Film-Tech

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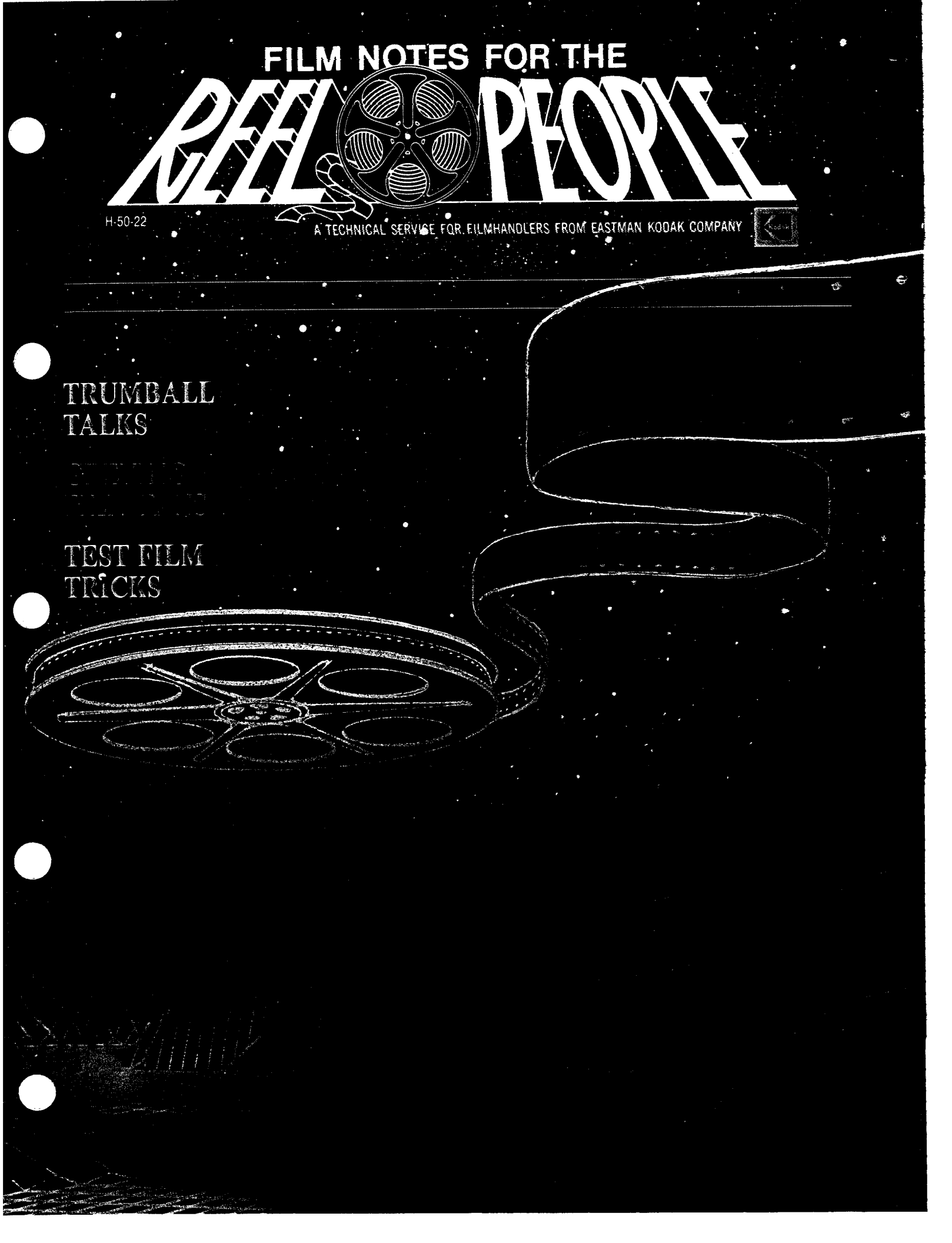
FILM NOTES FOR THE

REEL PEOPLE

H-50-22

A TECHNICAL SERVICE FOR FILMHANDLERS FROM EASTMAN KODAK COMPANY



TRUMBALL TALKS

TEST FILM TRICKS

FILM NOTES FOR THE
REEL PEOPLE
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SUMMER 1988

CONTENTS

EDITOR'S MAILBOX

We have been having a heated discussion on the effects smoking has on projection quality. Some feel it doesn't matter—others are adamant that smoking is detrimental to a quality presentation. Could you give us some information on this?

Debbie Meissner, Columbia, SC

Smoking decreases projection quality in many ways. The ashes, especially when coupled with low relative humidity, become dirt on the film, the projector and the film transport. The nicotine film that is generated by cigarettes will adhere to the film and all of the optical components. This can cause a decrease in sound quality when covering the sound lens, flare and soft focus when covering the port glass and projection lenses and decreased light output when effecting the lamphouse reflector.

In addition to the effects in the booth, smoking in the auditorium will cause the screen to yellow. Our advice is not to allow smoking in the booth, auditoriums or any film handling area.

