

REVIEWS

Energy: Science, Policy, and the Pursuit of Sustainability

Edited by Robert Bent, Lloyd Orr and Randall Baker

Island Press, May 2002, 257 Pages, \$55.00

Cloth ISBN 1-55963-910-5, \$27.50 Paper ISBN 1-55963-911-3

That our society is deeply dependent on energy should come as a surprise to no one. Consequently, the possibility that our energy sources could be running dry is quite troubling. This book is an impressively wide-ranging and multidisciplinary survey of the problem of supplying our society with the energy it wants in a sustainable way.

The book tends to do a good bit of dwelling on the obvious. Few will be shocked to learn that energy resources are limited and their use environmentally damaging, nor that our demand for energy is rapidly growing. Our limited resources will soon be unable to meet this demand. Oil is cheap, and people are not as eager to save the environment as they are to cheaply heat their houses, and so we are likely to keep using exhaustible oil for energy until it is, well, exhausted. Many contributors to the book dwell on familiar points like these.

Randall Baker examines the energy problem from the less familiar political standpoint, concluding that political solutions are unlikely because of the short time-scale and the need for a crisis that characterize our political system. However, oil is cheaper and more readily available now than ever before. The science behind global warning seems to lack consensus and doesn't really suggest paths of action to be taken. The voter perceives no energy crisis; a political response is unlikely.

Luckily for us, as John Sheffield explains in the most thought-provoking chapter of the book, the ball isn't actually in the court of the developed western world anyway. Presuming that problems in sources like wind, solar, and nuclear power can be overcome and that efficiency of energy use improves, Sheffield determines that we can supply the energy needs of 12 billion people living at a reasonable standard of living for a very long time. This, according to groups like the UN, is the maximum population the earth can support, a level we will likely reach in the next century or two.

Sheffield's idea of a reasonable standard of living is not random. He explains that a society's population growth rate is related to the rate at which individuals in that society use energy. History indicates that populations stabilize only when their economies develop, raising per capita energy use. People in the future should use, Sheffield claims, enough energy to bring their populations under control. His conclusion is that we can find the energy resources to bring all 12 billion people to the point of energy use at which the population has no tendency to grow larger. However, if we reach the 12 billion point at which no more people can be supported and some people are not yet at this level of development, the undeveloped population's impossible tendency to grow in population will be checked by unpleasant factors, such as famine. At this point, the energy production of the world would be simply incapable of developing the majority of the world that needs developing. The problem would become unsolvable.

If a single nation is left undeveloped in the near future, this nation will quickly outgrow the developed parts of the world. Every day that goes by increases the population of undeveloped areas, thus increasing the energy needed to bring their population growth under control. The fact of the matter seems to be that the energy-greedy lifestyle of the developed world is actually more

sustainable than that of the developing nations. However, even one nation that lags behind in development poses a problem for the rest of the world.

Sheffield's argument has the lovely property of shifting the blame for the energy problem away from the usual suspects, including America. Sure, we use absurd amounts of energy to fuel our SUVs and to keep our houses obscenely climate controlled, but at least our population is stable. If the rest of the world were more like us, there wouldn't be any problem.

However, Sheffield doesn't claim that we should be complacent and condemn the developing world. He realizes that we need to bring our lifestyles under control; the novelty of the argument is that this alone is not enough, and indeed may be the easy part. Not only must we drastically reduce the amount of energy used in the developed world, but we must also use the resources we save to move the rest of the world into a sustainable position. The energy we save today should not be used by tomorrow's America, but rather today's South-East Asia.

Lloyd Orr explains that economics will keep us from moving towards sustainability as long as oil is much cheaper than it would be if we could assess the damage its use will bring in the future. Orr suggests that the solution is to raise the price artificially by imposing a tax on the fuel. More expensive energy would cause use to become more reasonable and would give alternatives a greater chance of competing. Such a tax is the one concrete proposal to come from the book, but Orr realizes the difficulty of imposing a new tax on American voters; despite his efforts to make it feasible, the proposal seems like wishful thinking.

