in contrast to its extensive coverage in the second section. Oliver Sacks attempts to redress the balance in an epilogue emphasizing the importance of the integrity of the individual as therapy in brain disorders and invokes neural darwinism as a *deus ex machina*. But this holistic approach floats free of any real neurophysiological infrastructure and in any case is simply too little too late.

In general, however, this third section is of value in that it faithfully reflects the limitations of current research on the brain. There is a tendency to smugness among neuroscientists, engendered in part by the prevalence of technocratic attitudes and exemplified in this section, that they are set fair towards discovering how the brain works. But surely we neuroscientists, who are all so increasingly defined by, and dependent on, technique, must first become fluent in the abstracted concepts and questions that preoccupied our predecessors, and that ultimately now underscore our experimentation. *The Enchanted Loom* offers a unique reference source for neuroscientists to benefit from their sherringtonian roots, and allows the general reader to savour the visual beauty derived from exploring the brain. □

Susan A. Greenfield is in the Department of Pharmacology, University of Oxford, Oxford OX1 3QT, UK.

New in paperback

■ Ellis Horwood have recently published *Neuroscience: An Illustrated Guide* by Roger A. Barker which aims to provide an overview and guide to current knowledge about the nervous system. Price is £19.95, \$39.95.

■ Two books on computing are issued in paperback by Oxford University Press. *The Universal Turing Machine: A Half-Century Survey* edited by Rolf Herken was described by Stephen Muggleton as "a vital reference work for computer scientists and mathematicians" (*Nature* **335**, 597; 1988). Price is £25. For students and professionals, as well as nonspecialists, is issued the third edition of *Dictionary of Computing* edited by Valerie Illingworth. Price is £6.99, \$10.95.

■ *The Frozen Earth: Fundamentals of Geocryology* by Peter J. Williams and Michael W. Smith is the first book in English to concentrate on the effects of cold climates on the surface of the Earth. Published by Cambridge University Press, price £19.50, \$29.95.

■ For those interested in quantum mechanics comes *Quantum Implications: Essays in Honour of David Bohm* edited by B. J. Hiley and F. David Peat. The collection was praised by Tony Sudbery as being "a fitting tribute to one of the most searching thinkers in modern physics" (*Nature* **331**, 26; 1988). Published by Routledge, price £9.99.

■ Finally, to mark the birth of Michael Faraday 200 years ago this week, Adam Hilger have issued *Michael Faraday and the Royal Institution* by J. M. Thomas. The book contains many drawings and photographs published for the first time. Price is £12.95. □

Nuclear citizens

Alan Cottrell

Nuclear Choices: A Citizen's Guide To Nuclear Technology. By Richard Wolfson. MIT Press: 1991. Pp. 467. \$33.75, £22.50.

Meltdown: The Collapse of the Nuclear Dream. By Crispin Aubrey. Collins & Brown: 1991. Pp. 190. Pbk £6.99.

The Nuclear Lion: What Every Citizen Should Know About Nuclear Power and Nuclear War. By John Jagger. Plenum: 1991. Pp. 402. \$29.94.

CITIZENS have opinions and the right to express them. They also have, less certainly, heads for thinking, as well as hearts for feeling. The nuclear age has presented new arenas for the exercise of these faculties. Although all three of the above books recognize this — indeed, it provides their common guiding motivation — they could hardly be more different in their approaches.

At the cerebral extreme is Wolfson's *Nuclear Choices*. The author follows the conventional scientist's approach: people have only to be given all the relevant basic scientific facts, clearly and without bias, and all will be well. Sound opinions will then be formed out of which sensible answers can always be constructed, by do-it-yourself means, to meet any situation. In his own words, "I have written this book on the premise that nuclear choices are best made by citizens who know something of the underlying issues, who understand the basis of nuclear technology, and who can judge for themselves statements advocating particular positions". The book is thus replete with scientific facts and explanations, skilfully presented somewhat in the style of *Scientific American*, but at a generally more elementary level. Although intended for people "with no particular scientific, technological or political background", the book would undoubtedly give the assiduous general reader a formidable knowledge with which to tackle the great issues of the nuclear age: nuclear warfare, radioactivity in the environment, Chernobyl and Three Mile Island, nuclear waste, benefits and risks of nuclear medicine and so on.