I have seen advertisements for Kodak's "It's Your Image" seminar. Would you please give me some additional information?

Art Cooper, Seattle, WA

The theatrical experience represents the culmination of an investment of millions of dollars and the creative talents of hundreds of individuals. The theatre is the final and most important link in the distribution chain. In the seminar we want managers and operators to consider whether or not they would like to be paying customers in their own theatres.

The seminar addresses visual considerations, audio dynamics and the theatre environment. Kodak offers "It's Your Image" as a service to the motion picture industry. Seminars are scheduled at your convenience and at the location of your choice. You provide a slide projector, 35 mm projection capabilities and a group of 30 or more participants. To schedule a seminar, contact Terri Smith or Barbara Stokes at (213) 464-6131.

Photo by Virgil Mirano

DOUG TRUMBULL

Q: Please tell us a little about your background, as director, producer, and in special effects.

A: I began by studying architecture, which I thought would be my career. In the process of taking general art classes, I advanced rapidly into technical illustration. I generated a portfolio of illustrations which were like *Omni* magazine covers. I took the portfolio to animation studios and wound up with a company called Graphic Film Corporation. They were responsible for creating films about the space program and training films. I worked there for nearly three years on special projects, culminating in a project for the 1964 World's Fair. This film was shot in a special 70 mm process known as Cinerama 360, which is similar to today's large format, large curved screen, Omnimax presentation. Stanley Kubrick saw the exhibition and hired me to work on *2001*. Working with Stanley Kubrick was the opportunity of my life. I was 23 then and working on experimental photographic and artwork approaches for *2001*. I did illustrations and miniature construction for that film, helping to create the planets, moons and stars.

Q: What was your most important contribution to *2001*?

A: I would think it to be the development of a special effects process called the star-gate light effect and slit-scan technique. It has become a staple in blue-screen and special effects starfield photography. Following *2001*, I opened my own company and used some of that type of technology on television commercials and network ID's for ABC.

Q: When did you return to working in feature films?

A: My company was awarded a contract to work on Robert Wise's *The Andromeda Strain* in special effects. I followed that by writing and directing a film for Universal called *Silent Running*. I worked with both Michael Cimino and Derek Washburn on the script and had complete creative control of the final cut. It proved to be a great experience for me as a filmmaker.

Q: Obviously, you had a great deal of filmmaking experience prior to your development of Showscan. Can you tell us how the large screen, high frame rate, Showscan format came about?

A: By 1974, I had enough special effects experience to realize that recording an extremely complex image on film is a lot more than simply aiming a camera at a live-action scene. I wanted to expand the capacities of the film medium. There seems to be a strong consensus amongst the people that had worked on *Star Wars* and *Close Encounter of the Third Kind* that we were limited on just how much further we would be able to go. Projection rate seemed to be a logical place to start for improving image quality.

Q: How did you arrive at sixty frames per second as the optimum frame rate for the Showscan process?

A: We did some tests in 16 mm from 24 to 96 frames per second. Although 16 mm did not have the full capacity we needed, we shot a ten-minute demo reel of roller coaster and flume rides and other experimental material. It was shot and projected at 72 frames per second. This was met with enormous enthusiasm, but we felt we needed to progress to 35 mm. We did anamorphic tests at 24, 36, 48, 60, 66, and 72 frames per second. We tested each audience member in laboratory conditions, hooking them up to electrocardiograms, electroencephalograms and galvanic skin response apparatus. Additionally, we asked them a series of subjective questions regarding which films they enjoyed the most and which they felt most actively involved in. The response indicated that the human nervous system seemed to have difficulty processing more than 60 frames per second. We settled upon sixty because we wanted the process to be video-compatible with good resolution in addition to vastly improving the perception of the moving film image.

"...recording an extremely complex image on film is a lot more than simply aiming a camera at a live-action scene. I wanted to expand to the capacities of the film medium.

Projection rate seemed to be a logical place to start for improving image quality."

Q: "Frame rate" seems to be a hot topic right now within the industry. How do the different speeds under consideration: 24, 30 and 60 frames per second affect the quality of projection?

A: If you graph human physiological response with frame rate as the variable, you will immediately see that testing at 24 frames is at the very bottom of the list of human perception. Anything lower than that flickers and is exceptionally jerky. As you increase to 30, there is a substantial and immediate increase toward quality and response to the film. It eliminates flicker, increases brightness, and enhances color saturation. If the rate is increased even more, up to 60, you will see that the physiological response doubles again; and then seems to level off at 60. There is a substantial difference, then, from 30 to 60.

Q: Digital sound is topical now. When do you feel this technology will be practical for commercial theatres?

A: I think it is safe to say that some type of single-system digital optical soundtrack would probably be available within a couple of years.

Q: What are the advantages of digital sound versus the current optical and magnetic formats?

