

The Aftermath of Nuclear War

Last Aid. The Medical Dimensions of Nuclear War. Papers from a congress, Washington, D.C., March 1981. ERIC CHIVIAN, SUSANNA CHIVIAN, ROBERT JAY LIFTON, and JOHN E. MACK, Eds. Freeman, San Francisco, 1982. xxiv, 338 pp., illus. Paper, \$9.95.

Nuclear War: The Aftermath. JEANNIE PETERSON and DON HINRICHSEN, Eds. Pergamon, New York, 1982. viii, 196 pp., illus. Cloth, \$15; paper, \$5.90. Based on *Ambio*, vol. 11, no. 2-3.

Life after Nuclear War. The Economic and Social Impacts of Nuclear Attacks on the United States. ARTHUR M. KATZ. Ballinger (Harper and Row), Cambridge, Mass., 1982. xxx, 424 pp., illus. Cloth, \$27.50; paper, \$14.95.

Some observers of the Soviet-American nuclear arms race have noted that it is likely to terminate, like all previous arms races, in one of three ways: by petering out through economic exhaustion and mutual lack of interest; by negotiated agreement, such as the proposed nuclear freeze; or by a nuclear war. These three books explore, in excruciating detail, the last of these outcomes. Though there is considerable overlap among them in their initial chapters, covering the physical effects of nuclear explosions, each otherwise has a different emphasis. *Last Aid*, the most accessible to a general audience, concentrates on describing the actual acute and delayed medical effects of the Hiroshima and Nagasaki atomic bombings and the probable extent of such effects following a thermonuclear attack in the 1980's. *Nuclear War: The Aftermath* provides a more detailed treatment of the possible environmental consequences of nuclear attacks, emphasizing immediate and long-term effects on the atmosphere, global freshwater supplies, ocean ecosystems, agriculture, and forests. *Life after Nuclear War* covers some of the same ground but with an emphasis on the likely economic, social, and political consequences even of quite "limited" nuclear attacks. Together, they provide a comprehensive and chilling antidote to official musings about the feasibility of "limited" and "protracted" nuclear wars and raise important questions about the rationality and desirability of current military planning to carry out and defend against such attacks.

Last Aid is the result of the First Congress of International Physicians for the Prevention of Nuclear War, which brought together 72 physicians from 12 countries, including leaders in medicine from the United States and the Soviet Union. John E. Mack begins his prologue to the book with a quotation from Archibald MacLeish that precisely expresses what the group of physicians are trying to achieve through their detailed descriptions and photographs of seared skin and burned-out cities.

We are deluged with facts, but we have lost, or are losing, our human ability to *feel* them. The real defense of freedom is imagination, that feeling-life of the mind that *actually* knows because it involves itself in its knowing, puts itself in the place where its thought goes.

Bernard Lown, the president of the group, writes that though physicians will be powerless to mitigate the consequences of a nuclear war they can help to mitigate the enormous economic, psychological, and moral costs of the arms race by speaking out against it. World arms spending, he points out, is running more than \$1.4 billion per day, or \$1 million per minute. "A small fraction of these expenditures could provide the world with adequate food and sanitary water supply, housing, education, and modern health care." In support of this assertion, Lown notes that the World Health Organization required only \$300 million, "approximately five hours of the cost of military budgets," in its successful global campaign to eradicate smallpox. The lack of clean water, he writes, "now accounts for 80 percent of all the world's illness and imposes untold misery and degradation on half the world's population." The world could obtain a sanitary water supply for all its inhabitants "with a diversion of funds consumed by three weeks of the arms race." That amounts to \$30 billion, or about what Congress will pay over the next five years to buy 100 B-1 strategic bombers.

In the "summary proceedings" of the meeting, included as an appendix in *Last Aid*, the group of physicians concludes,

War is not an inevitable consequence of human nature. War is a result of interacting social, economic, and political factors; it has been a social institution widely used over time

to manage conflicts. To argue that wars have always existed and that this social phenomenon cannot be eliminated ignores history. . . . Slavery, cannibalism, dueling, and human sacrifice are among the practices which the human race has recognized to be improper and has abandoned. The genocidal nature of nuclear weapons has rendered nuclear war obsolete as a viable means for resolving conflict. . . . Wars begin in the mind, but the mind is also capable of preventing war.

