

Book Reviews

Nuclear Nonproliferation

The Nuclear Suppliers and Nonproliferation. International Policy Choices. RODNEY W. JONES, CESARE MERLINI, JOSEPH F. PILAT, and WILLIAM C. POTTER, Eds. Lexington (Heath), Lexington, MA, 1985. xvi, 255 pp. \$32. From a seminar, Washington, DC, June 1984.

The Nuclear Connection. A Reassessment of Nuclear Power and Nuclear Proliferation. ALVIN WEINBERG, MARCELO ALONSO, and JACK N. BARKENBUS, Eds. Paragon House, New York, 1985. viii, 295 pp., illus. \$27.95; paper, \$19.95. A Washington Institute Book.

The recent conclusion of the third review conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is a timely occasion for a reevaluation of international efforts to impede the spread of nuclear weapons to additional countries, which continues to be one of the most critical challenges to international security. Though the books being reviewed largely cover old ground, they provide new perspectives on certain nuclear supply questions and on the relationship between civil nuclear electric generation and nuclear weapons and thus contribute to the large body of literature on this important subject.

The Nuclear Suppliers and Nonproliferation provides new insights into the growing problem of "second tier" or emerging suppliers, those states that have recently become capable of supplying nuclear materials, equipment, or technology. The best paper on the subject, by Lewis Dunn, puts a potentially serious problem in perspective, eschewing the alarmist view. Some commentators have predicted that the new suppliers will undermine international efforts to assure that exported nuclear materials are only used for peaceful purposes by making exports that are not subject to international controls. To date, Third World countries with advanced nuclear programs, such as India, have been fairly circumspect in their nuclear dealings with other countries. Moreover, progress has been made recently in getting some emerging suppliers to require that their nuclear exports meet international standards. South Africa (which has vast uranium reserves and a uranium enrichment plant) has announced that it will require the same controls on its nuclear exports as are required by the existing members of the "London Suppliers Group." China has also recently announced that it will require international inspection under the "safeguards" system of the International Atomic Energy Agency on all its nuclear exports, a welcome development if China actually matches those

words with more responsible behavior in its nuclear commerce than it has shown in the recent past.

The book also contains good regional overviews of nuclear supply issues in South Asia, by Rodney Jones, and in Latin America, by Daniel Poneman. Poneman's paper contains a useful proposal for greater reliance on the Latin American nuclear-free-zone treaty (the Treaty of Tlatelolco) to reduce proliferation risks on that continent. The papers in the book on national export policies are self-congratulatory and contain little that is new. An exception is a paper on the Canadian perspective by Mark Moher, with its lucid advocacy of a policy of genuine "full-scope" IAEA safeguards (that is, a requirement that as a precondition of nuclear cooperation the recipient state must enter into a treaty obligation to place all its nuclear facilities under IAEA safeguards). Moher points out the risks of reliance on ad hoc policies and emphasizes the dangers of supplying nuclear materials and equipment with the hope, but without binding assurances, that the recipient nation will forgo nuclear weapons.

Disappointingly, the book only mentions in passing the recent negotiation of major improvements in the international "trigger lists." These lists specify the items that cannot be exported unless the supplier has received assurances that IAEA safeguards will be applied. The elaboration of the trigger lists to deal more effectively with centrifuge uranium enrichment and spent fuel reprocessing technologies is a major accomplishment of which the United States and other concerned governments should be proud. Though obvious limits are imposed by confidentiality, some details of these negotiations would have provided a valuable case study of the need for supplier cooperation to prevent the establishment of unsafeguarded sensitive nuclear facilities, and of the practical and political limits on such cooperation. There are similarly no details on new issues concerning the control of supplies, such as "dual-use" technologies, heavy-water production, and advanced uranium enrichment technologies. For a book on nuclear supply issues, these are serious lapses.

Similarly, despite excellent but brief overviews by Charles Van Doren and Joseph Nye, which point out some of the policy complexities of nuclear supply issues, and a thoughtful presentation of the nuclear industry's perspective by Myron Kratzer, there is relatively little attempt to develop a theory of supplier controls. Such controls can delay but cannot ultimately prevent indigenous development of nuclear facilities that might contribute to a nuclear weapons program.