A: The MPAA recently completed a study regarding the potential improvements for sound on film. I would say the present optical tracks are roughly equivalent to 78 rpm records in sound quality. Although Dolby has done a marvelous job of improving sound techniques through processing, there is still a great amount of surface noise. The fundamental optical track, which has been used since the inception of sound with movies, is basically flawed and limited in response.

Q: What about magnetic tracks?

A: Magnetic recording, like the six-track magnetic stripe on a 70 mm film, is much higher quality, although there is quite an expense difference since each must be done individually. We have created a monster of sorts by abandoning production in 65 mm and making all of the 70 mm optical blow-ups from 35 mm negatives. You may save money by using 35 mm rather

than 65, but then you increase 70 mm print costs without a real gain in quality. My philosophy is to proceed in the opposite manner—to do it at the camera end, when you are in production. If you are going to spend millions of dollars on sets and props and actors and locations, the most prudent and cost-effective thing to do is to capture all of that information accurately. *Then* you can print down to any format you desire. You can have a 70 mm print that is absolutely spectacular, three or four times better than a 35 mm blow-up. You get a vastly superior video transfer as well.

"People will come in greater numbers and be prepared to pay an increased ticket price if they receive a high degree of added value. Cinerama demonstrated this some years ago when they offered a special kind of entertainment."

Q: Why do you suppose the studios elected to stop shooting in 65 mm?

A: When the consent decree in 1940 made it impossible for the studios to own their own theatres, the technical competition was put on a back burner. So some of that mandate to improve technology fell to exhibition. Until very recently, the only technological improvements being made have been Eastman Kodak Company coming up with faster films or some type of new print medium. Reinvestment in equipping the theatre from a technological standpoint is crucial to maintaining a presentation edge over in-home formats.

Q: The vertical integration of distribution, through theatre ownership, can potentially impact this very area to which you refer as well as the more traditional ways of doing business. Do you see this as a positive restructuring?

A: It is going to be very important to people who want to improve the quality of motion pictures because it is the first time we now have a business connection between production, distribution and exhibition. We may start to see a re-emergence of technical competition between theatres as well as producers. I believe that in the very near future, for instance, a studio will commit to producing a modestly-budgeted film with 60 frame per second frame rate, to be exhibited initially in a small number of theatres. I believe audience will be tremendous for this type of premier experience. People *will* come in greater numbers and be prepared to pay an increased ticket price if they receive a high degree of added value. Cinerama demonstrated this some years ago when they offered a special kind of entertainment. They reached the non-movie-goer very effectively. There were family groups, corporate and church groups. They operated 52 weeks per year and charged an average of 50% more than regular theatres. If you offer value, the audience will pay.

Q: 1987 was a banner year at our box offices. What do you think exhibitors can do to maintain or increase theatre attendance?

A: They have to continue to make the experience of going to a movie more spectacular, pleasant, and enjoyable, as well as convenient. The multi-plex is a mixed situation—convenient because of the variety of films, but frequently designed without strong presentation quality considerations.

Two upgrading elements that I feel strongly about implementing *right now* are digital sound and 30 frames-per-second film speed. And I would combine those with industry-wide acceptance of a new aspect of ratio, which would be 2:1. A large percentage of the 20,000 plus auditoriums in the U.S. have their screens permanently masked at 2:1. They cut off 1.85:1 pictures and they cut off 2.35:1 pictures. Whether the director shoots anamorphically or flat, his/her pictures are going to be arbitrarily cropped in theatres.

Exhibitors have it in their power to trigger an industry-wide format change to 30 frames-per-second, which would vastly improve picture quality. It will also make pictures compatible with television. If the theatrical business does not embrace 30 frames and digital stereo, we will see a continued re-balancing of the scales and a slow but inevitable erosion of the theatre box office in favor of the video market. And that would be undesirable for the movie industry across the board. ●

Show Us Your Stuff!

We all know the entertainment experience offered by theatres is hard to match. In an upcoming edition of ***Film Notes*** *we will be highlighting your efforts to tout the fact. Send us the details as well as any photos of your marketing efforts—innovations, circuit-wide events, theatre promotions, or customer service efforts which have impacted the attendance or have increased the awareness of the public by promoting the movie-going experience.*

Send your accomplishments to:

Film Notes for the Reel People
Eastman Kodak Company
6700 Santa Monica Boulevard
Hollywood, CA 90038

THE REEL TEST FOR YOUR IMAGE

by Glenn Berggren, Vice President, Optical Radiation Corporation

Among the many specialized test films available through SMPTE (Society of Motion Picture and Television Engineers) are

