



Echo of the big bang

An end to the boom in popular science books may actually raise standards.

Peter Tallack

Stephen Hawking may have taken science to the bedside table, but the phenomenon is over. The attitude of publishers and booksellers towards popular science writing has changed, and the market is not as buoyant as it was a decade ago. Gone are the days when publishers were falling over themselves to acquire the next *Brief History of Time* or *Longitude*, and were happy to pay big bucks to fend off the competition.

Whereas authors could once command six-figure advances for books on cutting-edge science or narrative-driven histories of the subject, most today struggle to get a deal, let alone shift several thousand copies of their books. This is not to say that the audience for serious popular science has evaporated: there are still plenty of readers hungry for authoritative, well-written, interesting books. But the 'trade' — the commercial sector of the publishing market — has raised the bar for what kinds of book find their way on to the bookstands.

Why has this big bang turned out to be a whimper? Part of the problem is that the trade has decided that popular science as a genre is not what it was cracked up to be. So many people — academics and journalists, as well as publishers and agents — jumped on the bandwagon that the market became saturated and publishers got their fingers

burnt. The public is spoilt for choice when it comes to books on genetics or cosmology, mathematics or neuroscience. Just how many books do they really need on the impending threat from asteroids and comets, the sequencing of the human genome, or the challenge of the Riemann hypothesis?

The pace of popular science publishing has outstripped that of scientific advance — even popular-science aficionados would be hard pressed to name one scientific leap in our understanding of human consciousness, despite the vast number of books on the subject. Big ideas simply don't come along very often, and when they do, several books on the same idea often get signed up simultaneously. Witness for instance the recent spate of titles on network theory by Mark

Buchanan, Duncan Watts, Albert-Laszlo Barabasi, Philip Ball and Steven Strogatz. Despite the impeccable credentials of the authors, none of these has taken off, because there is a limit to how many similar titles the market can sustain.

This means that publishers today must be absolutely sure that every science book they commission has what it takes to stand out from the crowd. They are placing ever greater store on works that are original, topical and important — and written with verve and style by authors who are in full command of their subjects. And with publishing success nowadays so dependent on marketing and publicity, it is an advantage if authors have some kind of public profile. That is how Bill Bryson's funny but otherwise pedestrian overview of science, *A Short History of Nearly Everything*, managed to reach the parts that many established science writers couldn't reach — the bestseller lists.

But as well as a lack of public demand, there is a more pernicious force conspiring to keep popular science at bay: the handful of buyers in the head offices of the key bookshop chains, who decide which titles their stores should stock. This is in stark contrast to a few years ago, when most buying was done by the branch staff, and has altered the complexion of publishing as a whole.

A publisher at a major UK trade house, for example, was recently told that the 'key

Scientist wins Guardian First Book Award

Armand Marie Leroi's book *Mutants: On the Form, Varieties and Errors of the Body* has won the Guardian First Book Award 2004. This prize rewards new writing across fiction and non-fiction, and past winners include Zadie Smith for her novel *White Teeth*. Peter Little, reviewing Leroi's book for *Nature* (427, 101–102; 2004), wrote: "*Mutants* is an exquisitely life-enhancing book.

It captures what we know of the development of what makes us human... Read it and enjoy words written carefully, elegantly and with sensibility."

accounts' had decided that scientific micro-histories were 'over', and he was thus finding it increasingly difficult to take anything on at all in this genre. This is despite a lack of real evidence that the public's appetite for books such as Simon Singh's *Fermat's Last Theorem* or Mark Kurlansky's *Cod* is satiated.

The upside to all this is that there has been a move back towards traditional history — epics such as Deborah Cadbury's *The Dinosaur Hunters* or Jenny Uglow's *The Lunar Men*. This trend is hardly surprising. In an increasingly weighty world, there is an increasing demand for weighty books, including agenda-driven titles such as Eric Schlosser's *Fast Food Nation*, Bjørn Lomborg's *The Skeptical Environmentalist*, and even aspirational titles, such as Roger Penrose's *The Road to Reality*, which offers nothing less than a complete advanced course in modern physics.

