REPORT OF THE STANDARDS AND NOMENCLATURE COMMITTEE

THE following items have received but one approval by the Society and should be ratified at this meeting.

External Diameter of No. 1 Projection Lens.

The external diameter of the barrel of a No. 1 projection lens shall be two and one thirty second of an inch (2-1/32 in.). (In metric measure 51.6 mm). Adopted TRANSACTIONS No. 24. Discussion in Nos. 19 and 22.

DISCUSSION

MR. MAYER: Why can not the dimensions be expressed in decimals, or in both ways? Our proceedings should record both because it is customary for all societies to express everything in decimals.

PRES. COOK: There is no reason, but since the first vote is on a fractional measurement, we could not in fairness change it at this time. The motion merely confirms the former vote on a dimension of 2-1/32 inch.

DR. GAGE: This would involve changing over all dimensional standards. What I have done and am going to do, is to add the metric measurement. I think every manufacturer has a table showing the decimal equivalents of fractions.

MR. RICHARDSON: I think that members not present at the time this was originally taken up will not know what it is all about. It is simply a difference of opinion of the lens makers. We must adopt the standard. We can not compel manufacturers to adopt it in practice.

MR. MCAULEY: Have the lens makers been consulted? Very often tubing in fractional parts of an inch can not be readily obtained. If this has been taken up with them it is all right.

DR. GAGE: The makers have certainly been consulted. One manufacturer is already making lens barrels of this dimension, and we are asking the others to make them the same.

MR. JOHN G. JONES: I believe in fairness to the manufacturers, we should add plus and minus tolerances to the dimensions.

MR. GRIFFIN: I don't think it is necessary to specify tolerances. The method of mounting lenses in projectors, at present and in the future, is that they shall clamp in, so that tolerances are not required.

MR. PORTER: Theoretically, we should have tolerances on all dimensions adopted. On the other hand, as manufacturing processes improve, those tolerances are liable to be cut down, and it seems to me that we lay ourselves open to prolonged and indefinite argument if we try to set tolerances on our figures. I think if we set standards and let the manufacturers set their own tolerances, we shall do better.

MR. RICHARDSON: There is no tolerance necessary because the lens is mounted in a split ring.

(*The motion for adoption of the dimensional standard for the No. 1 projection lens was passed*).

Dimensions of film splices

At the last meeting it was adopted that film splices shall be made in accordance with the dimensions given in the figure (Fig. 1, p. 20, No. 27 Transactions) for laboratories and exchanges. This was held up at the request of Mr. Denison, but he agreed at the last meeting that this would be all right.

(*Motion passed to adopt above dimensions.*)

Perforation of positive film

The dimensions of newly cut and perforated 16 and 28 mm positive and negative, and 35 mm negative film have been approved

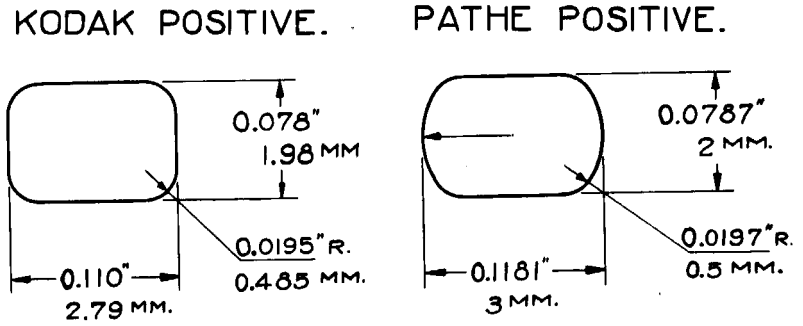

FIG. 1.

previously in accordance with the diagram printed on p. 8, No. 24 Transactions. Approval was also given to the following perforation dimensions for 35 mm positive film (see Fig. 1).

Either "Kodak" positive .110 inches (2.79 mm.)x .078 inches (1.98 mm.) with rounded corners as illustrated in the diagram Fig. I or the "Pathé" positive perforation .118 inches (3 mm.) x. 0788 inches (2 mm.) with rounded ends and corners illustrated in Fig. 2, p. 9. No. 24 TRANSACTIONS.

