Nuclear Scenarists

Minds at War. Nuclear Reality and the Inner Conflicts of Defense Policymakers. STEVEN KULL. Basic Books, New York, 1988. x, 341 pp. $19.95.

Steven Kull is a clinical psychologist who now studies what some call the "nuclear theologians": the small group of military officers, civilian government officials, and private analysts who conceive, justify, and implement U.S. nuclear weapons policy. Kull's new book, *Minds At War*, shows that those specialists exhibit a frightening degree of irrationality and inner confusion about nuclear weapons. The book should finally put to rest their claim that they alone command the technical knowledge and sophistication to judge nuclear weapons policy.

Kull sought to determine the degree to which policymakers recognize the fundamental new military realities that nuclear weapons have brought: the vulnerability of both superpowers to complete destruction and the inability of either side to reduce that vulnerability. These new realities invalidate the traditional goals of military strategy, in the nuclear area at least. Seeking to gain military advantages is simply irrelevant when neither combatant is likely to survive as a modern society in the event of a nuclear war.

What Kull calls the "adaptive stream" in military thought acknowledges the new realities. By contrast, the "traditional stream" continues to attribute great importance to traditional military goals. The nuclear experts Kull interviewed exhibited remarkable confusion, frequently jumping back and forth between adaptive and traditional points of view without seeming to notice the contradiction.

For example, one strategic analyst from a private think tank told Kull that in the event of a nuclear war the United States should seek outright victory, even including a "reconstitution" of the Soviet government that would entail a partial breakup of the Soviet Union. He argued that if the United States fielded appropriate nuclear forces, it could compel the Soviets to accept such terms without inviting total annihilation. But under Kull's questioning, this analyst abruptly acknowledged that he had "a strong feeling of unreality" about his scenario, and even that "the margin between this [scenario] and the George Lucas *Star Wars* I regard as fairly limited." The analyst then totally contradicted his earlier statements, acknowledging that in the event of a nuclear war the only hope for the United States would be to keep the war as limited as possible and to *avoid* provoking escalation with outrageous political demands like dismemberment of the Soviet Union.

Kull's respondents promoted almost every conceivable strategy for seeking a usable military advantage in the nuclear arms race. Like the strategic analyst quoted above, however, almost without exception they quickly retreated when Kull pointed out the obvious difficulties of their analysis. Remarkably, the experts themselves more or less admitted the extraordinary irrationality of mainstream nuclear thought. *Minds at War* shows that simple, well-informed common sense would be a far more rational guide to nuclear policy than the convoluted, self-contradictory views of those now in authority. Kull, by the way, found similar patterns of thinking in a small group of Soviet analysts he interviewed.

After Kull induced his respondents to drop their contorted military rationales, they often argued that big new weapons like the MX missile are still required to manipulate perceptions—that is, to impress leaders in the Soviet Union and the Third World who might not recognize that new weapons are militarily irrelevant. Again, however, Kull's respondents acknowledged obvious problems with their arguments when Kull pointed them out. At that point, the nuclear experts frequently fell back to even vaguer, purely psychological rationales, such as the need to build hugely expensive weapons to demonstrate U.S. "resolve," to increase U.S. status and prestige, and to maintain morale at home.

Despite its many virtues, *Minds At War* is limited by a narrow psychological perspective. Kull tries to trace his respondents' inner conflicts to irrational emotions, some with deep cultural roots, such as a primitive instinct to compete and a compulsion to suppress awareness of society's terrifying vulnerability. At the personal level, such emotions are no doubt powerful. But to a large degree they are probably only internal adaptations to the social forces that ultimately shape the behavior and thought of nuclear policymakers.

Once the political decision to run the arms race is made, those chosen to execute the decision will inevitably find themselves in a confusing social role—planning elaborate nuclear weapons systems and war strategies even though it is obvious that these can no longer affect usable military capabilities. People find it difficult to believe one thing and do another; hence if the policymakers want to keep their jobs and advance their careers without undue anxiety, they must suppress their awareness of what Kull calls "nuclear reality" during their day-to-day routine. People who are unwilling or unable to adopt such a schizoid stance simply do not become nuclear policymakers, or else they resign or get fired. Policymakers' inner conflicts can be resolved only when the United States stops participating in the arms race. Such a decision, obviously, can only be made by those holding ultimate power in the United States, whom Kull did not interview. And though top elites undoubtedly harbor their own nuclear confusion, the arms race is largely driven by real economic and political interests that cannot be understood within a psychological framework.

A second weakness of the book is Kull's own failure to "adapt" to nuclear reality. While he recognizes that no new nuclear weaponry can provide a military advantage, he repeats the view (which is widespread in the arms control community and the peace movement) that certain new weapons, such as the MX, could "destabilize" deterrence by giving one side an incentive to launch a first strike. As we argue in our forthcoming book *The Nuclear Seduction*, that is just another instance of "traditional" military thinking; it is misleading for the very reasons Kull highlights throughout his book.

The reality of mutual vulnerability is inherent in the existence of substantial numbers of nuclear weapons. No plausible development in the arms race (or, for that matter, in arms control) can reduce that vulnerability. No quantity of MX missiles or any other weapons could give either superpower the slightest rational incentive to launch nuclear weapons first (or to launch them in haste), since the result of such a decision would almost certainly be total, mutual annihilation, no matter what the composition of the superpowers' nuclear arsenals. With only a few exceptions, new weapons do not make the nuclear danger worse, and they do not make it better. They simply waste a lot of money. What truly matters to the nuclear danger is not the details of redundant military hardware but the real violence raging

throughout the world—violence that could suddenly escalate to a nuclear confrontation, as it has all too often threatened to do in the past.

