

Ando will succeed Dr. Mitsui as President of Canon U.S.A. with headquarters at 64-10 Queens Blvd., Woodside, NY 11377.

Richard Blum has been appointed Assistant General Manager of Reela Film Laboratories, Inc., a subsidiary of Wometco Enterprises, Inc., 306 North Miami Ave., Miami, FL 33128. He was formerly Executive Vice-President of Perceptual Development Laboratories, St. Louis, MO.



books reviewed

Variational Calculus in Science and Engineering

By Marvin J. Furray. Published (1968) by McGraw-Hill Book Co., 330 W. 42 St., New York, NY 10036. 222 pp. incl. index. Diagrams. 6 by 9 in. Price \$14.95.

Modern technological development is demanding more and more from designers of systems and equipment in the way of

performance, low cost and reduced bulk. This pushes forward the need of optimizing techniques as an important factor in the designs. And the optimization is requiring increasing mathematical sophistication on the part of the designer. The simple maximum and minimum techniques consider the case of finding an extreme in a given function as one or more specific variables are changed, each over a range. The technique becomes the calculus of variations when the courses of functions themselves are changed rather than simple variables, in order to obtain an extreme in some specified quantity. Thus, to take one of the more obvious problems, the functional shape of the boundary of fixed length which circumscribes the largest plane area can be determined to be that describing a circle.

The author notes in a preface, "In his quest for additional understanding of this subject and to enhance his ability to read current articles the student usually turns to mathematics books on the variational calculus. . . . Texts in this area are difficult to absorb, particularly by the average nonmathematician. This book is written in the hope that it will make the subject more palatable without sacrifice of rigor. Methods will be developed and extensively illustrated with worked examples."

The author develops the subject in eight chapters of progressively increasing difficulty. The reader can expect that in spite of the care in writing, study of the material will require fairly close concentration.

The numerous examples presented, in order to keep the treatment simple, cover principally problems in geometry, mechanics and vibration, with a few in optics — such as the determination of Snell's law from the minimum travel-time principle of Fermat. The reader will note the citation of names of many famous mathematicians and the discussion of their traditional methods of attack on thorny problems. But he will also note that in general these are not likely to be his own problems. Thus his initiative will be required in the task of formulating his problems in such a fashion that he can apply the traditional methods or some derivative of them to their solution. That is of course the expected task of the mathematical engineer or scientist. The book can also be used as a reference work to look up what some famous mathematician's method or principle or law in this field may be — inasmuch as such a goodly number of these are cited and in part discussed. The names run from Courant, Euler, Hilbert, to Rayleigh, Ritz, Timoshenko, and many others.

As can be deduced from these comments, the book will principally be of value to the somewhat mathematically inclined engineer who wishes to refine and systematize his methods of optimizing designs, and better to understand these methods. It will not usually solve his problems directly, but will suggest possibilities on how they might be attacked.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido, Long Beach, NY 11561.

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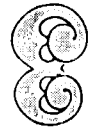
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Perspective World Report of the Photographic Industries, Technologies and Science

Ed. L. A. Mannheim. Published (1968) Focal Press Ltd., 31 Fitzroy Square, London, W.1, England. 440 pp. Illus. Diagrams. Tables 7 by 10 in. Price £7, 7s.

This book is a compact source of information and an easy-to-use reference book which presents the results of many worldwide surveys on progress in the photographic arts. A great deal of comparative data on various aspects of international trade is shown in the form of tables on photographic materials and products. Lists of books on photographic science and technology are also included. The surveys

cover a period of two or three years so that the findings can be arranged in proper perspective to permit assessment of any new trend.

Five sections cover: I. The Photographic Industry and Trade; II. The Photographic Product; III. Applied Photography; IV. Photographic Research and Theory; V. Publications, Associations and Conferences. Each section contains several chapters.

A chapter in Section V examines patents issued in 1967. The author of the chapter, "Patents in 1967," D. H. O. John, notes that a study of patent literature "... is frustrating because it is incomplete, as patentees (especially the bigger companies) do their utmost to camouflage

their intentions..." The survey shows that of 1,063 photographic patents, 543 originated in the United States, 225 in Great Britain, 153 in Germany and 142 in other countries of the world. Eastman Kodak (United States and Great Britain) was assigned 134 patents in 1967. Next in line was Agfa (Germany, Belgium, Holland) with 119 patents.

The book contains references to practically all aspects of photography, including chapters on Holography, Medical Photography, Electronic Monitoring in Motion Picture Production, Colour Television and Television in Medicine.

