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Book Reviews

Progress in Nuclear Energy, Series X, Law and Administration, Volume 4, Ed. Jerry L. Weinstein, Pergamon Press (1966). 394 pp. $15.00.

This year will mark the tenth anniversary of the adoption of the Price-Anderson Act, the first effort by any nation to deal with liability for damages to persons and property arising out of the operation of nuclear facilities. Since 1957 the development of comparable legislation, by other nations individually and through the adoption of international conventions, has been extraordinary. In general, comprehensive solutions to the nuclear liability problem have been reached throughout the West. The efforts in this area are now largely devoted to the elaboration and refinement of widely accepted principles of liability, with special attention being directed to specific questions, such as liability for incidents occurring in the course of transportation, and the elimination of some ragged edges that were necessarily produced in a multilateral approach of such dimensions.

The present volume, the fourth in the "Law and Administration" series, contains a number of articles principally concerned with a review of developments in national and international liability legislation occurring since 1962, the date of the publication of the preceding volume in the series. These developments include the Brussels Convention on the liability of nuclear ship operators, the Vienna Convention on civil liability for nuclear damage from land-based facilities, the Paris Supplementary Convention increasing the amount of compensation available under the original Convention, Additional Protocols to the Paris Convention, and the preparation of draft conventions for consideration by the member states of the Pan American Union. Each of these milestones (the texts of which are printed as appendexes to the present volume) is discussed authoritatively by an able commentator, usually a participant in the conferences and negotiations leading up to the convention. Unfortunately, the articles do not make for exciting reading, particularly for non-lawyers, because they deal with the ramifications of relatively simple underlying principles—an area where highly technical legal questions flourish. There is no question, however, of the permanent value of the articles on liability appearing both in this volume and in its predecessor.

Of particular interest and importance in the international liability field is the article on the Vienna Convention written by Karlfritz Wolff, who acted as Executive Secretary of the international conference which gave birth to the Convention. Mr. Wolff points up the fact that certain expected clauses are missing from the Convention, having failed to receive the requisite two-thirds approval, and speculates as to possible conflicting interpretations resulting from the gaps. Also of interest is the article on the Brussels Convention written by Peider Konz, who was Deputy Secretary-General of the 1961-62 Brussels Diplomatic Conference on Maritime Law. Mr. Konz appropriately views the Brussels Convention as indicating the minimum legal guarantees which ship operators and their flag states will have to meet before being allowed to operate in foreign waters; he recognizes, however, that the Convention will remain pretty much a dead letter as long as both the United States and the Soviet Union resist the inclusion of warships in the Convention.

In addition to discussions of international approaches to the liability problem, the present volume includes the texts of legislation adopted in Japan, Italy, Austria, and Spain, and amendments to the legislation adopted in the United Kingdom, in most cases accompanied by an analysis or introductory note by a legal expert in the country involved. The discussions of legislation enacted in Japan and the United Kingdom, written by Shunji Shimoyama and John Trevor, respectively, are particularly helpful; suppliers of nuclear equipment to Japan will necessarily have to take into account the concept of "koi" in assessing the risk of potential liability.

It is noteworthy that almost every country facing the issue has now accepted the principle of absolute liability for nuclear incidents and the "channeling" of all liability to the facility operator. In this context the United States approach in the 1966 amendments to the Price-Anderson Act looks especially clumsy, involving as it does "waivers" of defenses to liability—but only when an "extraordinary" nuclear occurrence is involved—and a continued rejection of the channeling principle despite the Congressional expectation that channeling will, as a practical matter, result.

In addition to questions of liability legislation, a variety of other subjects are discussed in several good articles. Gerald Charnoff, formerly Legal Projects Manager of the Atomic Industrial Forum, has written a first-rate survey of the political and economic considerations underlying the Private Ownership Law enacted by Congress in 1964. The article not only clearly summarizes the considerations dealt with by Congress in the legislation but also sets forth a number of unresolved issues which government and industry will have to meet in the next few years.

Ian Williams, of the Health and Safety Branch of the UK Atomic Energy Authority, has written a very thoughtful article on factors influencing safety regulation. Mr. Williams believes that we may be victims of our own terminology, such as "maximum permissible level," and that safety demands may well have been exaggerated. As Mr. Williams puts it:

> "It is now, in particular cases, fairly easily demonstrable that marginal improvements in safety may be obtained only at prohibitive cost. When, as is often the case, these marginal improvements exist only in the minds of statisticians, or safety measures are superimposed one upon the other and sometimes, therefore, unnaturally strained, the time has come to re-examine from first principles the demands requiring to be satisfied."

