Green Scene: The Gift of Glaciers

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[photograph]
[caption: The yellow and white flowers of stonecrop and mouse-eared chickweed create an attractive display among the rocks in the alpine of Cathedral Park.
Bruce Brandhorst photo]

[Title in Tri-City News: Glaciers created rich soil full of helpful nutrients]

Of the many benefits provided by natural processes, fertile soil is likely the most significant. Creation of soil begins with the action of glaciers and eruption of volcanoes. Here, in the Pacific Northwest, we have been blessed with both forces of nature. The glacial grinding down of mountains followed by repeated cycles of freezing and thawing creates a substrate for hardy pioneer plants in alpine areas. Over time, their growth and subsequent decay adds valuable organic matter to this nascent soil. Carried by seasonal water flows, some of this soil is washed down from the mountains to collect in level areas that become rich floodplains. In North America, the action of mile-thick glaciers during the ice ages ground up mountains on a colossal scale and left us with an abundant legacy of what we call "earth".

I was reminded of these processes on a recent trip to enjoy alpine blossoms in Cathedral Park. As I picked my way over boulders, I marvelled at the array of beautiful wild flowers that managed to find sufficient soil between the rocks to sustain their growth. I was bedazzled by the brilliant blue of the arctic lupine and impressed by the critical role it plays in fixing nitrogen to create an enriched soil that may eventually support the growth of future forests. Walking over rubble in the high alpine is similar, in some respects, to trekking in the Arctic. There also, the process of soil formation remains in an early stage. With almost no soil between the cobble, walking on what appears, from the distance, to be "flat" ground in the Arctic is a slow and treacherous process. Here, in the Fraser Valley, we tend to take the dirt beneath our feet for granted and fail to realize it has taken thousands of years of grinding and erosion to create the soil which fills the gaps between boulders and forms our fertile fields.

Because fertile soils are the basis of all great civilizations, it is axiomatic that, if people fail to take care of the soil, their civilization will perish. The Assyrians learned this unfortunate lesson when their irrigation methods on the dry plains of the Tigris and Euphrates turned their soil too salty to support crops. Similarly, it is recorded that the Greeks once had fertile hillsides of magnificent forests that are now eroded by years of destructive grazing from sheep and goats. In America, the Mayans established a great civilization in the Yucatan peninsula. When their soil failed around 800 AD, probably assisted by overpopulation and drought, so did their civilization. Because the annual flooding of the Nile brought the doubly rich blessing of Blue Nile carrying mineral soil from the Ethiopian mountains and organic material from the marshes of the White Nile, a great and long-lasting civilization grew up on the lower floodplain. Now, it seems the construction of the Aswan high dam, which stopped this annual replenishment in the 1970s, may eventually imperil it. It appears that only the Chinese, who learned to build terraces on steep mountainsides and fertilize their soil with human waste, developed a fail-proof agricultural system that has persisted through the millennia.

Tropical soils present a huge challenge for societies over the long term. Because glaciers have not enriched these soils, they are, for the most past, impoverished in their mineral content. People foolish enough to destroy tropical rain forests for agricultural purposes soon learn that little life remains in the bare soil. Here, in the temperate zone, we have been blessed by the action of glaciers. In the prairies, huge temporary glacial lakes collected sediments that have become the basis of the rich prairie soils now relied upon as the breadbasket of the world. Unfortunately, a mere century of farming is reported to have already halved the nutrient content of these soils.

On the coast, glacial sediments collecting on the floodplain of the Fraser River have created some of the best farmland in BC which, fortunately, has been protected within the Agricultural Land Reserve (ALR) since the mid1970s. Despite this, there is continual pressure to remove land from the ALR in the Fraser Valley to build roads and residential developments. If our elected officials continue to allow such losses, our ability to grow food and sustain our population may eventually be threatened as well. Rather, I hope, we will continue to respect the legacy provided by glaciers and alpine plants and seek to keep our floodplains forever fertile.