We ask for a vote of second approval on this item.

DISCUSSION

MR. PORTER: Do I understand we are adopting both the "Pathé" and "Kodak"?

PRES. COOK: Yes, and there is no change in the dimensions of those adopted many years ago, the only difference being in the shape of the corners.

(*Motion carried to adopt above dimensions.*)

Camera cranking speed

The camera cranking speed of 60 feet per minute has received first approval in No. 24 TRANSACTIONS as follows: and should be ratified at this meeting.

A camera taking speed of 60 feet of standard film per minute with a minimum of 55 feet and a maximum of 65 feet should be used when normal action is desired, in connection with the Society of Motion Picture Engineers recommended (projection speed.) of 80 feet per minute.

DISCUSSION

MR. L. A. JONES: I should like to point out at this time that this question of taking speed will have to be reconsidered somewhat, if the reproduction of sound on the film come into practice. In reproducing music or speech it is necessary that the taking speed be the same as the projection speed. That is absolutely necessary for satisfactory reproduction of music, because of the pitch change. I think we should consider this because it is possible that film in the near future will carry sound records.

MR. RICHARDSON: I have thought of that, but I think talking pictures will have to be dealt with by themselves. We can not apply the same rule to the regular motion picture and the talking picture.

PRES. COOK: Gentlemen, there are two possibilities before us Many years ago we adopted 60—somewhere around 1920 or 1921 or before that— and that was published for years in our book of Standards. At Roscoe it was again taken up and discussed, and at that time it was repassed at 60 with a tolerance of 55–65. We can either vote to eliminate that tolerance of 55–65, and in that case we shall merely confirm the ancient standard of 60 without tolerance, or we can vote to sustain that tolerance. I think it might be as well to get the sense of the meeting as to which is preferable.

MR. PORTER: I think the point that Mr. Jones has brought out is that with the increasing use of the recording of sound and pictures

on the same film we will have to take cognizance of it. I see no reason why we could not do this adequately by adopting recommended practice of 60 feet per minute for cases where pictures only are recorded on the film, stating definitely that an exception is made for pictures and sound recorded simultaneously.

PRES. COOK: I think we must consider that as new business. We are asking for the confirmation of that previously voted upon or the rescinding of it.

MR. PORTER: I think we are at liberty to modify it and lay it over for 6 months. I consider this in the way of modifying the first adoption, which will hold it over for 6 months before final adoption. I think this is better than rescinding or adopting it at the present time.

DR. GAGE: It is very evident with the speaking movies, that where the speech is on one edge of the film, we should have to change the dimensions of the aperture and have standards on speed and so on; but I think we should wait to find out what the manufacturers want as specifications for talking movies and then start out and draft a new set of specifications for such films, and let this matter come through for the kind of pictures we are talking about, which are not tied up with sound, thus clearing the decks of the present situation.

MR. PORTER: I think the last recommendation is good, provided our adoption is so worded that it makes it specifically clear that this refers only to cases where pictures only are recorded on the film.

MR. RICHARDSON: It seems to me that this is a case of too much delay. This was started at least 2 years ago, was laid over by two or three Conventions, and we have been bedeviled with it for several Conventions. I had well nigh forgotten about it. I believe before we adopt any camera speed, the Society of American Cinematographers should be consulted.

MR. PORTER: They have been in great detail.

MR. L. A. JONES: May I ask, is this a standard or recommended practice?

DR. GAGE: Recommended practice.

MR. L. A. JONES: I move its adoption.

(*Motion carried to adopt above recommendations.*)

Intermittent Gear Ratio

Listed among our Standards is the following which has received approval in the No. 10 TRANSACTIONS at a time when a second ratification was not required.

The movement of the intermittent gear shall be expressed in degrees of rotation during which the pin of the driver is in contact with the slot of the driven gear. For example, a gear in which the pin is engaged with the slot for one-quarter of a revolution of the driver shall be called a 90-degree movement; that in which the pin is engaged with the slot for one-sixth revolution shall be called a 60-degree movement, etc.

This is evidently Nomenclature and we ask that the rule of double approval of all Standards and Nomenclature be made unanimous by second approval of this definition and that it be listed under Nomenclature.

