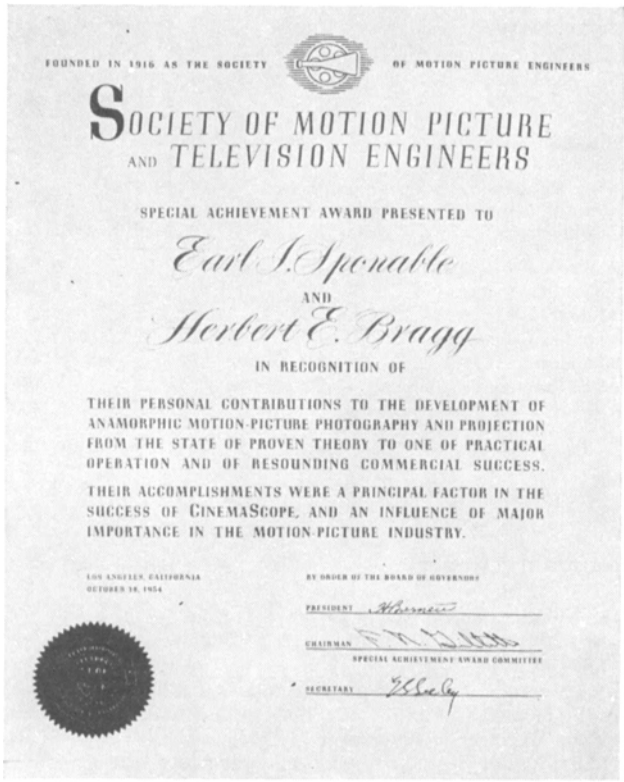
Awards

A detailed report of the Society's annual awards for 1954 may be found in the December 1954 *Journal*. A recapitulation of the recipients of previous years' awards last appeared in the April 1953 *Journal*.

Two special awards were made at the 1954 Fall Convention, to Earl I. Sponable and Herbert E. Bragg of Twentieth Century-Fox Film Corp., and to Arthur C. Downes, until recently Chairman of the Society's Board of Editors. These awards are reproduced below.


FOUNDED IN 1916 AS THE SOCIETY OF MOTION PICTURE ENGINEERS

SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS

SPECIAL ACHIEVEMENT AWARD PRESENTED TO

Earl I. Sponable

AND

Herbert E. Bragg

IN RECOGNITION OF

THEIR PERSONAL CONTRIBUTIONS TO THE DEVELOPMENT OF ANAMORPHIC MOTION-PICTURE PHOTOGRAPHY AND PROJECTION FROM THE STATE OF PROVEN THEORY TO ONE OF PRACTICAL OPERATION AND OF RESOUNDING COMMERCIAL SUCCESS.

THEIR ACCOMPLISHMENTS WERE A PRINCIPAL FACTOR IN THE SUCCESS OF CINEMASCOPE, AND AN INFLUENCE OF MAJOR IMPORTANCE IN THE MOTION-PICTURE INDUSTRY.

