

radiopharmaceutical chemistry, and their application to the brain and heart. It is introduced in proper fashion with a chapter by a father of the field, Louis Sokoloff, describing the quantitative autoradiographic basis for the measurements of cerebral circulation and metabolism. PET research is based to a large degree on these autoradiographic studies and techniques.

Chapters on in vitro and in vivo receptor binding autoradiography and the basic principles and instrumentation of quantitative autoradiography give more than enough information and provide a background for the chapters on PET that follow. Sections on PET instrumentation and quantitation, tracer kinetic modeling and parameter estimation, and positron radiopharmaceutical production and chemistry lead into the two final chapters. In this final section, the physiological and biochemical measurements, for which PET and its array of radiochemicals are heralded, are applied to the brain and heart. For the brain, both normal physiological stimulation and its many neuropathological disorders are treated from the perspective of the metabolic rate of glucose and oxygen, blood flow, and blood volume. The heart chapter is focused on the heart as an organ that can utilize different metabolic substrates, and the coverage of pathology is based on myocardial ischemia and cardiomyopathy. Equal emphasis is given to the brain and the heart. For both organs the basics and the basic science of circulation and metabolism progress toward the application of the PET technique to the quantitative measurement of metabolic rate and circulation in health and disease. A glossary is included to round out this book. The literature is well cited. The organization, choice and depth of topics leave the reader with the impression that this book has been well edited.

This book tells one story and leaves one nagging question. PET is complex; basic science must be dealt with at every level of a PET study. Quantitative PET requires careful attention to many potential pitfalls even with equipment that is commercially available. Where is the PET payoff? PET has not reached its potential of providing definitive and easily administered diagnostic tests. Hints of the payoff are given in the last two chapters and depend on the background of basic knowledge that is presented in the rest of the book. Although beyond the scope of this monograph, the answer to this question appears to be that PET will stimulate the development of technetium radiopharmaceuticals that, with SPECT, will fulfil that potential.

This book is quite obviously from the UCLA school of positron study that goes back to the earliest days of PET. The contributions of this productive group of investigators are highlighted.

The field of PET has matured to the point where a good monograph, or several, should be available. This is one of them. PET has grown and as a result, there are now many centers able to perform PET studies, with others planned or under construction. This book, and perhaps one or two more, would be a must for someone setting up a PET center or reviewing the field from an established laboratory. The specific chapters cover their fields with enough current awareness so that the specialist would be kept interested.

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#### THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION.

*E. R. Tufte. Cheshire, Connecticut, Graphics Press, 1983, 197 pp., \$34.00, cloth*

#### THE ELEMENTS OF GRAPHING DATA.

*W. S. Cleveland. Monterey, California, Wadsworth Advanced Books and Software, 1985, 321 pp., \$27.95, cloth; \$18.95, paper*

The successful communication of numerical data is often in a graphical rather than a tabular form. Creating good graphs is difficult, even for workers in a visually oriented field such as nuclear medicine. These two books present bad examples and their improvements and also guidelines for good graphics.

After flipping through both books, Tufte's *The Visual Display of Quantitative Information* is the more attractive for a thorough reading. The layout is inviting and the figures are fascinating. An 1869 chart by C. J. Minard depicting Napoleon's Russian campaign of 1812 is often used in advertisements for the book. Tufte discusses graphical practice with chapters titled "Graphical Excellence," "Graphical Integrity," and "Sources of Graphical Integrity and Sophistication." Graphical excellence is defined as "that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space." Tufte then decries the quality of graphic presentations in most U. S. popular media and suggests that a contempt for the reader's intelligence and a lack of quantitative skills on the part of those producing the graphics necessarily leads to poor graphics. "Graphical competence demands three quite different skills: the substantive, statistical, and artistic." The second part of the book presents a theory of data graphics with chapter titles, "Data-Ink and Graphical Redesign," "Chartjunk: Vibrations, Grids, and Ducks," "Data-Ink Maximization and Graphical Design," "Multifunctioning Graphical Elements," "Data Density and Small Multiples," and "Aesthetics and Technique in Data Graphical Design." Tufte argues that the ink in a graph should convey information and that extraneous borders, grids, cross-hatching, labels, and decoration should be removed.

