

BOOKS & ARTS

Design flaws

Destroying the argument that intelligent design has a scientific basis.

Intelligent Thought: Science Versus the Intelligent Design Movement

edited by John Brockman
Vintage Books: 2006. 272 pp. \$14

John Tyler Bonner

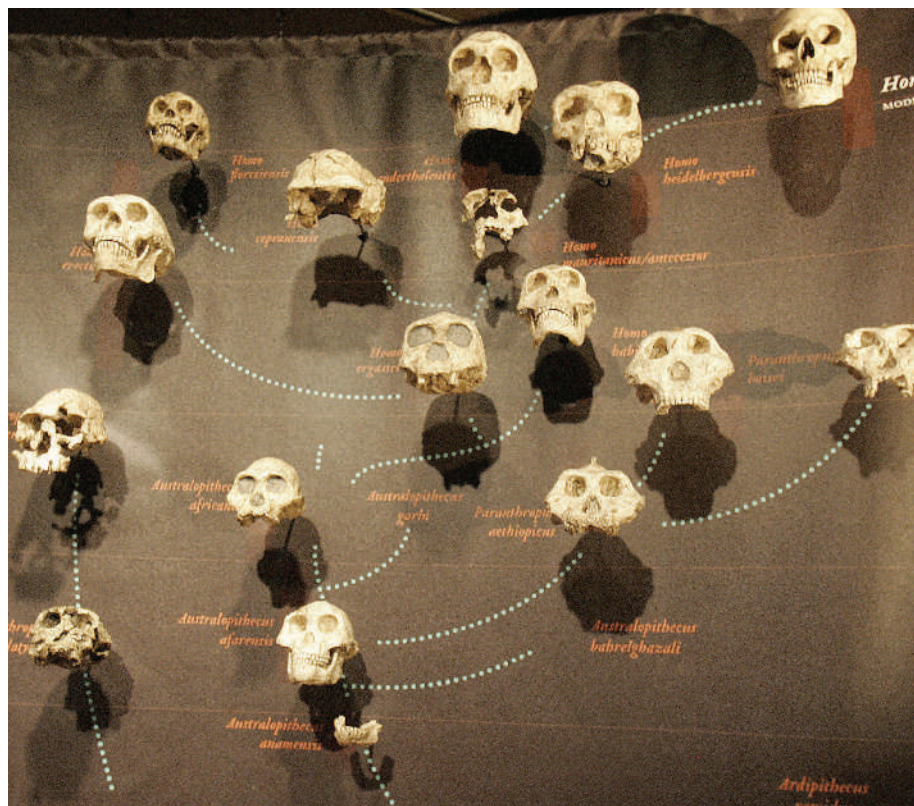
'Intelligent design' — the idea that life was shaped by an intelligent creator — has caused a stir in education circles in the United States. Its protagonists have pushed it as an alternative explanation to evolution and are demanding equal time for it in the classroom (see *Nature* 416, 250; 2002). The idea is considered ridiculous by almost the entire scientific community, and so far the legal challenges to introduce it in schools have failed.

Advocates of intelligent design have tried to invent a new definition of science that includes religious beliefs, with the clear intent of circumventing the strictures separating church from state, and allowing creationism to be taught in schools. This is an important constitutional and legal issue, and a serious question for the US educational system, but it is hardly a scientific one.

John Brockman's edited volume *Intelligent Thought* is largely a series of essays by scientists that make clear, often eloquently, how untenable the scientific basis of intelligent design really is. In some ways it is like shooting fish in a barrel. When giving his decision at the trial in which the school board in Dover, Pennsylvania, was challenged for including intelligent design in the biology curriculum (see *Nature* 439, 6–7; 2006), federal judge John Jones described the argument that intelligent design is science as a "breathtaking inanity". His ruling is reprinted in part at the end of the book.

If intelligent design has anything to say in its favour, it is that it spawned this book. Many of the essays are fascinating and fun to read, and tell us something new.

In the opening essay, Jerry Coyne directly attacks intelligent design by showing how it is refuted by conventional evolutionary biology. The approach may be somewhat standard, but he does a splendid job of devastating the central arguments of intelligent design's proponents. In no way can intelligent design qualify as science, and he makes the case in the manner of a canny lawyer. Several of the other essays in the book take up many of his themes and arguments, and the end result is an over-



Use your head: anthropologists have made an overwhelming case for evolution.

whelming indictment of intelligent design. It is not science because it is not falsifiable. Many of these arguments are also to be found in Judge Jones's decision; one might call them the core arguments as to why intelligent design is not science. They are correct, and devastate the arguments for intelligent design.

The book also includes other approaches to the matter, two of which I found particularly effective and worthy of mention. One follows a specific evolutionary study in some detail, which, like Darwin's method in *The Origin of Species*, gives an outpouring of all the abundant evidence, smothering objections and disagreements. It comes from Tim White, who provides a riveting tale of what physical anthropologists have done to puzzle out the ancestry of modern humans. He takes us to the plains of Ethiopia and tells us how little fragments of bone are pieced together and how the result is interpreted. He then shows where this find fits in with the many other discoveries in Africa and other parts of the world.

