Video 12

Climate Change and the Oceans
The Cradle of Life

Many of us know the ocean primarily from standing on a beach and looking out at a vast expanse of water. Some of us go surfing on the long smooth waves breaking toward shore. Some, like me, love to scuba dive with air tanks in a kelp forest along the coast, hoping to spot a sea lion or an octopus.

Some of us take a vacation where we can go snorkeling in the shallow water over a coral reef, where we marvel at schools of bright fish, and watch a turtle glide by with graceful sweeps of its flippers.

But even if we go out on a fishing boat far from shore, we are still on the surface of a vast expanse of water, with little knowledge of the many mysteries hidden below.

And yet, the oceans and the seas, which cover 71% of our unique planet, are the key to our fate. They first became the key to our fate a long time ago, when, as the Cradle of Life, they were the salty home of the first one-celled forms of life to appear on a tiny planet circling a large and distant star. The next time you go to the beach and wade into the water—which may be warm, or very cold—say to the ocean, "Thank you."

More recently, the oceans have been the key to our fate because they have absorbed most of the *carbon dioxide* which our burning of coal and oil has released into the atmosphere. And they have also absorbed most of the *heat* which the ever thickening blanket of greenhouse gases has trapped. The oceans—which have become increasingly acidic and increasingly warm over the past fifty years—have thus greatly reduced the amount of carbon dioxide and heat in Earth's atmosphere. The oceans have been cleaning up our mess, and consequently have greatly reduced the affects of climate change in our world today.

According to the research conducted by marine chemist Andrew Dickson at the Scripps Institute of Oceanography in San Diego, California, "26% of carbon released as carbon dioxide from fossil fuel burning, cement manufacture, and land-use changes during the decade 2002-2011 was absorbed by the oceans." [1] Roughly one-fourth of our massive pollution was absorbed by the Cradle of Life.

And according to a report from the National Oceanic and Atmospheric Administration (NOAA) in Washington, D.C., more than 90% of the unnatural heat which has accumulated on planet Earth during the past fifty years as the result of our atmospheric pollution . . . has been absorbed by the oceans. Most of this heat is stored in the upper 700 meters (63%), but some of the heat has been carried by currents and the overturning of ocean layers down as far as the floor of the ocean (30%). [2]

Had the oceans not been cleaning up our carbon dioxide and our heat for the past fifty years, we would be choking on hideously polluted air, and dying in unbearable heat. The oceans have rescued us, and thus the politicians and the Oil Boys can continue to lie to us, telling us that climate change is a hoax.

Young People of the World, are you angry yet?

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However, Mother Ocean is getting tired of cleaning up our mess.

As water becomes warmer, its capacity to absorb carbon dioxide diminishes. Scientists have noted that the warming oceans have absorbed nearly 10% less carbon dioxide since the year 2000. [3] This is bad news in a world in which we *continue* to burn more and more coal and oil—especially oil—every year.

Of course, having become our garbage dump, the oceans suffer. Carbon dioxide combines with water for form carbonic acid: $CO_2 + H_2O$ becomes H_2CO_3. Increasing levels of acidity dissolve the delicate shells of a multitude of species living in the seas, from the tiny diatoms to the larger shrimp and pteropods, which form part of the foundation of the oceanic food chain. Because colder water can absorb larger amounts of carbon dioxide than warmer water, the polar seas, such as our old friend the Arctic Ocean, become especially acidic. Not only are the diatoms losing the algae that grows on the bottom edge of the Arctic ice cap . . . the diatoms are dissolving in the acidic water.

The delicate eggs of many creatures are susceptible to damage by the acidic waters into which they were laid, as are the newly hatched larvae. Newborn creatures need water of a certain temperature, a certain salinity (saltiness), and a certain pH. If we change all three in the Cradle of Life, we threaten to turn the fragile oceans into the Coffins of Death.

The polyps of reef-building corals contain algae within their tissues. The polyps, living within the hard outer layer of the calcium carbonate reef, provide a protected home for the algae. The photosynthetic algae in turn provide food and oxygen to the polyps, and help to remove waste. This symbiosis—providing mutual benefits to each other—between a tiny animal and a tiny plant, both very delicate, enables them together to build the reefs found in oceans around the world.

But the two friends need water of a certain temperature, and a certain pH. If the water becomes too warm, or too acidic, the coral polyps expels the algae, and thus the polyps may slowly die.

A coral reef is like an underwater forest: it provides a sanctuary to a multitude of other creatures. If the reef dies, these creatures—many species of fish, turtles, lobsters, shrimp, and octopus—lose their home.

Reefs also protect shorelines from the battering waves of storms. The waves break offshore, rather than on the beach, which can be quickly eroded.

Today, coral reefs are dying steadily around the world. We know that this is happening. We look at paired pictures of *a healthy reef*, with pink and orange arms of coral and swarms of bright fish like living jewels, and *a dead reef*, where the coral has bleached white and most of the fish have vanished. But we have no idea what it will mean when this intricate web of sanctuaries, where life has flourished for millions of years before we appeared on the planet, has become a graveyard.

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The oceans also hold the key to our fate in the future. The enormous quantity of unnatural heat which they have absorbed, especially during the past fifty years of increasing pollution, will be released only in the course of *centuries* . . . after we finally stop producing our pollution.

Much of that heat has been carried by currents to great depths, where it will be stored as if in a battery. Heat is energy, and energy does not vanish; it will continue to melt any ice floating on the surface of the seas. It will continue to kill the newborn codfish. It will continue to kill any remaining coral reefs.

The ocean has a fever—an incremental increase in temperature—which will last for a very long time. How well do you feel when *you* have a fever? You feel sick, weak, exhausted; you want to rest.

Maybe . . . maybe . . . sometime in the future, you may feel new stirrings of life.

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Of course we could say so much more about the oceans. But I think that is enough for today. Sometimes the sadness is just too much.

You may have heard about something called “climate grief”. Yes, we all feel grief when someone in the family dies, or when a close friend dies. But at this unprecedented moment in human history, when our world itself is dying—when the wildfires are killing so many animals trapped by the flames, when lakes dry up and leave millions of fish dead on the dried mud, when whales and dolphins beach themselves because their stomachs are filled with plastic, when coral reefs are turning white—then some of us begin to feel a new sort of grief.

Young People of the World, please don’t wait any longer.

Thank you.

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Sunday
10 februar, 2019
15:49.

Lille, stille Ås.