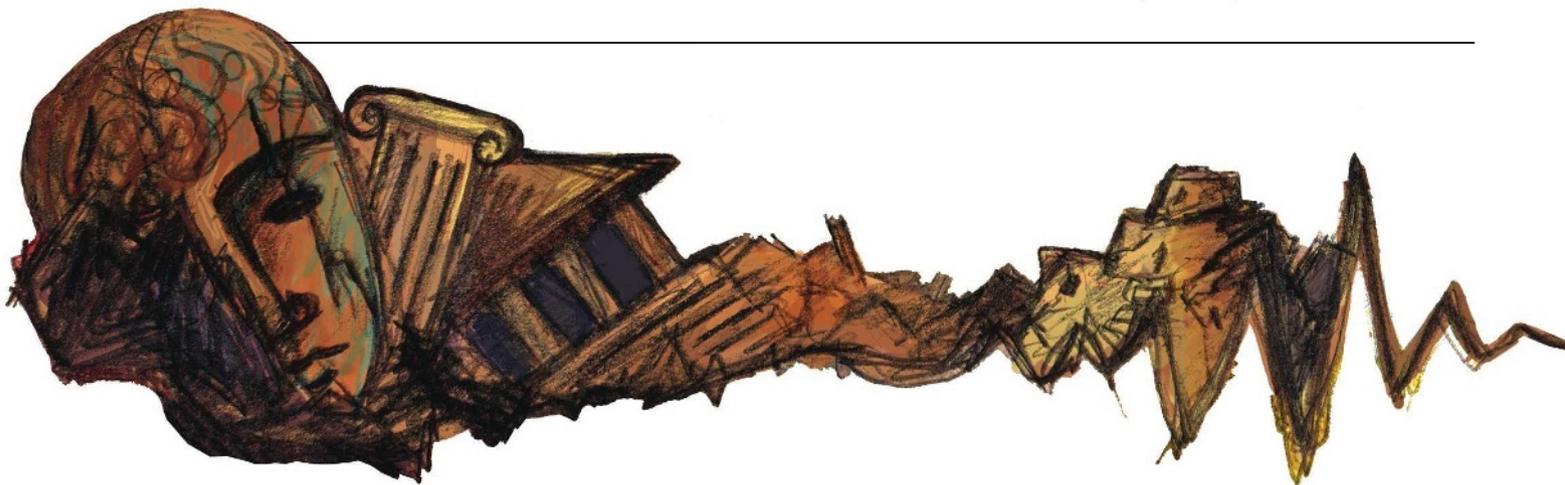


SPRING BOOKS



Shaking the foundations of archaeology

Did earthquakes trigger the collapse of ancient civilizations?

Apocalypse: Earthquakes, Archaeology and the Wrath of God

by Amos Nur and Dawn Burgess

Princeton University Press: 2008. 304 pp.
\$26.95, £15.95

Andrew Robinson

At 5:04 p.m. on 17 October 1989, Stanford University geophysics professor Amos Nur was sitting in his office in California when it started to shake. His steel bookcases toppled and crushed his chair. Ducking under his desk, he somehow escaped injury. Nur had just experienced the Loma Prieta earthquake that devastated parts of the San Francisco Bay Area.

Nur has long been interested in archaeology. Growing up near Haifa in Israel, he walked behind his father and two mules as they ploughed the family's field. "I remember picking up shards of ancient glass," he writes, "pieces of simple mosaics and little squares of pink or white limestone exposed in the turned earth." On a few rare occasions, the plough struck a massive object: a rough block of stone about 1 metre tall and 25 centimetres square in cross-section. "Probably a Roman mile marker," they thought. Much later, Nur

discovered that the field was on the *Via Maris*, the ancient Roman highway connecting the Mediterranean to the East.

A twin passion for seismology and archaeology drives Nur's deeply researched and compellingly written book, *Apocalypse*, co-authored with Dawn Burgess. In it he asks how earthquakes might be detected in the archaeological record, by analysing geological formations, faults, structural movement, human remains, the collapse of pillars and walls, and inscriptions. Nur wonders if earthquakes played a part in the collapse of ancient civilizations. Might they explain the enigmatic and quick disappearance of so many Bronze Age civilizations in the eastern Mediterranean during a mere 50 years around 1200 BC?