Somewhat the same note, in a much lower key, is struck by C. Rogers McCullough in his article dealing with the possibility of phasing-out restrictions on nuclear site selection in favor of engineered safeguards.

Another type of safeguards, those of the IAEA, is dealt with by Paul C. Szasz, a member of the IAEA Secretariat. Mr. Szasz provides a thorough, well-written examination of the international safeguards field, emphasizing the novel solutions attempted in this important area. It is remarkable how much progress has been made in intergovernmental controls on the administrative level in light of the relationship of the problem to the highly charged nuclear proliferation issue.

In summary, Volume 4 of this Law and Administration series continues the important efforts of Pergamon Press to collect the best writing in the nuclear field. The book reflects particular credit on its editor, Jerry L. Weinstein, who also introduces the volume with a fine summary of developments since 1962. Mr. Weinstein died in 1966 at the age of 39. His loss is a very real one to the international atomic energy community.

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Semiconductor Counters for Nuclear Radiations. By G. Dearnaley and D. C. Northrop. 2nd ed. John Wiley and Sons, Publisher (1966). 400 pp. $12.75.

It is roughly 20 years since the introduction of the photomultiplier-plus-phosphor scintillation counter into experimental nuclear physics, and in a few years this combination supplanted gaseous radiation detectors for many applications, while ushering in the era of gamma spectroscopy.

In its turn the preeminence of the scintillation counter is now challenged by a newer device, namely the semiconductor radiation detector. These detectors are basically similar to the old gaseous devices in that they operate by collection of the charge liberated by incident ionizing radiation. For this reason they can perhaps justifiably be regarded as descendants of the gas ionization chamber, and there is some poetic justice in their taking their turn supplanting the scintillation counter.

This history, together with an account of other detection methods, is covered in the first few chapters of the second edition of Dearnaley and Northrop's book, *Semiconductor Counters for Nuclear Radiations*. Later chapters briefly introduce the basic ideas of solid-state physics as they apply to semiconductor counters, while subsequent chapters cover the *p-n* junction counter and its fabrication, associated instrumentation, application to nuclear physics, and radiation damage effects in the detectors themselves.

These topics are much the same as were covered in the first edition of the book, although there have been some rearrangements and additions. Notable among the additions is information on the important topic of lithium-drift germanium detectors, which are revolutionizing the field of gamma spectroscopy by virtue of their high resolution. As was the case with the transition from gaseous to scintillation counters, there exist qualitatively new features of the semiconductor devices which make possible new applications, e.g., position-sensitive detectors giving information on both the energy and position of an incident particle. These and other applications are also briefly discussed.

Unfortunately, however, numbers of obscurities and errors have occurred in the new edition of this useful book. To pick some examples at random, on page 156 it is implied that contouring works purely because of the geometrical increase in the length of the leakage path—this is a misleading explanation; on page 162 it is stated that web silicon is well suited for dE/dX detectors—this is not the case because its thickness uniformity is too poor and it is not available in nonchanneling orientations; on page 75 in discussing the subject of fission-fragment pulse-height defect, the role of channeling is not mentioned; on page 138 in discussing charge collection it is stated that the assumptions and methods used in References 9, 10, and 11 are the same, while not only is this not the case but, indeed, Reference 9 is incorrect. Numerous other examples of this kind were found on only one rapid reading of the book.

In addition to such errors one is left with the impression that while the second edition was in preparation it could have been made more modern in many areas. For instance, much of the electronic instrumentation discussed is now considerably out of date. As an example, on page 215 a schematic diagram of the very first published charge-sensitive preamplifier for semiconductor detectors is given—this piece of vacuum-tube instrumentation must be regarded today as Stone Age electronics and really has no place in a revised up-to-date version of a book on this important subject.

These shortcomings do not negate the value of the book, but rather indicate ways in which it could have been improved. It remains a useful reference work and one of the very few available on this increasingly important subject. In addition, it provides a very comprehensive bibliography which should prove invaluable to anyone wishing to delve more deeply into the subject.

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