LOS ANGELES, CALIFORNIA
OCTOBER 18, 1954

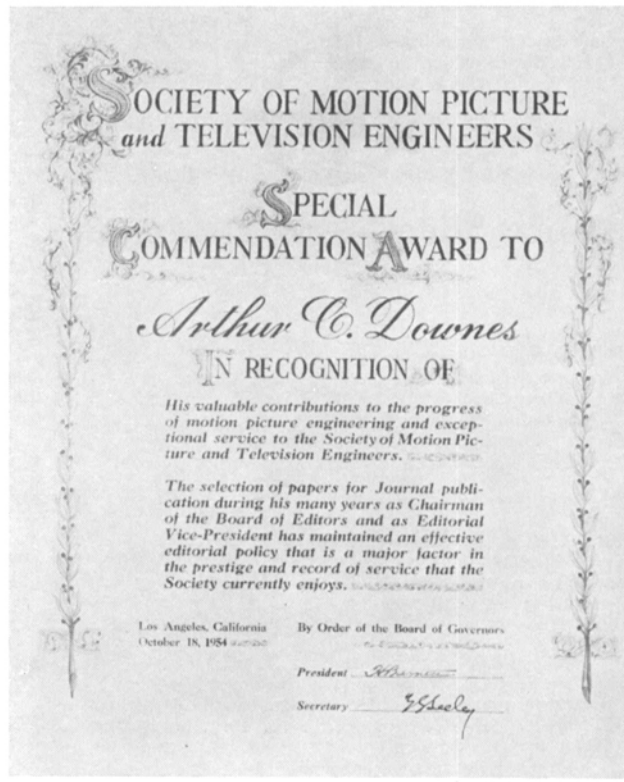
BY ORDER OF THE BOARD OF GOVERNORS

PRESIDENT

CHAIRMAN

SPECIAL ACHIEVEMENT AWARD COMMITTEE

SECRETARY


SOCIETY OF MOTION PICTURE and TELEVISION ENGINEERS

SPECIAL COMMENDATION AWARD TO

Arthur C. Downes

IN RECOGNITION OF

His valuable contributions to the progress of motion picture engineering and exceptional service to the Society of Motion Picture and Television Engineers.

The selection of papers for Journal publication during his many years as Chairman of the Board of Editors and as Editorial Vice-President has maintained an effective editorial policy that is a major factor in the prestige and record of service that the Society currently enjoys.

Los Angeles, California
October 18, 1954

By Order of the Board of Governors

President

Secretary

HONORARY MEMBERS

Lee de Forest V. K. Zworykin Edward W. Kellogg

The distinction of Honorary Membership in the Society is awarded to living pioneers whose basic contributions when examined through the perspective of time represent a substantial forward step in the recorded history of the arts and sciences with which the Society is most concerned.

SMPTE HONOR ROLL

Louis Aime Augustin Le Prince	Jean Acme Le Roy	Herman A. DeVry	Edward B. Craft
William Friese-Greene	C. Francis Jenkins	Robert W. Paul	Samuel L. Warner
Thomas Alva Edison	Eugene Augustin Lauste	Frank H. Richardson	Louis Lumiere
George Eastman	William Kennedy Laurie Dickson	Leon Gaumont	Thomas Armat
Frederic Eugene Ives	Edwin Stanton Porter	Theodore W. Case	A. S. Howell

Elevation to the Honor Roll of the Society is granted to each distinguished pioneer who during his lifetime was awarded Honorary Membership or whose work was recognized subsequently as fully meriting that award.

American Standards

A new American Standard, PH22.91–1955, 16mm Motion Picture Projector For Use With Monochrome Television Film Chains Operating on Full-Storage Basis, is published on the following pages. This Standard was published for trial and comment in the August 1952 Journal and a summary of its development will be found therein.—*H. K.*

American Standard

16mm Motion Picture Projector For Use With Monochrome Television Film Chains Operating on Full-Storage Basis

ASA
Reg. U.S. Pat. Office
PH22.91-1955
*UDC 778.5

1. Scope

1.1 This standard applies only to 16mm motion picture projectors in which the film is advanced intermittently.

1.2 Projectors complying with this standard can be used only with film chains which operate on a full-storage basis.

1.2.1 In full-storage operation illumination from the projector is restricted to the vertical retrace period of the television scan.

1.3 Many of the characteristics of the projector cannot be standardized in specific terms unless the pickup tube used in the film chain is specified. Since the Type 1850-A iconoscope is used almost exclusively at present in film-chain equipment, it has been used as the basis of standardization. If the projector is to be used with any other type of pickup tube, it will be necessary to modify the following paragraphs of this Standard: 2.1, 2.2, 3.1, 3.2.1, 8.1 and all subparagraphs.

2. Image Dimensions

2.1 An image width of 4½ inches shall be considered standard. (See Paragraph 1.3.)

2.2 The range of focus adjustment shall be sufficient to accommodate widths of image from 3¾ inches to 5 inches. (See Paragraph 1.3.)

2.2.1 The focusing operation shall not displace the picture by more than 1.0% of its width.

3. Projection Lens

3.1 Focal Length. In following sections, for test purposes, the use of a lens having a focal length of approximately 3½ inches will be assumed. (See Paragraph 1.3.)