Reading *Last Aid* is an effective step toward war prevention, particularly if undertaken, as Lewis Thomas suggests in the book's foreword, by "the generals, the admirals, the captains and the colonels, the senior faculties of all the war colleges, and all the rising young lieutenants in all the armed forces." "They," Thomas continues, "and I am beginning to think they alone, can do the persuading that the world's governments need most quickly: to give up, on all sides, thermonuclear weapons of all kinds, and to make sure that such devices for humankind's suicide are forever abandoned."

A similar spirit imbues *Nuclear War: The Aftermath*. The volume first assesses the dimensions and destructive capabilities of the Soviet and American nuclear arsenals and then develops a "Reference scenario: how a nuclear war might be fought" as a basis for subsequent assessments of structural, medical, and environmental damage. The scenario involves use of some 15,000 warheads, making up less than half the megatonnage of the projected 1985 superpower arsenals, of which some 7000 warheads and 3000 megatons are targeted against military facilities and 8000 warheads and 3000 megatons against population, industry, and energy installations.

The authors estimate that the number of immediate or early deaths from the effects of blast, fire, and heat in this nuclear exchange would approach 750 million (slightly more than half of the population of the cities bombed) and that an additional 340 million people would be seriously injured. They add,

A considerable proportion of those who survive the blast, fire, and heat will suffer from acute radiation sickness as a result of exposure to fallout. In addition, sublethal levels of ionizing radiation will lower resistance to infection, and diseases such as cholera and dysentery will spread rapidly in the absence of proper water and sanitation facilities.

One of the conclusions of the book is that the short-term effects that are relatively easy to quantify—fire, blast, and radioactive contamination—"may be matched or even vastly overshadowed by longer-term, less predictable environmental effects." Other papers in the vol-

ume examine the light-absorbing and reflecting qualities of vast quantities of particulate matter lofted into the atmosphere by nuclear explosions and the subsequent oil, gas, and forest fires that may burn for many weeks and even months after a nuclear attack and the effect that these phenomena, in conjunction with a dramatic reduction in stratospheric ozone (leading to increased intensity of ultraviolet radiation at the earth's surface), would have on agriculture, which would already be faced with a shortage of all types of supplies. Pests, relatively more resistant to radiation, would thrive in the aftermath of a nuclear war, attacking agricultural and natural ecosystems weakened by radiation and other environmental stress. All these factors would cause enormous problems for the survivors in the Northern Hemisphere, and industrially less developed countries with large populations and inadequate food production would be swept by waves of famine, disease, and social unrest as a result of the complete breakdown of international trade in food, fertilizers, fuel, farm machinery, and technology.

The final chapter in this volume examines the consequences of a "limited" nuclear war in East and West Germany and concludes that a preemptive nuclear exchange aimed at the 171 nuclear weapons sites in both Germanies (using 200-kiloton airbursts) would kill on the order of 10 million persons and seriously injure a similar number. The "defensive" use of small, 1-kiloton "enhanced radiation" warheads, primarily against tanks and other armored vehicles, would lead to the deaths of about "one thousand civilians . . . from radiation illness as a result of each nuclear explosion," yielding on the order of one million civilian deaths in the repelling of a large-scale Soviet tank attack.

Political and military leaders must be made to understand, therefore, that to the extent that they develop security policies which depend upon the use of nuclear weapons in Europe, they are committing themselves to a policy which involves the mass slaughter of civilians *no matter how purely military the nominal targets of attack!*

Katz's book, *Life after Nuclear War*, is an outgrowth of his work on the same subject for the now-defunct Joint Committee on Defense Production. Katz questions the line of thinking that equates levels of "acceptable" or "unacceptable" damage with simple measures of physical destruction and mere biological survival. He asserts that such thinking has created the mistaken impression that "a certain level of biologi-

