

*Field Notes from a Catastrophe:  
Man, Nature, and Climate Change*  
by Elizabeth Kolbert  
Bloomsbury Publishing, 2006;  
\$22.95

From a scientific standpoint, one might argue, we don't need another book on global warming. Everyone, it seems, knows about melting icecaps and hyperactive hurricanes. If you ski, you curse the warmer winters. If you own beachfront property—or reside on a coral atoll—you fear rising sea levels.

What is more, scientists seem to be in general agreement about the parameters of the scientific problem, even if some details of the current thaw remain to be determined. Few scientists doubt that the Earth's mean temperature has been rising at a rate unprecedented in recent geological history.



Erosion on Sarichef Island, Alaska, from storms and rising sea levels has forced the inhabitants to abandon the island for the mainland.

Few question the increased concentration of greenhouse gases in the atmosphere, and few deny that the burning of fossil fuels is the major source of this increase. And though computerized models lead to divergent predictions about which factors ultimately have the most effect on future climate, there is little disagreement that some kind of climatic change is in progress. Dramatic changes have taken place in the past, and there is no reason to expect today to be any different. Scientifically

speaking, global warming is old news.

But because of the nature of global warming—transnational in scope, and very likely tied to pollution caused by human activity—what to do with the bare facts is a political problem. From that point of view, Elizabeth Kolbert's book is more than welcome. Politicians, as you may have noted (more and more these days), are relatively insensitive to the raw power of scientific arguments. Faced with proof that the sky is indeed falling, decision makers still need to feel the will of their constituents: voters who would prefer that the sky not fall, and who make it clear that public and private funds should be devoted to keeping the sky from falling.

Elizabeth Kolbert presents a series of succinct and astutely written bulletins from the front lines of the climate-change community, and her assembly of the “old news” may still change the

right minds in the right places. Rather than reviewing the usual evidence, she has sought out voices who speak with knowledge and conviction about what is happening to the planet. The most dramatic effects of global warming, she notes, occur in places where the fewest people live, so she journeys to a small island in the Arctic Ocean, barely ten feet above sea level.

Vladimir E. Romanovsky, a Russian geophysicist who has been watching the island crumble in the past decade as its permafrost melts, gestures at the eroding bluffs. “Another disappearing island,” he says. Climate change is “moving very, very fast.”

It's moving just as fast on Greenland's vanishing ice sheet, where the Jakobshavn Isbræ, a moving river of ice, has more than doubled the rate of its slide to the sea, from 3.5 miles per year in 1992 to 7.8 miles per year in 2003. And

it's moving fast in Iceland, too, where Kolbert views the Sólheimajökull, a glacier that has retreated a fifth of a mile in the past decade. By the end of the century, an Icelandic glaciologist tells her, the island, which has been continually glaciated for at least 2 million years, will be virtually ice-free.

What climatologists worry about most, Kolbert writes, is that humanity may reach a tipping point, the state of “DAI,” or Dangerous Anthropogenic Interference, where calamitous change becomes inevitable. Climate modelers such as James E. Hansen of NASA's Goddard Institute for Space Studies, whom Kolbert visits in New York City, are hesitant to predict when the Earth will cross the DAI line, or whether we have crossed it already. But Hansen—who recently made headlines when he complained of being muzzled by political appointees in his agency—and many of the other scientists, agency functionaries, and political veterans interviewed by Kolbert express dismay that what seems to be the policy in the face of the gathering storm is “business as usual.”

It's hard not to share their concerns, especially when Kolbert conveys their insights with such immediacy and cogency. Take, for instance, the comment made by another NASA scientist, sipping coffee in a tent atop Greenland's melting ice sheet: “To put it nicely, we are heading into deep doo-doo.”

*Wave-Swept Shore: The Rigors  
of Life on a Rocky Coast*  
by Mimi Koehl; photographs by  
Anne Wertheim Rosenfeld  
University of California Press 2006;  
\$39.95

Successful symbiosis—the kind that makes green algae and sea anemones flourish in the intertidal zones along sea-coasts—takes place between organisms whose disparate talents complement each other to the benefit of both. The anemones, whose short, barrel-shaped bodies are firmly anchored to rocks, pro-

vide a sheltered habitat for the algae, which might otherwise be swept away by the waves. When tides are high, the anemones unfurl their crowns of tentacles into the sea, snagging mussels that float by. At the same time, photosynthetic algae in their guts, exposed to sunlight, provide added nourishment to both themselves and their anemone hosts. Algae and anemones form a partnership that works.

