and so much continues to slowly change; it’s holy yet strange. The Cenozoic heroically introduced the Age of Mammals, which gave a boost to the existence of us. Can you believe that I have barely discussed us? Earth history is just so long! It’s so much more than this song’s rhyming refrain can contain. It’s not even within the scope of a professional telescope. Its worth is beyond the range of the New York Stock Exchange and things just keep changing and changing and all so slowly rearranging over time. It’s more than enough to blow your mind! It’s the stuff that fills the deepest geologic time. It’s the climbing to the top of the mountain peak and stopping to catch your breath but before you can speak, erosion has erased the mountain to the ocean’s deep.

And it’s all about scale and without fail, CHANGE is the Earth’s constant prevailing force, which provides for interesting discourse, of course. But we still don’t know the source of this cosmic sorcery or just exactly what it means to be alive and to be free, to feel and to be. It’s a mystery but we can learn a lot from history. Like in the Pleistocene, beginning 1.8 million years ago, much of the Northern Hemisphere was covered by glacial snow. And I mean an ocean of ice, which shaped our landscape up real nice and filled our valleys with various types of rocks, which geologists consider to be the Earth’s natural ticking clock. It shouldn’t stop so don’t worry about hurrying it up and be sure to avoid those Styrofoam cups. It makes a difference what we consume so please don’t assume that the Earth was created just for you. Just coexist with Nature and that should do. That should do.

We are brewing up our knowledge and filling colleges with folks who acknowledge the importance of our granite-bearing planet. Can you stand it as you stand on it? It’s micro, it’s macro, it’s quantum and fun. It’s exciting and living thanks to radioactivity and the Sun. Has the story only begun? And are we the only ones? The universe doesn’t really seem that lonely or secluded, but the human quest for knowledge is hardly concluded. And now it’s our turn, this generation-tech,

The author won the Geological Society of America’s Best Student Presentation Award in 2008 for her memorized performance of Tectonic Petrameter in a Geoscience Education session related to alternative ways to teach the geological time scale, which has since been performed extensively throughout the US and Europe. Posner’s geology-inspired poetry and music will be featured in a 2024 US-based tour of “PhD, The Musical”. Contact eposner.elements@gmail.com for more information.

Calling all geo-poets! The natural world provides a wealth of inspiration for creative expression. Elements wants to hear your voice. Please submit your geoscience-inspired poetry/prose (<2000 words) to eposner.elements@gmail.com