



Rachel Carson launched a global environmental movement with her 1962 call to regulate DDT use.

## IN RETROSPECT

# Silent Spring

On its 50th anniversary, an exposé of pesticide overuse still stands as a beacon of reason, finds **Rob Dunn**.

During her short life, Rachel Carson wrote four impressive books. One, *Silent Spring*, lit a beacon that continues to burn. Published 50 years ago after long years of work, *Silent Spring* (Houghton Mifflin, 1962) dared to criticize the then-wanton use of pesticides. In so doing, the book changed US and international policy and helped to give rise to the environmental movement. It described the moment at which humanity, Carson felt, must choose between two roads: one leading towards apocalypse; the other towards reason.

Carson (1907–64), a marine biologist, started her career as only the second professional woman to be hired by the US Bureau of Fisheries. She had long been interested in the insecticide DDT (dichlorodiphenyl-trichloroethane), and was spurred to write *Silent Spring* partly by a friend's reports of the aerial spraying of pesticides on Long Island,

New York. But she was also compelled by her own observations and reading of the scientific literature — and, given the silence of other writers on the subject, by an inner sense that something needed to be said or done.

DDT, which had been used in Europe and the South Pacific during the Second World War to control the insect vectors of malaria, dengue fever and typhus, became a common domestic and agricultural pesticide in the United States after the war. Insecticide use was unregulated until the 1950s. In its campaign against the fire ant (*Solenopsis invicta*) alone, the US Department of Agriculture (USDA) had, by 1958, aerially sprayed hundreds of thousands of hectares of the country with pesticides. Yet evidence was building of negative effects on beneficial insect species and vertebrates such as birds. Many avian species, from the American robin (*Turdus migratorius*) to the

bald eagle (*Haliaeetus leucocephalus*), were becoming rare.

Faced with such observations, Carson began to type, marshalling her own soft voice on behalf of the birds. She found herself considering society's choices more generally, writing: "The road we have long been traveling is deceptively easy, a smooth super-highway on which we progress with great speed, but at its end lies disaster." Seeing that the urge for progress at any cost was driving choices about nature, she gave eloquent vent to anger, criticizing indiscriminate spraying with non-selective pesticides that have "the power to kill every insect, the 'good' and the 'bad', to still the song of birds and the leaping of fish in the streams, to coat the leaves with a deadly film, and to linger on in soil".

Carson's intent was to trigger change, but on the face of it, *Silent Spring* seemed unlikely to manage that. It was a beautiful book written by a scientist at a time when scientists were not 'supposed to' write beautiful books. It was about pesticides, chemistry and society — by a researcher who studied fish. And it concerned the perils of excessive use of pesticides at a time when pesticides were widely believed to be part of the progress of civilization.

Yet *Silent Spring* did not sit quietly. First serialized in *The New Yorker* starting on 16 June 1962, then published in book form, it ignited a flame that raged, bookshelf to bookshelf, around the world. It kick-started the US campaign to ban DDT, led to tighter regulation of pesticides in the United States and other countries, and was a significant driver in the 1970 formation of the US Environmental Protection Agency. The book also began to shift public discourse about the environment, progress and exactly what means are justified in making human life better.

In a September 1962 issue of the *Saturday Review*, anthropologist Loren Eiseley said that *Silent Spring* "should be read by every American who does not want it to be the epitaph of a world not very far beyond us in time". By December of that year, more than 100,000 copies had been sold. The agrochemical industry spent hundreds of thousands of dollars to fight the book's message. There was, after all, much for industry to justify.

The USDA's campaign against the fire ant became *Silent Spring*'s emblem of hubristic attempts to control the living world. The ants, introduced into Mobile, Alabama, in the early twentieth century, have proven to be an ecological problem for some native ant species and vertebrates, and a modest public-health threat — but they do not spell

the doom of agriculture. And those hundreds of thousands of sprayed hectares were full of wild species, many of them more

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For the original review of *Silent Spring* in *Nature*, see: [go.nature.com/mtwr15](http://go.nature.com/mtwr15)

susceptible than fire ants to the pesticides. It was the misuse of DDT that had provoked Carson to action.

Yet since it was first published, critics have described *Silent Spring* as an argument for the wholesale ban of pesticides and — through the resultant loss of crops — a return to hunting and gathering. Carson has even been blamed for malaria deaths in countries such as India, where DDT is no longer used to control the mosquito vector. But although Carson did paint worst-case scenarios and describe apocalyptic scenes of thousands of dead raptors and other birds, she was asking only for a reconsideration of pesticide use, and for the strongest pesticides to be used only when most necessary.

She did not advocate an end to using DDT to control malaria; indeed, the regulations she inspired, even the sweeping Stockholm Convention on Persistent Organic Pollutants, signed in 2001, have this as an exemption. In some cases, such rules may even have made DDT use more effective, because regulating this pesticide has helped to forestall resistance to it — a phenomenon that Carson anticipated in *Silent Spring*.

