

on Australia's outstanding record in medical research. He rightly praises Barry Marshall and Robin Warren for their work on *Helicobacter pylori*, which won the 2005 Nobel Prize in Physiology or Medicine. But Macfarlane Burnet, Peter Doherty and Suzanne Cory are barely mentioned, and Jack Eccles, Frank Fenner, Don Metcalf, Gus Nossal and Jacques Miller are ignored.

The most thoughtful element in Barlow's book is a brief examination of the comparative value of individual versus collaborative research; he should have expanded this argument. He expresses concern that Commonwealth and state funding of research may involve too much fanfare about multidisciplinary at the expense of research by individuals. Darwin's research and Einstein's celebrated 1905 papers would have been too small to qualify for Australian Research Council (ARC) grants, and I suspect that Burnet, a notorious loner, might have looked in vain for funding from the National Health and Medical Research Council.

The proof-reading is careless. We are treated to a quotation from Arthur Koestler twice. And Barlow dismisses Australia as a "relatively small economy", even though *The Economist* ranks Australia as number 15 in the world. The book also suffers from the lack of an index.

Barlow is right to point out the Australian public's high level of interest in science, but is dismissive, even contemptuous, about complaining academics. He fails to examine the reasons for this paradox. He should have commented on the striking fall in enrolments in the enabling sciences, physics, chemistry and mathematics, parallel to the relentless march of the business students. Research disciplines are down proportionally (but not in absolute numbers) while the packaging and marketing subjects are well up. Was this worth a sentence or two?

Barlow is unduly modest and says little of his time advising Nelson. He mentions the case of Trofim Lysenko, the Soviet geneticist who suppressed darwinism, and asserts that nothing similar could happen in Australia. I am not so sure. Australia practises its own form of soft lysenkoism, with climate scientists in CSIRO silenced if they do not produce 'agreed science', supporting the Howard government's ideological rejection of global warming. 'Public good' Cooperative Research Centres were closed down unless they worked on commercial products. The ARC's recommendations were subject to ministerial veto, and a chair and chief executive appointed for expertise in research were replaced by people experienced in working with government and interpreting, or even second-guessing, shifts in policy. ■

Barry Jones is a vice-chancellor's fellow at Melbourne University. He was Australia's science minister from 1983 to 1990. His autobiography, *A Thinking Reed*, will be published in October.

Renaissance man

Thus Spoke Galileo: The Great Scientist's Ideas and their Relevance to the Present Day by Andrea Frova & Mariapiera Marenzana
transl. by Jim McManus

Oxford University Press: 2006. 512 pp.
\$34.50, £19.99

Giorgio Parisi

Galileo Galilei is known as one of the founders of modern science. But his works, as well as those of co-founders such as Isaac Newton, are seldom read. It is not that they are in some exotic language: Newton wrote in Latin, Galileo mainly in a limpid, straightforward Italian, in contrast to the baroque style of many of his contemporaries. As well as science, Galileo is a major figure in Italian history and literature. Italian high schools teach his dramatic life and prosecution by the Inquisition. But professional historians of science aside, few Italians have read many of his works.

The problem is that we must understand the scientific questions, knowledge and — most importantly — prejudices of the time. Changes in scientific notation make the scientific papers of even a century ago all but unintelligible to today's experts, so it is no surprise that scientists are seldom moved to read 400-year-old books of physics whose scientific context almost completely escapes them.

Thus Spoke Galileo by Andrea Frova and Mariapiera Marenzana, an attempt to bring Galileo's work to general readers, should solve this problem. The texts are introduced in their

correct and precise historical context, framed to stimulate the reader's curiosity.

The book opens with an imaginary autobiography, composed of a collage of letters and other documents written by Galileo, interpolated with writings from Frova and Marenzana in Galileo's style. Galileo tells his life story, discussing the clash with the Church that eventually led him to disown his writing. It is a portrait of a complex man, with light and shade. He was frank, but also able to adapt himself to difficult times: he knew that his forced abjuration was only a momentary defeat, and that in the long run, with the help of his students, his ideas would triumph.

Each of the other chapters deals with a specific topic. They begin with a summary of the knowledge at that time, followed by Galileo's writings on the subject. The most crucial points are put in his words; the rest of the argument is summarized. Often the chapter ends with a short historical excursus where, presenting the same ideas in modern scientific language, the authors show the impact of Galileo's ideas on subsequent science.

To understand the originality and ingenuity of a scientist we must compare his statements with those of his contemporaries. It turns out that Galileo leant on the work of other scientists more than is commonly believed: the famous example of the ship in motion is taken from Giordano Bruno, and an argument on the fall of a heavy body comes from Giovanni Battista Benedetti. Galileo's unique skill was to

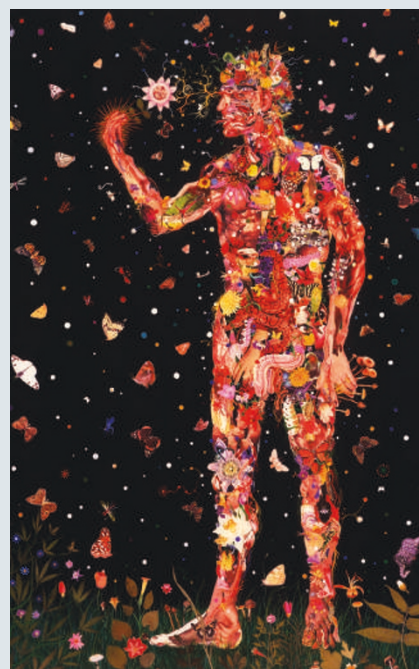
Galileo in the gallery

Galileo's influence on science and culture is celebrated in art and on stage in Britain this summer.