3.2 Resolution

3.2.1 Resolution shall be defined and measured in accordance with American Standard PH22.53-1953, or the latest revision thereof, except that measurement shall be made with the standard picture widths. (See Paragraph 1.3.)

3.2.2 The resolution shall be at least 80 lines per millimeter for the patterns identified as E and D and at least 90 lines per millimeter for all others.

4. Optical Axis

4.1 The projector shall include, or have available as an accessory, a sturdy pedestal. Means shall be provided to place the optical axis (when level) at any required height from 47 to 49 inches from the floor.

4.2 A tilting mechanism shall be included although this need not permit either quick change or change during operation. The range of tilt shall be sufficient to raise or lower by 1 inch an image of standard width, projected by a 3½-inch lens.

4.3 A leveling mechanism capable of rotating the projector about an axis parallel to the optical axis shall be included.

5. Film Gate

5.1 Dimensions. The dimensions of the picture aperture and its location relative to the film shall be in accord with American Standard Z22.8-1950, or latest revision thereof.

5.2 Lateral Guiding. At the picture aperture the sprocket hole edge of the film shall be used for lateral guiding. (Note: This is an exception to the recommendations of American Standard Z22.8-1950. For a discussion of the problem involved, see Note 3 of Z22.8.)

Approved February 2, 1955, by the American Standards Association, Incorporated
Sponsor: Society of Motion Picture and Television Engineers

*Universal Decimal Classification

Printed in U.S.A.
ASA43.M355

Price, 35 Cents

6. Framing Device

6.1 The projector shall have a readily accessible means for positive framing of the picture when the projector is in operation. The range of the framing mechanism shall extend 0.025 inches above and below the standard position measured at the film. The framing device shall be free from creep during operation.

6.2 The method employed for framing shall not change the position of the projected image of the picture aperture by more than 1.0% of the picture width over the full framing range.

7. Picture Stability

7.1 Definition

7.1.1 The stability of the image depends upon the ability of the projector to locate succeeding frames of film in exactly the same position relative to the picture aperture. Failure to perform this function perfectly results in either jump (vertical instability) or weave (horizontal instability) or both.

7.1.2 Jump and weave shall be measured in terms of the peak-to-peak excursions observed. In each case the result shall be stated as a percentage of picture width.

7.2 Standard

7.2.1 Jump shall not exceed 0.2% of picture width.

7.2.2 Weave shall not exceed 0.15% of picture width.

7.3 Method of Measurement

7.3.1 Since jump and weave are mechanical characteristics of the projector and are independent of image magnification, it is recommended that both be measured with the greatest magnification that will still give a sufficiently bright image for direct observation.

7.3.2 Jump and weave are usually measured by projecting a Steady Test Film which has an extra perforation in the center of the picture area. This test perforation is made in the same operation in which the sprocket holes are made and it is very precisely located with respect to the sprocket holes. Film of this type may be obtained from the Society of Motion Picture and Television Engineers.

8. Image Illumination

8.1 Intensity. There is no evidence to indicate that any particular significance should be attached either to the peak value of the illumination or to the exact shape of the light pulse as a function of time. Consequently, only the time average value of illumination intensity is standardized. However, in full-storage operation the duration of the light pulse will be approximately 5% of the period of a television field. This short duty cycle is likely to introduce large measurement errors unless certain precautions are observed. (See Paragraph 1.3.)

8.1.1 Definition. The intensity of illumination will be measured in Iconoscope Exposure Units (abbreviated IEU). The IEU is analogous to the foot-candle. Just as foot-candles are measured by a detector having a spectral sensitivity similar to that of the human eye, so are IEU's measured by a detector having a spectral sensitivity similar to that of the Type 1850-A iconoscope. For illumination from a blackbody radiator at a color temperature of 2700 K, a foot-candle meter and an IEU meter will give identical readings. (See Paragraph 1.3.)

8.1.2 Standard. The intensity of illumination shall be at least ..... IEU'S* (See Paragraph 1.3.)

8.1.3 Method of Measurement

8.1.3.1 The intensity of illumination, with no film in the gate, shall be measured in the plane of the standard image with the detector in the central area of the image. (See Paragraph 1.3.)

