OF IMMENSE VALUE, BUT. . .

Title Air Conservation. (The Report of the Air Conservation Commission of the American Association for the Advancement of Science)

Author James P. Dixon (Commission Chairman)

Publisher American Association for the Advancement of Science, 1965

Pages xi + 335

Price $8.00

Reviewer Merril Eisenbud

This report is an outgrowth of a 1960 recommendation of the AAAS Committee on Science in Promotion of Human Welfare which called attention to the need for organized study by scientists of the impact of technological matters on human welfare. The Air Conservation Commission, under the chairmanship of James P. Dixon, President of Antioch College, was formed shortly thereafter in response to this recommendation, and it began work immediately on preparation of this 335-page report.

The Commission consisted of a number of individuals well informed in problems involving environmental health, the basic sciences, and urban affairs. They have produced a document that should prove of immense value as a relatively concise statement of the scientific, sociological, and organizational problems associated with conservation of our atmospheric resources.

From the point of view of the reader of *Nuclear Applications*, it is perhaps somewhat unfortunate that the chapter on "Radioactive Pollution of the Atmosphere" seems to be on a much less solid basis than the chapters concerned with chemical pollution. This chapter does contain a well-balanced discussion of contamination of the atmosphere by radioactive debris from weapons tests, but the portion dealing with contamination by the reactor fuel cycle is not in proper perspective, and fails to present a well-balanced analysis of the public health implications of the kinds and amounts of nuclides released from power reactors now in operation.

The shortcomings of the chapter on "Atmospheric Radioactivity" should not be allowed to detract from the remaining portion of the report that describes the physical chemistry and meteorology of air pollution, and the chemical and biological characteristics of the principal nonradioactive atmospheric contaminants. The extensive literature on sulphur and its compounds, the chemical carcinogens, carbon monoxide, the photochemical reactions, the toxic metals, fluorides, and the economic poisons are summarized in a lucid and well-balanced form. There are also excellent chapters on the legal and organizational problems associated with air-pollution control programs.

The book is intended for the nonspecialist who wants to be informed about the technical factors underlying the enormous problems in air conservation with which communities have suddenly become concerned. This book has, in many respects, accomplished this objective, and, despite the shortcomings noted above, your reviewer recommends this volume as a useful addition to any book shelf on contemporary scientific problems.

Merril Eisenbud is Professor of Environmental Medicine and Director of the Environmental Radiation Laboratory of the Institute of Environmental Medicine at the New York University Medical Center. He has been associated with the atomic energy program since 1947 when he joined the staff of the USAEC's Health and Safety Laboratory. In 1949 he was appointed Director of the Laboratory and in 1957 became Manager of the Atomic Energy Commission's New York Operations Office, a position he held until 1959 when he joined the faculty of the NYU Medical Center. He holds a degree in Electrical Engineering from New York University and an honorary ScD from Fairleigh Dickinson University.

LOST IN TRANSLATION

Title Applied Dosimetry

Authors K. K. Aglintsev, V. M. Vodyukov, A. F. Lyzkov, Vu. V. Sivintsev

Publisher The Chemical Rubber Co.

Pages 235

Price $17.00

Reviewer Gordon L. Brownell

Any discussion of the book *Applied Dosimentry* must be prefaced with comments on the translation and format. Usually, the minor errors arising from the translation and reprinting of a book are only a nuisance. However, the many obvious typographical and grammatical errors appearing in this book are not only a nuisance, but greatly reduce its value. There is scarcely a paragraph that does not contain a sentence having a shade of meaning which could be misleading to the reader, an equation that does not have an error in typesetting, a figure that does not have an extraneous undefined symbol, or a table that does not include some symbol or number which requires further thought. Again and again unfortunate situations arise, as on page 19, where it is stated that the values of the k factor for a few gamma emitters are shown in Table 3. Table 3 then proceeds to show the values of a quantity called P_γ, a symbol previously undefined, but which is presumably the k factor referred to above. In addition, the dimension of P_γ is given as r/hr-mc instead of the correct quantity, cm^2-r/mc-hr. In most cases, someone familiar with the field would have little difficulty with these numerous gaffes; to a beginning student they would appear to be a serious hurdle.

A brief listing of the obvious errors on two facing pages, 16 and 17, of this book will serve to illustrate the magnitude of this difficulty.

