

## BOOKS &amp; ARTS

# A Silent Spring for climate change?

Helping the public understand climate change is an important part of tackling the problem.

**The Winds of Change: Climate, Weather, and the Destruction of Civilizations**

by Eugene Linden  
Simon & Schuster: 2006. 320 pp. \$26

**The Weather Makers: The History and Future Impact of Climate Change**

by Tim Flannery  
Allen Lane: 2006. 368 pp. \$20

**David S. Reay**

"Blame the trees!" shrieked a British newspaper, the *Daily Mail*. "Cutting down the rain forests may actually be a way of preventing global warming!" This and other similarly ill-considered headlines marked the publication of a recent paper in *Nature* (439, 187–191; 2006) reporting methane emission from living plants. Such emissions would constitute only a minor offset to the huge carbon sink the world's forests represent, but the message given to the public was at best confused and at worst downright misleading.

Increased public awareness and understanding of climate change is vital if we are to effectively tackle this greatest of all threats, but too often the reporting of climate science is blurred by self-interest or the need for an eye-catching headline. What's urgently needed is a *Silent Spring* for climate change: a book that will do for the fight against global warming what Rachel Carson's 1962 book did to protect the environment from chemical pollution. It will need to set out the history, science and politics of climate change in a way that is truly accessible to the public while steering clear of sensationalism and vested interests. This is a lot to ask.

*The Winds of Change* by journalist Eugene Linden is one of two new books that take up this challenge with verve. From the start, Linden uses in-depth research and expert opinion, rather than scaremongering and exclamation marks, to make his point. In discussing the 'gears' of the earth's climate, he expertly and succinctly describes the natural cycles that control climate and the many ways they interact. He has a great knack for metaphor, with the 'hall of mirrors' that constitutes the positive and negative feedbacks in Earth's climate system being a prime example.

The subtitle of Linden's book refers to the destruction of civilizations, and he uses the imaginative conceit of a legal case in which climate change is in the dock. The prosecution's



Body of evidence: in 1991 hikers found a man who died 5,200 years ago as temperatures dropped.

argument is that climate change has not simply been a factor in the downfall of communities throughout history, but has been the causal agent — a serial killer of civilizations rather than an accessory.

There is no denying that climate has played a role in shaping human evolution and civilization. The fall of the Akkadian empire in 2200 BC, where a period of sustained drought seems to have led to the collapse of this Mesopotamian civilization, is just one of several convincing pieces of circumstantial evidence that point the finger of guilt in the direction of climate change.

In a case so outwardly intractable as to make Jarndyce and Jarndyce from Charles Dickens' *Bleak House* seem straightforward, palaeoclimatology steps in as the forensics of climate science, providing a stream of convincing witnesses in the form of climate proxies. These include ice-core and sediment records that indicate rapid changes in global climate at the same time that certain civilizations apparently went into free fall.

We even have a corpse — that of a man found at the edge of a retreating glacier in the Alps. The man was frozen where he fell some 5,200 years ago and remained in place until found by a group of hikers in 1991. The proxy record shows that, at about the same time that the man breathed his last, so did countless other organisms around the world. Biological

activity dropped abruptly along with global temperatures.

Rather than climate change being a slow-moving beast that past civilizations could easily dodge, the palaeoclimate record indicates something very different. Big changes in climate can occur on a scale of decades rather than millennia, and so would stretch even the most resilient communities to the limit. Climate, it seems, is on a switch rather than a dial.

The case for the prosecution looks strong then. However, if climate change is a serial killer then it is also a serial creator. From the Archaean era onwards, abrupt changes in climate have been scorching one branch of the evolutionary tree only to nurture a new off-shoot somewhere else. On the charge of civilization killer, the jury is still out. Climate change was certainly at the scene of the crime on several occasions, but then so were other likely suspects such as overpopulation, disease and war.

A central question posed here is: "Are we better prepared than our ancestors were to deal with rapid changes in climate?" Linden's answer is a decisive "Maybe". That we should take note of the rapid climate shifts of the past to help avoid catastrophe in the future is clear. But history can only take us so far. We have entered a new age — the Anthropocene, as Paul Crutzen called it — in which, rather than humankind and civilization being shaped

by the weather, we are shaping the weather through our greenhouse-gas emissions.

This brings us to Tim Flannery's *The Weather Makers*. Flannery is an acclaimed scientist, writer and explorer, and his book carries a ringing endorsement from Bill Bryson, so it should be a good bet for the *Silent Spring* of climate change. Flannery is a consummate science writer and weaves together fascinating descriptions of his own exploration and experiences with interviews from other researchers. On the impacts of climate on biodiversity, I've not read anything better. From the last sighting of the golden toad in 1987 — a solitary male waiting in forlorn hope for a mate that never came — to the grotesque 'hairy

seadevil', dragged up into our world from the ocean depths and slowly dying from the heat, the writing is wonderfully evocative.

Unfortunately, there are also some niggling errors. Most of these are relatively minor, such as citing incorrect figures for Kyoto Protocol targets. But there are some clangers that Flannery or his editor should really have picked up. At one point he talks of "sea water turning acidic, its pH increasing by half to one unit". This kind of error is rather, well, basic.

Such distractions aside, this is a very good book. It covers the science and the politics of climate change in an engaging and thoughtful manner. Drawing on James Lovelock's Gaia hypothesis at regular intervals, Flannery leaves

the reader in no doubt about the magnitude of the problem we are facing and the urgency with which we need to act. The Kyoto Protocol and related political machinations are largely covered well, as are the options for mitigation through renewable energy, nuclear power and increased energy efficiency.