The chapters in each section are contributed by specialists in that particular subject. *Perspective World Report* is certainly an important reference and source of information for scientists, students and executives.—*Edit.*

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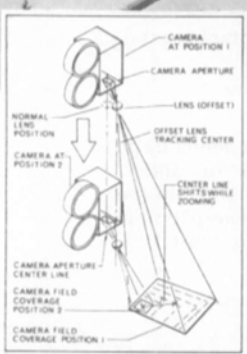
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Applied Optics and Optical Engineering:

Vol. IV, Optical Instruments, Part I

Ed. Rudolf Kingslake. Published (1967) by Academic Press, Inc., 111 Fifth Ave., New York, NY 10003. 396 pp. Illus. Diagrams, 6 by 9 in. Price \$16.00.

The latest volume of this Optical Engineering series shares with the next and last volume the field of Optical Instruments — too broad a field to be covered in one binding. The Preface, as in each previous volume, outlines the general objective of the series: "There is great need for readily available information on the design, testing and use of optical equipment, and for data on currently available apparatus. . . . It is hoped that these volumes will provide information on many aspects of applied optics which may be obscure to an engineer called upon to design some piece of apparatus in which optical instruments have an important place."

There are twelve contributors to this volume, with each preeminent in his subject. In spite of the small compass of less than 400 pages for the vast field, the treatment gives a reasonable and authoritative bird's-eye view of the subject-matter involved, with occasional details of specific apparatus — as many as can be included. But the self-study reader will require much supplementary consultation in most situations; to help him, copious references are given.

The general subjects covered are Fiber Optics, Microscopes, Camera Shutters, Still Cameras, Microfilm Equipment, High-Speed Photography, Optical Workshop Instruments, Radiometry, Interferometers, and Refractometry. To give a notion of the condensation, the longest chapters are on Microscopes (63 pages) and Interferometers (54 pages).

Only three of the chapters will be particularly noted here. That on shutters covers the standard between-the-lens shutters, including the moderately high-speed type with reversing blades replaced by continuous rotating ones with separate edges for opening and closing. It includes operation with the various flashlamps and, further, focal plane shutters and lou-

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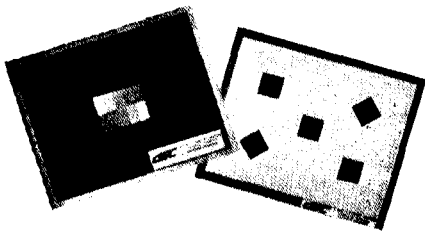
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ver shutters. The ultra-high-speed-shutters are described under high-speed photography.

The chapter on still cameras covers briefly the usual amateur cameras and accessories, aerial and mapping cameras and panoramic cameras. Auxiliary equipment is also mentioned. Motion-picture cameras are scheduled to be covered in Volume V.

High-speed photography is treated in 32 pages. Beyond an introduction, it covers 14 topics, grouped under "methods for obtaining short-duration exposures," "methods for frame separation," and "instrument selection." This gives an average of only some two and a half pages per topic, which is really brief for this type of subject material. It runs from mechanical shutters and pulsed electron image tubes to optical image dissectors and laser techniques.

In spite of this great emphasis on condensation, it must be said that the book constitutes a fascinating and expert review of the wide range of optical instrumentation which has been introduced into our technical civilization, and explains how optical instrumentation has helped us to understand and master our environment through the use of light and our eyes. The book will be of general interest and consulting use to engineers involved in the technical employment of optical devices.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido, Long Beach, L.I., NY 11561.

Conic Mirrors

By H. P. Brueggemann. Published (1968) by Focal Press, Inc, 20 E. 46 St., New York, NY 10017. 132 pp. Diagrams. 7 by 9 in. Price \$21.75.

Workers designing conic-mirror optics or assessing the performance of conic-mirror optics should find this book helpful. As the author says, the enlarged spectral range opened by rocketry has forced a new look at all reflective systems to see if they can meet the new instrumentation demands. The purpose stated in the introduction and admirably carried out in the following chapters is to analyze conic mirrors mathematically, "as applied to wide-field and broad-band systems. Fields of view of 3π steradians and greater will be investigated, as well as systems for x-ray imaging, and the standard and modified Cassegrains which are proving useful in the deep infrared. The material is oriented to the optical engineer, but the amateur or the technical-minded layman should not find the subject matter difficult to follow." In addition to discussing conic mirrors in general, Mr. Brueggemann describes a specific practical design, introduced to bear out his claim that a system of conic mirrors can be free of monochromatic aberrations over any field of view at the designer's discretion.