Energy: Science, Policy, and the Pursuit of Sustainability covers very little ground but from a wide range of perspectives. For the most part, the conclusions are not surprising, and where a point is unexpected, it tends to instill a sense of pessimism. The problems we are likely to face in the near future to satisfy our dependence on energy will be serious, and the only thing more apparent than our need to take action now is that we are unlikely to do so.

Matthew Sharp
Columbia University
mks42@columbia.edu

Science and Security in the 21st Century

by the Commission on Science and Security, John J. Hamre, Chairman

The CSIS Press (Center for Strategic and International Studies), 2002, 121 pages, ISBN 0-89206-410-2

This report comes from a commission set up by the Department of Energy to address the security procedures at the DOE laboratories with an emphasis on preventing these procedures from hindering the science goals. It was set up in the aftermath of the Wen Ho Lee fiasco which exacerbated the tensions that have always existed between the scientists and the security system. The report is supposed to cover 16 labs in all from Los Alamos to Fermilab, but it is mostly relevant to the weapons labs. Although the report is dated April 2002 it was essentially completed before 11 September 2001 and so does not deal directly with the issue of terrorist attacks. It contains a 10-page bibliography of related government reports and legislation.

A major theme of this report is the failure of the DOE security system to adjust to the post-Cold War era and to make use of modern security technology. It stresses the importance of international collaboration and the need for the labs, including the weapons labs, to employ foreign-born scientists. There is a particular emphasis on cyber security.

Recommendations include the ending of micromanagement by a large DOE staff, which is in part a relic of the past Watkins regime at DOE. The security responsibility should be in the hands of the laboratory director who should be fired if there are serious lapses. A major theme is that security procedures must be based on careful risk assessment so that resources can be directed effectively. A policy of "zero tolerance" for security infractions announced by the DOE in 1999 does not distinguish between serious and trivial. This can lead to low morale and may actually discourage the reporting of infractions. There is an interesting but inconclusive discussion of the somewhat open-ended category of "sensitive but unclassified information".

The report does not probe the fundamental question of what are the dangers from which this elaborate security system is protecting us. As far as I know the U.S. has not been significantly harmed from a security lapse at a DOE lab in the last 50 years. The most obvious danger is the spread of weapons of mass destruction to small dangerous states or terrorist groups. There is far more danger arising from the former Soviet Union with its security and financial problems than from U.S. sources. Thus logic would suggest that much of this security funding should be diverted to the Cooperative Threat Reduction Program and other efforts to safeguard Russian weapons. No such fundamental issues are addressed.

This report makes some useful general recommendations. In view of national attention focused on the aftermath of September 11 and the use of "homeland security" for political purposes, it is not clear how much attention the DOE will give to this report.

Lincoln Wolfenstein
Carnegie Mellon University, Pittsburgh Pa. 15213
lincoln@cmuhep2.phys.cmu.edu

Silent Spill, the Organization of an Industrial Crisis.

Thomas D. Beamish

MIT Press, 2000. 181 pp, \$4.95, ISBN 0-262-52320-5

This book calls attention to a very large oil spill that occurred in the Guadalupe Dunes, 170 miles north of Los Angeles and 250 miles south of San Francisco. It was the largest recorded petroleum spill in U.S. history. The spill persisted over a period of 38 years with a total of 20,000,000 gallons, nearly twice the size of the more chronicled spill of the Exxon Valdez in Prince William Sound of an estimated 10,900,000 gallons.

The author indicates early in his introduction a relatively clear motive in writing the book: that his home was located 65 miles from the spill site. Although the Guadalupe Dunes is only the largest discovered spill, as the author states, I could not buy his argument that it exemplified a "genre of environmental catastrophe that portends ecological collapse."

As I proceeded further through the book, I had no doubt that it had been well researched (as evidenced by the 17-page list of references). However, I could not fully grasp the significance of documenting this event which apparently did not emerge as an issue within its local environment until February of 1990. Granted, it is important to note that areas affected by the spill included an estuary and wetlands, and a preserve managed by the Nature Conservancy. But it would have been more helpful to know the exact effects of this spill on this fragile environment, rather than page after page of denials on the part of Unocal, the company allegedly responsible for the spill.

