on "Interface Electronic Circuits." Space limitations prevented him from doing justice to this complex, wide-ranging technical area. Fraden suggests some references; my choice would be the third edition of the *Analog–Digital Conversion Handbook*, edited by Daniel H. Sheingold (Prentice Hall, 1986).

The third part of the book, covering 13 chapters, is organized by type of variable measured. I agree with the author's apparent intent: to try to make the reader aware of the remarkable number of choices that exist. I like his inclusion not only of commercially available versions but also of, as he puts it, devices that "have only been patented and still remain just bright ideas on paper."

Many of us depend on files containing journal articles, trade-magazine clippings and manufacturers' catalogs to help us locate design and performance information on instruments, equipment and devices, including sensors. The PHYSICS TODAY *Buyer's Guide* has helped to bring order and logic to that search-and-find mission. Now Jacob Fraden has produced a valuable, single-volume reference on the devices that bridge the analog and digital worlds. I highly recommend it.

LAWRENCE G. RUBIN
*Massachusetts Institute of Technology*
*Cambridge, Massachusetts*

## The Physics of Three-Dimensional Radiation Therapy, Conformal Radiation Therapy, Radiosurgery and Treatment Planning

**Steve Webb**
*IOP, Philadelphia, 1993.*
*373 pp. $100.00 hc*
*ISBN 0-7503-0247-X*

The American Cancer Society estimates that in 1993, more than 1.1 million Americans were newly diagnosed as having an invasive and potentially life-threatening cancer. In the same year, more than 500 000 Americans died of cancer. With an expected increase of life expectancy in developing societies and an increased exposure of their populations to diets rich in fat and salt as well as to abuse of tobacco and alcohol, cancer will soon be a major health problem in those countries as well.

In the US, radiation therapy is used in the care of over half of all cancer patients, and it contributes in a major way to the benefit of about one-third of all long-term survivors. It can be argued (but not proved) that it is cheaper to cure a cancer patient (with prolongation of life and function), including the costs of death later from another disease, than it is to fail in the initial treatment and pay for the long-term care of a patient who dies of cancer.

Since 1970 contributions to radiation therapy from physicists have included treatment-planning computers, cast cerrobend blocks (for field shaping to provide better definition and delivery of radiation doses) as well as computed tomography and magnetic resonance imaging (for better establishment of the tumor's location and relationship to sensitive normal structures). Although these improvements are not universally employed because of cost, complexity and

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inertia in hospitals and reimbursement agencies, distinct benefits can be related to each of these improvements in radiation therapy. Steve Webb's book *The Physics of Three-Dimensional Radiation Therapy, Conformal Radiation, Therapy Radiosurgery and Treatment Planning*, provides an authoritative, timely and effective review of the next generation of radiation therapy processes and techniques, and it documents the detailed studies and developments that are contributing to that future. The book represents an expansion of a course Webb taught at Royal Marsden Hospital in London.

While most radiation oncologists (including me) and many radiation physicists may have trouble with the mathematics used in the volume, the concepts and principles are well defined and emphasized. This book provides an excellent reference and guide for a course that should be mandatory and is desperately needed to make both radiation oncologists and medical physicists able to recognize and implement the alternative practices and processes described in this skilled, detailed review. The chapter on the use of protons is strong and effective. Except for the probable higher costs of a proton therapy unit, protons would be the modality of choice for many patients. To make an accurate cost determination it will be necessary to compare the total costs per patient treated, as the throughput may be more rapid with the proton unit than with more conventional methods.

Webb stresses the need for clinical evaluation of the benefits of the multiple-element chain of events that makes up "conformal treatment" (which, as Webb describes it, tailors the tumoricidal dose envelope to a target volume and delivers as low-radiation dose as possible to all normal tissues; the high dose "conforms" to the target) to ensure continued funds for research and development and to stimulate widespread implementation of the procedures. Since the cost-benefit ratio of current successful radiation therapy is below that of failure, the additional costs of conformal treatment, if as effective as predicted, will be a very reasonable investment. So far, the money spent for the research and development reviewed by Webb in this book has been modest, if compared to the development cost of any one of the many new and relatively ineffective chemotherapy agents in current use.

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## Invention: The Care and Feeding of Ideas

**Norbert Wiener**
*MIT P., Cambridge, Mass., 1993. 159 pp. $19.95 hc*
*ISBN 0-262-23167-0*

This is an unusual book, being published nearly 40 years after it was written and 30 years after its author's death. Yet it is otherwise typical of a popular book on the sociology or history of science by an amateur sociologist and scientist who achieved greatness for his professional contribution to science itself. Such a book usually first finds a place on coffee tables and then on dusty shelves of second-hand book shops; rarely is one published after the public has forgotten its author.

Norbert Wiener won fame in the 1940s and 1950s for his novel concepts of artificial intelligence (he