What to do? The weakness of this book, an update of a work first published in 1999, is that its emphasis is on the financial crises of the 1990s and not that of today. If Krugman were writing from scratch now, he would surely focus much more on the present day. However, the 11 pages he does devote to solving the current crisis make good sense: government borrowing is vital to substitute for slumping private demand, as Keynes said. At the same time, banks need to be recapitalized and have their bad debts written off to make them capable of lending again; financial regulation must

be reformed to make the system more stable and to encourage people to trust it again. All that is fine in principle. But more detail would have helped readers to understand how it might work in practice. ■

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For more on the credit crunch, see online at www.nature.com/news/specials/recessionwatch.

reductions in the degradation of various ecosystems. I am not saying they do not — it is just very difficult to tell.

In the financial districts of New York, Hong Kong and the City in London, market intelligence is not set up to convey this kind of knowledge. Research shows that capital markets have difficulty capturing environmental feedback. Most financial-investment decisions are decoupled from on-the-ground effects. The abstraction becomes clear only when there is a visible collapse.

In one chapter, investment managers from the investment banking group Société Générale concur: “In our experience, long-term analysis is almost always sacrificed in favour of short-term profits by both investors and brokers.” Sustainable investment can introduce new information, but there is significant bounded rationality. In regular financial investment, “a financial analyst covers a maximum of four to eight stocks and often has as much as 10 or 20 years’ experience in doing so. In contrast, many SRI [socially responsible investment] analysts cover up to 50 stocks, with far less experience and an often limited financial background.” There is also the inherent danger of market spin in sustainability ratings: “best in class ... needs to be complemented by a searching analysis of the sustainability of the ‘class’ itself”. The authors warn that unless this is done, a situation can emerge in which everyone wins, and relative benchmarking ensures that there is always a sector leader, even if neither business model nor behaviour warrant such an outcome.

Sustainable Investing argues for a paradigm shift in financial markets, and suggests that better data and stronger networks will positively affect the effectiveness of managers of sustainable funds. However, this is not an academic book, and the chapters are of uneven quality. Notably absent is any mention of what role scientists could have in this shift — a serious omission.

From a scientific standpoint, managing complex nonlinear change requires flows of robust information that cross spatial and temporal scales, and adaptive governance arising from a mix of legislation and economic incentives. Sustainable investing is only one of many strategies that we can choose, and it should be more tightly coupled with actual impacts.

The recent financial collapse highlighted the need for new forms of financial governance. To take advantage of this opportunity, we need to ask questions that are more

Investing in the environment

Sustainable Investing: The Art of Long-Term Performance

Edited by Cary Krosinsky and Nick Robins
Earthscan: 2008. 272 pp. £19.99, \$38.95

Money can't buy love. But can it buy a more sustainable world? *Sustainable Investing* suggests that it can, yet this book presents only half of the story.

Editors Cary Krosinsky and Nick Robins are industry people: Krosinsky is vice-president of a US environmental research organization and advised on the United Nations' Principles for Responsible Investment as part of its Environment Programme Finance Initiative, and Robins is head of the HSBC Climate Change Centre of Excellence. Together with co-authors from a range of financial organizations, they provide tips on the emerging market of sustainable investing, ranging from equities, bonds, carbon finance, private equity, sustainable real-estate and microfinance. With up to US\$5 trillion in sustainable investment funds and a quarter of public equities and bonds incorporating sustainability criteria, the world has never had such green markets.

If you take this book at face value, it certainly pays to be green. Sustainable investing — investing in green technologies, clean-energy sectors or companies that have an integrated environmental approach — has “outperformed not only ethical funds, but mainstream indices as well over a one-, three- and five-year period”. Ethical funds, a separate category of responsible investing, are less profitable.

You may be relieved to hear that your clean-energy funds are good

financial bets. But Krosinsky and Robins warn us against the ‘materiality trap’: the tendency of investors to incorporate environmental or social issues only when they are financially attractive. Many chapters focus on this point. Yet the book does not pay enough attention to another trillion-dollar question: how do we measure the effects of investment on the sustainability of our world?

To answer that, we need to know more about the systemic effects of specific investments on specific ecosystem services and societies, both over time and on a cumulative basis. This requires multidisciplinary research. For example, funds such as Jupiter Ecology, Winslow Green Growth, Orange SeNSE or the CalPERS emerging markets fund all invest in green activities and offer strong financial returns. It is less clear if they make measurable

Green technologies, such as this reverse vending machine that refunds consumers who recycle, represent good investments.

fundamental. For example, how can dynamic socio-ecological feedback loops become integrated within dynamic financial markets? How can we measure the effects of trillions of dollars of investment on natural capital stocks or ecosystem services? How can financial governance models make these interconnections possible? And we need to experiment with new organizations that better connect financial markets to science and societies.

