

JOURNAL of the SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS

PUBLICATION OFFICE TWENTIETH AND NORTHAMPTON STREETS EASTON, PA.

Officers

President, 1965-66

ETHAN M. STIFLE, Eastman Kodak Co., Prudential Plaza, Rm. 2430, Chicago, Ill. 60601

Executive Vice-President, 1965-66

G. CARLETON HUNT, General Film Laboratories, Inc., 1546 North Argyle Ave., Hollywood, Calif. 90028

Past-President, 1965-66

REID H. RAY, Reid H. Ray Film Industries, Inc., 2269 Ford Pkwy., St. Paul, Minn. 55116

Engineering Vice-President, 1966-67

DEANE R. WHITE, Photo Products Dept., E. I. du Pont de Nemours & Co., Inc., Parlin, N.J. 08859

Editorial Vice-President, 1965-66

HERBERT E. FARMER, Dept. of Cinema, University of Southern California, University Park, Los Angeles, Calif. 90007

Financial Vice-President, 1966-67

JOSEPH T. DOUGHERTY, E. I. du Pont de Nemours & Co., Inc., 45 Rockefeller Plaza, Rm. 550, New York, N.Y. 10020

Conference Vice-President, 1965-66

KENNETH M. MASON, Eastman Kodak Co., 200 Park Ave., Rm. 2910, New York, N.Y. 10017

Sections Vice-President, 1966-67

WILTON R. HOLM, E. I. du Pont de Nemours & Co., Inc., 7051 Santa Monica Blvd., Hollywood, Calif. 90038

Vice-President for Education Affairs, 1966-67

D. MAX BEARD, 10703 East Nolcrest Dr., Silver Spring, Md. 20903

Vice-President for Instrumentation & High-Speed Photography Affairs, 1966-67

WILLIAM G. HYZER, 205 Wall St., Janesville, Wis. 53545

Vice-President for Motion-Picture Affairs, 1966-67

RICHARD J. GOLDBERG, % Houston Fearless Corp., 11801 W. Olympic Blvd., Los Angeles, Calif. 90064

Vice-President for Photo Science Affairs, 1966-67

J. S. COURTNEY-PRATT, Rm. 1D-449, Bell Telephone Laboratories, Murray Hill, N.J. 07971

Vice-President for Television Affairs, 1966-67

RICHARD S. O'BRIEN, CBS Television Network, 51 W. 52nd St., New York, N.Y. 10019

Secretary, 1965-66

ROBERT G. HUFFORD, Eastman Kodak Co., 6706 Santa Monica Blvd., Hollywood, Calif. 90038

Treasurer, 1966-67

SAUL JEFFEE, Movielab, Inc., 619 West 54th St., New York, N.Y. 10019

Governors, 1965-66

WILLIAM D. HEDDEN, Calvin Productions, Inc., 1105 Truman Rd., Kansas City, Mo. 64106

HERBERT W. PANGBORN, 6512 Orion St., Van Nuys, Calif.

RODGER J. ROSS, 784 Duchess Dr., Cooksville, Ont., Canada

JOHN M. WANER, Eastman Kodak Co., 6706 Santa Monica Blvd., Hollywood, Calif. 90038

JAMES L. WASSSELL, Hollywood Film Co., 956 N. Seward St., Hollywood, Calif. 90038

Governors, 1966-67

ROBERT A. COLBURN, George W. Colburn Laboratory, Inc., 164 N. Wacker Dr., Chicago, Ill., 60606

C. RUSSELL DUPREE, 9 3rd Ave., Denville, New Jersey

JOHN L. FORREST, General Aniline & Film Corp., Photo & Reproduction Div., 29 Charles St., Binghamton, N.Y. 13902

JACK P. HALL, 10146 Gaynor Ave., Granada Hills, Calif.

GARLAND C. MISENER, Capital Film Laboratories Inc., 470 E St., S.W., Washington, D.C. 20024

EDWARD H. REICHARD, Consolidated Film Industries, 959 Seward St., Hollywood, Calif. 90038

WILLIAM M. SHEAHAN, 26 Azalea Dr., Cocoa Beach, Florida

EDWARD A. WINKLER, Eastman Kodak Co., 200 Park Ave., Rm. 2910, New York, N.Y. 10017

Section Chairmen

JACK BEHREND, Behrend's, Inc., 161 East Grand Ave., Chicago, Ill. 60611

ROBERT M. BETTY, Lockheed Missiles & Space Co., P.O. Box 504, Orgn. 55-76, Bldg. 102 Sunnyvale, Calif. 94088

H. PATRICK DICKEY, Anglophoto Ltd., 160 Graveline St., Montreal 9, Que., Canada

JOSEPH A. FLAHERTY, JR., 19 Murray Ave., Port Washington, N.Y.

