

cists I know. I definitely do not agree with her that the recent rash of physics books with the word 'God' in the title shows that physicists view themselves as a priesthood engaged in a religious enterprise. I suspect the answer has more to do with the Hawking effect: having 'God' in the title helps to sell books, and that's all there is to it.

I was also disturbed by Wertheim's apparent confusion of physics with technology, and the conclusions she draws as a result: that society should direct physicists to concentrate their efforts on "helping humanity" in the most obvious and immediate ways. On this point, I feel Wertheim misunderstands the nature of science, and her claim that much of today's physics research will be of no benefit to mankind seems odd from one who has so obviously studied the history of science.

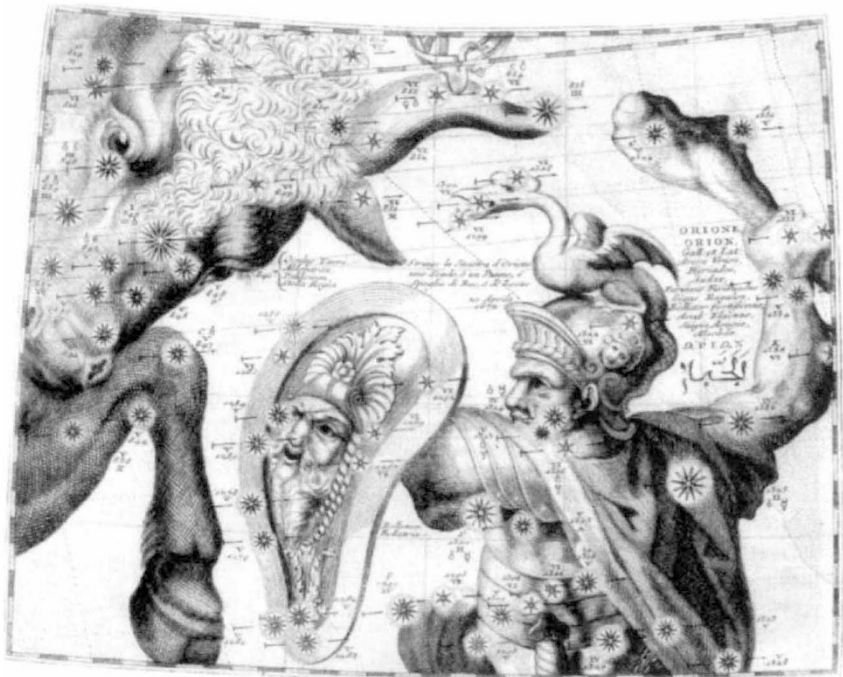
But whether or not you agree with Wertheim's thesis, her book is a delight to read, and highly informative. So too is *Conversations on Mind, Matter, and Mathematics*, translated from the original French by M. B. DeBevoise. The book is an edited transcript of a series of conversations between a leading neurobiologist, Jean-Pierre Changeux, and a Fields Medal-winning mathematician, Alain Connes. The book's title sums up what the two talked about: the nature of mathematics and how the human brain can engage in mathematical thought about abstract entities.

As an insight into the views of two of the world's leading scientists, the book is a success. As a conversation, it is in some ways a failure. What struck me throughout was that, for all Connes's attempts at an explanation, Changeux never does understand the real nature of mathematics, and as a result much of their conversation is at cross-purposes.

And so to the fifth and final book, John Casti's *Five Golden Rules*. In many ways this is not really aimed at the 'general reader'. It is hard going from the beginning, although well worth the investment for anyone who really wants to learn about some of the contemporary mathematics that affects our everyday lives. The book's high-profile marketing probably results from Casti's earlier bestseller *Paradigms Lost* (also not the easiest of reads) and the fact that he is a cracking good writer. The five themes chosen by Casti are game theory, topological fixed-point theory, singularity theory, computation theory and optimization theory. He makes no attempt to entice you in. He assumes you want to know. For those who do, the reward is substantial. □

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## Stars in their eyes



**STARMAN** — the constellations of Orion and Taurus mapped by Venetian Vincenzo Coronelli around 1701. Coronelli produced unique hand-painted celestial globes that were scientifically impeccable but mostly intended to be artistic: the positions of the stars are almost lost in the intricate engraving of the figures of the constellations. It is one of many illustrations in Peter Whitfield's *The Mapping of the Heavens*, which charts mankind's conceptualization of the heavens through cartography from the stone age to the space age. Pomegranate/British Library Press, \$29.95, £20.

## Crossing cultural thresholds

Lucy Bending

**The History of Pain.** By Roselyne Rey. Harvard University Press: 1995. Pp. 394. \$39.95, £25.50.

PAIN is not simply a brute given, a constant to be interpreted always in the same way. It is pulled sharply this way and that by culture and by expectation. Although bound to the body, the experience of pain is hedged about by frameworks of explanation, which in turn affect the way in which the pain is felt. Nietzsche, calling his pain "dog", made sense of his physical suffering by fitting it into just such a framework: "It is just as faithful, just as obtrusive and shameless, just as entertaining, just as clever as any other dog — and I can scold it and vent my bad mood on it, as others do with their dogs, servants, and wives".

Roselyne Rey in this serious and scholarly book, aimed at the historian of medicine rather than the medical student, recognizes the role of culture in shaping the perception of bodily suffering. She examines medical ideas about bodily pain

from Graeco-Roman times until the 1950s, delineating and questioning the ways in which physicians have attempted to get to grips both with the mechanics of physical suffering and with formulating solutions to the problems it poses. This history does not suggest a steady accumulation of knowledge, but rather provides a survey of continuities and discontinuities, as dissection fell in and out of favour, or as classical anatomical texts were refound in the Renaissance, reopening long-forgotten paths of investigation. Methods of research may have progressed, as staining techniques and microscopy made neurological investigation possible, or the introduction of gunpowder into warfare forced advances in understanding, but frameworks of reference may also subsist beyond their time, serving to hold back medical advance. As Rabbi Julia Neuberger suggested in the 1980s, old ideas of sin and its connectedness to pain are fed back into modern ideas of natural childbirth, tearing themselves away from their original religious context, and suggesting needlessly that it