(*Motion carried to adopt above recommendation.*)

Sprocket Dimensions

In the No. 27 TRANSACTIONS is printed a report by Mr. J. G. Jones on the dimensions of sprocket wheels for projectors. The method of arriving at this standardization of sprocket dimensions, proposed by Mr. Jones, has I believe the approval of the Society. There has been raised an objection to the dimensions which Mr. Jones proposed for the take-up sprocket which is a hold-back sprocket. In the design of this sprocket it was assumed that if it is of such size that it corresponds to a film having a shrinkage of 2.92 per cent that no injury will be done to new film having zero shrinkage provided, of course, other considerations such as tooth thickness treated in this recommendation be complied with. It has been pointed out, however, that when perfectly new film is used, the last tooth of the sprocket wheel holds back the film until it lets go and, when it does so, there is a sudden jump of the film to the tooth just preceding it. Thus the sprocket of the dimensions recommended would give the greatest smoothness of action to film shrunk to 2.92 per cent but allows slipping from tooth tooth in the case of new film. This slipping action for new film was not assumed to be in the least injurious. It has been pointed out, however, that the standard tension of the wind-up which is 16 ounces on the periphery of a 10 in. reel is perhaps five times that amount or five pounds when a new reel is started and the film is wound near the hub. This jumping action on the new unshrunken film when used on a hold-back sprocket adjusted for the maximum 2.92 per cent shrinkage is highly injurious and moreover does the greatest damage to new film which is presumably both more valuable and is tenderer than old film.

As a result of this the Committee in proposing a new dimensional standard has followed the general plan suggested by Mr. Jones, namely:

The take-up sprocket which is a hold-back sprocket on a motion picture projector should be designed to have the same pitch as the perforations on film which has shrunk to the maximum amount occurring in films of commercially useful condition as supplied by exchanges. The feed and intermittent sprocket are to have a pitch equal to that of the sprocket holes in newly finished film.

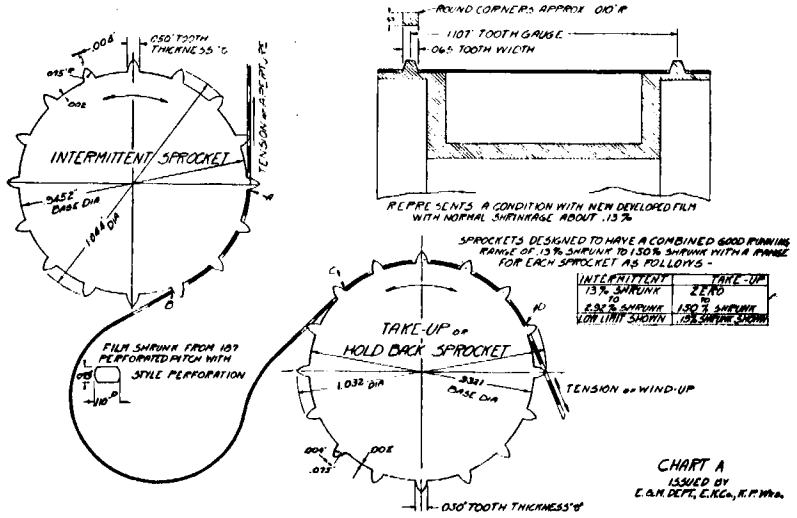

CHART A

Sprocket dimensions proposed by Society of Motion Picture Engineers

Intermittent sprocket with base diameter of 0.9452 in. (24.01 mm.) has same tooth pitch as the perforations of freshly processed film shrunk 0.13 per cent. Sprocket holes in theoretical contact with four teeth from A to B; i.e., the best running condition is for new film.

Take-up sprocket which is a hold-back sprocket with a base diameter of 0.9321 in. (23.67 mm.) is smaller and the tooth pitch is less than the perforations of newly processed film. There will be a slight clearance at the back of tooth C, also clearance between front of tooth C and all other teeth except the last tooth D which holds the film against the rewind tension. As the film leaves sprocket D, it will slip forward off this tooth until the slight clearance between the sprocket and the next tooth is taken up. If the take-up sprocket is too small the slipping from tooth to tooth is excessive and particularly damaging to new film.