Cleveland's *The Elements of Graphing Data* is less eye-catching than Tufte's book, but Cleveland is concerned more narrowly with scientific and technical data. He divides the book into four chapters: an Introduction, "Principles of Graph Construction," "Graphical Methods," and "Graphical Perception." The conclusion of the second chapter is a list of principles covering clarity both of the graph's appearance and the information it conveys, the scaling of the data, and the strategy of graphing data. These two pages would serve well posted above many drafting tables. Cleveland then proceeds to a thorough presentation of methods to implement these principles. Among his more interesting techniques are the use of two-tiered error bars to reflect more realistic confidence intervals for data points and the scatterplot matrix as a means for presenting three and higher dimensions of data on a flat page. The last chapter discusses a number of psychophysical theories and experiments which bear on the perception of graphical techniques. Many approaches, such as representing quantities by areas of objects, prove to be difficult to perceive accurately. The most reliable presentation uses position along a scale.

Cleveland's book is the better book for students and medical illustrators. Its only shortcoming is that a figure and the text

alluding to it rarely fall on the same page. Tufte's book is not so detailed in matters of method, but considers a broader range of graphics and is the better produced of the two. These two books, while clearly similar, are sufficiently different that they usually complement, rather than repeat, each other. While *The Elements of Graphing Data* is excellent for the efficient presentation of graphs, *The Visual Display of Quantitative Information* captures more of the artistic potential of data presentation.

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## Books Received

**Nuclear Medicine Update.** *Chinese American Society of Nuclear Medicine. New York, The Modern Press, 1986, 230 pp*

**NMR in Medicine—The Instrumentation and Clinical Applications.** *S. R. Thomas, R. L. Dixon, Eds. New York, American Institute of Physics, 1986, 595 pp, \$60.00*

**Nuclear Medicine in Clinical Oncology.** *C. Winkler, Ed. New York, Springer-Verlag, 1986, 420 pp, \$90.00*

**High Technology Medicine: Benefits and Burdens.** *B. Jennett. New York, Oxford University Press, 1986, 317 pp, \$14.95*

**The Quality Factor in Radiation Protection.** *ICRU Report 40. Bethesda, ICRU, 1986, 32 pp, \$15.00*

**Cardiac Imaging: New Technologies and Clinical Applications.** *M. N. Kotler, R. M. Steiner. Philadelphia, F. A. Davis Company, 1986, 454 pp, \$85.00*

**Nuclear Cardiac Imaging: Principles and Applications.** *A. S. Iskandrian. Philadelphia, F. A. Davis Company, 1986, 527 pp, \$75.00*

Monterey, Calif.: Wadsworth Advanced Books and Software, 1985. 323p. \$18.95 LC 85-10603. ISBN 0-5340-3730-5. The only negative thing that might be said in connection with this book is that it probably won't be read by even a fraction of the scholars who could benefit significantly from exposure to its content. The Elements of Graphing Data is to graphs what Strunk and White's The Elements of Style is to text; high praise is implied and intended in this parallel. Cleveland's writing style—clear, concise, orderly, authoritative, and commonsensical—suggests that he has more than a passing acquaintance with Strunk and White's classic volume. The publisher has also done well by Cleveland, with attractive, legible type, and a generally well thought out book design.

@inproceedings{Birnbaum1996TheEO, title={The Elements of Graphing Data WS Cleveland}, author={David A. Birnbaum}, year={1996}}. David A. Birnbaum. Published 1996. DOI:10.2307/30141308. View via Publisher. Save to Library. Create Alert. William S. Cleveland, 322 pages. Wadsworth Advanced Books and Software, 1985. Authors. Authors and affiliations. Issei Fujishiro. Book Review. 165 Downloads. This is a preview of subscription content, log in to check access.