Is this a *Silent Spring* for climate change? It's not far off. If you want the real story on climate change — its history, science and politics — you should put down the *Daily Mail* and pick up one of these two excellent books. ■

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## FILM

# Big trip to the red planet

### Roving Mars

An IMAX movie produced and directed by George Butler  
Walt Disney Pictures: 2006  
<http://disney.go.com/disneypictures/rovingmars>

### Jay Pasachoff

Robotic space exploration is humanized and dramatized when it is turned into an exciting story and presented on a screen so large, and showing such detail, as to be overwhelming. The IMAX film *Roving Mars* brings the movie skills of the Walt Disney Company to NASA's Mars exploration missions. We hear and see the stories of the Spirit and Opportunity rovers as they were built, launched and operated on the martian surface.

My bedroom television, although not small, subtends an angle of about 10°, the width of my fist held at arm's length (astronomers go around measuring angular distances with their fists and fingers all the time). An IMAX movie, seen from a typical seat in the middle of the theatre, subtends an angle of about 70°. What's more, it is 50° high, enveloping you in the picture. But IMAX is more than simply a big screen — the film in the water-cooled IMAX projectors (and in the IMAX cameras) is much larger than ordinary film, having about ten times the area, so it captures much more detail. And the detail shows: the images are crystal clear. High-quality sound, with pumping subwoofers, also helps the ambience, and *Roving Mars* has an appropriately ethereal score by Philip Glass.

The film begins by crediting NASA's Jet Propulsion Laboratory (JPL) with the unique capability of building the rovers, and explains that Steve Squyres of Cornell University was chosen to head the mission. A substantial part of the film deals with building and testing the rovers, which we see in exquisite, close-up detail. We learn how flexible each rover is, with

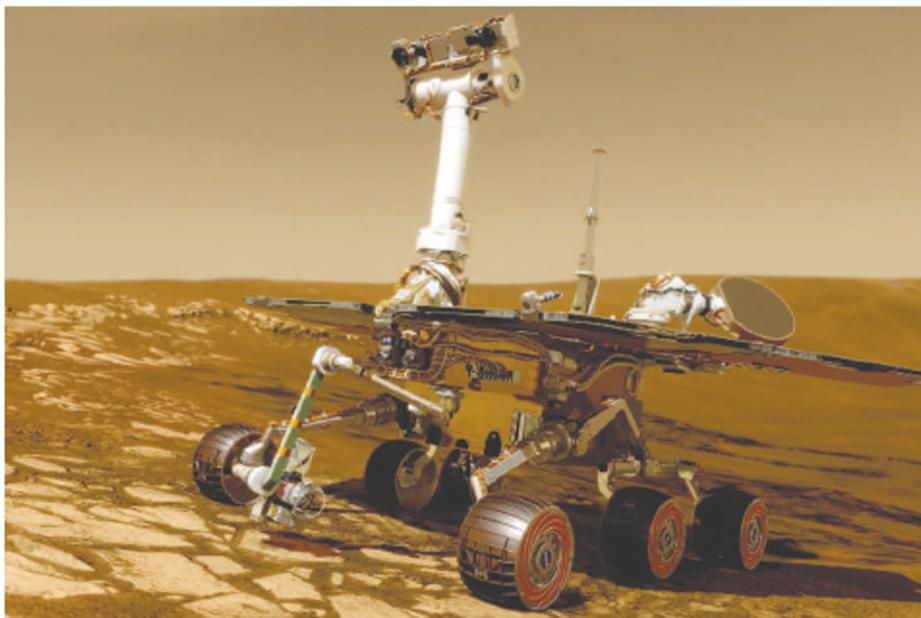
its six wheels each individually mounted and with a robotic arm that has the equivalent of shoulder, elbow and wrist motions. We see the individual devices on the arm, and how one of them, the rock abrasion tool, can cut through rock surfaces to allow unweathered surfaces to be analysed.

The movie takes us to Cape Canaveral for the launch. Dramatic high-resolution images are followed by an animation of the mission. The main problem I had with the film was distinguishing photographs from the animations, which are of exceptionally high quality; I wish the latter always had "animation" printed in a corner, or some other demarcation. And I wish the movie-makers hadn't added whooshes of sound as the later-stage rocket engines ignited, as sound doesn't travel in space.

We are shown an animation of the landing

on Mars, as no cameras hovered overhead to film the event. We see the delicate rovers cradled in spherical airbags that are cut free from parachutes and left to bounce several times, with the images animated using actual data transmitted to Earth. Real cutaways to the scientists, engineers and administrators in the JPL control room provide the spirit of space exploration. We clearly see the emotional effects of the time delay caused by the finite speed of light. And we share the elation in the control room when, after a frightening further delay, the first signals come through.

Actual film obtained on the martian surface is shown for only a few minutes at the end, but the treatment is nonetheless first-rate. The narrator discusses the evidence for past water on the martian surface, and we see types of rock that only form as sediments, such as jarosite. The movie shows, in tremendous close-up, the haematite masses known as 'blueberries' that have eroded out of the rocks — these are taken as evidence for past water on Mars. And we see some dramatic images of the planet's surface, including the crater that Spirit



The rovers' six wheels and battery of tools made them well equipped to explore the martian surface.

DISNEY ENTERTAINMENT