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## book reviews

The traditional attitude of scientists towards science was well summarized in the 1940s by the sociologist Robert Merton, who spoke of the imperative of sharing information and of science's characteristic disinterestedness, universalism and organized scepticism. Whereas Gregory and Miller report the attacks on this idealistic picture made by Bruno Latour and other influential scholars, Jack Meadows scarcely mentions them in his new book.

Meadows discusses how academic researchers in the sciences communicate their findings to each other and to the public. This is scientific research as many scientists would have it portrayed, unpolluted (as they would say) by the subversive misreadings of the so-called sociologists of scientific knowledge. No wonder the book is endorsed by Lewis Wolpert, the sociologists' scourge, who commends it as "sociology of science at its best".

Most scientists will find Meadows' account predictable. Many, I fear, will see it simply as the elevation of their informal professional chatter to the level of a worthy academic discourse. Is it easier to publish in the sciences than in the humanities? When do most scientists do their most intensive reading of the journals? Questions such as these are answered authoritatively here, with the aid of the best available data, providing answers that usually confirm the prejudices of the seasoned coffee-table pundit.

Meadows' approach may be unfashionable but he makes many points that ring a good deal truer than the writings of some of the more revisionist sociologists of science. For example, he recounts how the late Lev Landau rated his fellow physicists on a logarithmic scale: he put Einstein in class 0.5, Dirac and Heisenberg in class 1, himself in class 2.5, with most humble foot soldiers of physics way down below. Hard to defend though this exercise is, its results chime better with the experience of many physicists than observations of the unimportance of personalities made by some of the modish critics of science, many of whom do not seem to have done any science.

A meeting of minds between scientists and the scholars who study their work remains a distant hope. Similarly, Gregory and Miller point out that there is a worrying chasm in the field of public understanding of science between its theorists and its practitioners, who work with the public and the media. If a harmony could somehow be achieved, scientists might stand a better chance of winning back public trust, now at a worryingly low level throughout the West. You never know, we might live to see a day when astronomers outnumber astrologers, if not footballers. □

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## Tripped up by timekeeping

### Time's Pendulum: The Quest to Capture Time – From Sundials to Atomic Clocks

by Jo Ellen Barnett

Plenum: 1998. Pp. 340. \$27.95, £16.94

Kristen Lippincott

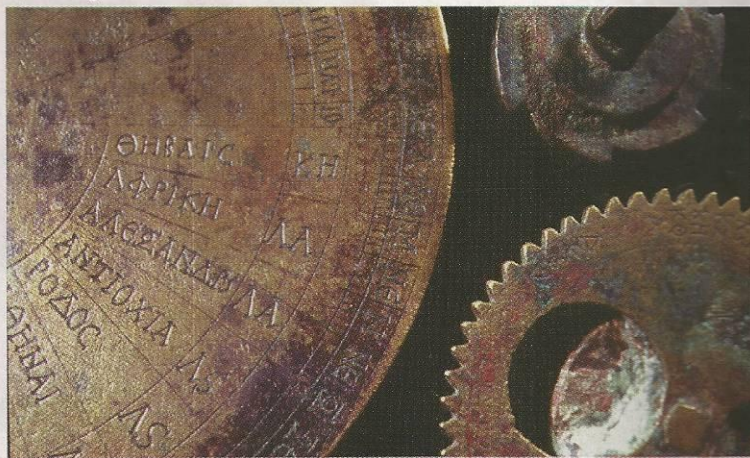
The only problem with the recent flowering of 'popular science writing' is that the large number of authors who have succeeded in creating exciting, readable and intelligent books has led a series of other writers to think that writing accessible science books must be easy. Unfortunately, on the back of the wave, we are now being forced to suffer the consequences. Those who are not demonstrably well read, nor expert in any given field, nor (in many cases) particularly gifted communicators, have decided that now is the time to enter the fray.

Time is a tricky subject to write about clearly. When trying to define time, even the usually eloquent St Augustine became tongue-tied. In trying to write a popular book about the ways in which Western man has developed a timekeeping system, however, it is a great mistake to assume that the

model of 'popular science writing' is going to help. The story of time (insofar as it might have one) is not a story of discovery or progress. There may be heroes in the story of time measurement or timekeeping, but this — as all my horologically inclined colleagues are eager to tell me — has very little to do with time itself. Indeed, even at the end of the twentieth century, our understanding and modes of thinking about time are more closely linked to cultural assumptions, religion and philosophy than to what most *Nature* readers would understand as science.

