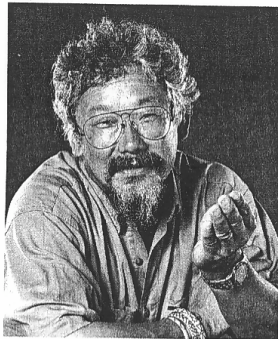


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David Suzuki.
Credit: Fred Phipps/CBC Television

Author biography

Unesco Prize-winning geneticist David Suzuki has felt increasingly drawn during his life to the social impacts of his science, from eugenics to rainforest destruction. Best known to biologists for his classic text *Introduction to Genetic Analysis*, he is more popularly known as a writer, radio and television journalist on scientific and environmental issues. He is host of the long-running Canadian TV series *The Nature of Things* as well as the BBC series *Cracking the Code*.

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Chapter 1

David Suzuki

Blinded by Our Minds

IT HAS been my fortune to participate in two disciplines: in science as a geneticist and in journalism as a television host and writer. It is interesting to see the beliefs and values held by professionals in these two areas. The great boast of journalism is to aspire to reporting that is balanced and objective, whereas scientists perpetuate the image of objective seekers of truth who follow where the facts lead. In both cases, the reality is a long way from the ideals.

This is because, however seriously we espouse the model of objectivity, the inescapable fact is that each of us, regardless of profession, is first and foremost a human being with beliefs, values and attitudes which are shaped by our personal experiences. The way we perceive the world is conditioned by the cultural, social, economic and political milieu in which we grow up. Gender, religion, race, socioeconomic position and physical appearance all affect the kinds of experiences we have and thus the way we think.

That is why in both journalism and in science, despite the claims of simply reporting the facts, it does matter whether women and people of many races participate.

I was struck by how different perspectives may be when I became involved in a battle over the fate of the last untouched watershed in the southwestern corner of British Columbia. The Stein Valley is sacred to the area's aboriginal people who recruited environmentalists to help them oppose proposed logging of the forest. In the early 1980s, a native elder and I were flown by helicopter over the Stein Valley. He pointed out his people's sacred burial sites, the salmon spawning grounds, the grizzly bear feeding area and the site of a great battle between rival tribes centuries ago. The pilot chimed in: 'Last week I flew a group of forest industry people and politicians along the same route and all they talked about was jobs, board, feet and profit.' It was a striking illustration of how two groups of people could look down at the same watershed and forest, yet see profoundly different things. We encounter the same thing in the perspectives of Catholics and Protestants in Northern Ireland, of blacks and whites in South Africa, of Jews and Arabs in the Middle East—people sharing the same territory, but 'seeing' very different realities.

I dwell on this because these *perceptual filters* underlie our apparent inability to respond seriously to the global ecological crisis. Organizations ranging from Greenpeace to the Worldwatch Institute and the Union of Concerned Scientists have warned about the catastrophic degradation of the planet's life support systems. From the explosion in human numbers to decline in food production, deforestation, toxic pollution, atmospheric changes and species extinction, the facts are horrifying and undeniable. Yet the destruction continues.

In Rio de Janeiro in June 1992, the largest group of world leaders in history assembled for the Earth Summit.

It was meant to signal global concern for the degrading biosphere and the political commitment to act on it. Yet two weeks later, the heads of the Group of Seven leading industrial countries met in Munich and did not mention a word about Rio or the environment. And now, several years later, the urgency and will to act are not evident as governments scramble with their economies. The question is why, if the world is in such a desperate state, are we not responding as forcefully as we did in the Second World War, and more recently against Iraq?

In 1988, the US Presidential candidate, George Bush, promised to be an 'environmental president'. Once elected, he quickly showed that his statements were crass political opportunism. At the same time, Canadian Prime Minister Brian Mulroney suddenly discovered the environment as a priority. When he was re-elected in 1988, he appointed a high-profile man, Lucien Bouchard, as Minister of the Environment. I interviewed Bouchard shortly after his appointment and asked him what he felt was his most serious challenge. He answered immediately 'global warming'. Impressed, I asked how serious it was. 'We're talking about the survival of our species. If we don't act now, we face a catastrophe', he said. I was ecstatic and went on: 'So does that mean your government will cancel all megaprojects to develop oil and gas and concentrate on conservation and energy alternatives?' His response was a shock: 'We can't annihilate the past. We made political promises that we have to carry out.' So here was an intelligent, well-meaning person who articulated an understanding that global warming threatened our very survival, yet failed to integrate that crisis into his political priorities.