Most archaeologists today say that earthquakes have had little to do with historical demises. They prefer to attribute the collapse of civilizations to human agency: war, invasion, social oppression, environmental abuse and so on. The conventional explanation of the Bronze Age collapse involves maritime invasion by the mysterious Sea Peoples, whose identities have long eluded scholars. There are notable exceptions of academics who were sympathetic

to the idea that earthquakes could crush civilizations — Arthur Evans at Knossos in Crete, Carl Blegen at the Turkish city of Troy and Claude Schaeffer, for instance — but the majority are sceptical.

Robert Drews took pains to quash any earthquake explanation in *The End of the Bronze Age: Changes in Warfare and the Catastrophe ca. 1200 BC* (Princeton University Press, 1993), as Nur is contemptuously aware. Jared Diamond made no mention of earthquakes or volcanic eruptions in *Collapse: How Societies Choose to Fail or Succeed* (Viking, 2005). If earthquakes really have had so great an influence, the sceptics ask, then where is the hard evidence?

In reply, Nur and Burgess cite several powerful instances. The seismic destruction of the Portuguese capital of Lisbon in 1755, which provoked Voltaire to write *Candide*, shook the pillars of both religious faith and Enlightenment optimism. "By striking at a time when there was a particularly delicate balance of power between church and state, and between science and religion, the earthquake tipped the scales and changed society around the world," the authors argue.

In Venezuela, an earthquake in 1812

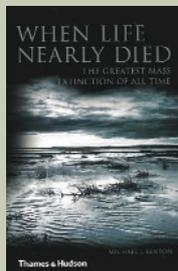
ILLUSTRATIONS BY C. ALLEN-FLETCHER

NEW IN PAPERBACK

When Life Nearly Died: The Greatest Mass Extinction of All Time

by Michael J. Benton (Thames & Hudson, \$24.95)

The end-Permian extinction 250 million years ago destroyed 90% of Earth's life. Delving into geological history, Michael Benton investigates the science that documents the event, how its true scale was discovered, and discusses evidence for the possible cataclysm that caused it.



From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism

by Fred Turner (Univ. Chicago Press, \$17)

By focusing on the life of ethical entrepreneur Stewart Brand and the influential Whole Earth Network, Fred Turner shows how alternative culture ideas in San Francisco, California, gave rise to the networked world.



precipitated the collapse of Simón Bolívar's republic by his own reckoning. This ultimately led to Bolívar freeing Colombia, Ecuador, Peru and Bolivia from Spanish rule.

In Japan, the Great Kanto earthquake of 1923, which reduced two-thirds of Tokyo to ashes, spawned political and racial turmoil that contributed to the rise of militarism and, ultimately, to the Pacific war. If the Tokyo area experiences another such earthquake in decades ahead as seismologists expect, its repercussions will surely make the global financial system tremble. Were it to strike at a time of economic depression, its effects might be globally catastrophic.

Apocalypse focuses mostly on the ancient world, with a distinct emphasis on biblical archaeology. It discusses earthquake evidence from the Middle East, including Jericho, Megiddo (Armageddon), Jerusalem and Qumran, the location of the 2,000-year-old Dead Sea Scrolls.

In the caves at Qumran, Nur has considerable field experience, which he deploys to illuminating effect. He was part of an expedition from Jerusalem's Hebrew University that excavated the rubble in the Cave of Letters, in the hope of finding a previously glimpsed skeleton and other evidence of habitation buried by the collapse of the roof in an ancient earthquake. Nur is convinced — a little like Howard Carter in the Valley of the Kings — that there remain sealed caves that were not looted by the Bedouin who first reported the scrolls' existence in 1947. "These places, undisturbed since their destruction by earthquakes, may provide the means to unravel the complicated and emotionally charged story of the Dead Sea Scrolls."

Apocalypse is a winning combination of cautious interdisciplinary investigation and interpretation, writing suitable for a general readership, and excellent illustrations (including a striking photograph of Nur's own crushed office chair). Although it will deliberately irritate many archaeologists, it should also provoke a serious reconsideration of the archaeological record. As with the evidence for human activity in climate change, the evidence for earthquakes in pre-historical change may be staring archaeologists in the face. ■

Andrew Robinson is a Visiting Fellow of Wolfson College, Cambridge, CB3 9BB, UK, and author of *Earthshock*.