8.1.3.2 The detector shall have a spectral sensitivity matching as

* Field experience relating illumination in IEU's to satisfactory quality is as yet quite limited. It has not yet been possible to determine the number of IEU's which represent the line of demarcation between satisfactory and unsatisfactory performance.

closely as possible the spectral sensitivity of the Type 1850-A iconoscope. A sufficiently close approximation is afforded by a Weston Photronic Cell, Model 594RB, equipped with a Corning filter, Type 5-51, 5562. (See Paragraph 1.3.)

8.1.3.3 The meter used with the Photronic Cell shall have a resistance of 20 ohms or less. Because the illumination pulse is of short duration and high peak intensity, the resistance of the meter will cause errors in measurement which increase rapidly with resistance value. For a 20-ohm movement, the error will not exceed 2% over the anticipated range of intensities with the Weston Model 594RB cell. (See Paragraph 1.3.)

8.1.3.4 The combination of meter and cell shall be calibrated against a foot-candle standard using a blackbody source of illumination at 2700 K. (See Paragraph 1.3.)

8.1.4 The source of illumination shall be operated within any applicable ratings established by the manufacturer of the source.

8.2 Control of Intensity. It is probable that means for varying the intensity of illumination will be required for certain types of pickup tube. However, present information is not sufficient to permit the formulation of a standard.

8.3 Uniformity

8.3.1 With no film in the gate, intensity of illumination at any point in the area of the standard image shall be not less than 80% of the maximum intensity of illumination.

8.3.2 Upon replacement of an incandescent projection lamp, if such is used, no readjustment shall be required to achieve this distribution.

8.3.3 The receptive area of the light-sensitive element used for these readings shall have a diameter not greater than 5% of the picture width. No reading shall be taken with the center of the receptive element closer to the edge of the image area than 5% of the picture width.

8.4 Color. Although color of illumination may have significant effects on picture quality, present knowledge is not sufficient to permit the formulation of a standard.

8.5 Flicker. Variation from pulse to pulse of the time integral of the illumination falling on any small area of the image may, under some conditions, give rise to visible flicker in the picture from the film chain. However, present knowledge is not sufficient to permit the formulation of a standard.

8.6 Illumination Period

8.6.1 Definition

8.6.1.1 The illumination period is the interval of time in which the instantaneous intensity of illumination in any part of the image area exceeds 10% of the peak instantaneous intensity.

8.6.1.2 The length of the illumination period shall be stated in terms of a percentage of V, where V is the time from the start of one television field to the start of the next field.

8.6.2 Standard. The illumination period shall not exceed 6.5% of V.

8.6.3 Method of Measurement. The illumination period shall be measured by means of a photocell, an amplifier, an oscilloscope and a timing oscillator. The photocell and amplifier must respond without saturation to the peak intensity encountered and the frequency response of the combination shall be down not more than 3 db at 50 kc.

9. Pull-Down Period

9.1 Definition. The pull-down period is the interval of time in which film is moving through the picture aperture.

9.2 Standard. The only restriction to be placed on the pull-down period is that it shall never overlap any part of the illumination period.

9.2.1 If, in a particular mechanism, there is any possibility that the pull-down period may vary in phase relative to the illumination period, then the mechanism shall be designed to allow this phase to change by ± 3% of V from the optimum position with no overlap of the two periods.

9.3 Method of Measurement. The existence of overlap may be detected by projecting a test subject consisting of sharply defined white objects on a black background, and inspecting the projected picture for evidence of travel ghost. For this test, film complying with the requirements of American Standard Z22.54-1946, or latest revision thereof, is recommended, although many title strips will be found quite satisfactory.

10. Phasing of Projector Relative to TV Vertical Scan

10.1 For the case of a fixed relation between pull-down and illumination periods:

10.1.1 Means shall be provided for setting the illumination period in any desired phase relative to the 60-cycle frequency which controls the phase of the motor.

10.1.2 Each time the projector is turned on, it shall re-establish this preselected phase relation by fully automatic means in less than 3 seconds.