Bouchard's ability to defend completely contradictory demands illustrates the way we compartmentalize our lives so we see the world as disconnected fragments. During a

heated argument with the president of one of Canada's largest forest companies over the environmental pollution by one of his company's pulp mills, he said with absolute sincerity 'I'm an environmentalist too. I have seven children and I care about the future.' Somehow, he too had failed to connect what his company was doing with the future of his children.

Try analyzing a typical 10 minute news report on radio or television. Items ranging from 10 to 40 seconds are strung together as completely separate reports. Each story is too brief to provide any of the historical context within which it matters, or what the broad implications are. So, like the increasingly fragmented way we live our lives, the media also shatter the world around us.

We have another very different problem: the great survival strategy of our species was adaptability, but that now blinds us to what is going on. Our species' plasticity enabled us to use our brains to recognize patterns of regularity in our surroundings and to exploit those patterns to our advantage. As we acquired a measure of control over the factors impinging on our lives, we adapted to a variety of habitats ranging from the Amazon rainforest to the deserts of Australia, the plains of Africa and the Arctic tundra. (Some of us even manage to adapt to New York or Los Angeles.) This cultural and social change was far faster than genetic change within a species, but still took place over centuries or even millennia. Today, change has become a normal part of the way we live. We have come to expect and even to welcome almost all change, and regard it as a measure of progress. In our ability to adapt to rapid change, we have lost the perspective of time and speed. Thus, although aboriginal people in North America still think in time-frames extending seven generations into the past and seven generations into the future, our priorities are often driven by annual car models or clothes fashions,

quarterly stock dividends or the next pay check. In other words, we soon forget how things were and thus have no reference against which to compare the present.

One of the important lessons aboriginal people have taught me is to listen to my elders, whose knowledge and experience are priceless. As I've traveled across North America, I've talked to non-aboriginal elders from Newfoundland to Vancouver Island about what things were like 60 and 70 years ago. All across the country, my elders inform me that Canada and the United States have changed beyond recognition. Our elders are a living record of the enormous changes that have happened within the span of a single human life. By projecting the changes that they have experienced into the future, it becomes clear that our children already live in a radically diminished world and that the planet cannot sustain a continuation of this change into the next millennium. In the past, people would say 'There's plenty more where that came from'. There isn't plenty more today—all over the planet wilderness is disappearing and taking with it up to 50 000 species a year. In the past, others would shrug their shoulders and say 'That's the price of progress'. But it is not progress to use up now what should be the legacy for our children and for all future generations.

The greatest hurdles we face in convincing people of the severity of the eco-crisis are the psychic filters through which we perceive reality. I call these filters 'sacred truths', notions that are so deeply held that they are taken for granted and never questioned, yet are often the very cause of the problems we are trying to resolve. Let me show you what I mean.

(1) We believe that human beings are superior to other life forms and because our intelligence enables us to understand and control our surroundings, we lie outside the natural world

It is easy to understand why we have come to believe this. Eighty percent of North Americans live in cities and towns. We live in a human-created environment that gives the illusion that we can 'manage' our surroundings. Furthermore, the very notion of wildness or our biological roots has become a pejorative. Foresters speak of old growth forests as 'wild' forests and the tree plantations that replace them as 'normal' forests. If we refer to someone as an 'animal' or being 'wild', we insult them, just as we do by calling them 'pigs', 'apes', 'chickens', 'asses', etc.

