vances of their field. It does what it is supposed to do: describe the state of the art of each field. Small parts of it are intelligible to well-informed readers, but much of it is an encyclopedic reference to be housed in all self-respecting technical libraries.

This yearbook covers European security (long-range theater nuclear forces, European disarmament initiatives, the neutron bomb); developments in world armaments (expenditures, arms production and trade, strategic nuclear weapons, laser enrichment of plutonium, military use of outer space, developments in chemical and biological warfare, environmental aftermath of warfare in Vietnam); militarization and arms control in Latin America; and developments in arms control in 1981 (nuclear explosions, arms control in outer space, prohibition of inhumane weapons, disarmament at the 1981 UN General Assembly, summary of past arms-control agreements, chronology of arms control for 1981).

Several of the topics are of particular interest to physicists. The treatment of the neutron bomb tells what a neutron bomb is, what it does, and how it fits into the military scheme of things. There is a fascinating discussion of the high-tech Maverick weapon and its rather dismal (but interesting for its physics aspects) track record. There is a good update on strategic nuclear weapons and their delivery systems. One chapter is concerned with laser enrichment of plutonium, a very important research area that influences both nuclear power and nuclear weapons. Two chapters deal with military uses and arms control in outer space, in other words, antisatellite warfare. Finally, there is an excellent discussion on nuclear explosions (49 in 1981), their military signficance, limitations on nuclear testing, and the related negotiations for a comprehensive test-ban treaty.

This book is excellent for finding out who has done what in weapons development and arms control. SIPRI is one of the best institutes for arms-control research in the world; it has the reputation of being fair and unbiased. It is European, however, and takes a view somewhat different (but nonetheless intellectually honest) from those prevailing in the US on such things as the US–USSR arms race, the environmental havoc heaped on Vietnam, the militarization of Latin America, and recent developments in chemical and biological warfare.

World Armaments and Disarmament is an excellent contribution to the arms-control literature. Its price puts it beyond the reach of most readers, and its pages of charts and references will strain the minds of all but the most avid. It is, however, the standard in its field and will enable an informed reader to find out what is happening in arms control each year. Many parts are quite readable, particularly the introduction, which summarizes the book.

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National Defense

J. Fallows
204 pp. Random House, New York, 1981. $4.95

Real Security

R. J. Barnet
127 pp. Simon & Schuster, New York, 1981. $4.95

Public interest in foreign policy and defense issues is growing. The dangers posed by the arms race have frightened many, and the drain of high defense expenditures on a troubled economy is apparent. In this environment, physicians, scientists, lawyers, and other professionals are increasingly concerned about national security affairs. Although they often bring understanding of aspects of particular problems—for example, technical characteristics of weapons systems or radiation effects of nuclear blasts—many of these newly mobilized citizen professionals lack insight into the wider political context in which policy is shaped. The responsibilities of continuing participation in the growing public debate require education into the domestic and international politics that significantly affect the possibilities for change in national security policy.

In this context, *National Defense* by James Fallows and *Real Security* by Richard J. Barnet are worth examining. Published in 1981 and now available in paperback, both books are well written and occasionally passionate critiques intended for an educated audience of nonspecialists. Fallows, Washington editor of the *Atlantic Monthly*, is a self-professed neo-liberal and neophyte on defense issues. Barnet, a former official in the Kennedy Administration, is co-founder and senior fellow at the left-of-center Institute for Policy Studies. Although the critiques of Barnet and Fallows resonate with the public mood of concern and discontent, the criteria for judging both works are clear: Is there a convincing demonstration of what is wrong with our system of defense? Are the factors that cause the problem sufficiently analyzed? Is there a satisfactory demonstration of how the system should be changed? Is there understanding of the factors that prevent movement to the desired state?

For Fallows, the United States is getting less and less for each defense dollar because the Pentagon is infatuated with high technology and because the military has been corrupted by a false careerism. Consequently, in an era of decreasing resources and increasing instability in world politics, we buy progressively more costly and complex weapons systems that don't work, are too expensive to maintain, and are ill-suited for battlefield conditions. Furthermore, our soldiers know less and less about the virtues and values that make good fighters.