Reviewed in This Issue

<i>Abusing Science</i> , P. Kitcher	851
<i>American Collegiate Populations</i> , C. B. Burke	814
<i>The Brattleboro Rat</i> , H. W. Sokol and H. Valtin, Eds.	856
<i>The Channels of Mars</i> , V. R. Baker	847
<i>Christianity and the Age of the Earth</i> , D. A. Young	851
<i>Circulation in the Coastal Ocean</i> , G. T. Csanady	849
<i>Creation and Evolution</i> , N. D. Newell	851
<i>The Developmental Psychology of Time</i> , W. J. Friedman, Ed.	845
<i>Extraterrestrials: Where Are They?</i> M. H. Hart and B. Zuckerman, Eds.	846
<i>The Establishment of Human Antiquity</i> , D. K. Grayson	834
<i>Fusion</i> , J. L. Bromberg	821
<i>The Great Television Race</i> , J. H. Udelson	819
<i>The Historical Development of Quantum Theory</i> , vols. 1-4, J. Mehra and H. Rechenberg	824
<i>A History of American Physical Anthropology, 1930-1980</i> , F. Spencer, Ed.	832
<i>An Island Polity</i> , C. Renfrew and M. Wagstaff, Eds.	837
<i>Language Acquisition</i> , E. Wanner and L. R. Gleitman, Eds.	843
<i>Last Aid</i> , E. Chivian, S. Chivian, R. J. Lifton, and J. E. Mack, Eds.	812
<i>Life after Nuclear War</i> , A. M. Katz	812
<i>Life Histories and Psychobiography</i> , W. McK. Runyan	842
<i>Linguistic Evidence</i> , W. M. O'Barr	841
<i>Margaret Mead and Samoa</i> , D. Freeman	829
<i>Mass Psychogenic Illness</i> , M. J. Colligan, J. W. Pennebaker, and L. R. Murphy, Eds.	838
<i>The Middle Stone Age at Klasies River Mouth in South Africa</i> , R. Singer and J. Wymer	835
<i>Molecular Biology of the Cell</i> , B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts, and J. D. Watson	856
<i>The Monkey Business</i> , N. Eldredge	851
<i>Neyman—From Life</i> , C. Reid	827
<i>No Sea Too Deep</i> , A. McConnell	850
<i>Nuclear War: The Aftermath</i> , J. Peterson and D. Hinrichsen, Eds.	812
<i>Pioneer Plastic</i> , R. Friedel	818
<i>Science on Trial</i> , D. J. Futuyma	851
<i>Scientists Confront Creationism</i> , L. R. Godfrey, Ed.	851
<i>Stronger than a Hundred Men</i> , T. S. Reynolds	816
"Tabibito" (<i>The Traveler</i>), H. Yukawa	822
<i>The Theory of Sex Allocation</i> , E. L. Charnov	853
<i>Tikopia</i> , P. V. Kirch and D. E. Yen	836
<i>The Time of Darkness</i> , R. J. Blong	848
<i>Vertebrate Circadian Systems</i> , J. Aschoff, S. Daan, and G. A. Groos, Eds.	854
<i>Volcano Weather</i> , H. Stommel and E. Stommel	848
<i>Yankee Enterprise</i> , O. Mayr and R. C. Post, Eds.	817

cal and physical resource survival is equivalent to a functioning nation and, in turn, an international power." Not only is this equation false, he argues, it completely ignores "what kind of entity remains to fend for itself in the postattack world."

Viewed from this qualitative perspective, even small-scale nuclear attacks like those contemplated in current nuclear doctrine and crisis relocation planning may have consequences that are qualitatively unacceptable—that is, not worth risking under any circumstances, regardless of the national interest at stake. A "key lesson" of his inquiry, Katz tells us, is that "the weapons requirements necessary to create unacceptable damage are significantly smaller than we have been willing to acknowledge." Some 70 percent of industrial installations in either the Soviet Union or the United States could be destroyed by only 1300 weapons capable of generating 6 pounds per square inch overpressure 1.5 nautical miles from their point of detonation. However, a facility need not be destroyed to be rendered inoperable. Because of the highly interdependent nature of modern industrial economies, supply bottlenecks caused by the destruction of particular industries whose output is largely consumed as input to other industries would lead to an aggregate loss of production far greater than

that represented by the facilities actually destroyed. A modern industrial society can be crippled so seriously by an attack of even 100 equivalent megatons, Katz argues, that its social, political, and economic life will be altered in ways that most citizens would consider to be "unacceptable damage." Of particular relevance is Katz's analysis of crisis evacuation planning, which in the case of a severe attack would only serve to heighten the disproportion between surviving resources and population, postponing but by no means eliminating the genocidal character of nuclear war. In the case of more limited attacks, crisis relocation would do nothing to alleviate the devastating social and economic effects of such attacks and would itself be the cause of serious economic disruption and conflict, in addition to enlarging the circumstances under which the fighting of a nuclear war could appear to be an acceptable option to national leaders.