Very few urban dwellers understand that as biological beings we continue to depend on the natural world for our very lives. We have an absolute requirement for air, water and soil through the food we eat. These are part of a global common that we neither fully comprehend nor control, and they are the very underpinnings of global economies. It is the interdependence of all life on Earth and the physical environment that make the planet hospitable for human life. By disconnecting ourselves from the natural world we can continue to believe that even though the birds nesting around Lake Ontario and the fish that live in it have a high frequency of developmental abnormalities and tumors, human beings can continue to drink its water and pollute it. We believe that we can get rid of vast quantities of toxic chemicals by diluting them in the air, water or soil, or foisting them on the poor in our own countries and abroad. We fail to recognize the signals—beluga whales that are too toxic to touch, thousands of seals dying in the North Sea, species' disappearance—as warnings because we no longer feel connected to them. Not long ago, coal miners took canaries into the pits with them to warn them of dangerous gases. Today, 'canaries' are collapsing all around us, but we fail to recognize the signs because we believe so strongly that we are different.

(2) We believe that science provides us with the insights upon which our control is based

Anyone who understands how science differs from other ways of knowing recognizes that this assumption is wrong. The essence of the scientific method is that we focus on a part of nature, attempt to bring it into the laboratory or under the microscope and control factors impinging on it and emanating from it. In this way, we gain knowledge about that isolated bit of nature. Ever since Newton's time it has been our belief that by focusing on the smallest fragments of nature, eventually we can understand the whole by piecing the parts together. Twentieth century physicists have understood that such reductionism simply does not work at the most elementary levels of matter. As Nobel laureate Roger Sperry has said, 'There are properties that emerge from the whole that cannot be predicted on the basis of the properties of the individual parts.' Unfortunately, most medical doctors, biologists, business people and politicians continue to operate on Newtonian assumptions.

Even if scientists were able to come up with principles that govern higher levels of organization and provide some measure of predictability and control, how much do we know? Although the growth of science has exploded in the 20th century, especially since the Second World War, the amount that we do not know is still far more impressive than the amount that we do, especially in the biological sciences. To take as one simple example: how many species are there on Earth? We do not know. There are ways of estimating, and these estimates vary from 5 to 30 million. To date, biologists have identified 1.4 million species. That merely means that a dead specimen has been given a name. It does not mean we know anything about its basic biology, habitat, food needs, reproduction, interaction with other

species, geographic distribution, and so on. I spoke to the eminent entomologist, Tom Eisner of Cornell, who has done more to interest people in insects than anyone I know, and he said he knows perhaps five or six insects 'very well'. And he is a world expert on insects. I reckon that hundreds of billions of dollars have been spent on studying *Drosophila melanogaster*, the fruit fly, and yet we still do not even know how it survives the winter in Canada or what its natural distribution is. It is simply erroneous to put so much faith in science as the means of our long-term environmental salvation.

(3) *We believe we can manage new technologies so their hazards can be minimized*

In the past, new technologies have rapidly become a part of our lives, so that their social, medical and environmental 'costs' only become apparent later. But can we do proper cost-benefit analyses of new technologies beforehand? History informs us that we cannot. We are so ignorant about the biophysical nature of the planet that we cannot anticipate the long-term consequences of most things. Take two examples. When the atomic bomb was first built, what would a cost-benefit study have come up with? The advantages were that the bombs might hasten the end of a nasty war and thereby save countless lives. There was some knowledge that radiation caused mutations. Perhaps a wild-eyed futurist might have foreseen a worldwide arms race, although the Soviet Union had not yet become the West's enemy. But no-one could have anticipated radioactive fallout (which was discovered at Bikini), hydrogen bombs, electromagnetic pulses of gamma rays or nuclear winter because these were all discovered after the end of the war.

Consider pesticides. If at the time DDT was first being used as a pesticide there had been a cost-benefit analysis, the benefits of killing agropests, disease vectors or just plain nuisance insects were obvious. Geneticists could have suggested that by selecting resistance genes, the pesticides would quickly lose their effectiveness and ecologists might have pointed out that as insects are over 90% of all animal species, they are the most ubiquitous and arguably the most important group of animals on Earth. When only one in a thousand insect species is a pest to human beings, spraying with chemicals that kill all insects just to get at the one or two that annoy us does not make much ecological sense. But no-one would have mentioned biomagnification, the process whereby trace levels of molecules are concentrated hundreds of thousands, or even millions, of times up the food chain. That is because we only learned of the phenomenon of biomagnification when birds such as eagles began to disappear because of high levels of DDT. The lesson that history provides is that the benefits of new technologies are immediate and obvious, that is why we love novelty. But the costs—and every technology, however beneficial, has costs—cannot be predicted beforehand because we know so little.