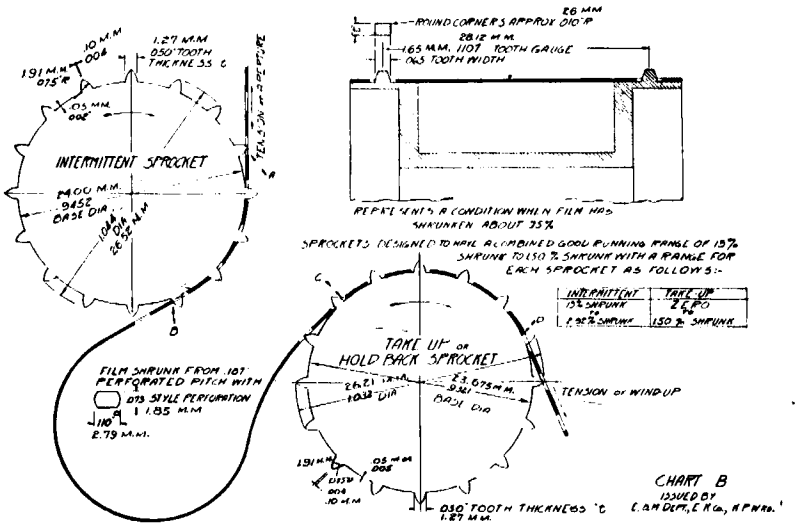

CHART B

Sprocket dimensions proposed by Society of Motion Picture Engineers with both English and metric dimensions

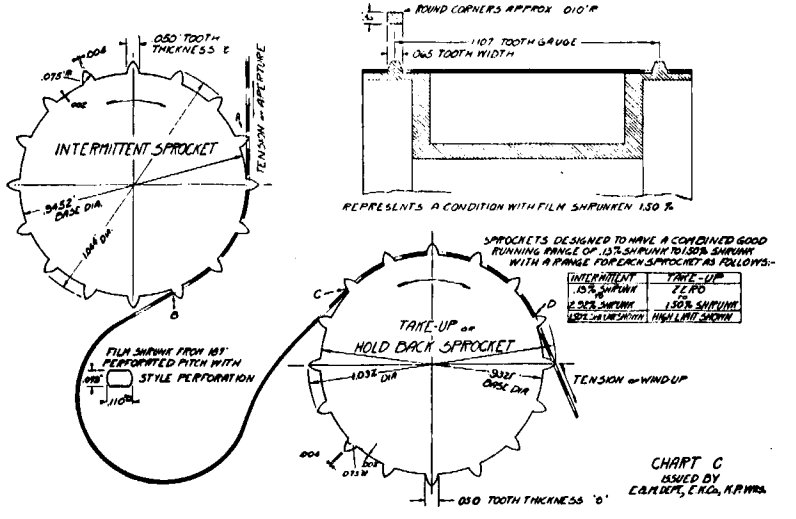

CHART C

Sprocket dimensions proposed by Society of Motion Picture Engineers

Film shrunk 0.75 per cent representing average film met with in service. Perforation pitch is slightly less than intermittent sprocket tooth pitch. The film is engaged by the last tooth B leaving a slight clearance at the other teeth. As film comes off tooth B, it is engaged by the next tooth. Motion of film is aided by the snubbing action between the film and the base diameter of the sprocket.

Film is held against rewind pull by the last tooth D of the take-up sprocket. There is increased clearance at the back of tooth C, hence no interference at the entering tooth. Compared to new film there is decreased slipping from tooth to tooth due to rewind pull.

Film shrunk 1.5 per cent representing oldest commercially useful film. Intermittent sprocket moves the film by the leaving tooth B. No interference by the back of the entering tooth A occurs until the film is shrunk 2.92 per cent.

Take-up sprocket has same tooth pitch as film perforations; i.e., the theoretically perfect running condition six teeth are engaged. If film is shrunk more than 1.5 per cent interference will occur at the entering tooth C and the sprocket holes will be torn.

