

Changing climate the ultimate crisis for our species (excerpts)

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The Science Show

Radio National (Australia)

24 December 2016

We stand at a unique moment in all of the history of life on this planet. That is four billion years of life. 99.9999% of all species that have ever existed in the four billion years are extinct. Extinction is the norm; but for the first time in those four billion years, one species that created the conditions for its own demise, that is us, recognizes the possibility of extinction and has the tools to avoid a catastrophic end. You know what we face: human activity, burning fossil fuels in machines, agricultural practices — especially grazing cattle, warfare are altering the chemistry of the atmosphere that in turn is trapping heat on the planet.

I first realized that we have to take climate change seriously. When I came to your country in 1988, I was a guest in Melbourne of the Commission for the Future, and at that time scientist showed me the evidence that they were gathering in climatology and I went back to Canada saying, "This is no longer a slow-motion catastrophe, we got to get going on it right away."

Australia with vast deserts and sunlight Canadians would kill for, and you can't develop alternative solutions? Disgraceful. Japan – the most earthquake prone country on the planet brings nuclear plants to what? To boil water. This in a country that has boiling water in over 6000 hot springs. We boast as a species that were intelligent. In Canada first nations, environmentalists, climatologists have now been labeled the forces of 'no' and eco-terrorists.

Of course, climate is just one of the issues, there is a whole suite of ecological issues that are confronting us now. Oceans cover 70% of the planet surface and they are a mess; overfishing, islands of plastic, dead zones from agricultural runoff, sea level rise by warming and expansion of water, and acidification from the dissolving of carbon dioxide in the ocean as carbonic acid. 80% of the forest on the land are gone. Hydrologic cycles are changing. We dread the disappearance of the monsoon reliability. Species are going extinct at a rate unparalleled since the last great extinction episode 65 million years ago.

Climate change is just the most obviously pressing issue we confront now, but I have to say it has taken a hell of a lot of time before it has come to the level that it is at now. The first international conference on climate was held in Toronto in 1988 and at that time, the scientists were convinced the evidence was in and were so alarmed by what they were seeing, that they issued a call for a 20% reduction in greenhouse gas emissions in 15 years. That was the call, but we didn't take it seriously and the record of political and corporate denial and monkeywrenching is why many scientists and experts despair and declare now openly that it is too late to turn things around.

When Sir Martin Rees, one of the eminent astronomers in Britain was asked, "What are the chances there will be in human beings left by the year 2100?" His answer is set to chill up my spine, 50-50. James Lovelock the inventor the concept of Gaia has written a book that declares 90% of humanity will be gone (0:15:00) by the end of the century and you all know Australia's eco-philosopher Clive Hamilton has written a book *Requiem for a Species* and guess for what species it is a requiem for. It is for us and now an American ecologist Guy McPherson is declaring "Human beings will be gone within decades in this century."

My response to all of that is, "Why are you saying that it is too late?" There is no point. Surely, we are going to struggle and fight right to the end. Yes, it is urgent and that is the message I get, but to say, "No, it is too late," that is ridiculous, that is simply too soul destroying to hear that. But I think that the urgency is what we have to listen to. We have very little time to act. So, I would suggest in your country and mine, do not offer your vote to a single candidate at any level of government unless they declare the climate changes an issue that they will devote a great deal of their lives to. And it mustn't be a political football, it is not just the green party that will say this. We must demand it out to every candidate for political office.

The signs are depressing, it is true, but I cling to hope and that hope is based on more than just the Pollyanna-ish, "Don't worry; good things will happen." My hope is based on the faith one that love — and please don't think I have suddenly become a dippy hippy. I believe that love is the driving force of our species and it is love of our children and grandchildren that must override all of the economic, political, and social pressures. But more than that, we don't know enough to say it's too late, and then we will give you an example of why I say that.

The most prized species of salmon in the world is called the Sockeye salmon. It is the salmon with the bright red flesh and lots of fat in it. It tastes great, especially when it's raw. Sockeye salmon are the biggest run in the world is in British Columbia in the Fraser river, and ever since pre-contact levels of Sockeye salmon, the runs were between 100 and 120 million fish each year, but after contact when we dammed the rivers and had landslides that blocked the Fraser, we got a catastrophic decline; but the Fraser river in British Columbia has the largest Sockeye run in the world and we would like to get 30 to 35 million animals coming back. In 2009, we barely got a million Sockeye returning to the Fraser. Now remember, looking entire, my wife is saying, "That's it. They saw there just isn't the biomass to get them to those spawning grounds. They're toast; they're gone."

One year later in 2010, we got the biggest run of Sockeye salmon in 100 years. I used that story not to show how stupid I am. Nobody knows what the hell happened, but nature shocked us with surprise and I believe nature has got a lot more surprises up her sleeve. We just have to pull back and give her room, and she will be far more generous than we deserve. That's my hope.

I returned to Canada in 1962 and I had studied four years in the States. I was a hotshot geneticist. I was going to make my name as a big scientist and I got completely sidetracked by a woman, not that she is too young for that, but this has happened all through my life, usually with disastrous consequences, but in this case I have been ever grateful to her and the great regret I have is that I never met her. But in 1962, a woman named Rachel Carson published a book called 'Silent Spring' and it changed my life.

We have to remember in 1962, there wasn't a department of the environment in any government on earth. The word environment didn't mean in 1962 what it has come to mean today. The discovery that DDT kills insects by Paul Miller won a Nobel Prize for him in 1947. We thought DDT pesticides were fantastic until Rachel Carson's book came out and for me as a scientist what stunned me was the realization that science can be very powerful; but we don't know and I have to anticipate all of the unknown things in nature that we can't expect to be affected.