So, too, do Mimi Koehl and Anne Wertheim Rosenfeld. Koehl, a Berkeley professor, is an expert in biomechanics. She has made her mark in studying how the structures of organisms help them function in particular environments. Why, for instance, aren't starfish peeled from rocks by the surf? (The answer: hard grit embedded in exposed areas of soft tissues makes them stiff enough to resist breakage; underneath, hundreds of tubelike feet hold the starfish in place.) Rosenfeld, by contrast, is a veteran nature photographer; eighty-seven of her exquisite pictures of the creatures and micro-inhabitants along a short stretch of California coast provide an eye-catching and instructive accompaniment to Koehl's descriptive prose.

*Wave-Swept Shore* is a field guide not to the creatures that inhabit the intertidal zone, but to the processes that enable them to live together in such a challenging habitat. In a few short chapters Koehl shows how their design helps them deal with the challenge of an environment that is alternately dry and wet, scoured by surging currents and desiccating winds. How do plants and animals anchor themselves? How do they protect their bodies against the relentless stress of flowing water? How do they find food, eliminate wastes, and reproduce?

Leafing through the book, it's clear that nature has devised a variety of solutions to these problems. Some littoral creatures—barnacles, for instance—



*Eddies that form between rocks as tides ebb and flow stir up the water and draw away wastes from the animals and plants that live on the shore.*

secrete a remarkable glue that bonds them so firmly, even to wet surfaces, that they can weather the fiercest storm. When they get amorous, though, they are, literally, stuck. Unlike crabs, which can scuttle long distances in search of a mate, barnacles can only marry, as it were, the girl next-door. To this end, each one (barnacles are hermaphrodites) has a penis long enough to reach other nearby barnacles. "If you bolt a camera to the rocks to record what barnacles do when the tide is in," writes Koehl, you'll see that, when they are not filtering food from the water, they are "snuffling around the neighborhood with their penises, perhaps checking out potential mates."

For barnacles and most other creatures of the intertidal zone, the constant waves are both a curse and a blessing. Many adaptations are, in essence, protective measures against the flow of water—protective shells, streamlined shapes, suckers that cling and adhesives that stick. But tidal creatures also depend on moving water to bring in the microplankton they eat, to scatter eggs and distribute larvae, and to dilute and

flush away wastes. "Try to feel the environment met by the animals and plants clinging to these rocks," Koehl advises. Together she and Rosenfeld ably do just that, conveying the feeling that—for sea squirts, mussels, and goose barnacles at least—the rocky coast is the best of all possible worlds.

*Fish on Friday: Feasting, Fasting and the Discovery of the New World*

by Brian Fagan

Basic Books, 2006; \$26.95

Fish have been a culinary delicacy in most cultures, yet oddly, in most of medieval Europe, they were regarded as something of an acquired taste. For centuries, the Catholic Church judged that eating fish was a form of self-denial, and permitted its consumption on fast days when other, more desirable foods were banned. The days of fasting and penance included the forty days of Lent, as well as Fridays and miscellaneous holy days. As the Church came to dominate European society, an enormous demand for fish developed that, eventually, local resources could not supply.

Brian Fagan, emeritus professor of anthropology at the University of California, Santa Barbara, weaves these themes together into a fascinating history of the fishing industry in Europe, from Roman times until the colonization of North America in the 1600s. It would be an overstatement to argue that the New World was settled because Catholics needed fish to obey ecclesiastical strictures. But Fagan makes an excellent case that the lure of rich fishing grounds should be given equal weight, with the quest for gold and spices, as forces that drove Europe's westward expansion.

Until the eleventh or twelfth century, according to Fagan, most fishing was done locally. Eels were among the most abundant species, and were so prized that in some markets they were used as a form of currency (one can only imagine how modern vending machines would work if the practice had continued). Herring were also abundant, but