The only message I was able to walk away with after reading this book is a common one: how the environment can be adversely affected and destroyed by corporate irresponsibility and greed.

Daphne Burleson
Oregon Institute of Technology
2300 Radcliffe Street
Klamath Falls, OR 97601
yurigregarin@yahoo.com

Reports of the National Center for Science Education, ISSN 1064-2358

Bimonthly, \$30/year; NCSE, PO Box 9477, Berkeley, CA 94709-0477; ncse@ncseweb.org

When “the Russians beat us into space” in 1957, the event triggered the public furor that erupts every so often concerning the quality of American science education. This broad interest made possible the publication, within the next few years, of several excellent middle- and secondary-school science textbooks, notably the PSSC physics and BSCS biology texts. The latter, of course, were based on biological evolution, the central organizing principle of the life sciences, as naturally as the former were based on Newton’s laws and their later extensions.

For the first time since the anti-evolution laws of the 1920s had banished the subject from most biology texts, at least some proportion of students nationwide were being exposed to biology as a modern science and not a mere cataloguing of disorganized information. In 1968, moreover, the U.S. Supreme Court, in *Epperson v. Arkansas*, struck down all such laws.

Responding to this changing environment, creationism evolved into a nod-nod, wink-wink “creation science” – an assertion that the mass of scientific evidence that supports and is made intelligible by evolutionary theory can equally well support the idea that the universe was created fewer than 10,000 years ago in six days, as is set forth in the first few chapters of Genesis. In 1979, the Institute for Creation Research began to peddle the idea that this “science” should be treated on an equal footing with evolution in public-school biology courses. By 1981, fifteen states had introduced “balanced treatment” bills, and political pressure for such legislation was being applied in at least 11 more.

In response to this serious threat to science teaching, a grassroots network of science teachers and scientists sprang up. Beginning in Iowa and expanding quickly to 42 states, these groups took the name Committees of Correspondence (CCs). With the aid of many national science and science-teaching organizations, these loosely knit groups were mainly successful in warding off. It was clear, however, that creationist groups, well funded by the Religious Right, were not going to disappear. A coordinating organization for the CCs was needed, and in 1987 the National Center for Science Education (NCSE) opened its office. NCSE continues to act as a clearinghouse and assistance center for the quality teaching of science. In particular, NCSE responds to the needs of educators nationwide, who daily confront efforts to expunge evolution from all the sciences, but particularly the life sciences. As creationism evolves, these efforts take modified forms, some of them subtle.

A major endeavor of NCSE is its journal, *Reports of the National Center for Science Education* (RNCSE), now in its 22nd year. RNCSE provides a unique and vital service. It tracks the evolution of emerging species of creationists. Of these, the most ubiquitous at present are the intelligent-design creationists (IDCs). They have exhumed the view, abandoned by scientists more than a century ago, that at least some components of living things are too complex to have

evolved and must therefore have been designed by a coyly unspecified intellect (read "God"). RNCSE keeps its readers up to date on efforts to introduce creationism and related pseudosciences into public-school science classes at every level from the classroom and school board to Congress. It furnishes a forum for criticisms of current creationist claims and even occasional rebuttals by the creationists themselves. In an ongoing science-religion dialogue, it opens its pages to religious scientists, ministers of religion, and theologians who, far from finding contradiction of their faith or heresy in evolution, find it more compatible with their religious positions than any other view of the natural world. It features summaries by experts of important emerging contributions to our understanding of evolution. And RNCSE is a rich source of book reviews, website references, and other relevant resources.