Brave new bioethics

Life As It Is: Biology for the Public Sphere by William F. Loomis

University of California Press: 2008.
272 pp. \$24.95

Eugenie Scott

Science's task is to explain the natural world: what it is, how it works and why it is the way it is. Ethics is about the oughts and the shoulds. Most ethicists — religious and secular — agree that knowledge of the natural world helps us make better, or at least better-informed, ethical decisions. But, as David Hume, Thomas Henry Huxley and G. E. Moore have noted, a particular understanding of nature does not dictate a unique moral stance. For every Alexander Pope declaring "Whatever is, is right," there is a Rose Sayer (from the film *The African Queen*) retorting, "Nature ... is what we are put in this world to rise above!"

It is the complicated interplay of moral decisions and biological sciences that motivates cell biologist William F. Loomis. His brief book, *Life As It Is*, is a tour of the brave new biology relevant to such social issues as abortion, euthanasia, the use of embryonic stem cells, cloning, overpopulation and global warming. Loomis holds that scientific evidence should be taken into account when making socially important decisions. He provides a fascinating, if occasionally disjointed, survey of topics that bear on these decisions: the nature and evolution of life, and current scientific thought regarding consciousness, psychology and social behaviour.

Sometimes it is questionable whether the scientific aspects of a situation are most relevant to the ethical decision. Is it ethically permissible to destroy the surplus human embryos created for *in vitro* fertilization (IVF), for example? Loomis believes the answer should be shaped by a better understanding of the nature of cells.

Loomis emphasizes that at the cellular level life is cheap: at any given moment, billions of bacteria in our body are dying. A human zygote is merely a single cell, so shouldn't we think of it as such rather than the multicellular, functioning, conscious and precious baby into which it might develop? If a zygote is just a cell, and cells die regularly,

then the answer to whether it is ethically permissible to destroy it is yes. But this argument comes after the ethical question of whether a zygote is just a cell, which is one that science cannot answer.

The ethical status of a human zygote or early-stage embryo turns on the issue of personhood. For those who believe in a soul, the moral standing of the zygote is largely unaffected by the nature of life at the cellular level. Belief in souls is a first principle, unlikely to be either proved or disproved by science.

By contrast, as Loomis correctly notes, science may provoke a rethinking of religious dogma. Catholic theology holds that a soul is infused into a fertilized egg. So if an eight-celled embryo can be made to produce eight separate human beings, do they share a soul, or are seven new souls somehow generated?

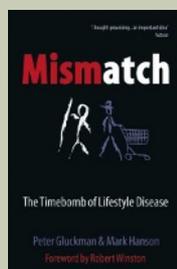
This conundrum has led some Catholic theologians to contend that the soul is infused not at fertilization, but only when cells of the dividing organism lose their plasticity. Other theologians try to accommodate scientific facts about cells in other ways. Although scientific facts about the nature of a developing embryo may have profound consequences for Christian (or at least Catholic) thinking about souls — as a first principle, the concept of a soul is unlikely to be abandoned, and will be a factor in ethical decisions about many issues that biology touches on.

Policy-makers deciding between contending positions are ultimately forced to make political decisions, not scientific ones. Science — ideally, and in most cases — influences the thought of the proponents of the contending positions, and they in turn influence the policy-makers. But science is rarely the deciding factor. In many cases, such as the example of the human embryos in IVF, the contenders on both sides can agree on the science and disagree on the policy, owing to a disagreement about whether (and which) religious concerns are most relevant. And such disagreements are beyond the competence of science to adjudicate.

Refreshingly, Loomis's discussion of ethical issues roams beyond the comparatively narrow issues of abortion and euthanasia and the

Mismatch: The Timebomb of Lifestyle Disease by Peter Gluckman and Mark Hanson (Oxford Univ. Press, £8.99)

The bodies we have now are the product of evolution. Peter Gluckman and Mark Hanson argue that they are mismatched to our needs in society today, and that this divide has increased the rate of lifestyle diseases such as diabetes and obesity.



Vaccine: The Controversial Story of Medicine's Greatest Lifesaver

by Arthur Allen (W. W. Norton, \$17.95)

Journalist Arthur Allen investigates the history of vaccination, covering three centuries' worth of controversies. Reviewing the hardback edition, Michael Oldstone wrote that, "What becomes clear ... is that, when facts tangle with culture, culture often wins" (*Nature* 448, 137; 2007).

