Green Scene: Welcome to the Anthropocene?

by Elaine Golds

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Yet another year has rolled by and we are now into a new one. However, it's not just a new year that we have entered. Some geologists are suggesting the planet has reached a new epoch they have named the Anthropocene because so many of its characteristics are due to the human race. Exactly when we transitioned into the Anthropocene is also open to discussion. It could have occurred when fossil fuel combustion began in earnest about 200 years ago or, perhaps, in the 1940s when atomic bomb explosions left behind a signature of radioactive chemicals in the earth's soils. Significant geologic transitions typically take place over many years.

Scientists divide the more than 4 billion years planet earth has existed into major periods which are distinguished from each other by their characteristic life forms, traces of which are left behind in rocks as fossil records. There have been 5 major geologic periods starting with the Precambrian when primitive life first evolved. The Precambrian was followed by the Paleozoic, Mesozoic, Tertiary and, finally, the Quaternary which is where we are now. These major periods are further subdivided into epochs in which species composition and planetary conditions were sufficiently distinct to be able to characterize each epoch.

Some people will be familiar with the division between the Cretaceous, the last epoch of the Mesozoic and the beginning of the Tertiary period. This famous transition, the so-called K-T boundary, occurred 65 million years ago when a large meteor crashed into the Gulf of Mexico. The resulting impact threw so much debris into the atmosphere that it blocked the light of the sun for many years which chilled the planet and essentially caused the death of the dinosaurs and initiated the rise of the mammals. Such definitive transitions between geologic periods and epochs are thought to be caused mainly by extraterrestrial impacts, volcanism or major tectonic shifting of the continents. Such catastrophes result in the extinction of many species and create opportunities for the evolution of new forms of life.

Human beings appeared for the first time during the Quaternary about 200,000 years ago. Our numbers remained low for the first 150,000 years or so but, as the ice ages waned, our population began to slowly increase and spread across the planet. The epoch in which we have been living since the end of the ice ages, the Holocene, has been a time of stable and benign climate. Human beings have grown to a population of 7 billion over the last 12,000 years. In essence, life during the Holocene has been very good.

Now, some geologists are declaring an end to the Holocene. They point out the impacts of the human race on the planet have now altered the composition of the atmosphere and the oceans and triggered a significant rise in the rate of extinction of other species. Estimates are that 80% of the earth's surface has now been altered by human activities; agriculture alone now accounts for the use of 38% of the planet's ice-free lands. Scientists who study the deposition of pollen from plants into lake beds can easily spot the transition in this pollen record from biodiverse forests to the few crops we grow for food and the invasive plants we have inadvertently moved about the planet. Today, humans and domesticated animals account for 90% of the weight of all the vertebrates in the world, up from 0.1% at the beginning of the Holocene.

Biologists calculate, if current extinction rates persist, the earth will experience another large mass extinction event similar to the events which characterized the transitions between the major geologic periods. But this time, we won't be able to blame it on a meteor or volcano. Excess nitrates from fertilizers applied to agricultural fields are being washed into the oceans where they are creating vast dead zones at the mouths of the great rivers of the planet. Mining and construction are now moving four times as much soil and rock as do the world's glaciers and rivers. Carbon dioxide from the combustion of fossil fuels is warming the planet and acidifying the oceans. The earth is changing.

As we carry out our daily activities within the confines of cities, it is all too easy to remain oblivious to the massive alterations humans have wrought upon the entire earth. But we need to be aware of the changes we are inadvertently making because dealing with their consequences presents huge challenges. The more I think about it, the fonder I become of those good old days in the Holocene. As the comic strip character, Pogo declared on Earth Day in 1971, "We have met the enemy and he is us".