Supplier controls therefore have value primarily if they are used to induce prospective recipients to agree to nonproliferation measures such as adherence to the NPT or the Treaty of Tlatelolco. Supplier controls have effectively induced such agreement in numerous cases in the past. Alternatively, supplier controls can force delays in unsafeguarded programs, particularly those involving sensitive technologies. The partial success of concerted efforts by the nuclear suppliers to deny parts to Pakistan's unsafeguarded centrifuge enrichment and reprocessing programs demonstrates that such cooperation can indeed cause delays and thus buy valuable time during which positive political measures or sanctions can be brought to bear.

The intended common theme of *The Nuclear Connection* is "nuclear power's potential linkage to weapons production." Most observers have long rejected the two extreme positions on the relationship between the two: that nuclear power is tantamount to weapons proliferation or that nuclear power has nothing to do with nuclear weapons. The relationship was discussed ad nauseam during the International Nuclear Fuel Cycle Evaluation, and the book adds relatively little to INFCE's conclusions. The book would have been greatly improved by case studies analyzing the countries that are currently thought to pose dangers of proliferation—something INFCE did not do. Such country-specific case studies would demonstrate that in the past 30 years nuclear material and facilities obtained for ostensibly peaceful purposes have contributed directly to known or suspected nuclear weapons programs in certain countries but not to those in other countries; that the existence of legitimate nuclear power programs has sometimes served as a "cover" for the acquisition of other technologies that are intended for nonpeaceful purposes; and that expertise developed in certain nominally peaceful programs (for example, in plutonium handling and chemistry) can be useful in but is not sufficient for the development of a weapons program.

A paper on the commercial prospects of nuclear power by Peter Aver, Marcelo Alonso, and Jack Barkenbus demonstrates a new realization, uncommon as recently as INFCE, that as a result of increased finds of uranium and reductions in demand for it, there is enough uranium to run 1000 reactors of 1000 megawatt electrical output for 50 years. This gives the international community additional time, perhaps several decades, before relatively more dangerous activities such as the reprocessing and recycling of plutonium could be justified on economic grounds.

Several papers and the concluding section argue for international cooperation in spent fuel disposal, such as the return of spent fuel to the fuel supplier or reactor vendor as a nonproliferation measure. As Richard Lester points out in a paper on the "back end" of the fuel cycle, a policy of assisting other countries by taking back their spent fuel could serve nonproliferation goals both directly (by reducing the quantities of plutonium that might otherwise be available in countries of actual or potential concern) and indirectly (by demonstrating tangible alternatives to reprocessing).

The primary difficulty with any take-back scheme is getting the major supplier countries to overcome domestic political difficulties. On this score, the authors seem overly sanguine. The Soviets do take back spent fuel from their Eastern European allies, although to date they have avoided any public pledge that they will do the same with reactors they are supplying to Cuba or Libya. China has recently offered to dispose of up to 4000 metric tons of spent fuel but reportedly for a very high price of \$4500 per kilogram of heavy metal. Getting the U.S. Congress to go along with a spent fuel return policy would be difficult, perhaps impossible, and there would be a number of practical problems to overcome.

Despite these problems, the idea deserves further investigation. A modest take-back program open to all U.S. nuclear customers at commercial rates, with a price advantage to developing countries that are parties to the NPT, could be attractive to some countries and would bolster the NPT by providing a tangible benefit for treaty adherence without excessive cost to the U.S. treasury. A compulsory-return program could be helpful in dealing with a limited number of existing or potential problem cases (such as Taiwan or the Middle East).

Both books reflect the growing recognition of the importance of the "nonproliferation regime." The basic notion, expressed most clearly by Lawrence Scheinman in *The Nuclear Connection*, is that the increasing acceptance of the NPT, the IAEA safeguards system, and other nonproliferation norms creates an international environment that makes further proliferation unacceptable. Though the nonproliferation regime is ultimately no barrier to a nation strongly committed to obtaining nuclear weapons, its development and improvement over the past 15 years are a major reason why the proliferation of openly declared nuclear weapons programs has been far less extensive than was predicted only a few years ago.