In the opening sections he lays down his ground rules, emphasizing the importance of choosing coordinate systems and parameters in a way that makes conic-mirror analytic expressions easy to handle, even in multi-mirror systems. For most of the functions, he develops exact analytic expressions. When he uses ap-

proximate expressions, he states the limitations. Since no astigmatism can be tolerated in wide-field mirror systems, he begins by proving that the only anastigmatic mirror is a conic of revolution. Then he sets forth the conventions and definitions to be used throughout the book and discusses other properties of conics that are optically useful. In addition he gives numerous helpful trigonometrical relationships written with the symbols used in the text.

Three chapters develop the properties of the wide-field conic mirror: field curvature, distortion, and coma and spherical aberration. The field-curvature chapter includes a remarkable photograph made with a 120°-half-angle flat-field camera. The photograph illustrates the practical application of the properties described.

Four chapters, under the general heading "Cassegrain Systems," discuss the narrow-field (and large-aperture) conic-mirror properties: true Cassegrains, modified Cassegrains, deep conic Cassegrains (grazing reflection), and anastigmatic Cassegrains. This section includes a discussion of ways to obtain additional large-aperture correction with refracting elements, as well as shorter discussions of the most popular corrector systems. A plot shows possible combinations of two conics that are free of specified aberrations. The text concludes with four two-conic prescriptions calculated by the procedure developed in this section.

This study's usefulness is helped by its unified treatment of the mathematics of conic-mirror optics, when discussing either classical properties or newly discovered ones. The footnote references direct the reader to many of the significant original papers.—*Berlyn Brixner*, University of California, Los Alamos Scientific Laboratory, Los Alamos, NM 87544.

Kurzzeitphysik (High-Speed Physics)

(Ed.) K. Vollrath and G. Thomer. Published (1967) by Springer-Verlag, Wein, Germany (175 Fifth Ave., New York, NY). 1066 + xxii pp. Illus. Diagrams. 6½ by 9½ in. Price \$75.

Kurzzeitphysik or *High-Speed-Physics* describes the instrumentation and the disciplines of experimental techniques capable of recording physical events occurring in time periods shorter than 1/10 s (the reaction time of human beings) down to 10^{-22} s (the lifetime of elementary particles). This book has 22 authors, and combines 21 different topics: 17 written in German, three in English, and one in French. It is addressed primarily to junior scientists concerned with the multiple facets of measuring high-speed phenomena.

Historically, experimental techniques for measuring high-speed phenomena were first recognized and developed in the field of ballistics. Presently, high-speed techniques have found widespread applications in dynamic photoelasticity, fast chemical reactions and plasma physics. The first eight chapters describe the principles of the various instruments used to measure high-speed phenomena, such as oscilloscopes, high-frequency flash motion-