Kull brilliantly dissects what we call the "weaponitis" of nuclear policymakers. But he fails to extend his critique to the weaponitis exhibited by many of the policymakers' critics. Still, *Minds At War* is one of the most original and important works in the vast nuclear literature. All serious students of Armageddon should read it.

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A Tour of Computers

Ideas and Information. Managing in a High-Tech World. ARNO PENZIAS. Norton, New York, 1989. 224 pp. $17.95.

Arno Penzias, vice-president for research at AT&T Bell Labs, Nobel prizewinner for measuring the temperature of the universe, and serious amateur sculptor, has written a book full of "ideas and information," but don't let the subtitle fool you. This is not a book about technology management. "Coping in a High-Tech World" might have served a little bit better. It's a book about how it all works, written for people who don't already know.

In essence, Penzias takes us on a leisurely tour of the world of computers. He takes plenty of time along the way to tell us why Napoleon lost at Trafalgar, why there are 60 seconds in a minute and 60 minutes in an hour, and how to analyze a balky automobile engine. He points out that, just as the telegraph ended the brief if glorious day of the pony express, the fax is likely to do the same for the Federal Express. He even tells us about his disappointment upon learning that a part he was ordering from a catalogue couldn't be shipped until the next week, in spite of a promise in the catalogue of same-day service. "You must have a very old catalogue," he was told, without a trace of irony, "Now we have a computer."

Nevertheless, this is a book about computers. We learn how a transistor works, how an integrated circuit chip is fabricated, how formal logic works, and how simple circuits can perform logic operations, and so on, through binary numbers, registers, compilers, and all the rest. The tour is anything but pedantic and orderly. We start with the catalogue clerk and get to the transistor somewhere in the middle of the book. But it is comprehensive. Penzias's goal seems to be to tell his reader, not in detail but in broad general principles, what computers are about and what they're likely to be good for.

Penzias has the born teacher's knack of simplicity. It serves him well in describing the transistor as a cheese sandwich, but the reader starts to get vaguely uneasy when he applies the same principle to historical events. For example, he tells us that the telegraph was invented by Samuel F. B. Morse, with help from William Sturgeon and Joseph Henry, who had discovered how to make an electromagnet. I think the story is considerably more complicated, involving Oersted and Ampère, Gauss and Weber, and Cooke and Wheatstone among many others. But then again, the transistor is also more complicated than a cheese sandwich. If simplifying technology is a virtue, why should simplifying history be a vice?

This is not a book for experts or highbrow critics. It is the view of an intelligent, knowledgeable, and fluent observer, watching and describing a historic revolution, from a privileged vantage point, written in a way that nearly anyone can understand.

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Some Other Books of Interest

Science Off the Pedestal. Social Perspectives on Science and Technology. DARYL E. CHUBIN and ELLEN W. CHU. Wadsworth, Belmont, CA 1989. xii, 196 pp. Paper, $17.75.

Courses in what the editors describe as "the multidiscipline of science, technology, and society," or STS, are now taught on a number of campuses, and this collection of readings is intended to aid both students and instructors in such courses in the effort "to take science off the pedestal on which modern culture has deposited it, to dig into problematic issues, and to be skeptical of pat solutions of untested assumptions." The emphasis of the collection is, as the subtitle suggests, on the impact of science on society rather than on its internal workings. Examples used are mostly relatively recent, rather than historical, episodes, and many contributions expound conclusions drawn as much from the authors' own work as from comprehensive literature surveys. In part 1, Science, Technology, and Other Social Institutions, James C. Petersen and Gerald Markle discuss controversies involving science and technology (biomedical issues in particular), Ron Westrum discusses the handling of anomalous or implausible phenomena ("hidden events"), and Rae Goodell and Sheila Jasanoff respectively discuss the relations of science with the press and with the legal system. Part 2 of the book, entitled World Views and the Politics of Knowledge, opens with an overview of the discipline of sociology of science by Sal Restivo. Further papers consider the use of citation analysis (Susan E. Cozzens), scientific communication as related to national security (Thomas F. Gieryn), research malpractice (Chubin), and the implications of biotechnology (Markle and Stanley S. Robin). In part 3, Science and Technology as Public Resources, Edwin Mansfield presents an economist's view of research and development, Arie Rip discusses the issue of technological determinism, Edward J. Woodhouse considers problems of political judgment in the face of scientific uncertainty, Michael S. Brown discusses issues pertaining to occupational health and safety, and Stephen P. Turner explores the differences between scientific knowledge and the kind of knowledge involved in making policy decisions. Each paper and group of papers in the volume is preceded by an introduction by the editors, who also add a brief "postscript," an appendix listing "STS resources," and a glossary defining a sampling of terms used in the book.—**K.L.**

Einstein Simplified. Cartoons on Science. SIDNEY HARRIS. Rutgers University Press, New Brunswick, NJ, 1989. Unpaged. Paper, $9.95.

The word "simplified" seems to have passed out of favor for titles of works of popular science, and its parody in the cartoon appearing on the cover of this collection ought to put a definitive end to its use. The cartoon consists of three portraits of the famous scientist progressing from a full panoply of hair, mustache, and wrinkles to a few barely recognizable strokes of the pen. Inside the book are some 170 more of Harris's cartoons, reprinted from periodicals scientific and otherwise. Some of the cartoons utilize well-worked themes (the equation-laden blackboard, evolutionary progression, Newton with apples), and a few (Boole ordering lunch) are on the arcane side. Though some on modern historical themes don't go beyond what contemporary cartoonists were able to do with the themes (Röntgen shining a light through his wife), others add a new twist (M. Pasteur being introduced to a colleague in milk improvement, M. Homogen). Among those dealing with present-day themes, genetic engineering and elementary particles are frequent targets, as are such extra-laboratory phenomena as food additives and computers. Some of the pithiest of the cartoons, to this browser, are those dealing with less-than-