

BOOKS & ARTS

The Arctic paradox

The traditional diet of Inuits has health benefits but exposes them to dangerous levels of pollutants.

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Silent Snow: The Slow Poisoning of the Arctic

by Marla Cone

Grove Press: 2005. 256pp. \$24

Geir Wing Gabrielsen

In 1962, Rachel Carson published her famous book *Silent Spring* about man-made chemicals found in the tissues of wildlife and humans. In so doing she started a debate in the United States and Europe about the production of chemical pollutants. Partly in response, the environmental movement grew and the public demanded that government and industry be held accountable for their actions.

Several decades later, Dianne Dumanoski, Theo Colborn and John Peterson Myers published *Our Stolen Future* (E. P. Dutton, 1996), which demonstrated the effects of man-made chemicals on wildlife. The book launched some major research initiatives to investigate the effects of chemicals (such as endocrine disruptors) on humans. Now, nearly ten years later, Marla Cone presents *Silent Snow*, a comprehensive book about pollutants found in the Arctic ecosystem and their effects on both wildlife and people.

The Arctic is generally considered to be pristine, as there are few local sources of pollution. However, during the past 10–15 years there has been increasing evidence (mainly from the Arctic Monitoring and Assessment Programme) that the Arctic environment is threatened by pollution and climate change. Cone, an environmental reporter at the *Los Angeles Times*, describes the 'Arctic paradox', in which people living in the Arctic are the most contaminated, despite the fact that they live far away from the sources of these pollutants. She describes how the Inuit in Canada and Greenland face a significant health risk as a result of their dependence on traditional food — meat and blubber from seals and whales — that contains high concentrations of pesticides and industrial pollutants.

Because of long-range transport by air, water currents and river outflow, the Arctic is a sink for industrial and agricultural pollutants from the south. When these accumulate in Arctic marine food webs, they affect humans and wildlife. In some human populations living in the Arctic, levels of persistent organic pollutants (POPs) and mercury are the highest anywhere on Earth and exceed health and safety guide-

lines. In children living in northern Canada, POPs have been documented to affect the immune system, as shown by higher than normal rates of infectious diseases. On the Faroe Islands, which were also visited by Cone, high mercury levels cause irreversible neurological damage to fetuses, leading to reduced learning ability later in life. As a result of these findings, children and women of reproductive age in some Arctic populations are being advised to reduce their intake of traditional foods.

Silent Snow is a journey into the science of toxicology and the ecological impact of pollutants on animals and people living in the Arctic. Cone has visited scientists in the field and in their labs and presents a fascinating but tragic story about the problems of Arctic pollution. She also talked to native people in Alaska, Greenland and the Faroe Islands, and illustrates the problems these people face if they continue their way of life and dependence on traditional food. They eat a marine diet, considered to be among the world's healthiest (based on the content of iron, proteins, vitamins and omega-3 fatty acids) — but the levels of pollutants are so high that it threatens their wellbeing. Unfortunately, switching to Western

food increases the risk of other diseases not normally found in these populations, such as cancer, heart disease and diabetes. This poses a dilemma for public-health officials: they encourage the Inuit and others to eat traditional foods, but advise them to reduce their consumption of such foods.

I enjoyed reading Cone's book, especially her descriptions of conversations with indigenous people and scientists in different parts of the Arctic. This discussion would have been improved if she had also visited the indigenous families of the Russian Arctic. These families, which constitute almost half of all indigenous people in the Arctic, face serious health risks. The collapse of the Soviet economy left them dependent on traditional food, increasing their risk of chemical exposure.

Cone presents the science of Arctic toxicology and the Arctic paradox in an interesting and readable way. She also presents some solutions and predictions about the pollution problem. The Stockholm Convention, which

will ban the use and production of a 'dirty dozen' chemicals, is an important step towards a reduction in the production and use of man-made chemicals. Although the concentrations of some chemicals (such as PCBs and DDT) are decreasing in the Arctic environment, others are becoming more common, especially mercury, brominated and fluorinated compounds. There is an urgent need for action, from both industry and government agencies. To this end the European Commission has made a plan for the testing and regulation of chemicals. Unfortunately, it seems harder than ever to ban toxic substances in the United States.

Silent Snow is an important book that should be read by environmentalists, scientists, politicians and the public. The environmental problem of man-made chemicals, addressed in this and previous books, should send a clear message to the rest of the world. ■ Geir Wing Gabrielsen is at the Norwegian Polar Institute, Polar Environmental Centre, Hjalmar Johansensgt 14, 9296 Tromsø, Norway.

that people possess free will and are responsible for their actions with the scientific view that, as physical objects, our actions are fully determined. Gazzaniga's solution is to distinguish brains from people — "Brains are automatic, but people are free." Responsibility is "a social construct that exists in the rules of a society, [it] does not exist in the neuronal structures of the brain". For him, scientists have nothing to say about such issues: they should stay in their labs and out of the courthouse and legislature.

This may be a bit too cautious. Even if Gazzaniga is right that responsibility is a social construct and that for a neuroscientist, no person is more or less responsible than any other, there are reasonable and unreasonable ways to apply this construct. If a paranoid schizophrenic kills someone while in a delusional state, we do not (and should not) punish him or her as we would a mafia hit man, because of what we know about schizophrenia. In this regard, science does bear on questions of moral responsibility, particularly with regard to difficult issues such as how to deal with crimes committed by teenagers, or by those with learning difficulties.

Gazzaniga is a lot less cautious when it comes to the implications of neuroscience for ethics in general. As he puts it in his preface, "I would like to support the idea that there could be a universal set of biological responses to moral dilemmas, a sort of ethics, built into our brains. My hope is that we soon may be able to uncover these ethics, identify them, and begin to live more fully by them. I believe we live by them largely unconsciously now, but

Dissecting the right brain

The Ethical Brain

by Michael S. Gazzaniga

Dana Press: 2005. 226 pp. £17.50, \$25.00

Paul Bloom

It matters to me what Michael Gazzaniga thinks about the brain and, if you live in the United States, it should matter to you too. In 2002, Gazzaniga was appointed to the President's Council on Bioethics and so his views on cloning, euthanasia, neurological enhancement and embryonic stem cell research will help shape US law and policy. Gazzaniga is an admirably clear writer who assumes no expertise on the part of his reader. Although he says that *The Ethical Brain* was written to encourage fellow neuroscientists to enter the public debate on these issues, it could be read by anyone who has an interest in the controversies that lie at the intersection of science and ethics.

Gazzaniga's main point can be summarized as: Don't Panic. He is sceptical that we will ever be able to create 'designer babies' or pills that lead to effortless improvements in human performance. He argues that 'mind-reading' techniques such as functional MRI and implicit tests of racial bias are actually of limited value when it comes to determining moral or legal responsibility. And he is confident that individuals can make competent decisions about the proper use of technologies such as cloning and neurological enhancement. With just a few exceptions, he believes the government should stay out of such decisions.

He is particularly dubious about slippery-slope arguments of the type: we can't let people

do X, because even though X is ok, it might lead to Y and Y is terrible. As he puts it, "It does not make moral, political, or social sense to allow the fear of the extreme to hinder the good."

He also addresses the big questions, such as how to reconcile the common-sense notion

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Left hanging: this demonstration in April 2002 put pressure on the US Senate not to ban therapeutic cloning.