

Cross Currents: The Promise of Electromedicine, The Perils of Electropollution. Robert O. Becker, Jeremy P. Tarcher, Inc. Los Angeles, 336 pp, \$19.95.

The biologic effects of electromagnetic (EM) fields have become a "hot" topic among members of industry, the scientific community, and private citizens. No clear answers have yet emerged since much of the available data can, like the economy, be held to support opposing perspectives. *Cross Currents* is a partisan, but logical and well-written introduction to the subject of EM fields and health.

The author, Robert Becker, a father of bioelectronic research, qualifies as an expert in the field. An orthopedic surgeon by training, he pioneered methods of electrically stimulating fracture healing. These efforts carried him to the front lines of a dispute with high medical and economic stakes.

The book is divided into three sections. The first reviews the evolution of research into the relationship between life processes and EM fields. The second describes current and potential applications of EM fields in medical treatment. These range from accepted applications in fracture healing to more controversial topics such as acupuncture and electrotherapy. The third, and most detailed, section discusses the biologic effects of natural and man-made EM fields. A very interesting chapter describes the phenomenon of cyclotron resonance, which could explain how EM fields alter membrane transport processes and thus affect human physiology. Becker is convinced that these fields are dangerous and bear some responsibility for the current patterns of disease in our civilized society. The book becomes practical as it discusses ways of measuring EM fields in the home and methods of decreasing personal exposure. These fields range from the obvious and colossal to the trivial and, surprisingly, from electric power lines to electric mixers.

This is not a highly technical book and is easily accessible to the educated layman. The book leaves the reader with a sense of curiosity about the man-made

"sea" of energy surrounding him. Most people have been born into this environment and, thus, lack a true perspective on it. Since specialized instruments are usually required to detect EM fields, cause-effect associations are rarely obvious. Becker suggests that the technical wizardry of electromagnetic applications has far outpaced both knowledge of and interest in their biologic effects. He argues that economic and political conflicts of interest have impeded impartial scientific investigation.

The book may disappoint those looking for a critical or technical review of the literature. It is, however, an excellent introduction for those new to the issue. Other detailed sources of information include Paul Brodeur's 1989 *New Yorker* series, the August 1990 review in *IEEE Spectrum*, Jerry Beers' 1989 review in *Magnetic Resonance Imaging*, and the September 1990 articles in *Science*.

Becker's opening quotation from Roger Bacon imparts the flavor of his message: "Since the days of revelation, in fact, the same four corrupting errors have been made over and over again: submission to faulty and unworthy authority; submission to what it was customary to believe; submission to the prejudices of the mob; and worst of all, concealment of ignorance by a false show of unheld knowledge, for no better reason than pride."

This book deserves a place on the reading lists of many physicians, particularly those involved in imaging. It requires some open-mindedness from the reader and asks more questions than it gives answers. The questions, however, cannot be ignored and the answers may be a long time in coming.

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Envisioning Information

Edward R. Tufte, Graphic Press,
Cheshire, CT, 126 pp, \$48.

"The hurrieder I go, the behinder I get..."

Sift, sift, sift. There is so much for us to weed through each day that poorly presented information is a liability. High technical quality and stultifying volume means that data-sorting skills are ever more important. Desktops become electronic publishing houses, and the PC/laser printer combination spews out publication-quality graphics 100 times faster than any artist could.

"But there *are* principles of graphic communication," says Edward Tufte, in his sequel to the famous *The Visual Display of Quantitative Information*, which bear thought. Tufte's quiet voice asks the same questions about which all readers (especially scientific) should be thinking. "What is the data/context ratio? 'How has 'chartjunk' and systematic distortion been used? What is the data-ink/total-ink ratio? What will he show me next?," the reader asks as each refreshing point is illustrated. Across culture, across purpose (newsprint, train schedule, advertising, journals), across time, and across media, a coherent view of communication efficiency emerges. Once the box is open, one finds oneself unable to view graphic data uncritically. And the enormity of the manipulating sinks in: no bureau of propaganda could organize this effectively.

To illustrate the beauty and intuitiveness of what Tufte calls histogram macro-design, coupled to observer-directed micro-design, he selects the Vietnam memorial in Washington, DC. The memorial "... achieves its visual and emotional strength by means of macro/micro design. From a distance the entire collection of names of 58,000 dead soldiers arrayed on black granite yields a visual measure of what 58,000 means, as the letters blur into a gray shape, culminating to the final toll. When a viewer approaches, these shapes resolve into individual names. Some of the living seek the name of a particular soldier in a personal micro-reading; more than a few visitors here touch the etched, textured names. We focus on the tragic information; absent are the big porticoes, steps and stairs, and other marble paraphernalia usually attached to grand official monuments. Walking on a slight grade downward (approaching either side), our first close reading is of panels