One such example is the Resilience Alliance, an international research network of scientists and practitioners working on sustainability. Their Connectors Group is trying to establish more-explicit links with the business world — not an easy task given the differences in career

focus, social norms and conventional meeting places. Yet scientists can be inspired by the chapter on civil society. Non-governmental organizations influence capital markets through active capital campaigns, including shareholder activism, partnerships with powerful institutional investors and formal investor briefings.

Sustainable Investing is a good read for managing your portfolio. But it remains to be seen if *Nature* will be read by investment analysts. ■ **Gail Whiteman** is associate professor and director of the Sustainability and Climate Research Centre, Rotterdam School of Management, Erasmus University, 3062 PA Rotterdam, the Netherlands. e-mail: gwhiteman@rsm.nl

In search of adventure

Most scientists have tried to explain their work to inquisitive relatives or acquaintances. Whether one studies salamander biology, glacial moraines or dark energy, one inevitably faces someone who is convinced that a life devoted to understanding nature is no vocation for a grown person and is merely an escape from the 'real world.' The string theorist and author, Brian Greene, has argued that these misperceptions are derived from how science is taught and communicated to the public. His prescription is that scientists need to convey the breathtaking vistas opened up by scientific inquiry and teach science for what it is: one of humanity's great adventure stories. Evolutionary biologist Sean Carroll's new book, *Remarkable Creatures*, fills this important niche.

Carroll tells the story of evolution through the adventures that lie behind its great discoveries. With skill as a storyteller, and a passion for his subject, Carroll deftly describes the great expeditions and people behind 13 major discoveries in natural history over the past 200 years. He imparts an infectious enthusiasm for the act of discovery, with all the risks, failures, dead ends and ultimate successes that expeditionary work often involves. As fast-paced as a detective story, the book is a primer on the joy of being an evolutionary biologist, written by one of our best modern practitioners.

Carroll reveals the challenges and rewards of venturing into the unknown. He begins his tour in 1800, in an age when vast stretches of

Ecuador's unexplored terrain thrilled the nineteenth-century naturalist and explorer Alexander von Humboldt.

Earth were unexplored wilderness, and much of the flora and fauna was unknown to western science. His first tale, that of the naturalist and explorer Alexander von Humboldt, opens with the combination of enthusiasm, hardship and adventure that pervades the narrative of

later chapters. Venturing into the forests of South America, Humboldt exclaims in a letter to his brother: "What trees! Coconut trees, fifty to sixty feet

high... We rush around like the demented; in the first three days we were unable to classify anything..." Like Humboldt, each of the scientists in Carroll's book was the first one to see a new fossil, species or historical connection. And each shared Humboldt's excitement.

The first part of the book describes the travel

adventures of Charles Darwin, Alfred Russel Wallace and Henry Walter Bates. Lacing each tale with anecdotes of success and failure, Carroll conveys the sense that real people with real aspirations, fears and enthusiasm endured years in jungles and on ships to come up with ideas that would ultimately change the way scientists view the natural world. Next come stories of major fossil discoveries, showing how exploring the rocks of the world can reveal the history of life. He uses as his examples Eugène Dubois's discovery of the Java Man fossils, the Cambrian radiation of animal phyla, the origin of birds, the impact theory for mass extinction, and the fishapod, *Tiktaalik*, including my own work with Ted Daeschler and Farish A. Jenkins. The final grouping looks at human origins and bridges from the fossil record to the molecular one, first revealed by Linus Pauling and Emile Zuckerkandl, and later by Allan Wilson, Vincent Sarich, Mark Stoneking and Svante Pääbo. This shift, from expeditions revealing new fossils to laboratory adventures recovering ancient DNA, reflects a bridge to our current approach, one that integrates data from fields as diverse as geology and molecular biology to explain evolutionary history.

In reading *Remarkable Creatures*, one could feel a sense of loss that the days of great adventure are no more. We live in an age in which almost every region of Earth has been mapped and every species known is being documented with its own web page in the Encyclopedia of Life. It is easy to think that the days when a naturalist such as Humboldt could describe themselves as demented with the joy of seeing a new vista for the first time are over.

But unexplored vistas still exist, from the countless new species of microbes that dwell in every clump of dirt and every inch of our guts to the deepest reaches of space revealed by telescopes and probes. Indeed, in the cast of scientists manning the Mars rovers at NASA mission control, we find a room full of Humboldts, exploring a new world and giddy with each patch of Mars that is seen for the first time. These emotions are among the universals of our vocation, and there are few better introductions to them than Carroll's book. *Remarkable Creatures* is the book to give those inquisitive relatives, or even more important for our society's future, their kids. ■

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Remarkable Creatures: Epic Adventures in the Search for the Origin of Species
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