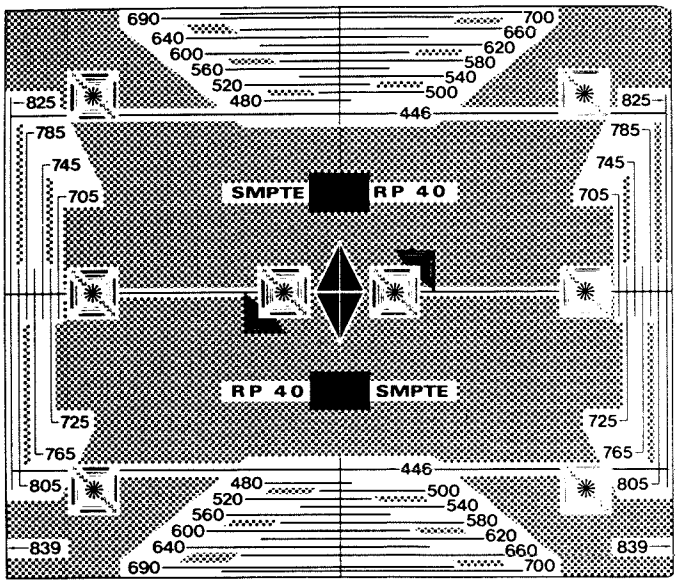


Figure 1

"image" test films. The most popular of these films is 35-IQ, also known as RP-40 *(Figure 1)*, which is utilized with 35 mm projection systems. 70-IQ or RP-91 is used in conjunction with 70 mm projection systems.

The 35-IQ test film was introduced in 1970. The introduction of 35-IQ began with a technical paper given in 1968 (SMPTE Journal, December 1968), which proposed replacing the test film in use at that time (APAL) *(Figure 2)* with a new test film. The new test film would allow the quality of the image to be measured. Dr. Fred Kolb of Eastman Kodak Company supervised the creation of the final pattern and the method of manufacture. The final pattern included a checkerboard pattern background having 50% light transmission, measurement lines for sizing the film image on the screen, as well as 8 NBS optical resolution charts. The master

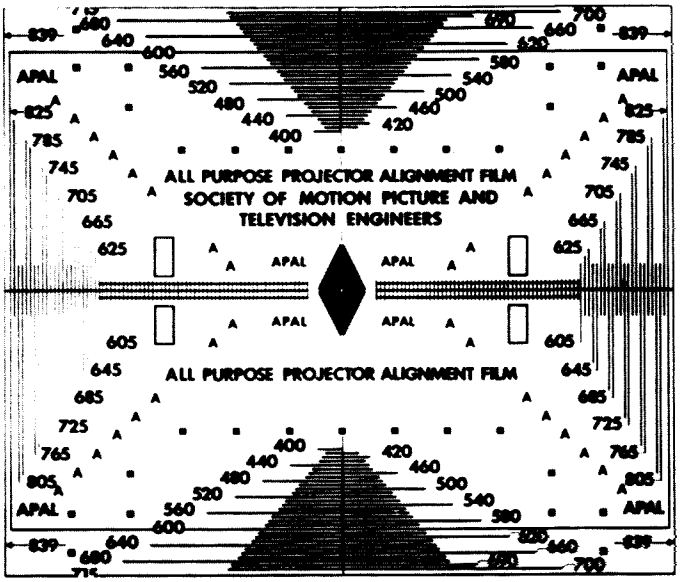


Figure 2

pattern was created twenty-five times larger than the image area it would cover on film and then photographed.

This unique image test film is widely used in the United States as well as many foreign countries because it includes patterns which can be used in many different modes.

—It allows for a **Quick Setup** of new or revised projection systems;

—It permits **Minor Analysis** and adjustments of the projector;

—It permits **Major Analysis** and adjustments of the whole system;

—It can be used for basic **Research and Development** of new lenses and projection equipment.

Quick Setup

To align your projection system, thread the test film through

the projector, as a loop or on a reel, so that the blank soundtrack area is accurately located and the printed text can be read correctly. This assures that the emulsion is located toward the lamphouse, as in a regular release film, so it will function normally in the projector gate. Because the film is made with such great accuracy, it becomes a precision tool, like a micrometer, to guide adjustments and to make final decisions about the edges of the image and lens focal length.

The vertical lines are marked **.825** for non-anamorphic ("flat") format films and **.839** for anamorphic (Scope) films *(Figure 3)*. The SMPTE does not recommend exceeding the edge lines and some technicians cut aperture plates within those lines. However, filmmakers feel that excessive cutoff of the sides of the picture (called cropping) ruins their intended picture composition.

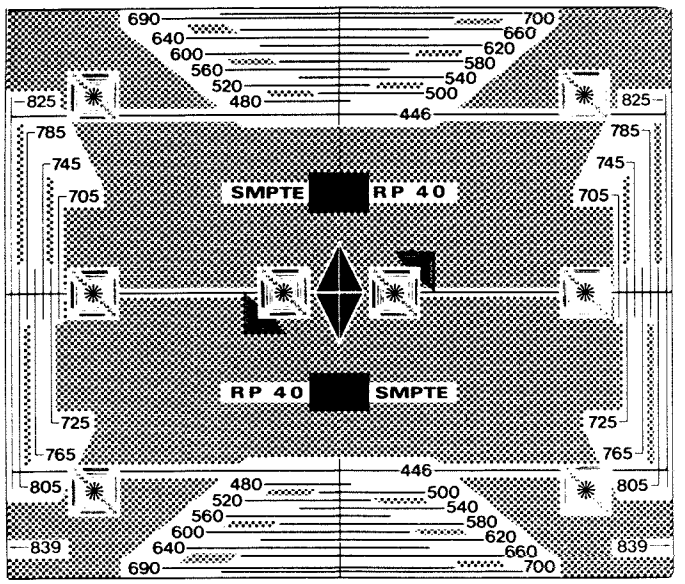


Figure 3

Excessive cropping can lead to titles and live action being cut off.