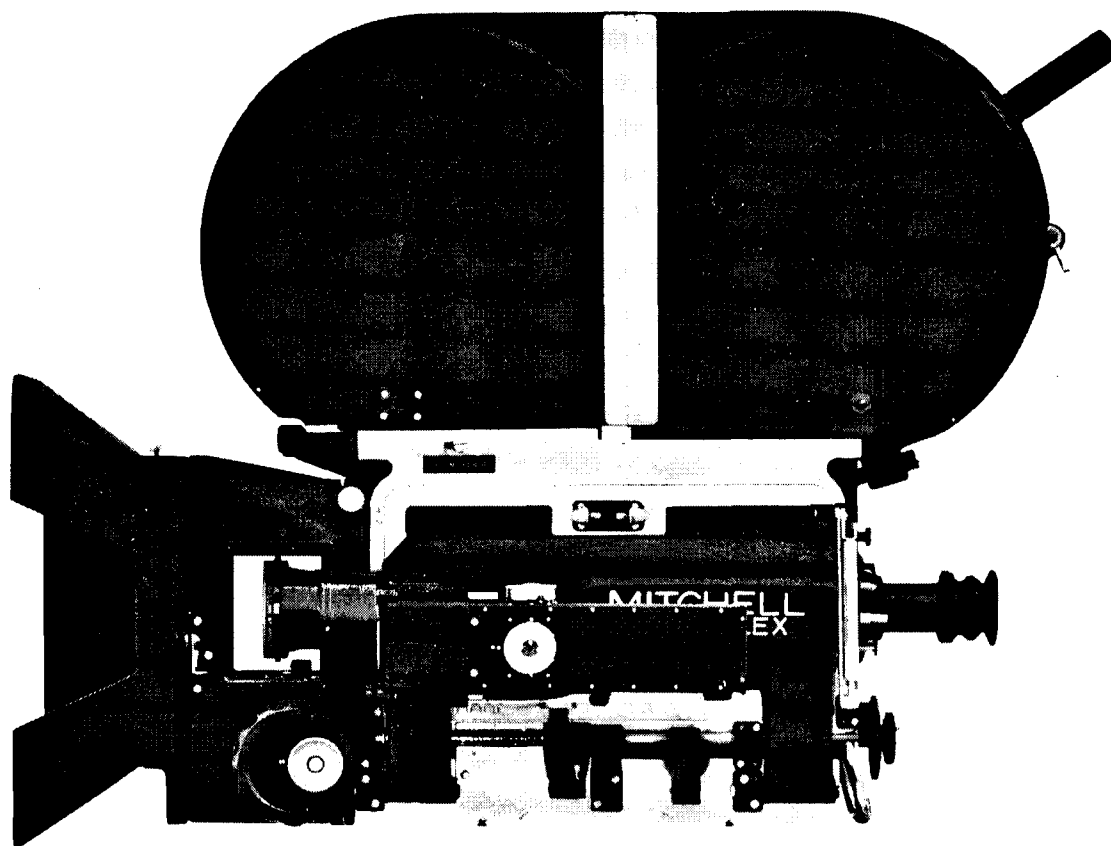
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picture cameras, lasers, electrooptic shutters, x-ray techniques, radio-frequency interferometers, and temperature gauges. K. Vollrath's discussion of spark lights and high frequency flash motion-picture techniques, and W. Muller's article on electrooptic shutters are unparalleled comprehensive treatments of the subject matters. The articles on oscilloscopes, amplifiers, and lasers are quite basic and could have been omitted since more comprehensive treatments are available. The next 13 chapters discuss the disciplines which require the use of high-speed measuring devices. The discussions of fracture modulation through elastic waves, high-speed analysis of fast deformations of metals, dynamic photoelasticity, impact at intermediate and hyper velocities, and measurements in the hypersonic shock tunnel are well prepared thorough treatments of the subject matters.

The articles on oscilloscopes, amplifiers at high-speed, shock waves in gases and physics of detonations treat both the general principles of the subject matter and the pertinent experimental procedures thoroughly. The articles on high-speed methods in nuclear physics and plasma-physics are complete compilations of the present experimental methods. The article on fast chemical reactions, explosions and detonation of gases indicates the new experimental techniques developed by M. Eigen and L. DeMaeyer; a more detailed discussion would have increased the utility of this volume.

The great number of references at the end of each article is especially useful for those wishing greater depth or additional information on specific subjects. However, the majority of the articles lack a table for the identification of symbols which would aid the reader. The book is well edited, and only a few typographical errors appeared. This well-written volume will be beneficial to the junior engineer concerned with the design and marketing of high-speed instrumentation.—*Ottmar H. Dengel*, Manager, Nuclear Physics Research, Naval Ordnance Research, Indian Head, MD 20640.

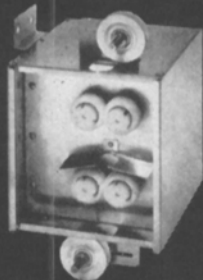
Magnetic Recording in Science and Industry

(Ed.) Charles B. Pear, Jr. Published (1967) by Reinhold Publishing Corp., 490 Park Ave., New York, NY 10022. 454+x pp. Illus. Diagrams. 6 by 9 in. Price \$19.50.

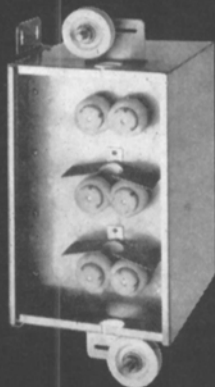
A wealth of information on magnetic recording theory and practice is contained in this volume. It is really several books in one, with twelve chapters written by eight experts in their fields, including Pear, Friend, Daniel, Eldridge, Popowski, Comstock, Bushor and Tipton.

Approximately half of the chapters deal with fundamentals that are common to all branches of magnetic recording: materials, magnetism, heads, tape manufacture, drive systems, biasing, print-thru, noise, erasing, losses, distortion, equalization, flutter, direct recording, FM-recording, PDM Modulation, carrier erase, boundary displacement, contact printing, digital methods, testing, and care and storage of tapes.

