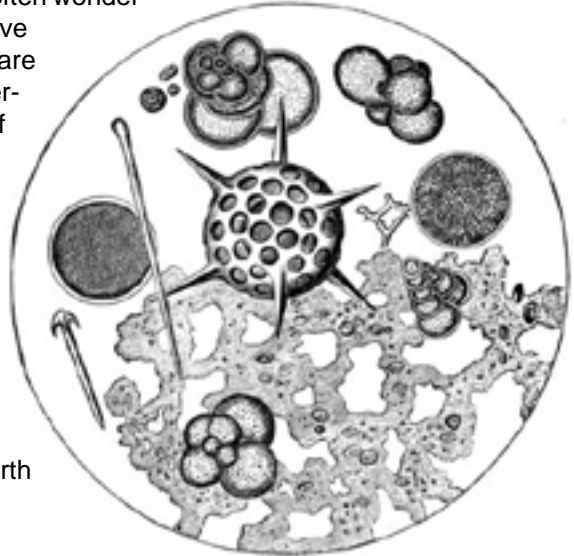


The Emerald Ocean of British Columbia

More and more Canadians are travelling to tropical places in search of the sun and warm clear water. Upon their return to more temperate climates they often wonder why our western ocean is so green. Is it pollution? Does it have something to do with the forest industry and the fact that logs are moved in the ocean in booms? Or is it perhaps caused by over-fishing or some other human intervention in the normal cycle of nature?

While human activity may influence local waters in small ways, the overall story is much larger. As large, in fact, as our spinning planet.

Almost everyone knows that our planet is spinning in space. The spinning globe and the water covering much of its surface is the start of the story. The next part of the story is the air mass, almost 160 km (100 miles) thick, that surrounds our Earth and covers our oceans.



As the planet spins, the water and air moves with it. Due to friction and other physical forces, the water and air do not move as a coherent mass, but rather in large circles on and over the face of the earth. This movement of air and water is the basis of the world's weather patterns.

Earth spins in an easterly direction which results in water being pulled away from the western coastlines of continents by the movement of the Earth and by the friction of air. As the surface water moves westward it must be replaced — and the replacement water comes from deep in the ocean. This phenomenon, known as *upswelling*, occurs only along western coasts.

But what does this have to do with the green water in British Columbia?

The floating plants in the ocean, called *phytoplankton*, require only two things to grow: sunlight and nutrients. In the tropics sunlight is available all the time, but nutrients are not — so they are the controlling factor for phytoplankton populations. As the nutrients are used up, the phytoplankton die off to a population that can be maintained by the recycling of nutrients. Over the aeons, nutrients in the tropics have been reduced to relatively low amounts, and the water now appears clear to us; there is little planktonic life.

In more temperate regions, however, both sunlight and nutrients are controlling factors. During winter we have low sunlight and low phytoplankton growth, but the population is still higher than in the tropics. As spring approaches, the amount of light increases and the phytoplankton begins very rapid growth in a phase called a *bloom*. As spring proceeds into summer and fall the nutrient amounts decrease, but are maintained by nutrient recycling and upwelling, which brings more nutrients from the depths. This is why the colour of British Columbia waters is green! It is green of living phytoplankton that we see.

Phytoplankton is the basis of a magnificent food web that gives our western, temperate coastline one of the greatest diversities of life know on Earth. The green of plankton should be treasured far more than the green of emeralds, for plankton gives oxygen to the air and sustains many forms of life, including the great whales and even humans.

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For more reading:

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Weyl, Peter K. 1970. *Oceanography*. John Wiley & Sons, Inc. New York.