When DDT began to be used on a wide scale, it was only when eagles in the United States began to disappear, that scientist tracked it down and discovered a phenomenon called 'biomagnification.' Up the food chain, you concentrate DDT, hundreds of thousands of times

until you get to the shell glands of birds or the breasts of women. How could we have managed DDT properly when we only discovered biomagnification after eagles began to disappear, and that has happened over and over again.

When CFCs began to be used on a wide scale, we had no idea, high up in the atmosphere ultraviolet light would break chlorine free radicals off CFC that would scavenge the ozone. When nuclear bombs were dropped over Japan, we didn't know there is a phenomenon called 'radioactive fallout,' and now we have such conceit, we want to genetically engineer plants and animals for our use. We want to indeed engineer the planets with geoengineering to deal with the issue of climate change. I believe it is a form of madness to have the hubris to think that we are capable of doing that.

For me, as a scientist, the most profound message I got from Silent Spring was that in nature **everything is connected to everything else**, and I realized scientists look at things in bits and pieces all on the assumption if we look at enough bits and pieces we will fit them back together to get a picture of the whole system. But we spray on the chemicals on farmer's fields to kill insects and end up discovering that fish and birds, and human beings are affected. Everything is connected and we can't determine all of those interconnections through science.

I just want to tell you a story that one of the programs that the David Suzuki Foundation undertook that I am so proud about was to try to illustrate this issue of interconnectivity. One of the rarest ecosystems on the planet is called 'The Temperate Rainforest,' and in North America we have the largest Temperate Rainforest extending from Alaska down to the Northern part of California, and it starts thin band pinched (0:25:00) between the Pacific ocean and the coastal mountain range. It has the highest biomass, the weight of living things of any ecosystem on earth, and the reason for that is we have got big trees.

But the dilemma for scientist was, "How can you have such big trees when the soil is nitrogen deficient?" It rains a lot, that's why it is a rainforest. That rain washes nutrients but especially nitrogen out of the soil. So, it was a real paradox for us, you have got these big trees and you got not enough nitrogen in the soil to raise them. And it turned out the solution was the salmon. The Salmon are born in thousands of rivers and creeks, all up and down through the temperate rainforest; and they are born in freshwater, they go out to see... there are five species of salmon that live depending on the species two to five years at

sea and then they come back to spawn in the original rivers of waters where they were born.

Now, it turns out that almost all of the nitrogen you find on land is the normal isotope of nitrogen called 'nitrogen-14,' but in the oceans there is a very large proportion. Well, they are small, but still very significant proportion of the nitrogen in the oceans is nitrogen-15. It is a slightly heavier atom isotope that we can detect the difference between N-15 and N-14. So, the salmon go to sea, for two to five years, they load up in nitrogen-15, and then they return to the spawning rivers and creeks by tens of millions up and down the coast.

So, they are loaded with nitrogen now and everyone celebrates. If you have ever gone to a spawning experience on the coast, you know the birds and the seals, and the whales everybody is making noise because now this massive creatures is coming back. And they get to the river and the major predators of the salmon are eagles, bears, and wolves. So, they will eat the salmon as they are coming up to spawn, and then of course they poop and pee nitrogen-15 loaded urine and feces throughout the forest. So, they are literally fertilizing the forest.

Now, the bears are normally solitary animals, but during the salmon season they will fish in the same pool with literally dozens of others. But when they grab a salmon, they take off into the forest up to 150 meters on either side of the river because they want to eat it by themselves. I mean I understand that, they only eat the best parts which is you all know; the brains, the belly, and the eggs, and they then dump the carcasses. Lots more, they go back for another one. On average, a bear will take about 600 salmon in a season.

So, they are spreading the carcasses again through the forest, the carcasses left or eaten by ravens and salamanders and slugs, but the major exploiters of the carcass are flies. So, flies lay their eggs within a few days that carcass is a seeding mass of maggots, loading up with nitrogen-15 from the salmon, drop to the forest floor over winter and in the spring, flies hatch by the trillions at the very time the birds from South America are coming through on their way to their nesting grounds in the Artic. So, you see those birds have been genetically programmed to come through at the very time those salmon through the flies are feeding them on their way to the artic.

If the salmon are not taken out of the river and sink to the bottom, within a week or so they are covered with a thick mat of fungus and bacteria, and the fungus and bacteria are eaten

by copepods and insects and other invertebrates. So, when the baby salmon emerge from the gravel four months later, the rivers are filled with nitrogen-15 containing invertebrates, so that the salmon can feast on their way down to the ocean. So, when dying the salmon prepare a feast for their offspring. And then what we funded was scientists to go in and actually take the cores of trees in salmon bearing areas and non-salmon bearing areas, and we showed that when we pull out the core and look at the fat rings, they are loaded with nitrogen-15. And the skinny rings when they are hardly grown, you find very little nitrogen-15. So, the salmon are literally feeding the forest with their carcasses.

So, it's a magnificent story of the interconnection of the North and Southern hemisphere, and the oceans and land and the air. Now, modern humans come along, all those indigenous people they don't know anything. We are going to manage these resources and so we say, Wow! We have got all these salmon: that's the minister of fisheries and oceans for the commercial fishery. Oh, but then all those indigenous people, that (0:30:00) is the Ministry of Indian affairs. What about the sports fisherman? Well, that's the department of tourism. So, we divide the salmon into three areas.

Now the trees, that is the Minister of Forests and the Rivers, well, that is the Minister of Energy and the Minister of Agriculture, and the Minister of Urban Affairs. And then we have all the rocks and the mountains, that is the Minister of Mining. And oh yes, what about the eagles, the wolves and bears, that the ministry of the environment. Now, let's manage everything. I mean, it is absolutely absurd because the way we look at the world has shattered it into pieces that have no connection to each other, and we ensure we will never manage those incredible systems.

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