

one: the editors follow Lewis Wolpert in mistakenly attributing to Oppenheimer a statement about the social responsibility of the scientist that was in fact made by the man who destroyed Oppenheimer's reputation, Edward Teller. ■

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A natural history of India

Inventing Global Ecology: Tracking the Biodiversity Ideal in India, 1947–1997

by Michael L. Lewis

Ohio University Press: 2004. 352 pp.
\$55, £36.95 (hbk); \$26, £17.50 (pbk)

Deepak Apte

The title of this book couldn't be more apt. It is hard to be sure whether the word 'tracking' is a cleverly crafted metaphor or is just used to mean 'tracing the path of something'. Nevertheless, the word conjures up visions of an English gentleman (preferably with the name Major Bill Witherspool) in a pith helmet, shielding himself from thorny acacia branches, extricating a 1948 Morris Minor from a mud pool, and trying to have a conversation in Swahili while pursuing a herd of *Loxodonta africana* (to 'shoot' them one way or the other) over the intractable terrain of sub-Saharan Africa. Or if you would prefer a less colonial scene, you might think of a young Indian postgrad trying to fulfil the specifications of her World Bank grant by pursuing the flighty (and nocturnal) Nilgiri marten as it scampers across the rainforest of the Kalakad Tiger Reserve. Or you might want to indulge in visions of technological empowerment and imagine instead a technocrat lounging at his computer station logging satellite data that beep in by the minute from a piece of silicon embedded within the dorsal skin of a brown palm civet.

Michael Lewis has done pretty much all of the above. He has faithfully traced and eloquently recorded the labyrinthine evolution of wildlife science (now called conservation biology). From its governing ideology and practice in India, he moves through the highways and byways (many of them literal, rather than figurative) of history, international politics (and politicking), Indian nationalism and nation-building. He even takes in the 'anthropology of science', the changing face of global scientific debate, and the evolution of field biology itself.

He has straddled the academic worlds of both biology (as an undergraduate) and history (graduate and doctoral). It therefore

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On the move: Indians have made huge strides to improve their own conservation efforts.

seems natural that he should apply one to the other, and thus magnify insights into both. After all, they are intellectual disciplines located not separately in a vacuum, but in an interactive matrix of other fields of enquiry.

Inventing Global Ecology is based on Lewis's doctoral dissertation, so it reads as a fairly scholarly piece of writing. It smacks of painstaking research, which is its greatest claim to credibility. In fact, the information is often so detailed that the reader senses impatience within.

More importantly, the reader gets the distinct impression that Lewis has made a sincere attempt to embody 'deep democracy'. He is politically correct in the most profound and meaningful sense. He has the ability to transcend his inner barriers of rank, race, culture, affluent 'developed world'-ness and geopolitics. He writes with humility, grace, honesty and openness about the geopolitical realities of a people and its wildlife that are positioned often antagonistically and disadvantageously to his own. It is people such as Lewis, and the debate that books like this can initiate, that have the potential to make a real difference to difficult and chronic global problems.

The prose is smooth, unselfconscious and eloquent. For example, he uses elegant metaphors while writing about the Bombay Natural History Society (BNHS): "Perhaps more than a gateway, the BNHS has been a colossus astride Indian conservation-oriented ecology over the last fifty years." He also demonstrates his insight into the society and its activities. Of Salim Ali, its driving force for many years, Lewis writes: "His story is the story of the BNHS". He perceptively explains that ecology "was not introduced to India by

Westerners, but by the degreeless Ali, by way of his German training". It's certainly true that Ali brought the BNHS to the highest possible standards of ecological research in India. But it is because of Ali's pioneering work on Indian ornithology that even now the BNHS is known as an institute specializing only in birds.

Lewis also examines the various reasons for the shift in funding for the BNHS from Britain to the United States. Whether this shift was strategic or coincidental, it is worth adding that, in the past decade or so, the funding for BNHS projects has come mainly from Britain, completing the circle.

In the subsequent chapters, Lewis chronicles the evolution of the BNHS and various controversies during this process. Without being judgemental, he covers various facets of these debates in lucid prose. These chapters will be essential reading for anyone with an interest in the BNHS.

Chapter 2 focuses on what could be called the anthropology of science — the social, cultural and political constructs upon which science is based and conducted. There is a growing dialectic among social scientists around the related issues of what constitutes science, whether or not its nature and practice are independent of the context in which it exists, and on the appropriateness of transplanting scientific practices from one part of the world to another. Lewis uses this as a springboard to question whether the import of scientific techniques, legislative measures (such as prohibiting human habitation in wildlife sanctuaries) and methods of enquiry (for example, using expensive radio collars in developing countries) in wildlife science and management is meaningful or

useful. This discussion is pertinent not only to wildlife science but to all spheres of enquiry.