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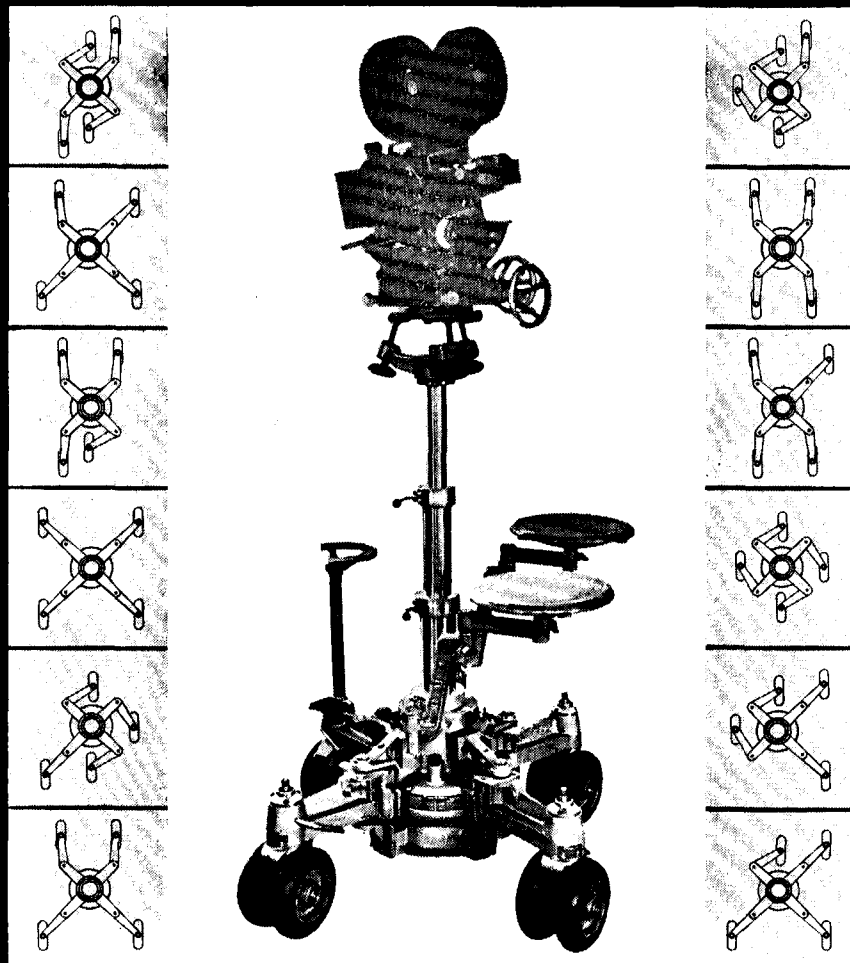
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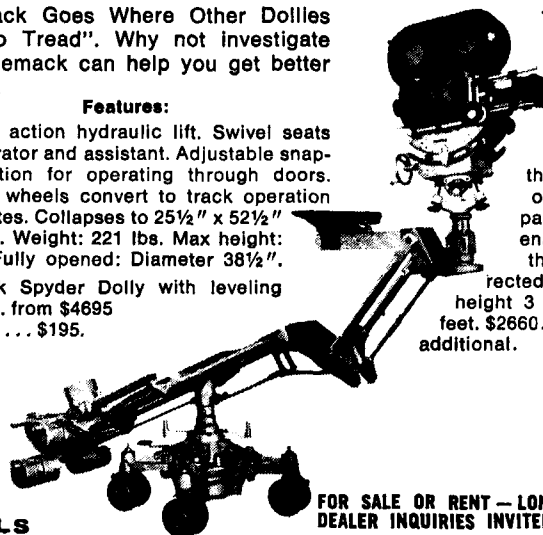
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The treatment is up-to-date and will appeal to those who already are familiar with elementary theory. Extensive bibliographies are a guide to advanced studies.

The specialized chapters describe digital systems and methods, drums and discs, data recording, telemetry, control applications, accessories and auxiliaries. There is extensive treatment of satellite recorders, digital codes, error control, tape transports, disc memories, flying heads, data acquisition, IRIG telemetry, predetection recording and spectrum analysis. The information is gleaned from hundreds of recent publications as well as from the authors' direct experience.

