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The Media Lab: Inventing the Future at M.I.T. FREE

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some limited attention is paid to the problems associated with the generation and testing of pseudo-random variants. The concept of variance reduction is introduced by the use of control variants, but other techniques are not mentioned.

Both volumes are oriented toward graphical output. Graphical techniques are introduced early in Part 1, and are used extensively throughout the remainder of the texts.

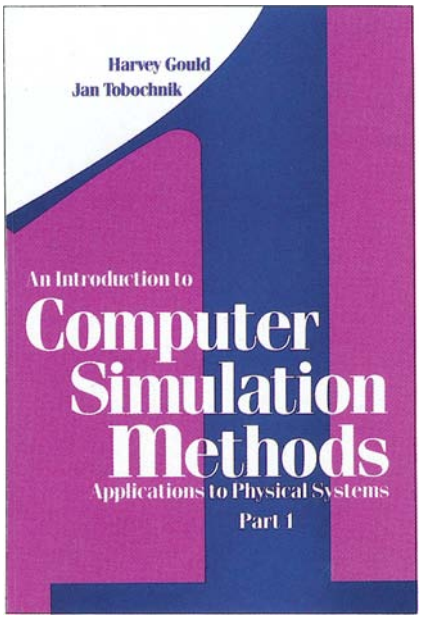
Despite the general success of the presentation, these books may cause problems when used as texts for courses which extend beyond the relatively narrow bounds for which they were designed. For example, the emphasis on graphical output and encouragement toward the use of microcomputers inevitably led to the choice of a dialect of BASIC as the primary language. Despite its many sterling virtues, True BASIC is not so well supported in the marketplace as other BASIC dialects, and therefore probably will be less accessible to students unless supplied in a laboratory environment. Fortunately, when treated as an algorithmic language, True BASIC is readily translatable into almost any other commonly used language; so the choice may be inconvenient, but certainly is not 'lethal.'

On a more serious note, the books do not lend themselves to self-study. Because of the laudable emphasis on 'learning by doing,' the texts raise questions which the student is expected to answer by direct experimentation with the program; therefore answers are never provided. While a student will obtain correct results from a correct program modification, an individual has no way of checking those results unless the instructor is readily available.

Treated as programming texts, there are other problems. In particular: True BASIC may not be the best choice of a first language for students embarking on a scientific career. Also, little attention is paid to questions of program design. The student is shown examples of successful design, but the discussion of the program design process is minimal; so a beginner often might not understand why a specific option is preferable is a specific situation.

The numerical methods techniques introduced are more than adequate for the stated purpose, but are sufficiently limited that the books would need to be supplemented before they could be used as a numerical methods textbook.

Finally, despite the emphasis on simulation in the title, Part 1 deals almost exclusively with computational physics techniques applied to problems for which analytic solutions already exist. While these techniques must be introduced before the simulation of more complex systems can



be considered, the student is never encouraged to consider a choice between theoretical analysis and simulation. Without careful complementary instruction, many students will come away from the course with the impression that all physics problems should be solved computationally, and that analytic theory is superfluous.

On a more abstract level, no consideration is given to the verification of simulation results in situations where no analytic analogs or experimental results exist. If the results 'look right' they often are presumed to be correct without further investigation. Attention is centered on the presentation of successful programs, not on how one would develop such a program for a real problem. The books give no indication that the development of a logically correct and functioning computer program does not guarantee a physically correct simulation. Validation (debugging) and verification are never presented as complementary steps in simulation design.

Despite the stated limitations, which may preclude the use of these books as a primary textbook of simulation, they are a valuable addition to the rapidly developing literature of simulation. They are designed to address a limited set of objectives, and do so successfully.

When used intelligently, these books will provide many useful ideas to anyone who believes with the authors that "Computer simulation is now an integral part of contemporary basic and applied science and is approaching a role equal in importance to the traditional experimental and theoretical approaches." The reviewer supports this position and recommends the books.

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The Media Lab:
Inventing the Future at M.I.T.
Stewart Brand
285 pp., Viking Penguin Inc.,
New York, 1987. $20.00

Reviewed by R.E. Crandall

The underlying credo of M.I.T.'s Media Laboratory—essentially that of founder and director Nicholas Negroponte—is that communications technology is "poised for redefinition." The Media Lab's ambitious purpose is to lead that process, or as intimated in Stewart Brand's chronicle of the Lab's ongoing work, to invent the requisite media future. Since its founding in 1985, the Media Lab's staff of some 120 scientists and researchers in Cambridge, Mass., have been endeavoring to apply new technology to enhance or create tomorrow's versions of newspapers, television, sound recordings, desktop workstations, and other communications media.