There are many horizontal lines but only a few are meaningful in normal projection. The outer limit is the **.700** line at the top and bottom, which is full frame height for anamorphic features. The lines marked **.446** are for films with 1.85 aspect ratios *(Figure 4)*. Cutting the aperture plate smaller than 0.446" x 0.825" is not recommended. Ideally, the .446 and .825 lines should be visible on the screen surface for non-anamorphic films.

For the larger anamorphic (Cinemascope or Panavision) format the image area is ideally 0.839" wide by 0.700" high. Excessive cropping should be avoided.

After setting the system up for each of the formats and selecting a lens, it is a time to consider focus quality, film motion and other image distraction.

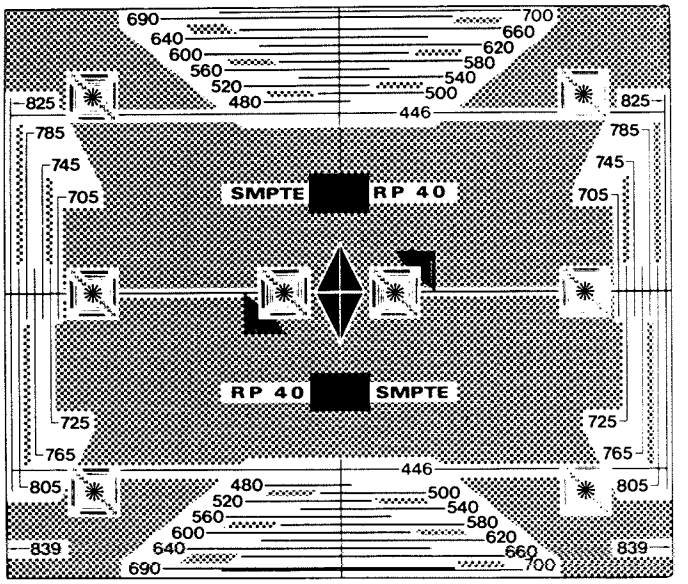


Figure 4

Minor Analysis and Adjustments

The projected test film should be viewed from the front row of seats in the auditorium. The 35-IQ film allows you to analyze lens attachments, jump and weave and picture centerline.

Aspect Ratio	Aperture plate	% Movement (One Square)
1.37:1	0.600" x 0.825"	0.7%
1.66:1	0.497" x 0.825"	0.8%
1.75:1	0.471" x 0.825"	0.9%
1.85:1	0.446" x 0.825"	0.94%
2.35:1	0.700" x 0.839"	0.6%

To analyze jump and weave select a steady visual reference, such as an edge of masking or microphone stand, which makes a shadow on the screen *(Figure 5)*. This enables you to compare the projected image to the steady shadow. The acceptable motion for pictures with a 1.85 ratio is less than one-quarter of one of the checkerboard blocks for jump and one-half a block for weave.

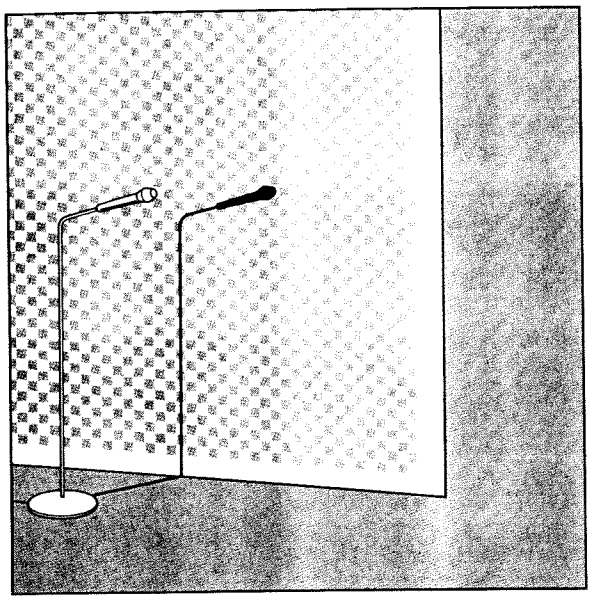


Figure 5

Film motion greater than this requires adjustments in gate tension or lateral guides.