Audio, video, broadcasting and motion-picture applications are not the specialty of this book. However, it is still recommended highly to motion-picture and television engineers for its advanced up-to-date fundamentals, and as a reference of useful techniques that would otherwise remain unknown to the specialist. — *Marvin Camras*, IIT Research Institute, Chicago, IL 60616.

The Optical Industry and Systems Directory

Published (1968) by the Optical-Publishing Co., Seven North St., Pittsfield, MA. 8½ by 11 in. Paperbound. Price \$18.50.

The 15th annual issue of *The Optical Industry and Systems Directory* is, as the editors claim, bigger and better than ever. It is the most complete directory covering the fields of optical instrumentation, systems design and fabrication.

The 600-page directory is a must for anyone dealing in optics, whether he is the Chief Engineer, Purchasing Agent or a student contemplating a career in optics.

The Editors have arranged the issue in eight sections:

The first is a General Index to Section A, Optical Products and Services, and Section B, Systems, and a Classification Index—a new Index of Components and Systems categorized into Chemicals, Components, Equipment, Instruments, Materials, Services and Systems.

Section A lists manufacturers, custom manufacturers, suppliers, designers or importers in 628 categories covering Instruments, Components, Raw Materials, Special Services and Manufacturing Equipment used in the Optical and related industries.

Section B lists manufacturers, custom manufacturers, suppliers, designers or importers in 139 categories covering Precision Electro-Mechanical and Mechanical Devices for Control, Detection, Guidance, Data Reduction and Display, Testing and other applications used in the Optical and related industries.

Section C lists New Books, Associations and Societies of interest to the Optical and related industries and a monograph on *Sine Wave Testing*.

Section D lists alphabetically Corporate Names, Locations, Officers, Telephone Numbers, Description of Specialties. It is now preceded by a Company Index with cross references to Subsidiaries and Divisions.

Section E lists geographically Corporate Names and Locations.

Section F has been gathered directly from the original source and collated by the editorial staff to introduce the Foreign Market. Manufacturers and Suppliers are listed alphabetically and according to country.

Section G lists American and Foreign Manufacturers of commercially available lenses for Photography, Projection and Optical Instrumentation.—*Alex E. Alden*

The Art of Stage Lighting

By Frederick Bentham. Published (1968) by Sir Isaac and Sons Ltd., 39 Parker St., London, W.C. 2, England. 447 + xix pp. Illus. Diagrams. 5½ by 8½ in. Price 70 s.

Although this book is primarily useful to practitioners of the art of lighting the stage in the "legitimate" theater, it contains material that would be equally applicable to motion-picture lighting, particularly in the chapters on Color (6), Lighting Control (8), Painting With Light (11), Optical Projection (12) and Equipment in Common Use (14). The book also contains a glossary of lighting terms. Appendixes list standard Cineroid stage filters and CIE basic symbols for stage and studio lanterns.

The book is written in such a clear and lively style that it would be quite comprehensible to the nontechnical reader provided he had at least a passing interest in the reality behind the "magic" of stage and motion-picture lighting.

Mr. Bentham is well known in the field of theatrical lighting. He is the author of an earlier book, *Stage Lighting*, which has been described as a "classic" in the field. While *The Art of Stage Lighting* is a new book and not a new edition of the earlier one, the author states that the material in this new book largely supersedes the material in the earlier book. He states in the Preface, "I find it harder to be definitive than when I wrote my previous book on the same subject some 18 years ago. The theater is not a place for a hard-and-fast line today. There are many kinds of theater and much experiment, though none of it quite as novel as some people seem to think."—*Edit.*

The Golden Web

A History of Broadcasting in the United States 1933-1953

By Erik Barnouw. Published (1968) by Oxford University Press, 200 Madison Ave., New York, N.Y. 10016. 391 pp. + title page, Table of Contents. Illus. 6 by 9 in. Price \$9.00.