True to his scientific attitude, the author is entirely objective and impartial in his approach: rather like a judge addressing the jury at the end of a long case, summing up all the facts and pointing to the important questions to be answered, but refusing entirely to lead with his own views.

All of which is in total contrast to Aubrey's *Meltdown*. Here it is all heart, and a passionate anti-nuclear one at

that. Everything nuclear becomes a horror story, presented in lurid language. Nuclear sites are notorious; Britain is a nuclear dustbin; accidents at nuclear plants are invariably serious; nuclear plans are great white hopes, their projects white elephants; relations between government bodies and the nuclear industry are of course cosy; and independent pro-nuclear people are crazy.

There are few scientific facts in this book, which is perhaps as well, since those that there are are pretty inaccurate. For example, the moderator in a nuclear reactor "moderates the nuclear reaction by literally slowing it down"; radiation causes "genetic damage to a developing foetus"; and, "as the Windscale fire had shown, once the nuclear reaction had got out of control . . .". So much for the facts. But then, what do they matter to a heart in full frenzy, which already knows all the answers by instinctive conviction and is hermetically sealed in its certitudes? Let not the native hue of resolution be sicklied o'er with the pale cast of thought.

The most interesting part of the book is the description of the events surrounding the public enquiry into the proposed Hinkley Point C nuclear power station; and the associated 'stop Hinkley expansion' campaign, of which the author was one of the two full-time organizers. Provided that one is prepared to read this through the unavoidable antinuclear spectacles, it is an engaging account of a small historical episode in the nuclear age.

Jagger's *The Nuclear Lion* bases its title on a child's symbol of unbridled, mysterious and fearsome power: "to the general public, nuclear energy is a lion. It is a fearsome and terrible thing. And . . . this fear has arisen because it is not understood". And so, like Wolfson, he sets out to convert this fear into rational opinion by providing the necessary understanding. His presentation of the scientific facts is similar to Wolfson's, but not as detailed. Where his book differs strikingly however, and in this he takes up a position between Wolfson and Aubrey, is in its allowing both the heart and head full and equal expression.

Jagger grips the reader by the intensity of his passion, particularly that about the horrors of nuclear warfare. Writing obviously before both the recent US-Soviet agreement of strategic arms reduction and the equally recent discovery of the secret Iraqi military nuclear efforts, he finds a paradox in the fact that nations are "arming themselves to the teeth with apocalyptic nuclear weapons" yet have virtually stopped civil nuclear power because of fear of it. He is as strongly in favour of the latter, because it can easily be made very safe

and can give the world the energy it will need in the coming century, as he is against nuclear weapons and their military-industrial complex. It must seem incredible to Aubrey, to whom everything nuclear is unreservedly devilish, that anyone could passionately hold such diametrically opposite views about the civil and military aspects of nuclear energy. Yet many of us do. □

Sir Alan Cottrell is in the Department of Materials Science and Metallurgy, University of Cambridge, Pembroke Street, Cambridge CB2 3QZ, UK.

■ Also published recently on the politics of this subject: *The International Politics of Nuclear Waste* by Andrew Blowers, David Lowry and Barry D. Solomon, published by Macmillan, price £45 (hbk), £17.50 (pbk); *The Politics of Nuclear Power: A History of the Shoreham Nuclear Power Plant* by David P. McCaffrey, published by Kluwer, price Dfl. 150, \$89, £53. □

Out of Darwin's shadow

W. F. Bynum

Alfred Russel Wallace: An Anthology of His Shorter Writings. By Alfred Russel Wallace. Edited by Charles H. Smith. Oxford University Press: 1991. Pp. 551. £40, \$79.