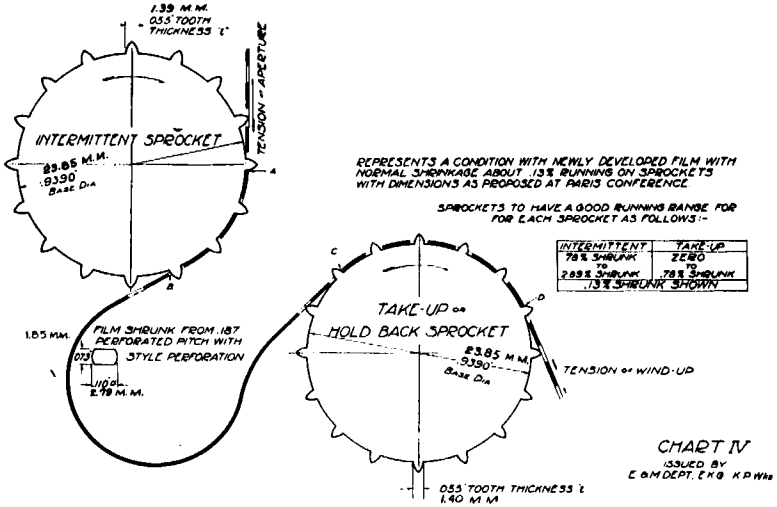

CHART IV

Sprocket dimensions proposed by the Paris Congress

Intermittent and take-up sprockets both have the same base diameter, 0.9390 in. (23.85 mm.). The tooth pitch is that of the perforation pitch of film shrunk 0.78 per cent.

Film is shrunk 0.13 per cent. Entering tooth A of the intermittent sprocket engages the film perforation. When the next tooth engages film it pushes the film forward out of engagement with forward teeth. If tension is too great or film soft as in the case of new film the sprocket hole is likely to tear instead of pushing the film forward. *This condition is to be avoided as it causes damage.*

Take-up sprocket holds film against rewind tension by leaving tooth D and allows clearance to entering tooth C. This condition holds until film is shrunk 0.78 per cent.

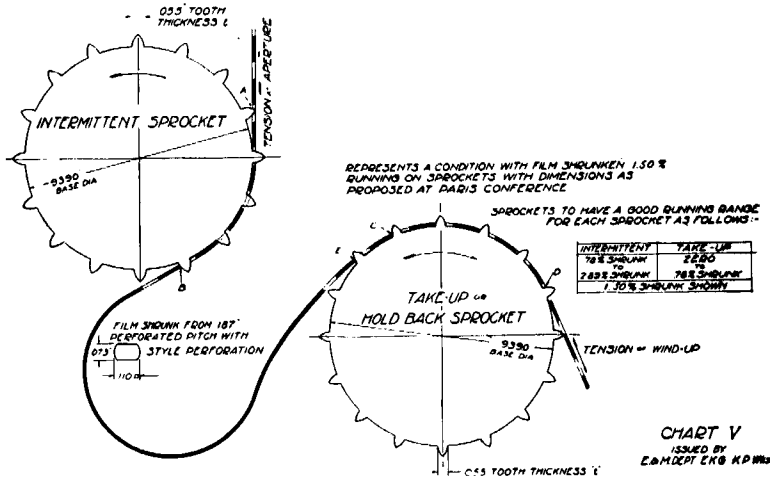

CHART V

Sprocket dimensions proposed by Paris Congress

Tooth pitch same as perforation pitch of film shrunk 0.78 per cent.

Film shrunk 1.5 per cent; i.e., old film.

Intermittent sprocket engages film at leaving tooth B leaving clearance at entering tooth A. This good running condition occurs at 0.78 per cent shrinkage and holds until film has shrunk 2.89 per cent.

Take-up sprocket engages film at entering tooth C. When next tooth E engages film, either (1) film is pushed forward, (2) film climbs sprocket tooth or (3) perforation is torn. This condition occurs at 0.78 per cent shrinkage and is more aggravated the greater the shrinkage.