In a review of so diverse a journal, it is perhaps best to make brief mention of some typical content. Currently, IDC efforts to incorporate creationism into Ohio's K-12 science standards are the hottest issue. In its most recent number (Jan-Apr 2002) RNCSE extensively covered the history of this effort, whose high point to date has been a debate between two scientists (representing many thousands of their community) and two IDCs (representing their small but vocal group). The former two speakers were Lawrence M. Krauss, chairman of the Physics Department at Case Western Reserve University and Kenneth Miller, a distinguished biologist from Brown University who has written elegantly on evolution and his own deep commitment to Roman Catholicism. The IDCs were Steven Meyer, a philosopher from Whitworth College and the Discovery Institute (the principal IDC center) and Jonathan Wells, also of the Discovery Institute. Wells, like Miller, is deeply committed to religion; he states that he began his doctoral studies in biology at the behest of the Rev. Sun Myung Moon with the specific aim of opposing evolution. The debate was attended by an overflow audience; the Ohio Board of Education will vote this fall on the matter.

RNCSE Jan-Apr 2002 also featured an interview with Howard Van Till, emeritus professor of physics and astronomy at Calvin College and a traditional evangelical Protestant. In this interview, Van Till expands eloquently on the dynamic connection between the scientific and religious aspects of his cosmology.

Two of the most exciting recent developments in our understanding of the history of life on Earth are the confirmation, through fossil discoveries, of the prediction that whales are descended from land animals, and the deepening understanding of the ancestral roots of birds in dinosaurs. RNCSE Jan-Apr 2002 presents lucid discussions of these topics, by paleontologists Gregory S. Paul and Kevin Padian respectively.

A leading IDC, biochemist Michael Behe of Lehigh University, has set forth his irreducible-complexity argument in favor of intelligent design in a widely read book and numerous other publications. A critique of Behe's arguments by philosopher of science Niall Shanks and biologist Karl H. Joplin appeared in RNCSE Jan-Feb 2000. Behe's reply and the response by Shanks and Joplin, together with commentary by three other experts, followed in RNCSE May-Aug 2001. The three articles provided a lively interchange, though it is pretty clear that Shanks and Joplin inevitably had the better of the debate.

The fine PBS series, *Evolution*, was reviewed in RNCSE Sep-Dec 2001. Accompanying the review was an account of the strong creationist reaction.

RNCSE, for all its seriousness, occasionally publishes articles that cannot but amuse. I like to refer to Kurt Wise, a young-earth creationist, as the anti-Scopes. Remember that John T. Scopes, the defendant in the famous Monkey Trial of 1925, went from Dayton, Tennessee to the University of Chicago, where he earned his master's degree in geology. Wise, on the contrary,

went from the University of Chicago, via Harvard, to Dayton, where he is an associate professor of science at Bryan College. In “Sermon Under the Mount,” Matthew Chapman, a great-great-grandson of Charles Darwin, writes of accompanying one of Wise’s classes on a geology field trip to a local cave. Though the students don’t learn much science, Chapman learns quite a lot about the commitments of young fundamentalist students. (“I hear, like, intellectuals, a lot of them commit suicide? ‘Cause they believe what they’re taught, evolution an’ all, so they got nothing to live for?”) (RNCSE Sep-Oct 2000).

Such views are not restricted to fundamentalist Christians; similar attitudes can be found in ultra-orthodox Jews, among others. In “Creationism and Geocentrism Among Orthodox Jewish Scientists” (RNCSE Jan-Apr 2002), psychologist Alexander Nussbaum recounts his experiences in teaching at Touro College. There, all scientific questions are solved by reference to the Torah and the writings of revered commentators. Thus radioactive dating is false and the universe is about 6000 years old; thus Einstein, in his relativity theory, proved that the sun does indeed go around Earth.

Biologists are not the only scientists who need to devote effort to keeping such nonsense out of public schools. The physical sciences are affected not only directly, as in geocentrism and a 6000-year-old universe, but indirectly in common with all sciences when students are given a false idea of what science is about, how scientists do their work, and the results that emerge from that work. RNCSE performs a vital service in the cause of teaching good science.

Lawrence S. Lerner
Professor Emeritus
College of Natural Sciences & Mathematics
California State University, Long Beach
lslerner@csulb.edu