Cultivating and improving the current nonproliferation regime are a difficult pro-

cess, and one prone to setbacks. The regime can be hurt, as industry spokespersons in both books point out, by precipitous action imposing onerous restrictions on the nuclear programs of our allies. After all, their restraint and cooperation in matters of nuclear supply are essential to the success of the regime. Certainly, a policy of denial of nuclear supplies to responsible countries willing to accept reasonable safeguards not only will not work, it severely undermines support for the NPT among Third World nations. On the other hand, the regime is equally harmed by injudicious nuclear exports and by supply policies that focus only on the use of the particular equipment and materials supplied, rather than on the intentions of the recipients with respect to making weapons and on their treaty obligations. Such policies effectively tell recipient countries that their access to nuclear materials for peaceful purposes will be the same whether or not they give up the nuclear weapons option.

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The Behaviorist Tradition

The Origins of Behaviorism. American Psychology, 1870–1920. JOHN M. O'DONNELL. New York University Press, New York, 1985. xii, 299 pp. \$40. American Social Experience Series.

If its members' knowledge of esoteric sources delineates an invisible college, then familiarity with John M. O'Donnell's 1979 dissertation on "The Origins of Behaviorism" has separated for the past half decade the sheep (who actively investigate psychology's past) from the goats (who regularly indoctrinate thousands of undergraduates with its mythology through required "history and systems" courses). To be sure, each year several goats transmute themselves into sheep, and the history of psychology is unique among history-of-science specialties in that those professionally identified with the field whose past they investigate do some of the best work. O'Donnell has now revised his dissertation into a book, and one hopes that the revision will greatly increase the transmutation rate. Certainly one can cite no finer recent study of psychology's past, and its more accessible form deserves many readers.

Working within what some have called "the new social history of science," O'Donnell focuses not simply on the narrow history of psychological concepts but on the interplay of individuals, ideas, and institu-

tions, all within a broad context of national and local culture, professional community, and even personal circumstance. He thus presents a richly textured portrait of "American Psychology, 1870–1920" that effectively argues a convincing thesis as to how and why behaviorism came (by the end of World War I) to dominate American psychological thought and practice. In doing so, he goes far beyond earlier accounts, which often equate behaviorism with John B. Watson's pronouncements of 1913, see its origins primarily in terms of internal scientific debates, and typically describe it as an explicit psychological school. In O'Donnell's analysis behaviorism appears as much more and much less: more in that it emerged from concerns about, and had its major influence on, discussions of psychology's purpose and self-definition; and less in that for many psychologists it often remained a vague and unstated scientific ideology. Even from 1900, the work of many psychologists—discussed in a fine chapter entitled "The silent majority"—could be defined as behavioral. But few called themselves behaviorists in Watson's sense. The origin of this phenomenon becomes O'Donnell's subject.

O'Donnell opens by reviewing Wilhelm Wundt's "new psychology," which used experimental methods to give age-old answers to ageless questions. Lying at the edge of his focus, the Wundt industry's latest scholarship remains undigested by O'Donnell, and he portrays the German professor much as his U.S. students did. This portrait, however, shows quite well why Wundtian concerns for consciousness—developed philosophically within a university system that fostered the "research ideal"—meant little to Americans working in universities that had to stress practicality and service. In this O'Donnell emphasizes intellectual and institutional factors equally, and his review of the native American functional tradition rooted in phrenology is especially original. To be sure, he (admittedly) overstates the direct continuity between phrenological and later concerns. But his analysis of the complex interplay of the 1880's and 1890's shows well how all sorts of influences came together to produce an American functional psychology, typically divorced from both the research ideal and philosophical relevance. Here he discusses the national culture's "search for order" and the rise of progressivism calling science to service; the interplay of Darwinian concerns for function with both a practical tradition derived from phrenology and such philosophical views as John Dewey's pragmatic instrumentalism (which in turn reinforced the progressive ideal); the institutional pressure on university administrators to serve their