Though much of Katz's lengthy volume may appear to some readers as an exercise in belaboring the obvious, clearly his message is not obvious to everyone, including high officials of the present administration, who would benefit by a careful reading of all three of these exceptional books.

CHRISTOPHER PAINE

*Federation of American Scientists,
Washington, D.C. 20002*

Higher Education: The Past Reappraised

American Collegiate Populations. A Test of the Traditional View. COLIN B. BURKE. New York University Press, New York, 1982 (distributor, Columbia University Press, New York), x, 374 pp. \$35. New York University Series in Education and Socialization in American History.

In 1931 Lyman Butterfield wrote an elegant essay entitled *The Whig Interpretation of History* (1) in which he commented upon the predominant tendency among English historians to view Protestants and Whigs as the instruments of progress while portraying Catholics and Tories as reactionary, misguided, and obstructionist. Whig historians saw the past as a march toward the beneficent institutions of their own day. Butterfield bemoaned this brand of relevance and urged historians instead to elucidate the "unlikeness between past and present." Historians, he said, must try to "see life with the eyes of another century than our

own." Thus the word "Whig" evolved into an adjective applied to any historical interpretation that used present-day institutions as a standard of moral judgment and as a guide for selecting key developments in the past. Bernard Bailyn (2) popularized the term among American educational historians in 1960 when he criticized standard public school histories written earlier in the 20th century. By equating "education" with "schooling" and searching for 17th-century precursors of modern public school systems, these Whig historians had fundamentally misunderstood the shared educational roles of family, church, workplace, and school in colonial America. Subsequent revisionist historians have deepened the critique of public school history, challenging the benevolence of state-regulated education and writing sympathetic accounts of groups who tried to go their own way in educating their children.

Students of higher education are now fomenting the same historiographical revolution. A Whiggish view of 19th-century colleges and universities had reigned almost unchallenged until the 1970's. Like public school history, it rested upon detailed monographs written before 1950. Whig historians of higher education took a dim view of the proliferation of small colleges in the pre-Civil War era, attributing it to sectarian competition and misguided hostility to state control. Donald Tewksbury, in the standard account (3), calculated that over 500 colleges were chartered in 16 states during the antebellum period, of which fewer than 20 percent survived into the 20th century. Tewksbury did not grieve about the high failure rate, for he viewed the colleges as "agents of denominational imperialism" that "maintained special privileges in the field of higher education." Happily, providence shone more brightly upon the eastern, reform-minded universities like Harvard and Brown, and upon new state universities. The latter were chronicled in Earle Ross's *Democracy's College* (4). According to the Whig version, universities became the dominant institutions after 1860, representing the triumph of democracy and science. No less a figure than Richard Hofstadter gave his imprimatur to this view in *Academic Freedom in the Age of the College* (5). He viewed the spread of small colleges as a "great retrogression," in contrast to the "new regime" of the late 19th century. Hofstadter's positive model, one recent critic has remarked, suspiciously resembled his own big, cosmopolitan Columbia University.

The challenge to this interpretation of college history has been building up for some time. Intellectual historians like Laurence Veysey (6) and Thomas Haskell (7) have certainly not viewed the rise of bureaucratic universities and specialized disciplines as the triumph of democracy and rationality, and other recent historians, chiefly David Allmendinger, James Axtell, Jurgen Herbst, James McLachlan, Natalie Naylor, and David Potts (8-13), have depicted the antebellum colleges as viable, local institutions. These revisionists have challenged Tewksbury's failure rate as exaggerated, softened the picture of pervasive denominational fervor, denied that small colleges were resistant to science and curricular reform, and called for more systematic research on the backgrounds and careers of 19th-century college students.

Colin Burke's *American Collegiate Populations* pursues these themes and answers the call for research on stu-