Lewis does not mince his words. For instance, he observes that neither Raghavendra Gadagkar of the Centre for Ecological Sciences in Bangalore nor US ecologists such as E. O. Wilson “are willing to abandon theoretical ecology to take up taxonomy though. Gadagkar encourages students to do so, and Wilson ecologists of the developing world to do the same. Neither will do it himself.” And while talking about differences between India and the West, he writes that villages in India, “even those who lose crops and occasionally relatives, have existed in close contact with dangerous wildlife for centuries without driving those animals to extinction. Before the British

there was no evidence of Indian ‘predator elimination hunts’ in the style of the Texas rattlesnake drives or the turn-of-the-century wolf bounties in the United States, aimed at the eradication of every member of a given species.” There is something irresistibly refreshing about Lewis’s willingness to speak his mind.

In keeping with his seemingly earnest desire to faithfully reproduce all his findings, all of his conversations (or rather, the relevant sections of them) seem to be recorded verbatim. The book is thus peppered with quotes in ‘Hinglish’, and misplaced modifiers, fractured sentence construction and other endearing linguistic idiosyncrasies are rife.

Despite its scholarly character, this book is user-friendly for lay-readers, thanks in no

small measure to the author’s superb storytelling ability. The more informed reader might skip over a couple of pages here and there with a ‘been there, done that’ shrug, but I suspect that few ecologists are privy to the intricate history of their chosen field of work. The book thus serves to round out their education by providing a historical and philosophical perspective. ■

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Erratum

We apologize to Gordon M. Burghardt for misspelling his name in the recent review of his book *The Genesis of Animal Play* (*Nature* **434**, 273–274; 2005).

Science and culture

Science and superstition

Thomas Heatherwick’s sculpture for the Wellcome Trust’s new building in London.

Martin Kemp

Foyer sculptures — those big lumps of arty stuff commissioned to hang or stand in the entrance spaces of large modern buildings — don’t tend to occupy a high rank in the pantheon of contemporary art. There is often an inverse relationship between the size of the object and the attention it commands from those who come and go. Generally decided by committees, which are inherently uncreative, these sculptures typically occupy an unsatisfying middle ground: just modern enough to seem adventurous without imposing themselves demandingly on the viewer.

In this context, it is good to see that the massive piece commissioned from Thomas Heatherwick, which adorns a seven-story space in the Wellcome Trust’s new headquarters in London (designed by Hopkins Architects), is a technical, visual and conceptual tour de force.

The statistics are impressive enough in themselves: there are almost 150,000 glass spheres; 26,732 stainless steel wires, 0.5 mm in diameter, and the same number of springs; the sculpture is nearly 30 metres in height; and it has a total weight of 14 tonnes. Needless to say, such a work is not the product of an archetypal artist working in romantic isolation in a studio-garret. The teamwork required is akin to that in the workshop of a major Renaissance artist-engineer.

Even more impressive, for those who enter, leave and pass by the building, are the beguiling visual effects and complex associations embedded within the sculpture. Each of the glass beads is composed of two hemispheres surrounding a piece of dichroic film that generates a range of floating effects, from clear to turquoise, pink, green, yellow, violet and orange. The glass and film together ensure that the visual impact is continually transformed as the light changes

and the spectator moves through the space.

The overall form is the result of a self-organizing process. Heatherwick and his team experimented with a range of viscous molten substances, dropping them into water and watching them solidify in shapes that are unpredictable yet observe certain material parameters. Such configurations, suggestive of organic entities, were among those considered by D’Arcy Thompson in his great 1917 book, *On Growth and Form*. Metal proved most amenable, and, after some 400 tests, a small piece of solidified white metal was selected. This small model was then translated digitally by a screen matrix into an overall configuration of suspended beads.

The work that arose from this process does not have one single meaning. The parameters of interpretation are set in part by its presence in the headquarters of one of the world’s major medical research charities. Parallels of the structure with molecular models are almost inescapable.

The German title, *Bleigiessen*, has strong associations with health. ‘Lead-guessing’ is a New Year’s Eve ritual in central Europe. Molten lead is poured into water and the resulting shapes are divined as signalling a person’s fortune. Yet Heatherwick did not intend this as a meaning from the beginning. It was only late in the process of design that he learnt about ‘lead-pouring’ from his German grandmother.

The end result is that the inherent unpredictability of the process of cooling molten metal in water

belongs simultaneously to modern science and to folk intuitions about the vagaries of fortune that govern all our lives. Henry Wellcome, founder of the trust, would have been delighted by this unanticipated conjunction of modern scientific knowledge with the superstitions behind traditional customs.

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