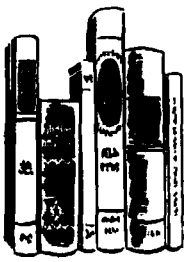

books reviewed

Basic Motion Picture Technology

By L. Bernard Happé. Published (1971) by Hastings House Publishers, Inc., 10 E. 40 St., New York, NY 10016. 362 + x pp. Illus. Diagrams. 6 by 9 in. Price $10.

Mr Happé has attempted the monumental task of presenting the basic technology of motion-picture production in simple readable form to the general reader and student. He has succeeded, in admirable fashion, in achieving this goal.

The scale of this task is apparent in the index which notes sections dealing with history, basic photography, photographic image characteristics, picture and sound recording, studio production support services, processing and presentation systems. The various techniques are adequately and in many cases ingeniously illustrated. I am sure that the author would have used color plates in three or four places to simplify some of the concepts had this been feasible.

This book, because of its scope, must be assessed as one organic unit. It would be a disservice to the author to compare the details in one chapter to that relating to a totally different operation in the next. The concise organization of the material is revealed when one selects sections at random and finds that they require no detailed appreciation of foregoing chapters to be understood clearly.

It has been said that a good technical book tells the reader only what the author wishes him to remember, not everything the author knows. Through careful and selective editing, Mr Happé appears to have met his specification successfully.

This book is simple, readable and up-to-date. It is not intended for the specialist but should prove most useful to students in film making and those general readers who like to be well informed on how things are done. — *Gerald G. Graham*, National Film Board of Canada, P.O. Box 6100, Montreal 101, P.Q.

Visual Perception

By Tom N. Cornsweet. Published (1970) by Academic Press, 111 Fifth Ave. New York, NY 10003. 475 + xiii pp. Illus. Diagrams, 7 by 10 in. Price $15.00.

Visual perception by the ultimate spectator is one of the two essential final elements (it shares this with auditory perception) of motion pictures and of television. Many characteristics and processes of visual perception have long been puzzling to the cinematographer and, more deeply, to the optical scientist and psychologist. In recent years great progress has been made in the study of this field, but there is still a great deal that is not understood.

A book on the subect is therefore most welcome. This particular volume, it must be said, is quite restrained in its aims, which are narrower than the title might suggest. The author in his preface says, "I have restricted the coverage to only two kinds of topics, those for which there is a widely accepted explanation at the present time, and those for which I can imagine one or more plausible explanations . . . I have excluded many topics because . . . I do not know enough about them to explain them plausibly." The author further says, "This is not a reference work; rather, it is aimed at developing an understanding of visual perception." Thus some topics are not described or even mentioned unless some kind of explanation is forthcoming. Among important missing items are those of color blindness in its usual meaning (of three or more types) and their characteristic lines of constant chromaticity, and stereoscopic or three-dimensional perception.

The treatment is generally unconventional. Thus light energy is measured in terms of light quanta rather than luminous flux. This has a number of advantages in several places. It does mean, however, that the reader has trouble in identifying the shapes of plots with those that he has repeatedly seen heretofore. Further, the author lays much emphasis on the information content of the luminous radiation. Thus he considers the possible matching of specific colors by a variety of physical wavelength compositions (metamerism) to be a form of universal color blindness because it represents a loss of the information of the actual physical composition. He discusses this to the exclusion of the more usual meaning of color blindness.

The author looks slightly askance at the CIE system, saying it "was developed primarily to . . . enable manufacturers of paints, fabrics, etc., to specify and communicate the colors of their products (and) to be convenient to use, rather than be consistent with any particular physiological data," and, "with a lot of brain work and luck, the logic of the CIE system may reveal itself" to the reader. He tends to overlook its use in classifying and quantitatively describing experimental visual phenomena.