10.1.3 During operation, the preselected phase relation shall be maintained within ± ½% of V.

10.2 For the case of the illumination period locked to the vertical synchronizing signal and independent of the pull-down period, means shall be provided for insuring compliance with Paragraph 9.2 of this Standard.

11. Film Capacity and Reel Tension

11.1 The projector shall accommodate reels of any capacity from 400 to 3600 feet which comply with the requirements of American Standard PH22.11-1953, or the latest revision thereof.

11.2 For any reel size in this range, the take-up tension shall at no time be less than 3 ounces nor greater than 10 ounces (hub diameters less than 4.5 inches excepted).

11.3 For any reel size in this range, the braking mechanism on the feed reel shall not cause a tension greater than 3 ounces (hub diameters less than 4.5 inches excepted).

12. Film Life

12.1 After 100 passages through the projector mechanism, film shall exhibit no evidence of damage either visible in the projected picture or audible in the reproduced sound signal.

12.2 In order that a loop of film may be used in this test, renewal of the splice as many times as may be necessary is permitted.

12.3 The film used in this test may and should be carefully selected and lubricated. The projector is not required to pass this test with film which is in inferior condition.

12.4 Passage of a splice in good condition through the mechanism shall not cause serious disturbance, such as loss of loop, nor shall the mechanism cause excessive damage to the splice.

13. Starting Time

13.1 Definition. The interval between applications of power and the attainment of: (a) synchronous operation of the motor and (b) a flutter content in the sound output which is less than the maximum specified in Paragraph 17.2.

13.2 Standard. The starting time shall not exceed 5 seconds.

14. Film Speed

14.1 The nominal speed of projection shall be 24 frames per second. This shall not be interpreted as excluding the use of a 3-2 mechanism.

15. Stopping Distance

15.1 Definition. The length of film that passes through the film gate after removal of power.

15.2 Standard. The stopping distance shall not exceed 3 feet.

16. Manual Drive

16.1 Some readily accessible means shall be provided for slow-speed manual operation of the mechanism as a check on threading, etc.

17. Sound Scanning System

17.1 Synchronization. The film path distance measured in the direction of travel from the center of the picture aperture to the point to which sound scanning occurs shall be 26 frames ± ½ frame.

17.2 Mechanical Stabilization. The rms value of the total (sum of all frequencies) flutter shall not be greater than 0.25% when using a 3000-cycle flutter test film complying with the requirements of American Standard PH22.43-1953. Film splices shall not cause any serious disturbance in sound stabilization.

17.3 Dimensions of Scanning Aperture. In the plane of optimum focus the scanning light beam shall have a maximum height of 0.0005 inch and a width of 0.071 ± 0.001 inch. (Reference for width: American Standard Z22.41-1946, or the latest revision thereof.)

17.4 Adjustment of Scanning Beam

17.4.1 Lateral Adjustment. Means shall be provided for adjusting the lateral position of the scanning beam such that the projector does not reproduce either signal on a buzz-track test film complying with the requirements of American Standard PH22.57-1955, or the latest revision thereof.

17.4.2 Azimuth Adjustment

17.4.2.1 Means shall be provided for adjusting the azimuth of the scanning beam.

17.4.2.2 The azimuth shall be adjusted to secure maximum response using a 7000-cycle test film complying with the requirements of American Standard PH22.42-1955, or the latest revision thereof.

17.4.3 Focus Adjustment

17.4.3.1 Means shall be provided for adjusting the focus of the sound optics to place the plane of optimum focus in coincidence with the emulsion plane.

17.4.3.2 Focus shall be adjusted to secure maximum response using a test film complying with the requirements of American Standard PH22.42-1955, or the latest revision thereof.

17.4.3.3 Means shall be provided for rapidly and accurately shifting the plane of optimum focus to coincide with the emulsion position on either side of the film.

17.5 Light Distribution. The light distribution in the scanning aperture shall be sufficiently uniform to produce a signal across a resistive load at the output of the preamplifier which is constant within ± 1.5 db when reproducing a Scanning Beam Uniformity Test Film complying with the requirements of American Standard Z22.80-1950 or Z22.81-1950, or the latest revisions thereof.

