

books and arts

history of early life on Earth, *Life on a Young Planet* is a time document, but it expresses better than most the bumptious vitality and sheer fun of open-minded research. ■

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More on the Cambrian explosion In the Blink of an Eye

by Andrew Parker

Perseus, \$24.95, Can\$ 38.95; Free Press, £18.99

The journey to Enlightenment

The Man Who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment

by Mary Terrall

University of Chicago Press: 2002. 408 pp.

\$39, £27.50

Steven Shapin

Being Pierre-Louis Moreau de Maupertuis was hard work. Some of that work was deciding what kind of man of science he wanted to be. Starting out in mathematics and mechanics, he eventually made notable contributions to the study of heredity, and ended his career swept up in a series of metaphysical disputes. Some of the hard work was physical: his most notable scientific research in geodesy called for courage and a willingness to suffer for science. In 1736, he led an expedition to Lapland to establish the precise measure of a degree of latitude. Heavy astronomical instruments had to be lugged up mountains at the northern end of the Gulf of Bothnia, and measuring rods were laid end-to-end for miles over frozen rivers. In winter

the cold was so cruel that the intrepid group's cups of eau-de-vie froze to their lips, and when summer came, swarms of mosquitoes drove them to the brink of madness.

The expedition to Lapland was a display of manly fortitude as much as an exercise in state-funded scientific rationality. When Maupertuis returned to Paris, he ensured that the world properly appreciated his achievements by publishing a vivid account, imaginatively combining the genres of travelogue, 'boy's own' adventure story and popular science.

Maupertuis had survived the rigours of Lapland, but now he had to make credible the precision knowledge brought back from the Arctic. What was at issue in the measure of equatorial and Arctic degrees of latitude was the bitterly contested question of whether the shape of the Earth was oblate (flattened at the poles), as Maupertuis maintained, or prolate (elongated at the poles), as was claimed by his local enemies in the Paris Academy of Sciences, the Cassini dynasty of astronomers. The problem of the Earth's exact shape was pertinent to practical cartography and navigation, but it was also connected in complicated ways to preferences for newtonian or cartesian theories of gravitation in particular, and philosophies of nature in general.

For Enlightenment men of science working in absolutist political settings, the question of the credibility of scientific knowledge was always linked to the security of their scientific careers. Science played to the sovereign and his courtiers, and without their approval there were limited resources to do research, few institutional stipends to sustain them, and only weak or marginalized cultural allies to support scientific positions. Part of Maupertuis' genius lay in the deft way that he kept audiences of scientific experts and polite society both in play. As Mary

New in paperback

Dr Tatiana's Sex Advice to All Creation: The Definitive Guide to the Evolutionary Biology of Sex

by Olivia Judson

Owl/Metropolitan/Henry Holt, \$14;

Vintage, £7.99

"Judson's text is both wonderfully entertaining and authoritative. All in all this is a stimulating feast of extraordinary sexual practices." Tim Birkhead, *Nature* 418, 483 (2002).

Shoemaker by Levy: The Man Who Made an Impact

by David H. Levy

Princeton University Press, \$16.95, £11.95

"Levy writes well, and his pacey style keeps his personal story bubbling along superbly. The book is everything a 'good read' should be." David W. Hughes, *Nature* 409, 133-135 (2001).

The Secret Life of Dust: From the Cosmos to the Kitchen Counter, The Big Consequences of Little Things

by Hannah Holmes

Wiley, US\$14.95, Can\$23.50

Shortlisted for the Aventis Prize for Science Books 2002.

Terrall writes, after many years, Maupertuis refined "an identity as a public figure equally at home in academy and salon".

When he returned from Lapland, Maupertuis was celebrated by both the court and the salons, falling into the arms of a series of married aristocratic literary ladies, whom he serenaded on his guitar, and securing a pension from the crown for his services to the state. He had his portrait painted dressed in exotic Lapp costume, with his left hand flattening the North Pole of a globe, just so no one could possibly miss the point. He never forgot the importance of amusing as well as instructing, and his literary merits were certified in 1743 by election to the Académie française, thus becoming an 'immortal'; and one of the very few French men of science honoured by the élite academies of both of the 'two cultures'.

Having achieved all he could in Paris, Maupertuis was now tempted by Louis XV's absolutist rival, Frederick the Great, who wished his court in Berlin to be furnished and burnished by the best Enlightenment literati that money could buy. Frederick wanted Maupertuis to take charge of the Berlin Academy of Sciences, but the Prussian king's first approaches were rebuffed. Maupertuis eventually succumbed in 1745, seduced by the opportunity for dinner-table intimacy with a monarch, by the offer of total authority over the academy's affairs, by piles of cash, and possibly by Frederick's arrangement of a posh German wife for



Snow easy life: Maupertuis endured the Arctic winter in his quest to determine the shape of the Earth.

