

PENNIES ON THE RAILROAD TRACKS

The Swedish scientist and engineer, Svante Arrhenius, published his ground-breaking paper in 1896. He called it, *"On the Influence of Carbonic Acid in the Air Upon the Temperature of the Ground."*¹ It was the pioneering scientific work that laid out what today is called the science of global warming and climate change. In the paper he demonstrated that the greater concentration of carbon dioxide and water vapor (the "greenhouse gases") in the atmosphere, the greater the capacity of the atmosphere to retain heat. So an increase in carbon dioxide in the atmosphere would cause an increase in air temperature. His insights encouraged Hans Heschger at the University of Bern, Switzerland, to further study and he demonstrated, among other things, that the rising concentrations of greenhouse gases in the atmosphere are the result of burning fossil fuels. Because fossil fuels are primarily carbon based, burning them releases carbon dioxide into the atmosphere.

The ratio of carbon dioxide molecules to all other atmospheric molecules is expressed as Parts Per Million, or PPM. Since the beginning of human civilization, the atmosphere contained about 275 PPM. Beginning in the 18th Century, however, with the rise of the industrial revolution, we began burning coal, gas, and oil to fuel our civilization. We took millions of years of carbon once stored beneath the surface of the earth and released it into the atmosphere when we burned our fossil fuels. About mid-century in the twentieth century, 1987, we reached the level of 350 PPM, estimated by climate scientists as the maximum level if we want to sustain our climate. Currently, in the early part of the twenty-first century, we have reached a level of 400 PPM. We are adding about 2 PPM each year. The greenhouse gas blanket is about 22% thicker than it was 50 years ago. We need to reduce our greenhouse gas level to 350 PPM within this century if we are to retain our current climate.

What impact has this rapid increase in PPM of carbon had upon the environment? In Alaska we have seen a dramatic shrinking of glaciers. When the visitors center at the Portage Glacier was built, the glacier was easily visible at the visitors center. Today it has retreated more than a mile. During his recent visit to Alaska, President Obama saw the retreat of the Exit Glacier at Seward, another dramatic reduction in size. In the Himalayas, the Gangotri Glacier retreated about 2 kilometers between 1780 and 2001 so that very soon India will face a huge, chronic fresh water shortage. The Uruashraju Glacier in the White Range Mountains of Peru retreated about 500 meters between 1986 and 1999. Glaciers are the source of fresh water upon which we depend to support life.

As fresh water bodies dry up and become marshes, mosquitos increase in number. The increase in mosquitos leads to an increase in malaria and dengue fever infections among humans. Often these are fatal illnesses; at least they leave their victims weak and subject to other infections.

Shrinking sea ice means threats to animals unique to the polar regions: polar bears, walruses, penguins, seals, sea otters. This year alone whole collections of walruses have moved to new land based places because their usual habitats have melted. Serious consideration is being given to naming polar bears as an endangered species. Seals and sea otters are diminishing in number. Penguins find it harder and harder to return to their traditional breeding grounds.

We are seeing an increase in severe weather leading to droughts and fires. As we meet, a major portion of California is recovering from fires that have left many people homeless with at least 1,000 properties that have gone up in smoke. Washington was also troubled with major fires. These fires are the results of droughts that have afflicted the west for several years. Haboobs (massive dust storms) have blown across central Arizona several times this summer and have even afflicted Nevada as far north as Reno.

My father was one of the many people who helped build Boulder (Hoover) Dam on the Colorado River. Lake Mead was created from the dammed up river and was an impressive body of water. It has been many years since I went to the shores of Lake Mead, but I have seen recent pictures. The lake has lowered by many feet leaving an unsightly white “tub ring” along the shore. A major cause of the depleting waters of the lake is the pumping nearly dry of the aquifer that is beneath the Las Vegas Valley in order to water the expanses of grass that make up the Las Vegas golf courses. When I was a boy, there were artesian springs in the valley. That is, in fact, why the railroad built a line through the valley: to capture and use the artesian well water for steam-powered locomotives. The artesian wells are gone, dried up. Indeed, rights to fresh water for agriculture and animal husbandry are, once again, becoming the source of “range wars” in the west.

As water from glaciers melts and flows into the oceans, the oceans are becoming more acidic. The acid in the water is impeding corals, clams, crabs, and other ocean animals from building shells and exoskeletons. If you enjoy Alaska’s abundance of sea food including king crab and salmon, then your food source is being threatened. The threat of acidic ocean water will be as great a threat to Bristol Bay as was the Pebble Mine.

Melting glaciers and the rise of sea water levels is threatening Barrow and Shishmaref and other Alaska coastal towns as the winter storms send pounding surf against the shorelines. To a larger world, loss of coastline in these communities may not be considered by many—except those who live there!-- a great loss. But what about the loss of the Mission District in San Francisco or the flooding of the One World Trade Center in New York or Boston Harbor or the Tidal Basin in Washington, D. C.? How devastating would another flooding of New Orleans be for the whole country? Rising ocean levels are threatening all the coastal cities of the world and the island nations such as the Maldives and Diego Garcia.