The Golden Web is the second volume of a three-volume history of broadcasting in the United States. The first volume, *A Tower in Babel* (reviewed by George L. George in the December 1966 issue of the *Journal*) takes the reader from Marconi's pioneering in wireless telegraphy in the late 19th century to Franklin D. Roosevelt's first inauguration in 1933. The second volume traces the rise of the American networks from 1933 through 1953. At the start of this period, the author states in the Introduction, the net-

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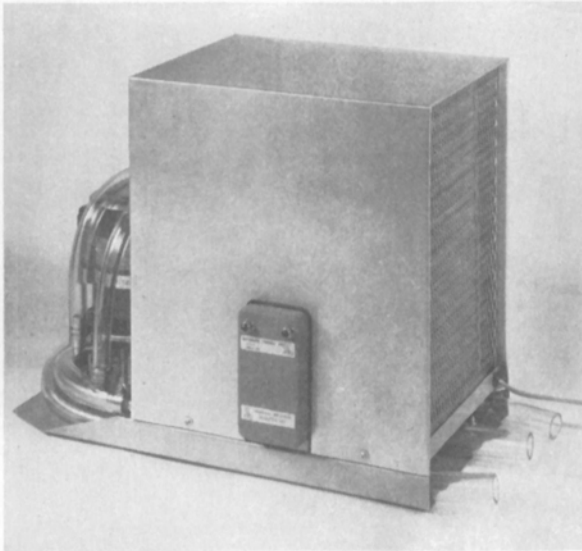
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works were "national distributors of voices and sounds; by its end they were distributors also of moving images, and reaching into international spheres." The third volume of the series (now in preparation) will deal with an era "dominated by television" and will continue the story of the networks to the present.

This is a brilliant and highly readable book. The glittering array of anecdotes, "inside" information and quotations from contemporary sources is the result of extensive and scholarly research. In examining the historical forces bringing about the rise of the great radio and television networks, the book illuminates the condition of America and Americans during the depression years, the New Deal, World War II, and the McCarthy era ("radio's darkest hour") when the careers of many talented people in radio and television were destroyed by the blacklists.

Mr. Barnouw "tells it like it is" and he tells it brilliantly with no hint of the "muckraker" but with something less (and more) than the total objectivity of the detached observer. He reveals the behind-the-scenes struggles for power between such giants of the radio world as David Sarnoff and William S. Paley and such tragic stories as that of Edwin Armstrong and his suit against RCA over FM.

The wonderful world of advertising and the emergence of the advertisers as the real masters of the airwaves is only one of the insidious developments traced in this book. A very funny (and significant) story concerns the advertising agency of Albert D. Lasker and the Pepsodent toothpaste account. Pepsodent contained a detergent, sodium alkyl sulphate. "Lasker decided to make it a mystery ingredient of fabulous power and told his staff to invent a name having three vowels and two consonants. They came up with irium." *Amos 'n' Andy* (a program which probably needs no further identification) was put on an NBC hookup for the toothpaste. "From then on it was *Amos 'n' Andy* and irium . . . backed by hard-selling commercials," the author relates.

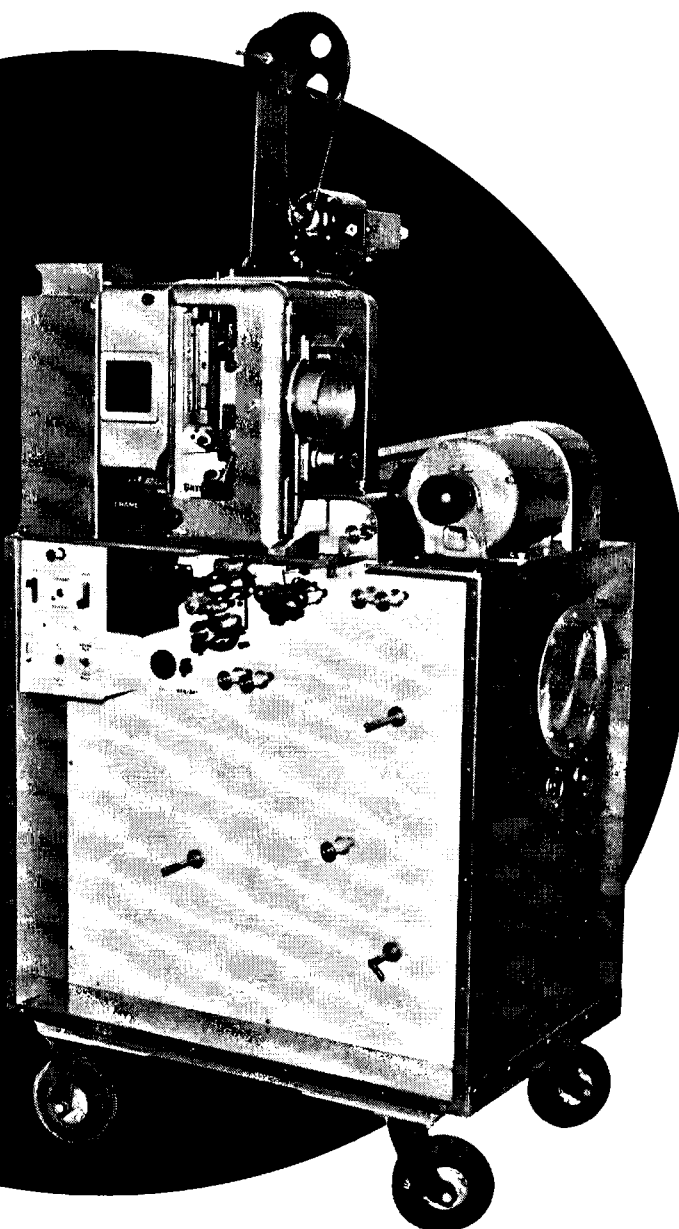
Mr. Barnouw works on a wide canvas. The panoramic view given the reader is astonishing in its scope. When the author deals with radio and television in World War II, the somber story begins to have terrifying implications. The author comments: "Thus peace brought a confusion of imminent changes — from armaments to consumer goods — live to recorded programing — radio to television. . . . The winds of change — sometimes merging, sometimes conflicting — whistled around the broadcaster. It was called peace, but it was more like the eye of a hurricane."