Adjustments of lens attachments must be done in a specific sequence. With the 1.85 ratio lens in place, the projector leveling adjustment should be made so the picture appears level in the auditorium, namely, the horizontal lines in the test film should be parallel with the floor and ceiling. After leveling the flat picture, install the anamorphic lens. When the lens is first installed the image may appear skewed on the screen. The lens should be rotated so that horizontal auditorium and film lines are parallel and there is no geometric distortion in the test film pattern. Once leveled, the lens must be locked in place. Attach the key locator for easy removal and replacement. When using turrets, simply tighten the lens.

The projector centering adjustment should then be made. The centerline of the 1.85 ratio picture and the scope picture may not correspond when projected on the screen. To achieve a common centerline the lens mount may need to be adjusted. With turrets there is usually a lens adjustment which permits easy centering adjustments. If the projection system utilizes 70 mm film, the centerline of the 70 mm format must be taken into consideration.

Major Analysis and Adjustments

The major purpose of the 35-IQ test film is to provide a means of measuring image quality. As a rule of thumb, a defect in image focus which is observable in the front half of the auditorium when using the test film will also appear as a defect when projecting a feature film. If vertical lines have an obvious color fringe in the test film the vertical lines in the feature will manifest the same problem. Simply using the test film does not make a perfect image; the defects must be detected and then corrected.

To perform a thorough inspection of your image quality sit in the center of the auditorium. While projecting the test film through the anamorphic lens, note obvious defects in focus quality. Is there a side, top or bottom out of focus? Is there a defect in only one corner? It is important for the four corners of the image to be equal in quality. To achieve this, the relation between the gate and lens may need to be altered. Installing thin brass shims or loosening of either gate or lens mount may be necessary to correct the focus. DO NOT remove the gate or lens mounts! Alignment of top-to-bottom and left-to-right are a must to make further corrections of focus problems.

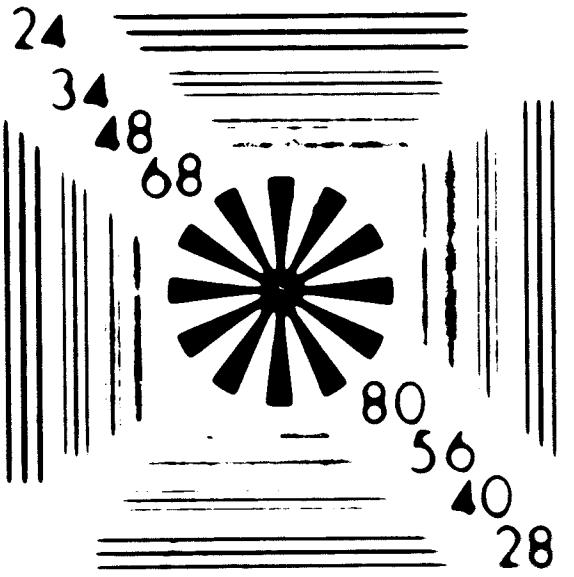


Figure 6

Once the sides and corners are in alignment, the relationship between corners and center must be considered. If there is an error, the film is not being held in the gate in a manner consistent with the lens design. The film may have a slight "sag" toward the lamphouse, as though a ball was pressed against it. Lenses manufactured before 1979 usually have edge focus problems when the center is in focus, particularly with the 35 mm anamorphic format.

When all of the screen areas have similar focus quality, the overall image quality can be judged. There are three resolution

patterns on each side, one above the other, and two side-by-side in the center *(Figure 6)*. The resolution from the patterns in the center may be expected to be slightly better than those appearing at the sides. Regardless of the actual resolution of each pattern, it is important that they appear to be similar. The side resolution patterns should have at least forty-eight line pairs per millimeter, marked 48 on the test film, while the center patterns should register fifty-six.

If you want to compare two lenses, do so after the aperture plates have been filed, the image leveled, the centerline determined, and the image focus has been adjusted. Lenses are designed with different field curvature factors. The better lens will give superior side and center resolution, not just a sharp center. Although the pattern of the test film is black and white, the fringe has obvious color. You may see dark blue, soft yellow or sharp red and green colors. These colors can be used to determine which direction the focus is located and thus help in making gate and lens corrections. Color fringing in the center crosslines will help you determine the correct alignment of the entire projection system. If the color fringe occurs on the vertical center line, only on one side, the lamphouse is off center from the center of the film and lens. A small amount of color fringe may remain. Any color fringing should be equal on both sides of the line and should not be visible to the audience in the front rows. Optical alignment is a necessary part of good image quality and light efficiency.

Research and Development

There are a variety of uses for 35-IQ in the research and development of new products. Factory engineers can use the resolution patterns to improve equipment performance regarding jump and weave.

When developing lenses, the overall contrast can be measured with precision light meters comparing the white and black squares and determining a contrast ratio. The brighter the whites and the darker the blacks, the more realistic the picture will look.