Interestingly, Carson concluded her book by calling for new forms of pest control, including what would now be called genetic management: altering a pest's ability to mate or feed. Carson believed that technological approaches to the management of nature should be cautious and targeted. She hoped for a world in which humans managed the life around us with reverence, using carrots and well-aimed sticks.

In rereading this remarkable book, it is hard to avoid seeing it through the lens of modern problems — the latest opportunities to choose between apocalypse and reason. One thinks of the choices that we are making about carbon emissions and their impacts on climate change. One thinks of the new ways in which we are poisoning the environment — still with pesticides, albeit more targeted ones, as well as with industrial chemicals such as the phthalates that mimic oestrogen.

*Silent Spring* proves that we can choose the road of reason. In 2007, the bald eagle was taken off the US Endangered Species List; since 2008, it has enjoyed the conservation status of “least concern” on the International Union for Conservation of Nature's Red List. Part of the eagle's recovery is down to pesticide control. Such conservation successes remind us of the power of individual and collective determination — and that springtime, and reasonable voices, should always be loud. ■

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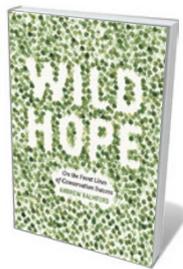
## Books in brief



### Taste Matters: Why We Like the Foods We Do

John Prescott REAKTION BOOKS 224 pp. £20 (2012)

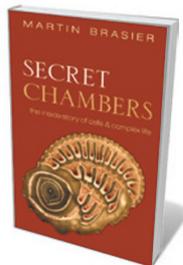
In Iceland, rotted shark is a delicacy; elsewhere, chocolate-coated marshmallows or fermented bean curd may set pulses racing. Taste is a matter of taste, says psychologist and sensory scientist John Prescott, as he delves into the science behind the pleasure-giving aspects of food. Compellingly and comprehensively, Prescott reveals the cultural, genetic and physiological differences behind gustatory preferences. From the effects of a woman's Kalamata olive habit on her unborn child to the uncoupling of flavour and nutrition, this is a top-notch scientific smorgasbord.



### Wild Hope: On the Front Lines of Conservation Success

Andrew Balmford UNIV. CHICAGO PRESS 240 pp. \$20 (2012)

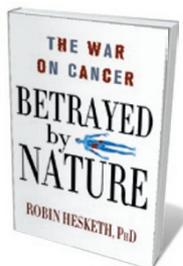
There seems to be a daily barrage of bad news about the biosphere, from the ongoing 'sixth mass extinction' to tropical deforestation. But conservation scientist Andrew Balmford examines successful conservation efforts, looking for replicable lessons. His case studies range from the total war on rhino poachers in India's Kaziranga National Park to baiting of alien predators in Australia with poisoned kangaroo sausage. Balmford's meta-analysis yields a checklist for success: good research, leadership, money, time, boldness, political savvy and willingness to accept improvement rather than perfection.



### Secret Chambers: The Inside Story of Cells and Complex Life

Martin Brasier OXFORD UNIV. PRESS 320 pp. £16.99 (2012)

Palaeobiologist Martin Brasier traces the history of research into cellular evolution, weaving in recent findings and his own fieldwork. This vivid, charmingly illustrated chronicle takes us through Robert Hooke's 1665 coining of 'cell' to describe the microscopic chambers in cork; Charles Lyell, Charles Darwin and the nineteenth-century meshing of evolution and the geological record; and evidence in the pillow lavas of Lake Superior, the fossil-ridden Sphinx of Egypt and the multicoloured seaweed of the Sargasso Sea. A fascinating follow-up to Brasier's book *Darwin's Lost World* (Oxford Univ. Press, 2010).



### Betrayed by Nature: The War on Cancer

Robin Hesketh PALGRAVE MACMILLAN 272 pp. £16.99 (2012)

It afflicts one in three people globally and kills more than 7 million a year. Yet cancer is, at base, simply an abnormal growth of cells. In this admirably clear overview, biochemist Robin Hesketh gives us the history, basic science and characteristics of cancer cells, charting how tumours spread and detailing genetics, detection, therapies and drugs. There is much to fascinate — from eighteenth-century physician Percivall Pott's deduction that there was a link between soot and scrotal cancer in chimney sweeps, to the challenges of treating the biological “hodgepodge” that is a tumour.



### What a Plant Knows: A Field Guide to the Senses of Your Garden — and Beyond

Daniel Chamovitz ONEWORLD 256 pp. £12.99 (2012)

Plants may be brainless, eyeless and devoid of senses as we know them, but they have a rudimentary 'awareness', says biologist Daniel Chamovitz. In this beautiful reframing of the botanical, he reveals the extent and kind of that awareness through a bumper crop of research. Chamovitz finds no evidence for floral 'hearing', putting the kibosh on the idea that the music of Led Zeppelin stunts their growth — but shows how they sense colours and can tell up from down.