The author gives a rather fuller discussion than usual of the elaborate interconnections in the retina between the various sensitive receptors, the rods and cones. Some of these connections are additive, but many are subtractive or inhibitive, and some are neural feedbacks on the same receptor. He suggests these interconnections as explanations (with detailed discussions) of such effects as the logarithmic response of Weber's law; and the observed higher perceptive sensitivity to image change and to motion, rather than to the static picture — especially to some very fixed static pictures such as vein configurations in the retina. These neural interconnections seem so extensive that the reader begins to wonder, where they interconnect between cones sensitive to different colors, how color perception can be so simple and so uniform in most of the population, as indicated by experience with the CIE data (even the 1964 data). This is especially so when the physical

interconnections appear so unsystematic as they are shown in views of the retinal cross-sections by Dowling and Boycott, and by Polyak. The interconnections must be more systematic than they initially appear.

The author suggests some interesting speculations on pattern recognition. The reader can be dismayed, however, at the extensive system of cross-connections that this presupposes in the brain, even for the recognition of mere straight lines. He would hope, possibly vainly, that more study would later show the actual mechanism to be more economical of components.

The book will be chiefly of use to those who are interested in keeping aware of the new and fresh thoughts on the subject of visual perception, partly as it affects their activities in fields that involve visual displays, and partly to satisfy their general understanding of the subject.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido, Long Beach, NY 11561.

Introduction to Electronic Computers (2nd. ed.)

By Gordon B. Davis. Published (1971) by McGraw-Hill Book Co., 330 W. 42 St., New York, NY 10036. 684 + xvi pp. Illus. Diagrams. 7½ by 9 in. Price $12.50.

The author of this book is the Director of the Management Information Systems Research Center of the University of Minnesota; the book itself is intended to be a classroom text as a general introduction to electronic computers. For the practicing motion-picture or television engineer who wants to learn about electronic computers, however, the book must be approached with extreme caution.

The "classic" method of using electronic digital computers, primarily in business and some forms of engineering, is by treating the computer as an extension of a desk calculator, that is, data to be processed are gathered first and then fed through the computer (usually input on punched cards) for an after-the-fact analysis. To be sure, using this classic approach, the computer can perform data manipulations far beyond the capacity of any desk calculator, but the analogy is valid.

For business data, inventory, records management, etc., requirements for computation are "built around" the computer. The computer itself is usually defined as a rather large machine and is typically located in some central place, such as a room or building known as a "comp center."

This reviewer has a "comp center" background and thinks of computers in terms of either comp centers or large centrally located computers. Since many of the applications of computers to the motion-picture and TV engineering activities of animation, editing and special effects use a different type of approach, the reviewer's bias makes the book only marginally useful to a motion-picture or TV engineer.

The book has 19 chapters, 3 appendixes, a glossary and an index. It is organized well enough, presenting (in the first chapter) an overview of electronic computers and (in the second) a discussion of computer uses before starting to discuss the basics. The succeeding chapters discuss binary arithmetic, programing fundamentals, operations, debugging and fundamentals of BASIC, FORTRAN and COBOL languages. Finally, the book discusses computer systems projections and how to evaluate a computer system. But again, this is all done with a strong comp center bias.

Let me try to put this in perspective. For engineering calculations, large comp center computers are used for three purposes: very rapid processing of routine formulas, processing of a highly complex problem, or running a mathematical simulation of a system. (Other uses of a large computer such as a remote timesharing terminal for "real time" responses to routine calculations can be performed by small on-site computers; or even programable desk calculators, in some cases.) Needs that a motion-picture or TV engineer might have for electronic computers (data gathering, measurement, evaluation, control or design) usually are met by minicomputers or medium-sized machines that are either built into systems or that have to interact directly (and immediately) either with the user or the process.

One area of interest to many engineers is that of interactive computer-aided design (CAD). In this method, a designer uses a computer that has a cathode-ray tube (CRT) display and a device called a

"light pen" which is a wand with a photosensor in its tip that is connected to the computer that acts as a feedback device so that the computer can detect what part of the display picure the user is interested in. The light pen is held in contact with the CRT face over the image of interest when in use. This is mentioned in passing in the text, but it is not discussed in detail; a design engineer would consider interactive design a very powerful and important method of using computers, if he knows that it exists as a discipline.

Similarly, and particularly for TV and audio engineering, minicomputers are incorporated into systems for test and calibration. It may cost approximately the same to design a special purpose measuring instrument (say, a device for calibrating a television system) as it would to incorporate a computer into the system; however, because the computer can be reprogramed with relative ease, the computer-based system would be considerably more flexible than the specially built "hard-wired" instrument. This type of use for computers is effectively absent from the introduction.