ALFRED Russel Wallace (1823–1913) has always been a bit of an enigma. Even his contemporaries did not know quite what to make of a man who could with equal passion advocate at different periods of his life agnostic naturalism and committed spiritualism; who kept the Royal Society at a distance yet accepted two of its most prestigious medals; who presented himself as the mildest of men but seemed to thrive on public controversy; who was self-effacing even in his fat, double-deckered autobiography; who was the co-discoverer with Charles Darwin of the principle of natural selection and one of its chief exponents for three decades after Darwin's death, yet was content for 'darwinism' to be the sole descriptive appellation. For Darwin's part, he came to believe that he might have more to fear from friends like Wallace than announced adversaries; and the socially conventional Darwin did not live to see Wallace's most ardent espousal of socialism, land nationalization and phrenology, or his assault on smallpox vaccination, which he maintained was a scientific delusion.

While Darwin scholarship has become a mini-industry, with the publication of his correspondence and a new biography every few months, Wallace remains too

Illustration plate of mollucan beetles from Alfred Russel Wallace's *The Malay Archipelago*.

much in the shade. For, as Charles Smith's splendid anthology reveals, Wallace was a wonderfully creative thinker whose writings are still fresh a century later.

Wallace wrote easily, well and much. Smith's bibliography of Wallace's printed works lists almost 800 items, including 20 books, ranging from his classics *The Malay Archipelago* (1869) and *Island Life* (1880) to less familiar titles such as *On Miracles and Modern Spiritualism* (1875) and *Is Mars Habitable?* (1908). Wallace's last book was published in the year of his death at the age of 90. His hundreds of articles appeared in the mainline scientific press (proceedings and journals of the Linnean Society, Zoological Society, Entomological Society, and so on), high-brow Victorian periodicals (*Quarterly Review*, *Macmillan's Magazine*, *Fortnightly Review*, *Nineteenth Century*), and somewhat less conspicuous publications such as *The Eagle and the Serpent*, *The Medium and Daybreak* and *The Journal of Astrology*. To *Nature* he contributed a scientific paper, five letters to the editor (Sir Norman Lockyer) and two book reviews in the first volume (1869–70), and a letter to the same editor in the seventy-sixth volume 47 years later. Many issues in between contained something from Wallace's pen.

Smith's bibliography is by far the most complete ever compiled and the care that has gone into its preparation is reflected throughout the anthology. He has chosen more than 100 separate publications, ranging across the vast breadth of Wallace's interests, and varying in length from one to more than a dozen pages. Editorial intrusions are mostly short but to the point. The selection is really a guide to Wallace's thought, because he often subsequently incorpo-

rated into his books material first published in his articles.

That thought was always clear, whether Wallace was creatively exploring the nuances of biogeography or discoursing on the reality of the unseen world. At all times he considered himself to be a student of the experiential Universe, using the methods and tools of science to make sense of it all. The same tools were appropriate because evolution pervades the Universe, linking the past with the present, and joining the cosmic to the biological, social and psychological. As Smith comments, to Wallace social change was a manifestation of evolution no less than was the biological process sustained by natural selection.

Smith makes no attempt to whitewash Wallace by emphasizing his work on geographical distribution of plants and animals, mimicry, adaptation and ecology at the expense of the iconoclastic portions of his *oeuvre*. Indeed, the section on spiritualism is almost as long as that on biogeography, although Wallace turns up as a geographer in other sections as well. A concern with spatial relationships underlay much of his best scientific work.

It would be too much to suggest that the democratic, self-taught, lower-middle-class Wallace needs rehabilitation in an age like our own. Nevertheless, he deserves his own ground outside Darwin's shadow, which is where Smith has firmly placed him. Among other things, this volume reminds us that the letter that Wallace sent to Darwin in 1858 from half-way across the world was but one episode in Wallace's long and eventful life. □

W. F. Bynum is at the Wellcome Institute for the History of Medicine, 183 Euston Road, London NW1 2BN, UK.