So many skulls are now known that human ancestry can be traced with a degree of precision quite impossible a few years ago. He makes the case for evolution using irresistible and overwhelming detail — the literary equivalent of saturation bombing — so it is difficult to come to any other conclusion.

Frank Sulloway, in contrast, uses a historical approach to the dichotomy between creationism and evolution. He shows that Darwin was originally a creationist, and remained so during his entire voyage on the *Beagle*. As Sulloway reminds us, Darwin seriously contemplated studying for the ministry while at the University of Cambridge and showed no signs of deviating from church doctrine. Furthermore, he was greatly inspired by the theologian William Paley, who was more or less the father of intelligent design. It was only when Darwin returned from his voyage, and began to examine the specimens he had collected and consider his observations on the Galapagos and elsewhere, that he realized

the possibility of evolution and the transmutation of species. And from this idea sprang natural selection. It is illuminating and convincing to see how Darwin, in his intellectual maturing, changed from intelligent design to evolution.

Intelligent Thought is a book for scientists;

that is, for those who see evolutionary biology as a science. If you are a creationist you will be unmoved; there is no point in looking at the evidence. ■

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Diary of a weed

Seed to Seed: The Secret Life of Plants

by Nicholas Harberd

Bloomsbury: 2006. 320 pp. £16.99, \$24.95

Anthony Trewavas

Diaries are objects of intense fascination. Not only do they provide unique insight into the private thoughts and attitudes of the author, rarely conveyed by autobiography, but they can become important historical documents. Famous diarists such as Samuel Pepys in the seventeenth century and John Colville during the Second World War described the intimate workings of British government during periods of enormous social upheaval and war. Others, like the British politician Alan Clark, who consigned to their diary assessments of their political peers they would never voice in public, provide highly entertaining reading.

Diaries by working scientists are rare, so with the above thoughts in mind, I welcomed the chance to read Nick Harberd's contribution to the genre. Harberd is a plant molecular geneticist at the John Innes Institute in Norwich, and kept 'jottings' throughout 2004. Apart from the inevitable descriptions of seasonal changes in weather and wildlife and outlines of conversations with his two children, it slowly becomes apparent that the real subject of this diary is *Arabidopsis*, a weed with a very short life cycle (seed-to-seed) of some 4–6 weeks. These characteristics have made it the plant of choice for an enormous amount of gene identification and developmental analysis. Harberd uses the diary as a vehicle both to describe simple aspects of plant development and to structure his own research on *Arabidopsis* in 2004. The life cycle of a few wild specimens of *Arabidopsis* (in contrast to lab-grown versions) is also lovingly described — it ends when they provide a first-class meal for some roaming slugs!

Harberd records the thoughts, guesses, assessments, excitement, obsessions, publication problems and productive experiments that are the meat and drink of any experimental scientist. His significant achievement of 2004 was the identification and sequencing of the crucial *rht* (reduced height) gene. The 'green revolution' of the 1960s and 1970s resulted from the introduction of this gene into wheat and rice by Norman Borlaug. The resulting dwarf cereals had grain yields more than three times greater than their parents,

and turned Mexico, China and India into net cereal exporters. An estimated 1 billion humans were saved from the savagery of slow starvation and premature death that some scientific Jeremiahs had long predicted as their inevitable fate.

The identification of this gene thus represents the final chapter in a story that vividly illustrates the value of technology in ameliorating human problems. We are technological animals. All human activities (including technology) have costs as well as benefits, but our capacity to rise to the challenge of complex problems is frankly what makes us human and makes living worthwhile. To deny this, to

deny the value of the advance of science, as some currently do, is to deny our humanity.

Harberd's diary makes for easy and enjoyable reading for a plant biologist like myself, but I gradually began to wonder who its wider audience might actually be. Commentaries on seasonal changes in weather and nature form the basis of many published Edwardian diaries and are often better illustrated. The introduction makes clear that the author thinks the diary is written for non-scientists, but I was left wondering who, if any, of my non-scientific friends would make sense of it all. There is enormous interest in Britain in plants of all kinds, but from a gardening and horticultural perspective only. So a diary about a weed is unlikely to gain a sympathetic readership here. Despite the author's view of his readership, I think that other non-botanical scientists are the most likely audience and that many animal scientists and microbiologists would find pleasure in learning how the other half lives and works.

So is this diary instead a charm offensive from genetics, a subject often painted as based on grim-visaged determinism? Is it the velvet glove of the intensely human diarist hiding a genetical iron fist underneath? Harberd

The body bared

From the early Renaissance on, our drive to discover, uncover and map the unknown has found rich pickings in the human body. Laying it bare from bone to skin became a mania among medics and artists alike, starting with Leonardo da Vinci and gaining momentum with the likes of Jacopo Berengario da Carpi, Andreas Vesalius, and later William Cheselden, John Hunter and today's digital modellers.

Human Anatomy: Depicting the Body from the Renaissance to Today by Benjamin A. Rifkin, Michael J. Ackerman and Judy Folkenberg (Thames & Hudson, £17.95) dissects this history with elegance — and with the aid of 320 stunning illustrations that cover the gamut of styles, from Baroque surreality to the drily detached.

