

George Stegeman, fills a need in the field of modern optics. In these volumes both linear and nonlinear interaction of light with matter are treated using the versatile harmonic oscillator model of the atom. In volume 1 various problems in linear physical optics are presented with an eye toward nonlinear and other electro-optic applications. For example, chapter 6 on optical activity provides a very clear physical and mathematical picture of this somewhat tricky subject, and the treatment of scattering—including statistical, Brillouin and Raman scattering—is especially recommended. This work really comes into its own in the second volume. There one finds a nice treatment of nonlinear optics in general, beginning with second harmonic generation, and a careful treatment of the phase matching problem and of such topics as refraction and reflection at a surface. Many applications of nonlinear optics involving cubic nonlinearities, such as optical nonreciprocity, real-time holography, four-wave mixing and phase conjugate optics, are to be found in this volume.

The books contain much background material, derivations of conventional formalisms, and a wealth of references to previous works. Most topics of linear and nonlinear optics are introduced briefly; for details concerning the problems readers are referred to specialized texts and literature. This pair of volumes provides an excellent basis for a graduate level introductory course to classical nonlinear optics, in particular for the experimentally oriented student. In fact, preliminary versions of these volumes have been used for graduate level courses with outstanding success.

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Physics in Medicine and Biology Encyclopedia: Medical Physics, Bioengineering and Biophysics, Volumes 1 and 2.

Edited by T. F. McAlinsh
980 pp. Pergamon, New York, 1986.
ISBN 0-08-026497-2. \$275.00

This encyclopedia of physics in medicine and biology covers many of the same topics found in a three-volume edition (edited by Otto Glasser) that was published in 1944, 1950 and 1960—and is long out of date. A new encyclopedia was badly needed.

This encyclopedia is as much for scientists outside medical physics as for those in it. Medical physicists will find

succinct summaries of many subjects outside their specialty. Physicists, especially those who teach premedical students, will find a treasure of applications of physics in medicine and biology. The simply curious will not be disappointed.

The two volumes contain about 250 short articles on a wide variety of topics, written by about 180 contributors, each a specialist in the field. At the beginning of volume 1 the editor lists the articles under 25 general headings. These include audiology, biophysics, blood, cardiology, computers in medicine, nuclear magnetic resonance, physiological measurements and monitoring (the largest category), radiology and vision. Individual articles are arranged alphabetically, and each contains a list of related articles as well as a bibliography.

The comprehensive index has over 5000 entries that make it easy to track down almost any topic. The only significant lapse I found in the index was the lack of entries for either "magnetic" or "magnetism," despite mentions in several articles dealing with nuclear magnetic resonance imaging.

The editor admits in the preface that a good deal of editing was necessary to make the articles uniformly readable. There are numerous medical terms, all carefully explained. In addition there is a 20-page glossary, which is useful if all you want is the definition of a technical word or medical term. The encyclopedia primarily uses SI units, often without reference to units in common use in the US. It will take a

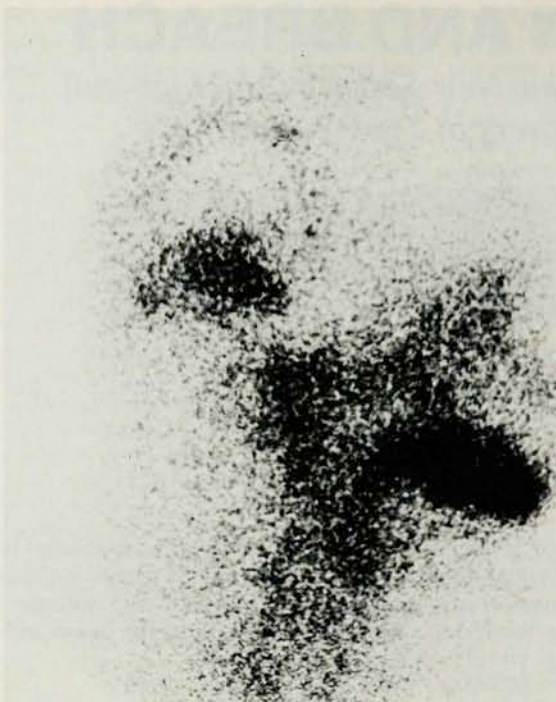
little effort to get used to blood pressure expressed in kPa instead of mm Hg.