17.6 Exciter Lamp

17.6.1 The exciter lamp shall be so mounted as to permit rapid replacement.

17.6.2 It is not desirable that uniformity of illumination in the scanning aperture be critically dependent upon exciter lamp position. If this condition exists, means shall be provided for independent horizontal and vertical adjustment of the exciter lamp position.

17.6.3 The exciter lamp shall be a prefocused type unless the lamp holder is a replaceable type equipped with adequate adjustments which can be preset, and a spare lamp holder is provided.

17.6.4 The exciter lamp shall be operated at all times within any applicable ratings established by the manufacturer of the lamp.

18. Sound Amplification System

Any statement of sound-reproduction characteristics must necessarily cover the performance of a preamplifier which is specifically designed as a component of the projector. However, it is not essential that all or even any part of the preamplifier be included in the projector structure. Wherever they are mounted, all parts of the preamplifier should be readily accessible.

18.1 Output Impedance. There shall be available output impedances of 600 and 150 ohms, both to be balanced outputs.

18.2 Output Level

18.2.1 Standard. The output level shall be −10 dbm.

18.2.2 Method of Measurement. This level shall be produced using level test film complying with the requirements of American Standard PH22.45-1955, or the latest revision thereof.

18.2.3 A gain normalization control shall be provided having sufficient range to insure compliance with the above standard for any normal combination of exciter lamp, photocell and amplifier tubes.

18.3 Frequency Response

18.3.1 If the frequency response from film to output is fixed, it shall be flat within ± 1 db from 50 to 6000 cycles per second. If tone controls are provided in the preamplifier, their range of adjustment shall include this response.

18.3.2 Method of Measurement. The frequency response shall be determined by means of a multifrequency test film complying with American Standard PH22.44-1953, or the latest revision thereof. The amplitude of response shall be measured across a resistance load at the output of the preamplifier. The frequency response shall be determined with standard gain. (See Paragraph 18.2.)

18.4 Distortion. Although it is desirable to state a distortion standard which will cover the photocell as well as the preamplifier, a method of measurement which will accomplish this result is not known. Consequently, the present Standard covers only distortion in the preamplifier.

18.4.1 Standard. Total harmonic distortion in the preamplifier at standard output level shall not exceed 0.5 percent in the input signal range from 50 to 6000 cycles per second.

18.4.2 Method of Measurement. Test signals from an oscillator shall be applied at the photocell input of the preamplifier and distortion shall be measured with a distortion analyzer at the preamplifier output at standard output level.

18.5 Preamplifier Noise Level

18.5.1 Standard. The noise level of the preamplifier shall be −65 dbm.

18.5.2 Method of Measurement. The noise level of the preamplifier shall be measured at standard gain (see Paragraph 18.2), with the projector running, the exciter lamp energized and no light entering the photocell.

18.6 Overall Noise Level

18.6.1 Standard. The overall noise level shall be −55 dbm.

18.6.2 Method of Measurement. The overall noise level shall be measured at standard gain (see Paragraph 18.2), with the projector running, the exciter lamp energized and no film in the machine.

Appendix

(This Appendix is not a part of the foregoing standard.)

The American Standards listed below have been cited in the present Standard. Copies of any of the reference standards may be obtained from the American Standards Association, 70 East 45 Street, New York 17, New York.

1. Z22.8-1950
   Location and Size of Picture Aperture of 16mm Motion Picture Projectors.
2. PH22.11-1953
   16mm Motion Picture Projection Reels.
3. Z22.41-1946
   Sound Records and Scanning Area of 16mm Sound Motion Picture Prints.