35-IQ does it all! Now, it is more valuable than ever. With its unique design, the test film can significantly enhance the projected image. ●

Test Film Storage

Improper storage and the introduction of dirt on the test film increase the possibility for error in results. Prior to running a test film, the following should be checked:

** Cleanliness;*

** Alignment;*

** Presence of physical damage.*

The film transport should be clean, particularly at all film contact points. Examine the film for dirt. If obvious collections of dirt exist, the film should be cleaned prior to projection. The mechanical alignment should be checked so the film is properly transported and guarded so distortions do not occur. Each time the test film is utilized, it should be examined for physical distortion. If the film is distorted, its reliability is questionable.

During storage, the film should be wound tails out and then rewound for usage. Keep the test film in its original can. Test films should be stored where temperatures will not exceed 80°F. Lower temperatures are preferred. For extended storage (over one month) the temperature should be 60°F and preferably below 35°F. If the test film is stored below 60°F, the film should be allowed to warm up in the unopened can until it has reached the temperature of the test area. A relative humidity of 25-30% is recommended for extended storage.

Two copies of each test film should be kept on hand—one for frequent use and a second used infrequently. Each should be stored in a different location. When the frequently used film becomes worn, it should be replaced with the other and a new backup introduced.

Trends observed in the results of both test films indicate a problem with the equipment. Trends observed in the results of only one indicate test film problems.

THE GREYING OF AMERICA'S FILM FANS

by Mike Shalett Reprinted courtesy of *Radio & Records* Magazine

Motion Picture Attendance Fueled by 25+ Demo

The average age of people who attend motion pictures is increasing, according to data just released by the Street Pulse Group's Soundata National Music Consumer Study.

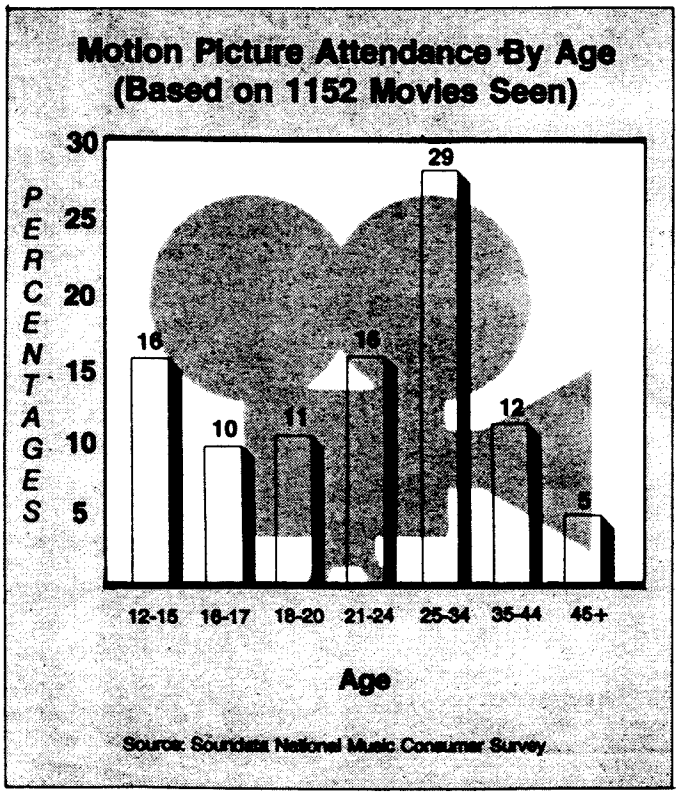
Nearly half of the 1152 movie tickets purchased and recorded in daily diaries by our panel for the month of October were made by someone 25 years of age or older. Six out of ten tickets for the month's number one film, "Fatal Attraction," were bought by people in this older demographic.