(4) *We believe that through environmental assessments we can avoid environmental problems from new developments such as dams, clear-cut logging, factories, etc.*

This sacred truth must be dropped for the same reasons that number 3 is wrong. But there is an additional point. Human beings will continue to cut forests, build dams and develop housing, and one way of trying to anticipate the ecological consequences is by having environmental impact assessments. The problem is that the enormity of our ignorance precludes making even educated guesses.

Environmental assessments, for example, of drilling for oil in the high Arctic, are made on the basis of seasonal studies carried out over perhaps two or three years. In the Arctic, where water is frozen for nine months of the year, it is completely dark for four to five months and conditions are hostile for human beings, research conditions are, to say the least, difficult. Generally studies are carried out by summer students (often under the direction of the companies wanting to drill) looking at a few species. Now, in the Arctic, populations of different animals and plants are exquisitely adapted to this unforgiving environment and may fluctuate in cycles covering 15 or 20 years or more. The notion that a short summer assessment of a select group of organisms over a limited range tells us anything at all about the complexity of Arctic communities is simply ludicrous. Such data are scientifically worthless because they are so limited in scale, scope and duration. These ideas are explored further in Richard Lindsay's chapter.

(5) We believe the economy is the major priority that must occupy us and that all other areas make up a part of the economy

The fundamentals underpinning all life on Earth are air, water, soil and biodiversity. Without these, we and most other creatures would not be here. So they must be considered a sacred truth that comes before all else. Everything we have in our homes and workplaces, whether plastic, glass, metal, energy, cloth, wood, etc., comes from the Earth. The planet is finite, so our economy is founded on limited resources. Some are renewable (thank goodness), but must be exploited in a way that allows their sustainability.

Economics is a human construct that is now completely out of touch with the real world. For one thing, mainstream

economists do not speak of limits to growth or of resources. As they believe the human mind is the greatest resource and is limitless in its potential, the faith is that we will discover new sources when resources run out, invent new alternatives or travel to other places in the universe. Even more pernicious, air, water, soil and biodiversity are classified as 'externalities' to economics; they are not even a central part of this construct. This enables economists to build a system of values on the basis of human utility. If something has a use for us, then it is worth something. If it does not, then it is worthless. This is species chauvinism of the highest order that lets us—one species out of perhaps 30 million—set a value on everything. The Premier of Quebec, Robert Bourassa, has a grand scheme to dam every major river flowing into James and Hudson's bays for electricity. He speaks of millions of kilowatts 'wasted every day' in an area that is an 'empty wasteland.' Yet to the thousands of aboriginal people and the countless indigenous plants and animals, the area is fully occupied and fully developed. But the economic mentality does not see it the same way.

Global economics now afflicts countries around the world, seeming to be the key to their future prosperity and progress. But because money is no longer based on reality, it has come solely to represent itself and can now be multiplied without any relation to the real world. The recent struggle of governments and banks to bring currency values under control exposed the horrible fact that currency speculators today spend 600 billion dollars a day on the markets, dwarfing most government economies, yet contributing absolutely nothing to the planet except the making of more money.

Globalization of the economy and the market means that national boundaries become porous to money. Money grows faster than biological organisms, so, for example,

British Colombian temperate rainforests 'add fiber' at the rate of 1-2% per year. Clearly, if only 1 or 2% of the trees were cut down annually in any one area, the forests could be maintained forever, but it makes no 'economic sense' to recover only 1 or 2% of an investment when, by clear-cutting the entire forest, the money can provide 7-8% on interest alone. If the money was invested in forests in Papua New Guinea or Malaysia, it could bring in 20%. Once the forests are gone, the companies can invest in fish, and when the fish are gone, the money can be put into computers or into biotechnology. Thus, global economics, as described in Cooper and Meyer's chapter, drives the destruction of the planet.

(6) We believe that growth is the criterion of 'progress'

This is a corollary of truth number 5. In our society, progress has become synonymous with growth. We measure the performance of a company or government by its profit margin or growth in the economy. But as everyone wants progress, when that is measured by growth, there is no end to it. No country on Earth has decided that it has enough and wishes to stay at that level of income and consumption. Because when growth is progress, then stasis or balance becomes a kind of death. No company can afford to stay at the same level of income or profit or market share in the topsy-turvy world of economics.