When the third volume of the trilogy is published it will unquestionably complete an historical work of genuine importance to scholars, specialists and the ordinary "gentle reader."—*Edit.*

Cinema and Value Philosophy

By Jeremiah C. McGuire. Published (1968) by Philosophical Library, Inc., 15 E. 40 St., New York, N.Y. 10016. 91 pp. incl. Bibliography. Price \$3.00.

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This book is not directed primarily to the engineer but rather to the student or reader who has more than a superficial interest in the art of motion pictures. However, it contains much of interest for any one involved in any way with cinema. The author states in the Introduction, "We intend to examine the primary relationship between the nature of film (production values, raw materials and purposes) and the nature of value theory." The author also attempts to apply value theory to certain contemporary films to decide "whether or not a philosophical value theory can be used as a critical apparatus in the construction and/or criticism of films."

It is not the purpose of this review to delve deeply into the value philosophy upon which this compact and learned book is based, but it should be reiterated that this is a book, not too difficult for the average reader, that deserves a thoughtful examination.

In a passage in which the author speaks of "the camera's unique expressive power," he explains the four aspects through which the camera becomes an expressive instrument, namely, the position (setup) of camera and lens and the angle from which the shot is taken; the camera's capability of location and size distortion and duplication of movement; the capability of movement (truck or pan); and the ability of the camera, handheld or on a dolly, to encompass the filmic object by closing in, pulling back and encircling it."

While such brief excerpts are admittedly unfair to the book, this reviewer's "value judgment" is that it is a valuable addition to the literature of the art of motion pictures.

The author is a member of the faculty of the Cinema Department of the University of Southern California and has also made feature and educational films for his own production company.—*Edit.*

Audiovisual Script Writing

By Norton S. Parker. Published (1968) by Rutgers University Press, 30 College Ave., New Brunswick, N.J. 08903. 330 + vi pp. Illus. Diagrams. 6 by 9 in. Price \$12.50.

More than 12,000 nontheatrical films were produced in the United States during 1967, the author points out in the Preface to this book. He also notes that more than 6,000 industrial films and business corporations now use film as part of their sales, promotion and training programs. This means that many people find themselves engaged in the production of motion-picture films, television films and video tapes without previous experience in basic audio-visual writing and production techniques, and also that many talented young people would tend to turn to audiovisual scriptwriting as a career. This book is intended as a practical guide for the beginner and a down-to-earth textbook for the student.

The author is fully qualified to explain the "how-to" of professional scriptwriting since he has written, directed and pro-

duced hundreds of documentary as well as entertainment films.

The book contains 14 chapters arranged in six sections: (1) The Importance of the Visual in Action; (2) The Two Kinds of Script Format; (3) The Scriptwriter and His Craft; (4) The Training Film; (5) The Stock Film Documentary and (6) The Conclusion. A selected glossary of motion-picture terms is included. Step-by-step instructions and examples take the beginning scriptwriter through the entire assignment to the finished shooting script. Each step is analyzed and clearly explained. As the author points out in the Conclusion, "In all forms of craftsmanship there is no substitute for experience." However, close attention to the basic principles and techniques set forth in this book should help the beginning scriptwriter to avoid mistakes and give him a firm foundation for the exercise of his own creativity.—*Edit.*

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