MAURICE L. FRENCH, 32 Dallington Dr., Don Valley Village, Willowdale, Ont., Canada

WILLARD H. HAUSER, 19 Independence Ave., Lexington, Mass. 02173

ROBERT EWING HAWKINS, 1208 Rosebank Ct., Nashville 6, Tenn.

LEIGH H. KELLEY, 4518 Club Circle, N.E., Atlanta 19, Ga.

WILLIAM G. LAPIER, SR., 11321 Crestfield Dr., S.E., Huntsville, Ala. 35803

ROBERT C. LOVICK, 88 Hillhurst Lane, Rochester, New York 14617

EDUARDO MORE, Soundfab Inc., 4547 Ponce de Leon Blvd., Coral Gables, Fla. 33146

WESLEY R. SANDELL, Kodak Processing Lab., Inc., 1350 Okie St., N.E., Washington 13, D.C.

MYRON P. SMITH, University of Denver, 2490 S. Gaylard St., Denver, Colo. 80210

Editorial Office

9 East 41st St., N. Y. 10017

Editor—VICTOR H. ALLEN

Advertising Manager—DENIS A. COURTNEY

BOARD OF EDITORS

Chairman—PIERRE MERTZ

66 Leamington St., Lido, Long Beach, N.Y. 11561

HARLAN L. BAUMBACH	CLYDE R. KEITH
GERALD M. BEST	W. I. KISNER
BERLYN BRIXNER	RALPH E. LOVELL
J. S. COURTNEY-PRATT	HERBERT W. PANGBORN
GEORGE R. CRANE	BERNARD D. PLAKUN
BERNARD E. DRIMMER	WALDEMAR J. POCH
HAROLD E. EDGERTON	ALLAN L. SOREM
CARLOS H. ELMER	R. T. VAN NIMAN
CHARLES R. FORDYCE	DEANE R. WHITE
JOHN G. FRAYNE	W. T. WINTRINGHAM
LLOYD T. GOLDSMITH	HAROLD WRIGHT
LORIN D. GRIGNON	CHARLES W. WYCKOFF
A. M. GUNDELFINGER	EMERSON YORKE
CHARLES W. HANDLEY	

Papers Committee Chairman—C. LOREN GRAHAM,
Eastman Kodak Co., Color Technology Dept.,
Kodak Park, Rochester, N.Y. 14650

THE SOCIETY today is the result of nearly fifty-one years of achievement and leadership. Its members are engineers, scientists and technicians skilled in every branch of motion pictures, television, instrumentation and high-speed photography. Through the Society they are able to keep abreast of current technology and contribute continuously to the technological advancements and education in these fields.

Membership is open to any interested person according to his qualifications. The Society's Headquarters welcomes inquiries from individuals who may apply for these grades: Active (annual dues, \$20.00), Associate (annual dues, \$15.00) and Student (annual dues, \$5.00). All members receive the Journal.

Subscriptions to the Journal are available to non-members at \$16.00 a year (outside continental United States, add \$1.00 for postage). Single copies are \$2.00 for one-part issues; \$2.50 for special two-part issues. A 10% discount is allowed to individual members and accredited agencies on orders for subscription and single copies. Residents in countries that participate in UNESCO may use UNESCO coupons for payment in the event other means for remitting are not available.

In addition to information about membership, subscriptions, technical activities, standards and test films, a list of priced and gratis publications is available from the Society's Headquarters Office, 9 East 41st St., New York, N.Y. 10017

SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS, INC.

Headquarters Office: 9 East 41 St., N.Y. 10017

Cables: Somopict

Telephone: (Area 212) TN 7-5410

Executive Secretary: LEWIS A. BERNHARD, JR.

Published monthly by the Society of Motion Picture and Television Engineers, Inc. Publication office 20th and Northampton Sts., Easton, Pa. Second-class postage paid at Easton, Pa. © Copyright 1966, by the Society of Motion Picture and Television Engineers, Inc. Permission to republish Journal text material must be obtained in writing from the Society's Headquarters Office, 9 East 41st St., New York 10017. The Society is not responsible for statements of contributors. Printed by Mack Printing Company, Easton, Pa.