The Committee finds that the maximum shrinkage of useful film is 1.5 per cent and recommends a take-up sprocket designed accordingly. The shrinkage of newly processed film for which the feed and intermittent are designed is 0.13 per cent. These latter sprockets as has already been shown will accommodate film shrunk as much as 2.92 per cent without damage. Dimensions of sprockets to produce these results are illustrated in Charts A, B, and C. The essential dimensions are:

For take-up Base diameter 0.9321 in. (23.67 mm.)
Sprocket Tooth 0.050 in. (1.26 mm.)

For feed and
intermittent Base diameter 0.9452 in. (24.01 mm.)
Tooth 0.050 in. (1.26 mm).

(*Motion carried to adopt above recommendations*)

Ratio of Height to Width of Picture

In the No. 18 TRANSACTIONS it was voted as recommended practice that:

The existing ratio of three to four between height and width of pictures when introducing any new size of film should be retained.

DISCUSSION

MR. CRABTREE: This brings up the matter of pictures projected on a very wide screen. I suppose we should have to make other recommendations later on those apertures.

PRES. COOK: That would be similar to the music films. I may say for the benefit of the Society that Dr. Gage and I have met the assistant to the secretary of the Standards Society, who explained that any standards adopted by the American Engineering Standards are always subject to revision, and they have a tremendous amount of this in other branches. The procedure is much simpler to revise than to get it adopted in the first place, so that we are not taking an irrevocable step in adopting any standard.

(*Motion carried to adopt above recommendation.*)

Camera and Printer Aperture Sizes

In the No. 19 TRANSACTIONS it was voted as recommended practice that:

The camera aperture should be of such dimensions in relation to the projector aperture that a picture with black borders inside the projector aperture shall be projected.

In the No. 24 TRANSACTIONS for the Roscoe meeting of Oct. 5–8, 1925, p. 11, is found the following:

In regard to camera and printer apertures, your committee believes it to be consensus of opinion in the Society that the black border is desirable. To obtain it we recommend the following aperture sizes:

* Camera 0.700 in. high x 0.925 in. wide; 0.035 in. radius corner
Printer: 0.757 in. high x 1.000 in. wide; 3/64 in. radius corner

* Combination adopted as standard by the Incorporated Association of Kinematograph Manufacturers, Ltd.

Projector: (already standardized as 0.725 in. high x 0.950 in. wide; square corners)

The camera aperture corners may be either square or rounded, but the projector aperture corners must be square.

Page 12. Motion passed to adopt above dimensions.

It is evident that the Society seriously considered standardizing on the black border. However the size of projector aperture in continuous use by all American manufacturers since 1911 and the present official standard of the Society of Motion Picture Engineers is 0.6795 x 0.9060 inches. In the discussion of this proposed standard it was pointed out that it would be necessary to change the dimensions of the projector aperture. This has never been done and inasmuch as the above quotation states that the projector aperture is "(already standardized as 0.725x0.950 in. wide; square corners)" it does not appear in the TRANSACTIONS that the Society ever really intended changing the dimensions of the projector aperture but it merely assumed thatthe dimensions, 0.725x0.950 in., was the standard it had already adopted. As a matter of fact the dimensions given for camera, printer and projector are the dimensions adopted by certain British manufacturers the Incorporated Association of Kinematograph Manufacturers, and will give a black border. When, however, the same camera and printer aperture are used with the present standard projector aperture of 0.9060x0.6795, no border is visible. However, other dimensions of camera and printer aperture would give the same result; i.e., no border with the present small American standard projector aperture and black border with the larger British aperture.

In order to put into dimensional standard form the requisites for possible projection of black borders, the Committee recommends the adoption of alternate aperture dimensions. The adoption or rejection of these dimensions at the present meeting is a prerequisite for submission of our standards to the Engineering Standards Committee.

The dimensions suggested by the Committee are as follows:

Dimensions of Projector Aperture.

For the projection of pictures bounded by the image of the projector aperture, the projector aperture for standard film shall be sixty-seven hundred and ninety-five ten thousandths (0.6795 in.) of an inch (17.26 mm.) high by ninety hundred and sixty ten thousandths 0(.9060) of an inch (23.01 mm.) wide.

(This is the present standard.)