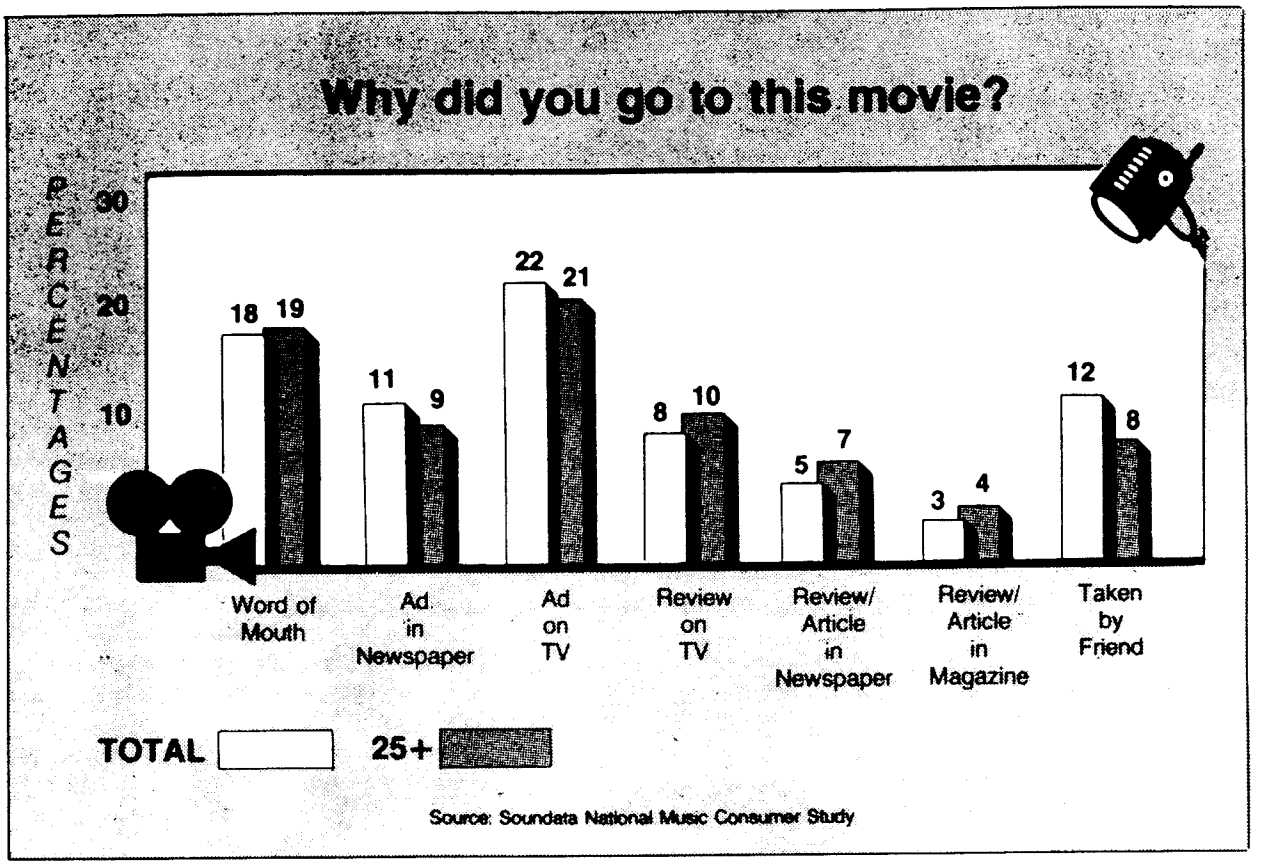
People in this age group generally attend movies as a couple, meaning they're responsible for buying at least two tickets each time out. Sixty-two percent of this group saw films with another person. Only 12% went to the movie alone, while 26% went with a group of three or more people.

Movie Choice Factors

The most popular reason given for attending a film among the 25+ share of our panel was television advertising. Twenty-one percent of the tickets purchased by this group were a direct result of TV ads. Word of mouth was the reason for 19% of our 25+ group attending a film, they're less likely to be dragged to a film by a friend than are younger panel members as a whole.

Also effective in stimulating attendance were the film reviews our 25+ group saw on TV or read in magazines and newspapers. Twenty-





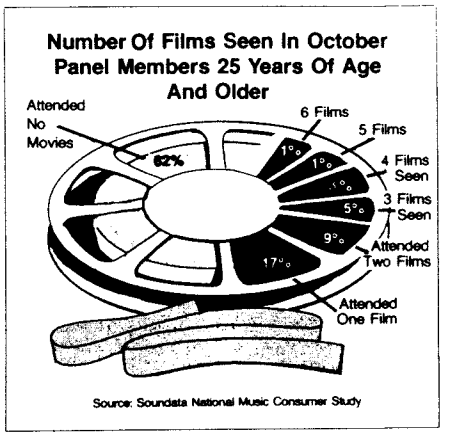
one percent of *all* films attended were based on a review. More specifically broken down, 7% of our 25 + group went to a film based on a newspaper review, or a magazine review, and 10% based on a TV review of the film.

Our study also reveals that radio isn't playing a very active role in stimulating movie attendance. Only one percent of our total panel went to a movie based on a radio ad, while *fewer* than one percent went based on a radio review. The 25 + members made up 45% of the tiny percentage who based decisions on radio ads, and 25% based the choice on radio reviews. It would seem that an opportunity is being missed here.

And even though movies and music are being tied together more frequently these days, it appears that music videos with film clips have very little influence on film choices. Fewer than one percent of the total panel cited a music video film clip as a reason for seeing a film, while there were no mentions of it by people in the 25 + group.

Film Attendance Statistics

Half of our total panel saw a film in a theatre during October. By comparison, four out of ten of our 25 + group saw a film during that same month. The mean average for our entire panel was one film attended. The mean average among those who saw *at least* one film



during the month was slightly over two films attended.

Our 25 + filmgoers saw slightly more films than the mean of all users. They are just as active as those 24 years old or younger. (The US Census indicates that there are more people 25 and over than there are 24 and under—and this should be taken into account.)

Obviously, today's so-called "greyhairs" are a more active film attending constituency than they've previously been touted to be. We'd better fill up the concession stands with Crackerjacks, bon bons, Sugar Babies, and Milk Duds. This group probably still has an aged preference when it comes to candy. ●

MOTION PICTURE AND
AUDIOVISUAL PRODUCTS DIVISION
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