but his work was enough to enable the publication of the entire collection two centuries later as a series of coloured plates. Ferdinand Bauer's sketches of plants and animals of Australia were intricately labelled with numbers indicating colours; it was only in the twentieth century that the key to the colours was discovered, deep in the collections in Madrid. His brother, Franz, used the same key in botanical paintings he made at Kew, near London.

Accuracy and speed of capture of the image are just as important now. But digital photography has not obviated the need for field sketches. As many contributors point out, a sketch can be labelled on the spot and does not require printers, cameras and other electronic hardware to be carried to remote places.

Whether notes are telegraphic or detailed, a key to abbreviations is a must. Making field notes directly on the computer can solve the transcription problem, as one only has to enter information once and typed text is easy to read, say entomologist Piotr Naskrecki and plant biologist Jim Reveal. But, Reveal adds, computerized notes lack the personality so apparent in handwritten accounts.

Illustrated field notes can provide the basis for public conversations on science. For example, anthropologist Karen Kramer's sketch maps of Mayan villages aided her research into how the villages functioned because local people were happy to talk about her interpretations of their space. And ornithologist Kenn Kaufman describes the species lists made through the eBird project, which records birders' observations via a website. This crowd-sourcing method of taking field notes is an extension of the 'bioblitz' concept, in which members of the public list all the species they encounter over a short period.

It is disturbing to observe, as ecologist Erick Greene does in his essay on best practice, that today's generation of field biologists do not keep notes as diligently as their laboratory-based counterparts. Lab books are retained as permanent records (sometimes drawn upon in cases of scientific misconduct), whereas field notebooks are rarely archived. Yet they record observations that might seem trivial at the time, but on reflection become the basis for new insight. As ecologist Bernd Heinrich rightly says, notes from the field often represent a search for problems, not solutions. Who knows whose field notebooks now contain observations that will change the world?

I will alter my own note-taking after reading this set of essays. All scientists, whether based in the field or the lab, could benefit from the advice given here so eloquently. ■

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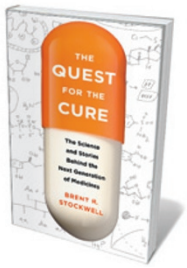
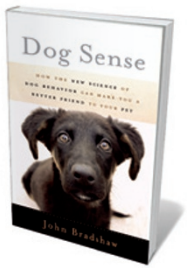
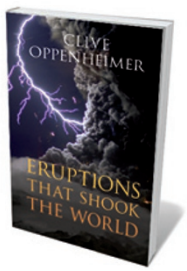
Books in brief



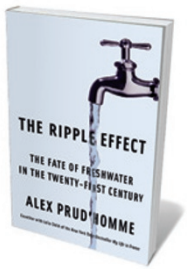
The Quest for the Cure: The Science and Stories Behind the Next Generation of Medicines
Brent R. Stockwell COLUMBIA UNIVERSITY PRESS *284 pp. $27.95 (2011)*
In the past 50 years, we have developed drugs to cure many major diseases. But treatments for some serious conditions, such as cancer and Alzheimer's, still elude us. Chemical biologist Brent Stockwell describes the history of drug design, from the invention of mustard gas and early anti-cancer agents to the decoding of the human genome. Countering the pessimists who fear that the end is nigh for significant breakthroughs, he argues that emerging technologies for drug testing and molecular modelling will open up new avenues.



Dog Sense: How the New Science of Dog Behavior Can Make You A Better Friend to Your Pet
John Bradshaw BASIC BOOKS *352 pp. $25.99 (2011)*
Although dogs are loved by many, their lot is not always a happy one. Originally bred as rural working animals, most dogs now live in cities where they are expected to be more obedient than any child. The perpetuation of pedigrees also mars the health of some breeds. Anthrozoologist John Bradshaw summarizes what science can teach us about man's best friend. Arguing that modern dogs should not be considered domesticated wolves, he asks how we can best breed these social animals to be companions and family pets.



Eruptions that Shook the World
Clive Oppenheimer CAMBRIDGE UNIVERSITY PRESS *408 pp. £18.99 (2011)*
Closures of international airspace after the recent Icelandic eruptions served as a reminder that volcanoes can be disruptive. But volcanic outbursts have also shaped our history, from aiding the demise of the dinosaurs to altering climate. Ash ejected into the atmosphere may even have led to the meagre harvest that triggered the French Revolution. Volcanologist Clive Oppenheimer relates in rigorous detail the consequences of eruptions over the past quarter of a billion years, and argues that lessons can be learned for future risk management of catastrophes.



The Ripple Effect: The Fate of Freshwater in the Twenty-First Century
Alex Prud'homme SCRIBNER *448 pp. $27 (2011)*
Flooding and drought are both on the rise. Journalist Alex Prud'homme digs into the reasons why, citing centuries of neglect of water infrastructure and a careless attitude to issues of water quality and use, ownership and waste. Focusing on issues that threaten clean and abundant water in the United States, he travels across the country to speak to people at the centre of the drama, including salmon fishermen and copper miners in Alaska and scientists investigating intersex fish in Chesapeake Bay.

The Fallacy of Fine-Tuning: Why the Universe is Not Designed For Us
Victor J. Stenger PROMETHEUS *345 pp. £24.95 (2011)*
The Universe seems to be fine-tuned, with precisely set parameters that allow life to exist as a rare event. This idea has been used by some to argue that humans have a central place in the cosmos, and even as evidence for the existence of God. Physicist Victor Stenger rails against this 'fallacy' by dismantling such assumptions one by one. The laws of physics and cosmology constrain some key numbers, he says, and others are not as fine-tuned or as improbable as proponents of the idea suggest.