Admittedly, this book is designed to talk about computers in general, but to the engineer who needs to know about computers that he can use both interactively and economically, the book is of little help.

Indeed, the author refers to a data processing computer as a "small scientific" computer system, presumably because it uses FORTRAN. The true "scientific" computers are those built into instruments (in the case of minicomputers) or connected to many different instruments (in the case of medium scale machines). Such machines are connected to such devices as gas chromatographs, spectrophotometers, photodensitometers, and mass spectrometers. The reason for direct connection is so that data can be presented while the experiment is still under way, which is quite different from an after-the-fact EDP analysis.

The author makes no distinction between general purpose computers (ones that can be reprogramed easily by the user) and special purpose computers (those whose reprograming requires at least partial mechanical disassembly, usually performed by the manufacturer). Missile guidance and control are listed among the uses of computers, but these are special purpose devices. Also, in his "uses" discussion, he mentions using computers for medical diagnosis through use of a comparison method (that is, the doctor enters the symptoms he detects into a computer, which compares these symptoms with all those in its memory and prints out the entire list of possible diagnoses); in many installations, computers are now interfaced directly to laboratory instruments (such as blood serum AutoAnalyzers) to make the initial tests, and they also interview the patients to obtain a medical history for the doctor. (This is rather the reverse of what the author had in mind.)

Probably the majority of computers used in TV and film editing, in animation and in special effects are minicomputers. These are interfaced directly to motors, sensors and converters (analog-to-digital converters for input; digital-to-analog for some output), yet the author dismisses them in three sentences in the first chapter — none concerned with engineering — mentions them once under the "uses" discussion, and rather ignores them until the last chapter where he discusses using them in conjunction with large computers in a system (called a "hierarchical system" by computer manufacturers and users). As a consequence, those points of interest to a motion-picture or TV engineer, such as proper interfacing considerations, system costs and design approaches, are not touched upon.

From the standpoint of general background information on electronic computers, the third through the seventh chapters of the book are most valuable, though still best viewed keeping the author's comp center bias in mind. Because of the book's structure, these chapters can almost be read by themselves as separate "booklets." Probably the best individual item for the engineer who is contemplating the acquisition of a computer is the discussion of comparing computer performances via throughput (pp. 619–620), which applies to computers of all sizes and for most varieties of use.—*Stephen A. Kallis, Jr.*, Consultant, 112 Central St., Acton, MA 01720

Active Filters: Lumped, Distributed, Integrated, Digital, and Parametric

Lawrence P. Huelsman, Ed. Published (1970) by McGraw-Hill Book Co., 330 W. 42 St., New York, NY 10036. 372 + xi pp. Illus. Diagrams, 6 by 9 in. Price $16.50.

The design of filters for electrical circuits has undergone a complete change in the last few decades. Printed circuits have placed a premium upon the use of resistors and capacitors as against bulky and heavy inductances. Integrated circuits have enabled the losses inherent in resistor-capacitor (RC) networks to be made up by including active elements in the chip structure. Thus, although the broad principles remain the same, the detailed design represents a radical transformation.

The present book has contributions by a number of author-specialists and has been collected and supervised by an overall editor. The subjects considered are not only the usual or analog signal filters, but include computer-type or digital filters to handle sampled or digital data such as occur in computer operations, gyrator circuits, and parametric amplifiers. "Gyrators" are RC circuits that, with the inclusion of negative impedance converters (also RC), simulate circuits that include inductances. Parametric amplifiers are various types of amplifiers that incorporate modulator or frequency change operations within them.

The treatment is fairly complete, including some notes on the incorporation of the elements to form integrated packages. However, as in the case of any network design problems, the reader must be prepared for a fairly stiff mathematical discussion. The dust cover notes, regarding the book, "Suitable as a text in graduate modern filter theory courses, this text will also be valuable as a reference for electrical engineers." — *Pierre Mertz*, Consultant, 66 Leamington St., Lido, Long Beach, NY.