Fallows deserves high marks for drawing a lucid and compelling case that something is fundamentally wrong in the defense department. His account of the M-16 fiasco is an indictment of the present system of procurement. A military bureaucracy fixated on standards irrelevant to actual battlefield conditions converted a superior weapon into a bad and dangerous one.

Fallows, however, views too selectively the political and historical context of Pentagon decision-making. Take as an example the relationship between the military and society in the United States. That the Pentagon focuses on high technology, or that the military emphasizes university degrees, is a consequence of an important truth: The US military is embedded in our society and reflects its values. By tradition and political choice, isolation of the military from broader currents in the society has been found undesirable. Moreover, there is a long tradition for civilian control to ensure integration of the military.

Because excesses emerge, it does not follow *ipso facto* that the solution to our problems lies in a defense establishment dominated by the thinking of those who fight wars. Yet, that is the assumption that unites Fallow's sections on technology and soldiering. Fallows implies but does not prove that accepting this bias will save money. But there are unstated political costs. In leading us down this path, Fallows ignores an insight of conservative Senator Richard Russell cited by Barnet: A country that invests heavily in a military that can go places and do things will find those forces doing just that.

In his introduction, Fallows writes, "At certain points, this book addresses foreign policy choices, but I have deliberately avoided them wherever possible." In Fallows's view, to discuss foreign policy is to draw defense issues into "ideological slugfests." But what we think we need for defense is strongly influenced by the political struggle over national goals, as Barnet makes clear in *Real Security*. Barnet's history of recent US foreign policy provides an excellent analysis of the national and international environment in which

the goals of US foreign policy are decided. Jimmy Carter, whom Fallows served as a speech writer, wanted, as Barnet points out, to cut the budget but ended up increasing it. Barnet analyses the work of the Committee for the Present Danger and shows how it decisively affected Carter's plans by lobbying actively and affecting three major decisions: the establishment of the B-Team, which gave official sanction to the idea of the Soviet threat; the confirmation debate of arms-control negotiator Paul Warnke; and finally, the failure of ratification of the SALT II Treaty.

For Barnet, the key question—what can military power, nuclear and nonnuclear, do for a great nation in today's world—was ignored. If the real limitation on the effective use of military power were recognized, Barnet believes that the United States could better come to terms with the changed world we face: Soviet military parity, economic challenge from other capitalist countries, and the inability of either superpower to control events in today's world. By focusing on who's ahead and whether or not the Soviets are bent on world domination, the United States fell victim to the perceptions competition: "Once the purpose of military spending is to create perceptions and weapons are procured primarily as symbols, there is never enough."

Barnet is least convincing in his arguments that the usefulness of military power has declined. Is all military power ineffective, or is its use limited only for the superpower? Clearly, the usefulness of military power declines where the goals of the user are unlimited and unrealistic. The recent wars in the Middle East and the Falklands suggest caution in making sweeping generalizations about military power or about the domestic unpopularity of leaders who resort to its use.

In sum, Fallows and Barnet have written useful primers, which complement each other. They teach an important though unintended lesson for newcomers to the national-security field who must move beyond the passion of protest to the realities of reform: Don't underestimate the contraints on reform nor the need to think through the implications of particular reforms.

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Direct Characterization of Fineparticles

B. H. Kaye
Wiley, New York, 1981. $72.00

"Fineparticles" is the term Brian Kaye pointedly employs to supplant "particulates" for clarity of usage and "particles" for bibliographic simplicity in this review of methods used in the counting and sizing of particulate matter in the nominal size range of 0.1–2000 microns. He chose this range evidently to accord with the needs of powder technology and to exclude the smaller aggregations of matter where questions not clearly defined by conventional physical considerations come to the fore (for example, Lifshitz–van der Waals forces in particle collisions, structural and other physical peculiarities of finite bodies, effects of transition-regime kinetic theory). By "direct" versus "indirect" characterization, Kaye posits a dichotomy in the measures of fineparticle characteristics that, while somewhat strained, is useful in restricting the scope of the material covered.

Kaye directs the text toward the technologist, that is, toward one who has practical needs for the determination of the mass, size, flow, and so on, of fineparticles in process streams, beds,