Gabriola SOUNDER, p.20, October 29, 1999

A warm heart

One thing I like about the Earth is that it has a warm heart. We owe a lot to that. Without its warmth, there would be no sea between us and Nanaimo, no Strait of Georgia, no majestic mountains, and no gold ring on my finger.

Some of the greatest scientific achievements of this century have been the development of the theories of quantum mechanics and relativity. *Nicht*? Well yes, perhaps so, but they are hard to understand. I like to walk the beach and ponder how things can be both a particle and a wave at the same time, or what happens when a finite but unbounded universe expands at the speed of light—but I never get very far. I fear that if anyone discovers how to integrate the two theories, the answer will be so complicated that us ordinary folk will have as much chance of understanding it as we have of playing Bach like Gould. No, to me, the greatest of all the 20th-century scientific achievements has been the development of the theory of plate tectonics. The world is the way we see it because the Earth has a warm heart—and thanks to the theory of plate tectonics, it's suddenly become easy to understand why.

I remember being taught geography in the early 1950s by a man named Mr. Jessop. Mr. Jessop was a map man. Even while I desperately sought the right notebook amongst the disorganized jumble of books in my desk, his hand would be flying over the blackboard as he worked on the first map of the lesson. Mr. Jessop never needed notes—he had an entire atlas in his head. We schoolboys spent our time trying to copy each of Mr. Jessop's maps before it was erased to make room for the next. The air was laden with concentration and chalk dust. Sometimes, there were mild protests at the speed with which Mr. Jessop worked and, with a sigh, he would impatiently leave half a map on the board while he worked on half of the next.

One month, we did geology. I remember especially puzzling over an ancient landmass off the northwest coast of Scotland. Mr. Jessop did not make mistakes, yet there it was, even if a bit vaguely drawn. Land where there is only open ocean, but land that had to be there to supply the thousands of feet of sediments that are today the Torridonian sandstone hills of the Northwest Highlands. Something was badly wrong, but I was too timid to question Mr. Jessop. Now of course, it is wonderfully obvious. The mysterious land of high mountains and fast-flowing rivers was Greenland, once as close to Scotland as Ireland is today.

Not long ago, 250 million years say, there was no Atlantic Ocean. You could walk from New York to London. But beneath all that continental crust the heat was gathering until, about 150 million years ago, rising magma began prising the blanket aside, creating giant rift valleys. The ever-widening valleys filled, first with freshwater, and then with the sea. In the valley bottoms, the mid-ocean ridge that runs the length of the Atlantic was born. Lava seeped continuously from the ridge, as it still does, flowing a few feet before freezing in the coldness of the Atlantic's depths. Slowly, but persistently, continents were pried apart. As North America moved

westward, it collided with islands travelling northeastward on the Pacific's own expanding floor. So violent were the collisions that the continental margin was folded up and thrust back over the ancient surface for hundreds of kilometres. Remnants of the exotic islands, long-since torn from their roots, form the contorted veneer that is most of present-day British Columbia. Now, not until you reach Alberta is the old continent itself again.

Vancouver Island is new here. It drifted in, as if with the tide, a 100 million years ago from somewhere a lot further south, moving at the same speed as toenails grow. Soon, the Strait of Georgia will fill with sediment—our island is part of that process—and Vancouver Island will join the mainland, as will its travelling companions the Queen Charlottes, and as already have, the Wrangell Mountains of Alaska and small pieces of Oregon and Idaho. Just a few million years ago, the Strait of Georgia became a broad and probably beautiful valley. Granted, the Strait has since been scoured by glaciers, and sea levels are rising, but it's just a matter of time before it's a valley again.

It never stops, the slow rolling boil of ocean floor. Something is always happening. Only 42 million years ago, we collided with a seamount. The land, already buckled from Vancouver Island's arrival, buckled again. That's why there are Coast Mountains over there, Mount Benson over here, and it's why marine sediments that form Gabriola Island are now high and dry beneath our feet. And the seamount that caused it all? It's now the Olympic Mountains.

Vancouver Island still tilts as ocean floor is forced beneath it, plating the underside with new crust as it goes. Like a boat heading out to sea, the west coast rises and the east coast sinks. A resident of Chesterman Beach near Tofino once told me that they found Japanese glass floats when they were digging their house's foundations. And there's a Nuu-chah-nulth midden there, a few hundred years old, in the forest, not at the edge of the present-day beach. And on this side, the Strait of Georgia is deepest, not in the middle, but over there in places like Jervis Inlet and Desolation Sound. And each day the mountains stand a little taller—they grow several millimetres in a human lifetime.

What? Oh, the gold ring! Well, without hot water, gold would not have been leached from the rocks and concentrated into orebodies in secret places. Without the remnant radioactive energy from the supernova that triggered the formation of the solar system 4700 million years ago, without the Earth's warm heart (and Jenni's too), there would be no gold ring on my finger.

Now if only I could get the notion that atomic particles are like billiard-balls out of my head....