For the projection of pictures with photographically produced black borders secured by the use of the standard size camera and printer apertures, the projector aperture shall be seven hundred twenty-five thousandths (0.725) inches (18.42 mm.) high by nine hundred fifty thousandths (0.950) inches (24.13 mm.) wide with square corners.

(This is the British Standard suggested as an alternate Standard.)

The following should receive second approval if the black border is to be used.

24 (Discussion printed in No. 18, letters from Mfg. No. 19 and No. 22)
Camera and printer apertures shall be as follows:

Camera 0.700 in. (17.78 mm.) high x 0.925 in. (23.5 mm.) wide; 0.35 in. (0.89 mm.) radius corners

Printer 0.757 in. (19.23 mm.) high x 1.00 in. (25.4 mm.) wide; 3/64 in. (1.2 mm.) radius corners

DISCUSSION

DR. GAGE: Consider what the adoption of the British aperture sizes might mean. Suppose that all pictures, taken by the producers after a certain time, were taken with this standard British aperture. We would then have films which will go through the present machines and look just as they do at present. When enough of these films were accumulated so that people would not get into trouble, it would be possible for the theaters to have the large apertures fitted into their projectors and to make whatever changes were required in the focus of the projector lenses used or possibly fixing up the screens so that they do not get into trouble with a painted black border, and as the theaters change over they will find that the films received from the exchange come out with the photographically produced black border. I would like to have the Society do something fairly definite about this at the present time, so that all matters will be straightened upso that we can deal with the American Engineering Standards Committee in a way which will be dignified and have some weight, and which will not be likely to be too easily upset.

MR. COFFMAN: Is the Society quite sure of its psychological grounds on this? As I understand it, the apparent object is to compensate for variations in the intermittent sprockets of the camera or projector. At any rate, if there is a variation on the screen because of inaccuracies in the sprockets, if the projector aperture is larger than that of the camera, you will have a large bright field moving

against a small dark one. In other words, you will have variations which should be more apparent than the motion of the field within a fixed frame.

MR. RICHARDSON: The idea was this: We have been projecting the picture a couple of inches over on the black border of the screen to hide the effect when the picture moves in the stationary aperture. The idea of this is that the opening will move with the picture; that is, the picture will not move with relation to the visible opening on the screen.

MR. JOHN G. JONES: For Mr. Coffman's information: We have had a film made and demonstrated before the Society on two occasions and the consensus of opinion was that the black border picture appeared more steady.

MR. TOWNSEND: The projection was not as practised in theaters. There was no permanent black border. It was projected on an open screen. While I have no authority to represent more than one theater, I want to go on record as being very much opposed to that practice. Distortion in the theaters is still present, and I predict that it will be there for a number of years to come, and when you put that black border in, you bring back the distortion and compel the theater to put the black border in further or use new lenses, which cost from $50 to $100 apiece.

MR. GRIFFIN: I think Mr. Townsend misunderstands the situation. The size of the picture within the black border as we have recommended is a little larger than the picture projected by the standard aperture, and it was discussed at great length at one meeting as to what would be best to do—let it ride and consider the error as there and not recognize it or recognize that it was there and not make another error. If angular distortion is present on the screen where the black border film is in use, it is expedient to use a standard aperture. Where they have an ideal condition, the black border serves two purposes; it serves to eliminate the idea in a person's mind of movement due to very tiny inaccuracies in the several machines through which the film passes before and during projection, and eliminates from view small particles of dirt that sometimes occur at the aperture. That is very bad, and inasmuch as the standard aperture can be used with that type of film, I do not see why it should not be adopted.

MR. JOHN G. JONES: It seems that it has not been made clear that this Society is not forcing the use of the black border. It gives the conditions if and when people want to use it.

PRES. COOK: For the benefit of the Society, it might be well to state whether this recommended practice is being followed by the makers of cameras in this country with which most of the pictures are being taken. Does any one know whether this corresponds with the camera aperture in general use? I would also point out that we have not very many members present who are as vitally interested in projection from an exhibitor's standpoint as Mr. Townsend, and possibly his being in the minority might not make it evident that the majority of exhibitors may take a different view from what we do from a theoretical standpoint.

MR. CRABTREE: Has this been discussed with the American Society of Cinematographers?