The market for popular science is still there — but as an echo of the original big bang. Publishers are increasingly sophisticated and discerning, and there has been a shakedown in the number of commercial houses who know, like and succeed with science. Ironically for an agent, I happen to think this is good news. It means that authors are taken on only by genuinely committed editors, and this in turn means that when their books do appear, people are more likely to buy, read and talk about them — more a case of Hawking radiation than the Hawking phenomenon. ■

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The search for meaning

The Dynamic Dance: Nonvocal Communication in African Great Apes

by Barbara J. King

Harvard University Press: 2004. 240 pp.

\$29.95, £19.95, €27.70

W. Tecumseh Fitch

The idea that certain primate vocalizations are information-bearing signals is an old one. In 1892, R. L. Garner used playbacks of monkey vocalizations to deduce that some monkey calls had referential significance — they were what we now know as food or alarm calls. But it was much later, only about fifty years ago, that the concepts of 'information' and 'signal' became clear enough to be formalized mathematically by Norbert Wiener and Claude Shannon, giving birth to modern information theory.



The kiss: chimpanzee communication is based on interactions, according to dynamic systems theory. (Photographs courtesy of Frans de Waal.)

By isolating and formally defining a quantity termed information, which has surprising affinities to the physicists' concept of entropy, Shannon and Wiener planted the seeds of today's digital world, where diverse types of information can be transformed, stored or transmitted as a pattern of binary digits (or 'bits', a term they introduced). Shannon and Wiener were acutely aware that information (a measurable quantity of signals) is not to be confused with meaning (which depends on context and interpretation, and exists in the eye of the beholder). They both explicitly set aside 'meaning' as a topic for future work, and it remains formally undefined today.

Because meaning, rather than information, is central to animal communication, information theory plays a less prominent role in contemporary ethology than in telecommunications research or neuroscience. Indeed, there is a growing tendency among some primatologists to reject information theory entirely, and Barbara King's book *The Dynamic Dance* is a forceful example of this trend.

King is an anthropologist who has spent

years observing captive chimpanzees, bonobos and gorillas. The first 85 pages of this book argue that the 'signaller–receiver' model of animal communication (King calls it the Shannon/Marler framework, acknowledging the influence of ethologist Peter Marler) must be supplanted by King's new approach, dynamic systems theory. Dynamic systems theorists eschew quantitative data, reject the notion that animal signals contain information, and focus instead on interactive aspects of ape social behaviour (their "dynamic dance").

The core insight in King's book is that communicative exchanges among apes are 'co-regulated': interactions unfold contingently and unpredictably. King is certainly correct that ape communication systems (like those of many other animals) are complex and contingent. Far from being simple robotic automata that respond to a particular signal in a fixed and pre-programmed fashion, apes show considerable social intelligence, interpreting each other's actions against a backdrop of their history and current social context, and responding appropriately. But this is also true of two dogs interacting, as is quickly apparent to even casual observers.

Recognition of contingency and context in communication provides a rationale not for rejecting information theory, but for extending it, as its founders recognized. Information theory rigorously specifies a quantitative upper bound to the information borne in signals versus that supplied by receivers — surely a useful tool for understanding how receivers interpret and respond to communicative behaviour. I have rarely seen the baby–bathwater distinction so consistently elided as in this book.

The second part of the book features detailed descriptions of ape behavioural interactions, many based on King's own observations. King studiously avoids any interpretations of ape intentionality. Furthermore, because she rejects quantitative data (which she believes obscure the underlying co-regulatory nature of communication), we are given no summaries or statistics. Unfortunately, these two theoretical convictions conspire to make this section rather heavy going.

Space precludes quoting these descriptions in full, but here is a short excerpt of four from a sequence of nineteen behaviours: "Elikya watches Tamuli eat, then pulls on Tamuli's hand... As Tamuli chews, Elikya attempts to take a bit of orange but Tamuli turns her head away. Elikya again tries to take a bit of Tamuli's chewed orange but Tamuli pulls her head back; Elikya climbs off Tamuli and goes back to her mother." The middle 100 pages of the book are full of such "qualitative data". Although King is undoubtedly a sensitive observer of ape interactions, she rarely shares her