Global climate change can be measured by the increase in temperatures in the seasons of the year. The summer of 2015 has been the hottest summer ever since summer temperatures have been recorded and marks the 39th consecutive year of above average temperatures since 1911. This alone demonstrates that climate change is a real crisis.

The “mantra” of the environmental movement has been for a long time “reduce, reuse, recycle.” It is a good mantra for, indeed, each of us must take responsibility to address the crisis of the climate change that is upon us. But shorter showers are not enough. Thinking that using recycle bags at the grocery store is enough is like betting that pennies on a railroad track will stop a locomotive. Because we have become a consumer culture around the world, we are dependent upon oil and coal, the fossil fuels, to power our energy systems. Our value to the business community that pumps the oil and mines the

coal is our continuing consumption. Every product we buy is dependent upon oil and coal. So shorter showers will not be an adequate response to the crisis before us.

Pope Francis, addressing the United Nations General Assembly on Friday, 25 September, 2015, asserted the following:

“First, it must be stated that a true ‘right of the environment’ does exist, for two reasons. First, because we human beings are part of the environment. We live in communion with it, since the environment itself entails ethical limits, which human activity must acknowledge and respect. Man, for all his remarkable gifts, which ‘are signs of a uniqueness which transcends the spheres of physics and biology’ (*Laudato Si*, 81) is at the same time a part of these spheres. He possesses a body shaped by physical, chemical and biological elements, and can only survive and develop if the ecological environment is favourable. Any harm done to the environment, therefore, is harm done to humanity. Second, because every creature, particularly a living creature, has an intrinsic value, its existence, its life, its beauty and its interdependence with other creatures. We Christians, together with the other monotheistic religions, believe that the universe is the fruit of a loving decision by the Creator, who permits man respectfully to use creation for the good of his fellow men and for the glory of the Creator; he is not authorized to abuse it, much less to destroy it. In all religions, the environment is a fundamental good (cf. *ibid.*). ”

“The misuse and destruction of the environment are also accompanied by a relentless process of exclusion. In effect, a selfish and boundless thirst for power and material prosperity leads both to the misuse of available natural resources and to the exclusion of the weak and disadvantaged, either because they are differently abled (handicapped), or because they lack adequate information and technical expertise, or are incapable of decisive political action. Economic and social exclusion is a complete denial of human fraternity and a grave offense against human rights and the environment. The poorest are those who suffer most from such offenses, for three serious reasons: they are cast off by society, forced to live off what is discarded and suffer unjustly from the abuse of the environment. They are part of today’s widespread and quietly growing ‘culture of waste.’”²

The response we need to craft to the crisis of climate change requires that we work together in corporate responses. We already have the technology to implement many of these changes, but we lack the will. We need bold, creative, and major investments in alternative energy generation plants. It is commendable that we have wind generators on Fire Island and on St. Lawrence Island, but we need them all across the State of Alaska. Every effort needs to be made to equip every building with a south-facing roof with solar panels to collect the solar energy that goes unused. We used to harness energy from flowing streams by erecting dams, but we have learned that damming rivers is often destructive of fish populations. But the turbines used in dams could be adapted for use with waves. How much energy is lost with the bore tide in Turnagain Arm? One resource Alaskans have not used at all is energy generation from hot springs the way Chena Power uses the steam of Chena Hot Springs to power the resort. Iceland can teach us a great deal about harnessing hot water and steam as energy source.

We need to hold the manufacturing companies responsible to manufacture energy efficient machinery. It is the oil companies in collusion with the automobile manufacturers that keep us driving gasoline powered automobiles. We have the technology to manufacture automobiles with electric

motors powered by batteries or solar sources. If we can send humans to the moon, why can't we manufacture more energy efficient and environmentally friendly automobiles?

We need to hold our government responsible to create alternative energy sources and to pioneer us—lead us—away from our current destructive practices that are harming our only home. We must demand that the United States government agree to and implement greenhouse gas reduction agreements already in place and already signed by most other governments. We must participate in the United Nations Climate Change Conference scheduled for 30 November to 11 December, 2015, in Paris. The goal of the conference is to keep 80% of fossil fuels in the ground and finance a just transition to 100% renewable energy by 2050. We need to campaign for and elect government leaders who are more enlightened about climate change and are as committed as Pope Francis is to addressing the crisis. We need to boycott oil, gas, and coal companies that are addicted to fossil fuels. We need to divest from oil, gas, and coal companies so that we choke off their funding to keep doing what they have been doing and are forced to adopt environmentally friendly practices and products.

The American song writer, John Denver, sang a song: "It's about time we start to see it: The earth is our only home." All of our explorations in the solar system so far indicate that Earth is unique, that this is the only planet friendly to hosting our species. So it is time to consider your personal answer to this disturbing question: "On what planet or heavenly body will you live when this one is ruined and used up by human destruction of the environment???"

¹Arrhenius, S., 1986. *On the Influence of Carbonic Acid in the Air Upon the Temperature of the Ground*. Philosophical Magazine and Journal of Science, Series 5, Vol. 41, No. 251, April, 237-276.

²Pope Francis. 09/25/2015. *Speech to the UN in full*. The Guardian. www.theguardian.com/environment. Pages 2-3.

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