MR. JOHN G. JONES: The Standards Committee have worked out the dimensions for the apertures for the camera, printer, and projector, so as to project a black border. The dimensions arrived at were practically the same as those adopted by the Incorporated Association of Kinematograph Manufacturers, Ltd. Up to this time this matter has not been taken up with the American Society of Cinematographers.

MR. PORTER: I should like to remind this body that this black border was demonstrated twice at two different meetings 6 months apart, and it was the opinion of each meeting that it was desirable. I understand Mr. Jones has the films here and will show them again if the Society wants to see them.

PRES. COOK: The fact that we are favorably impressed with its desirability is hardly sufficient reason for its adoption, because there are many reasons why the present width of film might be considered too narrow for ideal results. The wider film might cause a better effect, but we should not think of increasing it, so that it seems to me that the fact that the picture has an obvious advantage made that way is hardly sufficient reason for its adoption, and it is my impression that most of those vitally concerned with the projection of these pictures will join Mr. Townsend in emphatic protest against the use of the black border. It is rather revolutionary to expect that the projectionists will adopt it. I think we should go rather slowly in the adoption of something quite so radical.

MR. PALMER: I think that Mr. Griffin has explained this in a very clear way which removes the objection that Mr. Townsend has. If you use the same aperture in the projector as is standard, you will not be bothered by the black border, and it is only the man who

wants the black border who needs to be considered. He can use a slightly larger aperture in his projector; it will be there if he wants it.

MR. TOWNSEND: I did not understand that that part of it was that way, but in raising the objection I had given it considerable thought. There are things encountered by projectionists that people who look at the shows do not understand. With the present standard we have of a frame line between the sprockets there is a variation from it which causes slight mis-frames. I get more complaints from the management because of slight mis-frames than for any other one thing, because the operator running the show has several other things to watch. He is looking at the picture at a distance of 160-200 feet, and the slight line apparent in the theater is not always visible to him. The more leeway we give him the better the picture will look. If you have the black border, unless absolutely correct, it will be too low or too high. I don't want to take a lot of time holding up anything, but I want to make my objections clear. I did not understand it would come outside of the present aperture.

MR. RICHARDSON: I do not think Mr. Townsend is quite as well in a position to judge of this matter because he looks on projection from almost ideal conditions, whereas this is particularly designed to take care of theaters having poor film and as a consequence a lot of movement. Another thing: Four out of five theaters have distortion, and this is cured by filing the aperture.

MR. GRIFFIN: I think Mr. Richardson does not quite understand. The size of the film picture is larger in all directions—vertically and laterally—than the standard aperture; therefore, when you file the edge of the aperture, you do not change the top and bottom.

MR. RICHARDSON: You will on the sides, because you make it more narrow at the bottom.

MR. GRIFFIN: The standard practice is to use a narrow aperture.

PRES. COOK: Is it not a fact that the point brought up by Mr. Townsend that the objection of the occasional appearance of the frame line would be very much aggravated by the presence of the black border? If it is hard to eliminate errors so great that the frame line will show, it would seem to require constant attention to prevent the frame showing at the top or bottom.

MR. GRIFFIN: I am inclined to agree with Mr. Townsend.

PRES. COOK: The effect of a frame line is very unpleasant and this would come in constantly.

MR. TOWNSEND: That is fundamentally my objection; it is almost instinctively so.

MR. GRIFFIN: I move that it be laid over.

(*Motion passed to lay the recommendation on the table.*)

MR. L. A. JONES: I suggest that the Chairman of the Committee take this up with the American Society of Cinematographers before the next meeting.

DR. GAGE: The question has come up now as to what are we going to do with dimensional standards. We are in a jam in this case of projector aperture sizes.

I should like to get the last two items off the list or get the projector aperture off the list pending second adoption.

PRES. COOK: Does the Chair understand that we have already adopted 0.6792 by 0.906?

DR. GAGE: Yes.

PRES. COOK: The object of the second one is to provide for the subsequent use of the black border which we have voted to lay on the table for future consideration. Would it be logical to adopt the projector aperture at this time without apparent justification for any change?

(*Motion made, seconded, and passed to lay the recommendation on the table.*)