The Brundtland Commission coined the phrase 'sustainable development' as the means of our ecological salvation. However, in most parts of the developed world, development does not refer to personal or spiritual development, but to growth. In a finite world, this is simply an impossible goal. There are limits to growth, and many of us believe we have already overshot the carrying capacity of the planet. The depredations are not just from

population growth in the developing countries, but are far greater from the consumptive demands of the developed world. The challenge is twofold: to make a greater share of the planet's resources accessible to the poor countries so that they will bring their reproductive rate down, while drastically cutting back on consumption and pollution by the developed nations.

(7) We believe that, in a democracy, we elect people to represent us and lead us into the future

There are two points to make about this notion. The first is that politicians clearly do not 'represent' us. If they did, over half would be women and there would be those from visible minorities, from white collar workers, full-time homemakers, etc., in direct proportion to their numbers. In fact, politicians come disproportionately from law and business because its practitioners have the means to handle the costs of running for office and of defeat. This skews government priorities towards issues of jurisdiction and economics.

We live in a world in which the dominant issues of our time—genetic engineering, computers, telecommunications, ecological destruction—are caused and will be solved by applications of science and technology. Yet most politicians, especially lawyers and business people, are scientifically 'illiterate' and incapable of assessing the scientific and technological recommendations of their advisers. We are not led into the future, we back into it.

The second point to make is that the way we establish human bureaucratic subdivisions to run our affairs does not make ecological sense. Our national, provincial and municipal borders are generally geometric—shapes that have little to do with the geophysical boundaries of watersheds, lake and river systems, foothills, mountain

tops and so on. It is simply not possible to regulate water, air or living organisms as if they conform to human jurisdictions. The greatest body of freshwater in the world, the Great Lakes, supports about 35 million people. We use the waters for transportation, fishing, recreation, industry, agriculture, sewage disposal and drinking water. Water regulations are administered by different departments corresponding to these human uses, each of which has its own requirements and priorities. Thus the water is not dealt with as a single ecological system. Furthermore, the jurisdictional turf wars encourage jealousy and mistrust. Two countries, Canada and the USA, impinge on the Great Lakes and so there is an International Joint Commission. However, two provinces and eight states also border the Great Lakes, and dozens of municipalities, ranging from cities such as Chicago, Detroit and Toronto. These human bureaucratic fiefdoms prevent the cooperation and sharing that is needed for a comprehensive strategy of protecting the Great Lakes.

These are just a few sacred truths. Others can no doubt come up with their own list that illustrate other fallacious beliefs. If we are to come to grips with the magnitude and severity of the global eco-crisis and the need for profound change, we must recognize the fallacies of our beliefs so that we can then see the world through completely different eyes. Only then can we begin to reassess our place in the natural world and formulate the best strategies to reach a truly sustainable future.

Annotated List of Further Reading

Manufacturing Consent: Thought Control in Democratic Societies, Noam Chomsky, Boston: Beacon Press, 1991.

Ironically called 'One of the most important intellectuals alive' by the book review of the *New York Times*, a newspaper he has condemned, Noam Chomsky has written extensively on the way capitalist democracies manufacture the consent of the public rather than engendering understanding. Why do we remember Vietnam when more people were dying at the same time in East Timor?

Global Ecology: Conflicts and Contradictions, Wolfgang Sachs (Ed.), London: Zed Books, 1992.

A radical critique of the 'globalization' of western knowledge under the banner of environmentalism. Many environmentalists now support the global empowerment of government, corporations and science rather than more democracy and local self-reliance. Once they strove for cultural diversity, now they see no other choice than to push for a world-wide rationalization of lifestyles. This book offers elements of an alternative vision.

Biology as Ideology/The Doctrine of DNA, Richard Lewontin, New York: HarperCollins and London: Penguin, 1992.

Takes a close and informed look at the tidy and showmanlike packaging of science, especially new genetic techniques, as the panacea to human problems, persuasively demonstrating how science and scientists are moulded by society. By admitting the shadings and limitations within science, a leading geneticist here helps us rediscover both the richness of human nature and the value of science.