The selection of topics for an encyclopedia is a formidable task. With advice from colleagues, the editor has done an excellent job. About one-third of the articles deal with the conventional areas of radiological physics. But there are a few topics that seem inappropriate, such as articles on cancer statistics, dental diagnosis and chemical carcinogenesis. The most significant omission, to me, was the lack of an article on biomagnetism or magneto-biology.

The great majority of authors are from the UK, with many from Scotland. This is not surprising as Tom McAlinsh, the editor, is a medical physicist at the world's largest medical physics group, in the Department of Clinical Physics and Bioengineering in Glasgow, with 90 professional physicists and engineers and 130 medical physics technicians.

The practice of medical physics is much broader in the UK, where each medical school has a department of medical physics, than in the US, where only one medical school has such a department. Members of these physics departments are often involved with applications of physics outside radiology and radiation therapy, the main departments that hire medical physicists in the US.

A serious problem is the cost of the encyclopedia. While the average physicist will not want to spend \$275, all should encourage their libraries to buy it. It will be especially useful in those



Radionuclide imaging reveals, in this scintillation photo, a tumor in the parietal region of the brain. The radioisotope is also clearly present in the submandibular glands in the jaw. The photograph (reproduced by permission of the publisher) appears in the *Physics in Medicine and Biology Encyclopedia*.

libraries that cannot afford a large selection of books dealing with medical physics and biomedical engineering.

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Uncommon Sense

J. Robert Oppenheimer

195 pp. Birkhäuser, Boston, 1984.

ISBN 0-8176-3165-8. \$14.95

Of all the scientists propelled into instant celebrity on 6 August 1945, none achieved more lasting fame than J. Robert Oppenheimer. From that memorable day until his death in 1967, Oppenheimer was the very symbol of the scientist as a public man. Apart from the near-mythic Albert Einstein (and setting aside the problematic case of Edward Teller), Oppenheimer was surely the most famous and influential scientist of his era—and perhaps any era. Denied security clearance by the Atomic Energy Commission in 1954, he rebounded to win the Fermi Prize and a citation from President Johnson nine years later. Yet despite several biographies, published collections of letters, and even television documentaries, he remains an enigmatic figure. Our assessment of his character and motivation remains restlessly unresolved two decades after his death. Mention of his name can still stir the passions of those who knew and worked with him.

Uncommon Sense collects 16 Oppenheimer essays and speeches, from a January 1948 *Foreign Affairs* article to an address at Princeton three months before he died. Half the chapters are speeches published here for the first time. The editorial apparatus consists of a brief biographical appreciation and a listing of the chapters' provenances. Some of the essays and speeches have been heavily edited to fit the format of this work, and all have been retitled—not always helpfully. Chapter 12, for example, here called "A world without war," originated as a 1963 speech whose title, "Communication and comprehension of scientific knowledge," more accurately conveys its theme.

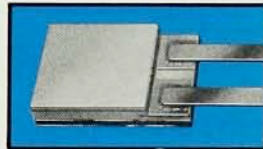
Although directed more to the general reader than to scholars, the collection reveals much about Oppenheimer's intellectual style and the role of seer and sage that he chose (or that society forced upon him) in his years of fame. The essays are for the most part rather abstract, oracular and olympian. The more sweeping pronouncements about society and culture do not always escape the platitudinous. Only rarely does one encounter the specific, the concrete or the personal. (His terse comment on the AEC ordeal in a 1964



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