1. Equation (16) gives the energy absorbed per cubic centimeter of air exposed to gamma rays of intensity I.

$$E_G = (I - Ie^{-\mu 1})I\frac{\tau+\sigma_\beta}{\mu} I = I(\tau+\sigma_\beta). \quad (16)$$

The brackets around the quantity $\tau+\sigma_\beta/\mu$ have clearly been transmuted into intensity such that it appears to give an I^3 relationship. Obtaining a differential energy absorption by using unit distance is perhaps a questionable procedure, but one that might be done in an elementary text as an illustration to a student.

2. Equation (17) gives the does rate

$$P = E_G = \ldots$$

As the dose rate has been defined in rads/hr and E_G presumably is in some quantity such as ergs/cm^3-sec, this equality would hold true only with a numerical conversion factor.

3. "The dose in rads D_{rad} is related to the dose in roentgens D_r by the formula

$$D_{rad} = \xi D_p."$$

4. Table 1 gives the intensity of a beam of gamma rays. In one column the intensity is correctly expressed as

$$\frac{erg}{cm^2 \times sec},$$

whereas, in another column, the intensity is given in the form

$$\frac{erg}{cm^2 \times sec^{-1}}.$$

Further, the same quantities in different columns are presented in different type form.

Although this brief sampling gives an indication of the problems that an inexperienced reader would have with this book, I would like to quote one paragraph from page 51 in its entirety.

> "The presence of relatively heavy elements in the chloroform dye systems increases the latter's sensitivity to about 60 KeV X-radiation, as a result of photoelectric absorption. To reduce this effect, dosimeters of the above type are screened with a lead filter 0.5 mm. thick. They can be used to record doses in a wide range of energies, with an acceptable accuracy of $\pm 20\%$. On the other hand, the sensitivity to quanta below 80 KeV is low, owing to absorption in the lead filter."

It is clear that some of these problems must have existed in the original text. However, it seems pointless to differentiate between these problems and those arising in the translation. The fact is that the English text of the book *Applied Dosimetry* is not in publishable form and requires sound technical editing. This need not be done by an expert in dosimetry, but it must be done by a person with at least a rudimentary knowledge of technical language and terminology. Indeed, it is quite likely that any reasonably intelligent student could correct most of the obvious technical flaws. In addition, it is quite likely that he could eliminate many obvious grammatical errors such as "to distinguish between the arrival of a beta particle.", "multiplied up very considerably," and "there is a number of reasons."

If one penetrates the translation barrier, one finds the book to be reasonably sound in the limited task it attempts to perform. It is unfortunate there is no preface or flyleaf to inform the reader as to the audience for which the book is designed. The book would scarcely be of value to a practicing health physicist because of the level of presentation and the lack of references (30 in the entire book). However, there is a real need for an elementary text in this field to serve as an introduction to the student, and it may be assumed that this book was originally intended for that purpose. With appropriate editing, the English version could well find such application.

The organization of this book is open to some criticism. For example, the second, third, and fourth chapters, which constitute nearly half of the book, are entitled "Methods of Recording Ionizing Radiation," "Dosimetric Instruments," and "Dosimetric Measurement Techniques." Although the approach in the three chapters is different, there is considerable overlapping of material. Ionization chambers are discussed at least three times with little reference to other presentations. The level of the presentation also differs quite considerably among the chapters. This undoubtedly results from the different styles of the various authors. The two chapters on fundamental principles of dose calculation and radiation shielding are presented at a much higher technical and mathematical level than the other chapters, and they contain quite useful geometrical relationships to aid in dose calculation and shielding. The presentation and general level of material in these chapters would make them very useful as a classroom text although further references would have aided considerably. For example, a table of buildup factors is included without reference to the original calculation.

When one digs into this book, one finds a great deal of useful, highly practical information, and it is obvious that the authors are competent in their fields. It is unfortunately true that there is no good elementary text in the field of radiation dosimetry, and this book, particularly its latter sections, may well be useful in such a course. One can only regret that further editing was not accomplished which would have greatly increased its usefulness.

Gordon L. Brownell is an Associate Professor in Nuclear Engineering at Massachusetts Institute of Technology and head of the Physics Research Laboratory at the Massachusetts General Hospital. He is a co-author with Dr. Hine of Radiation Dosimetry. *He has recently been appointed to the Executive Committee of the Isotopes and Radiation Division of the American Nuclear Society.*