Bertolt Brecht's play *The Life of Galileo* examines the conflict between reason and faith, a theme with current resonance. This month sees the revival of a version of this play by David Hare at the National Theatre in London. Directed by Howard Davies and starring Simon Russell Beale, it runs until the end of October.

Galileo's book *Sidereus Nuncius* (*The Starry Messenger*) lends its title to an exhibition at the Compton Verney gallery in rural Warwickshire. *The Starry Messenger: Visions of the Universe* explores how science and technology have changed the way we think about the Universe, and the role of artists in transmitting these ideas. Early scientific texts are on display alongside paintings, music and video installations by artists ranging from William Blake to Fred Tomaselli (shown here). The exhibition runs until 10 September.

► www.nationaltheatre.org.uk
► www.comptonverney.org.uk



JAMES COHANGALLERY

weave empirical observations into a coherent picture. He also used state-of-the-art technology to build and develop instruments of scientific observation, such as the telescope and the microscope, that, through their widespread use, went on to fundamentally influence later science.

The book is remarkable for its clarity, precision and historical accuracy. Numerous drawings, figures and photographs help the

reader pick a path through the historical and scientific reconstruction.

Nowadays scientific knowledge is extraordinarily developed and university education promotes hyper-specialization. Scientists who end up working in two different fields may struggle, owing to an insufficient depth of knowledge in either one. This book reminds us that things have not been always this way: as the authors note in their introduction, the excerpts from

Galileo's writings have been chosen to offer a vision of his multiple interests in many scientific and cultural fields, "of his prodigious curiosity for all natural phenomena, of his inexhaustible capacity for posing questions to himself and searching for answers by reasoning. And also of his exultation at making discoveries." ■

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A drink from the magic well

Asian Honey Bees: Biology, Conservation and Human Interactions

by Benjamin P. Oldroyd & Siriwat Wongsiri
Harvard University Press: 2006. 340 pp.
\$59.95, £38.95

Francis L. W. Ratnieks

Karl von Frisch, who won the 1973 Nobel Prize in Physiology or Medicine for discovering the honeybee dance language, called the honeybee a magic well — no matter how much was discovered, more remained. Most research on honeybees, including von Frisch's, has been done on *Apis mellifera*. This species, the western hive bee, is native to Europe, Africa and the Middle East, and has been introduced worldwide because of its economic importance in making honey and pollinating crops. But Asia is home to eight more species of *Apis*, five of which have been recently discovered or recognized. The past ten years has seen an upsurge of research on these species, leading to some 250 scientific articles.

Four of the Asian honeybee species nest, like *A. mellifera*, in cavities within which they build multiple vertical wax combs. There are also two species each of dwarf and giant honeybees. These build a single vertical wax comb, usually under a branch or, in the case of giant bees, an overhang. All live in tropical Asia, except for the eastern hive bee, *A. cerana*, which extends as far north as Japan and Korea, and the giant mountain honeybee, *A. laboriosa*, which lives in the Himalayas.

Asian Honey Bees has a simple but effective structure. It begins with chapters on honeybees in general, the Asian species, honeybee evolution, speciation and biogeography. These provide the context in which to understand the biodiversity and evolution of honeybees and also for the following five chapters on particular topics: dance communication and foraging; reproduction; worker sterility and kin selection; nesting and defence; and parasites and predators. The final two chapters address interactions with humans and conservation.

Studies of Asian honeybees have done much to elucidate the evolution of the dance language, a research question initiated more than 50 years ago by von Frisch's student Martin Lindauer, and many other areas of honeybee



Never mind the buzz about *Apis mellifera* — *A. nuluensis* is one of eight other honeybee species in Asia.

biology. These studies have also discovered examples of nature at its most wonderful, of which two deserve a mention here. Workers of *A. cerana* defend their nest against giant hornets by encasing the hornet in a living ball of bees, which generate heat and literally cook the hornet to death before it can send a pheromone signal to recruit more hornets to the attack. Indeed, the scout hornet's pheromone alerts the bees. Colonies of giant honeybees, *A. dorsata*, often migrate 100 km. At certain times of the year the bees abandon their nesting trees, flying to better areas for a season before returning. Genetic studies show that the same colony with the same queen may return months later to the same tree.

Asian Honey Bees succeeds admirably. It is both an authoritative monograph that will satisfy experts and a highly readable book that will engage students and biologists in general. It presents Asian honeybees in the broader context of social behaviour and evolution while giving a real feeling for the bees themselves, including their interactions with humans — you can buy bee brood in many Asian food markets, something the authors have used as a way of getting samples.

The book itself is well produced, although I have one quibble. The numerous photos are

reproduced in black and white. Surely insects demand colour! But this is partly offset by a stunning cover photograph of a nest of the giant honeybee, *A. dorsata*. ■

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MORE ON BEES

Letters from the Hive: An Intimate History of Bees, Honey, and Humankind

by Stephen Buchmann with Banning Repplier (Bantam Books, \$14)

A book interweaving the natural history of bees with their small but vital place in world culture. The story ranges from prehistoric honey-hunting to mead-making, pollination, bees in warfare, and the medicinal properties of honey.

A Keeper of Bees: Notes on Hive and Home

by Allison Wallace (Random House, \$23.95) A beautifully written book that peers into the hive for a hard look at honeybee behaviour, then swerves all over the place, covering the events that first sparked the author's interest in bees, the effects of pollution, bees' place in myth and nature, and the many hives the author has created over the years in various back gardens.