4. PH22.42-1955
16mm Sound Focusing Test Film.

5. PH22.43-1953
16mm 3000-Cycle Flutter Test Film.

6. PH22.44-1953
16mm Multifrequency Test Film.

7. PH22.45-1955
16mm 400-Cycle Signal-Level Test Film.

8. PH22.53-1953
Method of Determining Resolving Power of 16mm Motion Picture Projector Lenses.

9. Z22.54-1946
Freedom from Travel Ghost in 16mm Motion Picture Sound Reproducers.

10. PH22.57-1955
16mm Buzz-Track Test Film.

11. Z22.80-1950
Scanning-Beam Uniformity Test Film for 16mm Motion Picture Sound Reproducers (Laboratory Type).

12. Z22.81-1950
Scanning-Beam Uniformity Test Film for 16mm Motion Picture Sound Reproducers (Service Type).

Revision of American Standard

A proposed revision of American Standard Z22.48-1946, Picture Printer Aperture for Contact Printing 16mm Positive from 16mm Negative, is published on the following page for a three month period of trial and criticism. All comments should be sent to Henry Kogel, SMPTE Staff Engineer, prior to July 15, 1955. If no adverse comments are received, this proposal will then be submitted to ASA Sectional Committee PH22 for further processing as an American Standard.

This proposed revision differs from the 1946 version in two ways: one, a shortening of the title, is merely editorial in nature; the other and much more basic is a change in the value of Dimension A. With the previous value of A, 0.412 ± 0.002 in., it was discovered that the tolerances of the soundtrack, specified in Z22.41-1946, could combine with the tolerances of this value in an unworkable manner. The difficulty comes from the fact that with the given tolerances, it is possible for the perforations on the track side of the negative to be within the printing aperture. Prismatic refraction of picture printer light would then introduce flare into the soundtrack area and a consequent "motor boating" effect in the sound. To eliminate this potentiality, the Laboratory Practices Committee decided to decrease the value of A to 0.409 ± 0.003 in.

Both proposed modifications have now been approved by the Laboratory Practices and Standards Committees.—*H.K.*

Reaffirmation of American Standard

Z22.49-1946, Printer Aperture Dimensions for Contact Printing 16mm Reversal and Color Reversal Duplicate Prints, was reviewed by the Laboratory Practice Committee, Standards Committee, PH22, and on January 14, 1955, it was reaffirmed without change by the ASA as PH22.49-1946. Copies of this standard are available at twenty-five cents each on order from the American Standards Association.—*H.K.*

Letter to the Editor

Re: The Motion-Picture Laboratory

In my paper entitled "The Motion-Picture Laboratory" (*Jour. SMPTE, 64:* 13–34, Jan. 1955) I omitted reference to the excellent article by G. Mareschal entitled "L'Evolution des Machines à Developper les Films Cinématographiques Depuis 50 Ans" (Evolution of Motion-Picture Developing Machines During the Past 50 Years) which was published in *Bulletin de l'Association Francaise des Ingenieurs et Techniciens du Cinema*, No. 11, p. 3, 1952.

Although there is some duplication in the two papers, Mareschal gives very complete details of the work of the French pioneers.

March 1, 1955

J. I. Crabtree
Eastman Kodak Co.
Kodak Park
Rochester 4, N. Y.

Proposed American Standard

A Proposed American Standard, PH22.101, Magnetic Coating of 16mm Film Perforated Along Both Edges, is published on the following page for a three-month period of trial and criticism. All comments should be sent to Henry Kogel, Staff Engineer, prior to July 15, 1955. If no adverse comments are received, the proposal will then be submitted to ASA Sectional Committee PH22 for further processing as an American Standard.

This proposal originated in the Magnetic Recording Subcommittee in the latter part of 1952. The first two drafts contained sound specifications which were the basis of major disagreements. The importance of having a coating standard, whether or not there was agreement upon the sound specifications, led to a deletion of these specifications in the preparation of the third draft.

There was but one objection to the third draft and this was based on the premise that the balance stripe is desirable and should therefore be specified as mandatory rather than optional. The subcommittee took exception to this view on the grounds that the balance stripe is not necessary for making film track through the projector gate or to facilitate winding on reels, although a balance stripe may be advisable when winding film of over 400-ft lengths onto film cores. Another consideration was the unwarranted doubling of costs in applying a balance stripe where operating conditions do not require one. The optional specification, therefore, permits the necessary flexibility without adversely affecting factors of interchangeability.

The third draft, which is the one now published, was subsequently approved by the Magnetic Recording Subcommittee, the Sound Committee and the Standards Committee.—*H.K.*