The Media Lab is a well-written, and at times appropriately witty,

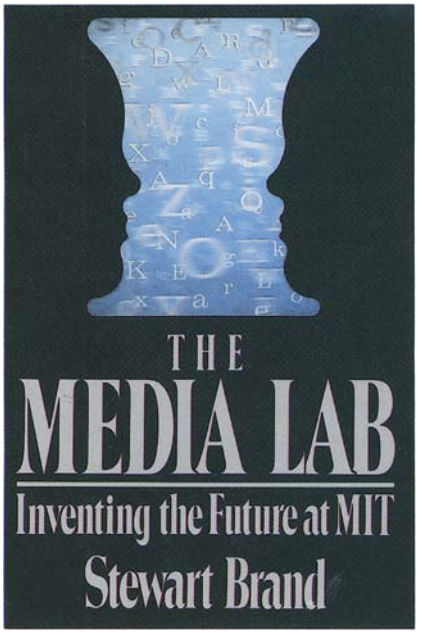
description of this glamorous research. In spite of some questionable stylistic and thematic directions the book is a good choice for any scientist who harbors an interest in media related technology. Any physicist, for example, who is concerned with the pedagogical presentation of natural phenomena, communications theory, earth sciences, acoustics, optics, holography, electronics, physiology, or advanced computer processing of images will find entertaining and fertile ideas in *The Media Lab*.

In 1968 Brand created one of the original user-friendly documents: the *Whole Earth Catalog*. In keeping with this heritage he does a masterly job of rapidly but gently coaxing the reader to adapt to the mindset of Media Lab personnel. It is pleasant to read these opening sections. The text is absolutely accessible to the lay reader, and Brand is scientifically accurate. He has a knack for isolating the key scientific words to emphasize. Readers of journals will feel properly directed to other topics, just as if Brand's key words were subject-classification abbreviations. Students also may benefit from such reading, as they see that people are doing heady, though mostly cosmetic, things with feedback, holograms, light-emitting diodes, and so on.

After the opening chapters, the rest of Part One, which is entitled "The World of the Media Lab," settles into a consistently interesting sequence of research descriptions. Part Two, "The Media Lab of the World," is an attempt by Brand to invert the emphasis of Part One. Part Two amounts to a somewhat dubious attempt to justify the Lab's self-proclaimed capacity as the harbinger of media revolution. In the last third of the book, Brand concentrates on such topics as the economics of information and the ecology of communication.

The book is more anecdotal than scientific. In terms of conventional scholarship the reader should not expect to learn anything really new. However, it is Brand's very anecdotal style that gives the book a distinct pedagogical value. *The Media Lab* is comprised of subplots, each centered around a charismatic personality, that may well enrich the understanding of teachers and researchers. One brief but welcome section—at the same time one of the least flashy—describes the precise manner in which the Lab's $6 million budget for 1986-87 was allocated. It is wonderful to see how the charismatic inhabitants of the wild Lab environment still have their allocation imperatives and well-planned goals. These budgetary disclosures serve to remind us that researchers of all affiliations must ultimately root their work in the soil of parent institutions and that scientific accountability creeps into even the most exorbitant research programs.

There are peculiarities of style



and intent that this reviewer finds difficult to accommodate. One problem that will discourage some readers is Brand's evident penchant for name-dropping. A related phenomenon is the book's overpopulation of "visionaries." It is as if conventional research facilities are to be evaluated by their results, while the Media Lab is to be evaluated by its roster, or even its visitor's sign-in book. Still, not all of this is Brand's fault. If one can judge from the numerous quotes and asides, it seems that Media Lab personnel are collectively anxious about their historical importance.

Then there is what some may take to be an epistemological failure of the book: do we really want the Media Lab to meddle at all with the future? And if so, along what guidelines? Brand concentrates only on whether Lab ideas are sufficiently radical and gaudy, rather than whether the world needs the Lab in the first place. In these respects the book is a kind of solicitation for artificial intelligence (A.I.) funding. Actually, this reviewer believes A.I. efforts generally deserve strong monetary support. The problem is that Brand evidently believes that the radical nature of the Media Lab automatically renders its operations wholesome and beneficial.

But the glitter of *The Media Lab* has its appropriate, even its pragmatic side. Readers will be moved by the fine white-light hologram on the book's cover, credited to Stephen Benton and the Lab's Spatial Imaging Group. Inside the book, the photos of researchers at work at the Lab are informative and helpful. Students, teachers, and technical workers alike will appreciate Brand's accurate reporting. For example, his section on the evolution of the Apple Macintosh computer from its Xerox PARC origins seems to this reviewer one of the few reliable renditions available.

The Media Lab is recommended highly for any scientist or aspiring scientist interested in the full path leading from theory to implementation of new communications media. All readers will benefit from the manner in which Brand safely steers us past the hairpin turns on that complicated and controversial road.

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COMPUTATIONAL SCIENCE

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