If one accepts that there might be intent behind the subtitle of Jo Ellen Barnett's book, one should also recognize it as a warning. The claim that this book explains "the quest to capture time — from the sundial to the atomic clock" presupposes two things: first, that there has been a quest to capture time; and second, that there is some sort of triumphal progression from a timekeeper that marks the apparent passage of the Sun across the sky to a timekeeper that measures the rates of oscillation in an atom of caesium-133. Both are claims that, on reflection, are difficult to sustain; but such is Barnett's starting point.

The rest of the book is a series of largely unrelated anecdotes strung together to show how silly ancient man was and how clever modern man is. To wit: "Our ancestors, of



The times they are a-changin': a Byzantine sundial calendar and a caesium atomic clock.

course, had no idea of the things discussed in the previous chapter. They were at least as ignorant of our twenty-four *equal* [her italics] hours... as they were about any of our astronomical discoveries"; or "The more complex life styles they [the ancient Egyptians] bred would certainly have been made easier by a firmer awareness of the time of day"; or "So powerful was the belief that time somehow inhered in [sic] the rhythms of nature that it had kept timekeeping in bondage to our planet's cycle of light and darkness for over three millennia".

Moreover, this positivistic romp through a self-styled history of time results in some fairly stunning anachronisms. When Steno decided to become ordained as a Roman Catholic priest, it was because he "couldn't handle the discontinuity with the biblical time line already hinted at by his discoveries"; and "Darwin himself may have even been behind the times when he set out on the *Beagle* in 1831... [because] he believed in 'the strict and literal truth of every word in the Bible.'"

Even if one were willing to suspend one's better judgement and try to enter into the spirit of the argument, the text is so peppered with errors, misunderstandings and sentences whose meaning remains a complete mystery that moving from page to page becomes a bit of a chore. To list even a fraction of the mistakes and inanities would be a waste of the reader's time.

As time is indeed a tricky subject, I tend to give the benefit of the doubt to anyone who even attempts to tackle it. But this book drove me well beyond incredulity and perilously close to despair. The only advice to offer is: for an intelligent discourse on time, go and re-read G. J. Whitrow, Derek Howse, David Landes, Jacques LeGoff, Gerhard Dohrn-van Rossum, Arno Borst or even Mircea Eliade — but steer well clear of this book. □

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## Truth and consequences

### **A Tremor in the Blood: Uses and Abuses of the Lie Detector, 2nd edition**

by David T. Lykken

Plenum: 1998. Pp. 333. \$28.95, £17.55

**Gisli H. Gudjonsson**

Lying and its detection hold a fascination for many people. The objective measurement of physiological responses such as heart rate, blood pressure and electrodermal reactivity forms the basis of lie detection. It is therefore not surprising that machines developed for measuring such responses in a medical set-



The nose has it: the specific physiological response to lying that has eluded modern science.

ting are of interest to researchers, police officers and practitioners with an interest in lie detection.

David T. Lykken provides a fascinating insight into the common abuses of this potentially important scientific tool. His main message is that lie detection techniques, apart from his own 'guilty knowledge technique', of course, are fundamentally flawed, prone to high error rates, and every year result in several miscarriages of justice. This is a big blow to the advocates of the most common techniques, such as the 'control question test'. The book is written by an eminent scientist for non-scientists, including lawyers, policy-makers and those who feel aggrieved by the injustice of having been wrongly classified as deceptive after allegedly failing a test. The first edition of the book appeared in 1981 (McGraw-Hill).

Lykken has for the past 20 years been the most vocal authority opposing the use of the polygraph lie detector. His interest in lie detection dates back to experiments he conducted in the late 1950s and his pioneering

work into the use of the 'guilty knowledge technique'. He is also well known and respected for his work on the genetic features of twins.

He tells us that the first instrument to detect lies was used at the end of the nineteenth century, when the Italian criminologist Cesare Lombroso used a 'plethysmograph' to measure changes in blood pressure as a means of detecting deception. But it was not until the early twentieth century that William Marston, a student of Hugo Munsterberg at Harvard, invented the lie detector and claimed to have discovered a 'specific lie response', which later proved to be unfounded. Indeed, a specific physiological response to lying has never been found, and probably never will be.

In 1915, Marston argued that lying was accompanied by an increase in systolic blood pressure, and about 20 years later he described experiments that showed a successful detection rate of between 97 and 99 per cent. Similarly extravagant claims were made by other early polygraph researchers,