

## Climatic and Evolutionary Whiplash

HOW SUDDEN SHIFTS IN CLIMATE MAY HAVE BOOSTED HUMAN INGENUITY BY JEFFREY H. SCHWARTZ

**A BRAIN FOR ALL SEASONS:  
HUMAN EVOLUTION AND  
ABRUPT CLIMATE CHANGE**

by William H. Calvin  
University of Chicago Press,  
2002 (\$25)



**Imagine going** to the first meeting of a course you'd long waited to enroll in. You sit down at your computer, open an e-mail message from your professor, in this case the author William H. Calvin, and get your first lesson. Your professor is thousands of miles away. In fact, he's at 51.4°N, 0.1°E. Where? Why, Charles Darwin's home in Kent, England, of course, the famous Down House.

So begins Calvin's journey through evolution, particularly human evolution, as he leads his "class" from the home of the man many would call the father of evolution to various locales that provide fodder for his ultimate message: human evolution, like that of other organisms, is not a gradual transformation of form and behavior over time. Rather, like the shifts in the environments in which organisms find themselves, evolutionary change is abrupt, even catastrophic. A neurobiologist by training (he is at the University of Washington School of Medicine), Calvin leads us along a trail that links sudden worldwide coolings to the origin of our large brains and modern human behavior. By modern behavior, he is thinking not just of sophisticated toolmaking; he includes such social behavior as pair bonding and, ultimately, language, a sense of the aesthetic, and "abstract

thinking, planning depth, innovation, and symbolic behavior."

The sudden coolings, Calvin tells us, reduced rainfall, induced dust storms and fires, and produced bottlenecks in the populations of our forebears. The few survivors had to adapt within one generation to, for example, a climate in which only grass grew well, spurring them to develop innovative techniques for hunting the large grazing animals that converted the grass into edible energy. Thus, he concludes, the cycles of "cool, crash, and burn" drove increased brain size and complexity. I think it unlikely that the climatic shifts were behind changes in the physical size and complexity of the brain, but these sudden jolts could certainly have spurred early humans to exploit the existing potential of the brain.

To make his points, Calvin takes us, his class, on a peripatetic journey as he visits museums, attends conferences, pays homage to a variety of African human fossil sites, and flies over huge African expanses and the vast Nordic seas. As one might expect, this approach is not always successful, but if you forget the formatting at the beginning of each brief chapter (a nod toward an e-mail message, but one without typos, code ab-

breviations and non sequiturs), the read flows a bit better.

Calvin's premise—that human evolution is correlated with climatic swings—is, of course, not new. Indeed, the traditional Darwinian view holds that evolution proceeds through organisms tracking their environments. And well over a decade ago paleontologist Elisabeth Vrba proposed that changes in species representation over time, as evidenced especially in the South African fossil record of antelopes and early hominids (such as *Australopithecus* and *Paranthropus*), were rapid and correlated with shifts between wetter and drier conditions.

But Calvin's presentation differs from the others in that it really is an attempt to think globally about past and present climatic change and its possible effects on creatures and their evolution. As one of the authors whose work on human evo-



**FOSSILIZED CAST** of early hominid brain (*Australopithecus africanus*), about 2.5 million years old.

lution he cites as recommended reading, I found his discussion of the fossils less engaging than the climate-related information. The book definitely picks up steam when he moves away from trying to discuss human fossils and digs into issues of global warming, shrinking polar ice caps, and oceanic currents. (This may be because much of this section had already been published as “The Great Climate Flip-Flop” in the *Atlantic Monthly*.) Here he seems to have more fun, getting across an image, for example, of subsurface oceanic water behavior by describing what happens when you pour very cold heavy cream over a spoon into a cup of hot coffee (it sinks as a column) and explaining North Atlantic Ocean current movements by way of a story about incorrectly hooking up a hot-water tank with a toilet that then acted as a radiator.

Heading back home to Seattle on the long, great-circle-route flight from Nairobi, over the Gulf Stream and Greenland, Calvin muses on the present global warming brought about by human activities. It could, he says, paradoxically trigger another episode of sudden cooling. The accumulation of greenhouse gases in the atmosphere could induce an abrupt shutting down of the oceanic “conveyor belt” that sends warmer waters into the North Atlantic, plunging much of the earth into a deep chill. But he doubts that another boom-then-bust cycle will jack up our brain power. We’re now smart, he concludes, “in ways that owe little to our present brain power, but rather to the accumulated experience of the people that have lived since the last ice age ended. Education. Writing. Technology. Science.” And he suggests that if we’re *really* smart, our accumulated experience may just help us find a way to avoid this looming threat. SA

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THE EDITORS RECOMMEND

**LOST LANGUAGES: THE ENIGMA OF THE WORLD'S UNDECIPHERED SCRIPTS**

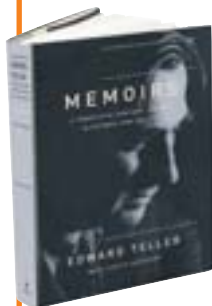
by Andrew Robinson. McGraw-Hill, New York, 2002 (\$34.95)

It is baffling and humbling to confront an incomprehensible form of writing, such as Chinese for most Westerners. People who try to decipher the scripts of lost languages face an even sterner challenge, because there are no contemporary speakers or writers to help. That is the challenge depicted learnedly and fascinatingly by Robinson, literary editor of the *Times Higher Education Supplement* in London. He sets the stage by describing the hard work that went into the “three great decipherments”: Egyptian hieroglyphs, Linear B of Crete, and Mayan glyphs. Then he poses the problems presented by nine undeciphered scripts, among them the languages of the Etruscans and the people of Easter Island. Success at deciphering, Robinson writes, requires “fanatical perseverance and devotion to detail and wide linguistic and cultural knowledge.” The book’s many illustrations of the enigmatic scripts make vivid the difficulty of the decipherer’s task.



**MEMOIRS: A TWENTIETH-CENTURY JOURNEY IN SCIENCE AND POLITICS**

by Edward Teller, with Judith L. Shoolery. Perseus Publishing, Cambridge, Mass., 2001 (\$35)



Whatever one thinks of physicist Teller’s reputation as a hawk in military matters and a controversial figure in science politics, he and his collaborator, Shoolery (a writer, editor and former science teacher), have produced a page-turner. Teller, now 94 years old, participated in many of the developments in 20th-century physics, so the book—which presents the science clearly—stands as a history of the period as well as an account of his work and his relations with other prominent physicists. And he leavens the book with a profusion of entertaining anecdotes. Examples: his ride through two islands of Denmark on the back of a motorcycle piloted by George Gamow and his “only experience as a thespian, when I played the part of a corpse in a production of *Arsenic and Old Lace*.”

**CHARLES LINDBERGH AND THE SPIRIT OF ST. LOUIS**

by Dominick A. Pisano and F. Robert van der Linden. Harry N. Abrams, New York, 2002 (\$22.95)

May 21, 1927. Le Bourget Airport, Paris. Thirty-three hours, 30 minutes and 3,610 miles since takeoff from Roosevelt Field on Long Island. “After circling the field one last time, Lindbergh throttles back. His reflexes are now quite dull from fatigue, and he finds himself struggling to control his aircraft.” But he lands safely to a tumultuous reception and enduring fame as the first person to fly nonstop alone from New York to Paris. Pisano and van der Linden—respectively, chair of the aeronautics division and curator of air transportation and special-purpose aircraft at the National Air and Space Museum of the Smithsonian Institution—almost put the reader in the cockpit of that single-engine airplane to share the challenge and ordeal of the flight. Many pictures of the pilot, the plane and scenes related to the flight enliven the story.



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