Science in culture

Deacon's nucleic acid

A DNA anniversary project took shape in an unpredictable way.

Martin Kemp

Major artistic projects, like scientific research programmes, can develop in unanticipated directions, although in this era of predefined outcomes for grant-funded projects in academia, the truly unpredictable is increasingly factored out. Where there is no contract with a funder, however, the constraints are absent — but so, generally, are the necessary resources.

These remarks preface the story behind the genesis of an important piece of sculpture recently completed by British artist Richard Deacon in response to a scheme to celebrate the 50th anniversary of Watson and Crick's seminal discovery of the structure of DNA. In 2001, Philip Campbell, the editor of *Nature*, approached me and my colleague Marina Wallace with the idea of stimulating a substantial piece of sculpture to commemorate the anniversary. None of us wanted a straightforward representation of the double helix, which has entered the world of visual cliché. Reviewing possible artists, we settled on Deacon, who had an impressive record of generating large-scale constructions, especially in wood, that look like 'real' things from the organic world but are in fact entirely invented.

Deacon took up the challenge enthusiastically, undertaking background research. The Gulbenkian Trust generously offered set-up money, and a full budget proposal was developed. Surprisingly, no major funder came forward.

But Deacon was undeterred. Carried forward on the wave of his creative impetus, he assumed the risk himself — and broke free of constraints. The developing work began to take on a fascinating life of its own in a process of visual and physical dialogue with its creator.

Deacon commissioned the making of a series of strongly bent and fiercely twisted oak components according to a set repertoire of barley-sugar twists, and 'fast' and 'slow' curves. His demands literally stretched the wood to its limits. The torsions were not the result of predetermined pressures in a machine but arose from progressive forces instinctively applied to the steamed timbers by two human operatives, whose eyes, ears and hands provided the most sensitive registers of when breaking point was near.

The components were at the centre of an inter-



DNA with a twist: Richard Deacon's *Out of Order* has evolved its own 'molecular' structure.

play between Deacon's visualization, the wood's inherent structural possibilities, and what seemed to be the self-organizational needs of the growing sculpture. Originally, the parts were arranged into four separate but related wholes, like the subunits of a large molecule. Then, suddenly, they came together, bolted and bonded, with a meandering and twisted spine from which sprays of ribbons launch themselves into space at skewed angles, seeking connections. The sculpture seems both closed and open, depending on the viewpoint.

The result, without any defined intention, is uncannily evocative of a ribbon model of a large protein molecule or nucleic acid as generated by a graphics programme such as MolScript. It is at once precariously dynamic and structurally poised. A piece of sculpture as large as this (700 × 570 × 190 cm) writhing in a confined space could well feel threatening, but those who witnessed its unveiling at the Lisson Gallery on 1 May could be seen smiling at its joyous vitality.

Deacon's magnificent sculpture is no longer about DNA. Its title is metamorphosing from the genetically orientated *Out of Africa* to the more

abstract *Out of Order* (suggesting, among other things, the emergence of unpredictable complexity from a limited set of basic parts). But its rootedness in a conceptual process akin to that which allowed Watson and Crick to see the structure of DNA remains central to its formation.

Where now for the sculpture? In the short term it is to cast its spell in Tampere in Finland and Vitoria in Spain, where it will no doubt prove itself to be a show-stopper. Where it will find a permanent home is still to be determined.

Martin Kemp is professor of the history of art at Oxford University and co-director of Wallace Kemp/Artakt. His book *Visualizations: The Nature Book of Art and Science* is now available in a German edition with the title *Bilderwissen: Die Anschaulichkeit Naturwissenschaftlicher Phänomene (Dumont Literatur und Kunst Verlag, 2003)*.

Out of Order will tour European venues next year in a major exhibition of Richard Deacon's work, starting at the Sara Hildén Art Museum in Tampere.

the now-47-year-old French bachelor savant.

Exile to the Prussian cultural hinterlands turned out to have limited charms for Maupertuis. He never mastered the language; he was irritated by German philosophers' preference for Christian Wolff's version of leibnizian metaphysics; and he got caught up in a nasty, and ultimately petty, polemical exchange with Voltaire, Frederick's other prize French catch. His health already suffer-

ing from the Prussian climate, Maupertuis faced personal disaster when Frederick and Louis, the two absolutist sovereigns to whom he owed allegiance, went to war with each other in 1756. Maupertuis died three years later, fittingly in Basel, about halfway between Paris and Berlin.

Maupertuis' life exposes some of the tensions that existed between the cultural powers of princely patronage and Enlighten-

ment ideals of intellectual republicanism. This well-crafted biography is one of the better studies of the problems and opportunities of the eighteenth-century scientific career under the conditions of absolutism. ■ Steven Shapin is in the Department of Sociology, University of California, San Diego, La Jolla, California 92093-0533, USA. His books include *A Social History of Truth: Civility and Science in Seventeenth-Century England*.