Film-Tech

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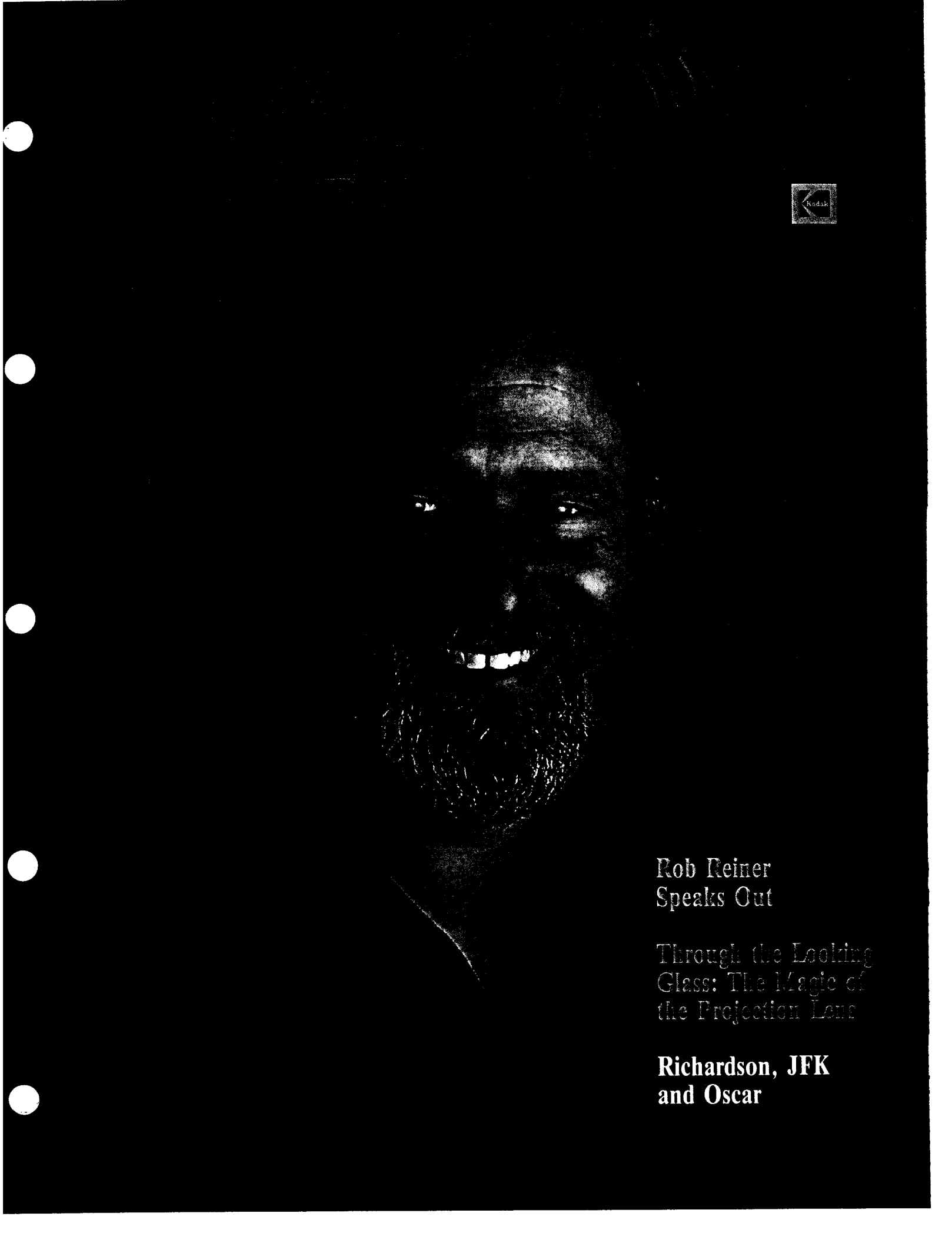

Rob Reiner Speaks Out

Through the Looking Glass: The Magic of the Projection Lens

Richardson, JFK and Oscar

FILM NOTES FOR THE REEL PEOPLE

H-50-29

A TECHNICAL SERVICE FOR FILMHANDLERS FROM EASTMAN KODAK COMPANY

FALL 1992

Letters to the Editor

Dear Film Notes,

I recently started receiving your publication and I was wondering how I could get some back issues. I am in the production side of the film business and I really enjoyed your interview with Robert Harris? Also, how do you determine what topics to write about, and what can I expect in upcoming issues?

J. Harrison
New York City

Dear New Film Notes Subscriber,
We thank you for your letter. We do have a limited number of back issues that we would be happy to send you. We are glad that you enjoyed the Robert Harris interview. He is a very insightful man and has a wealth of knowledge in film preservation, as well as film in general.

We try to cover topics that are relevant to film production and film presentation in our publications, such as the projection lens article featured in this issue, and to be continued in the next. We are always interested in any comments or questions that we can address. If the answer to your question is more in-depth than we can respond to in a few paragraphs, it might give us a possible area to cover in a future article.

Dear Editor,

Just a quick note to express my thanks for a superior presentation of *Film from Start to Finish* in Dallas, Texas. All who attended were impressed with the program. You may be receiving calls for seminar scheduling in our other areas. Again, it was terrific.

Thanks,

Steve Zuehlke
Area Manager, Cinemark Theatres

Plaudits to Cinemark for their company policy requiring the use of gloves at all times when handling film. Keep up the good work!

Contents

1 THE THEATER
Rob Reiner Speaks Out

2 TECHNOLOGY
Through the Looking Glass, The Magic of the Cinema Projection Lens

3 CINEMATOGRAPHY
Richardson, JFK and Oscar

If you have any questions or comments, please write to:
Editor, *Film Notes for the Reel People*,
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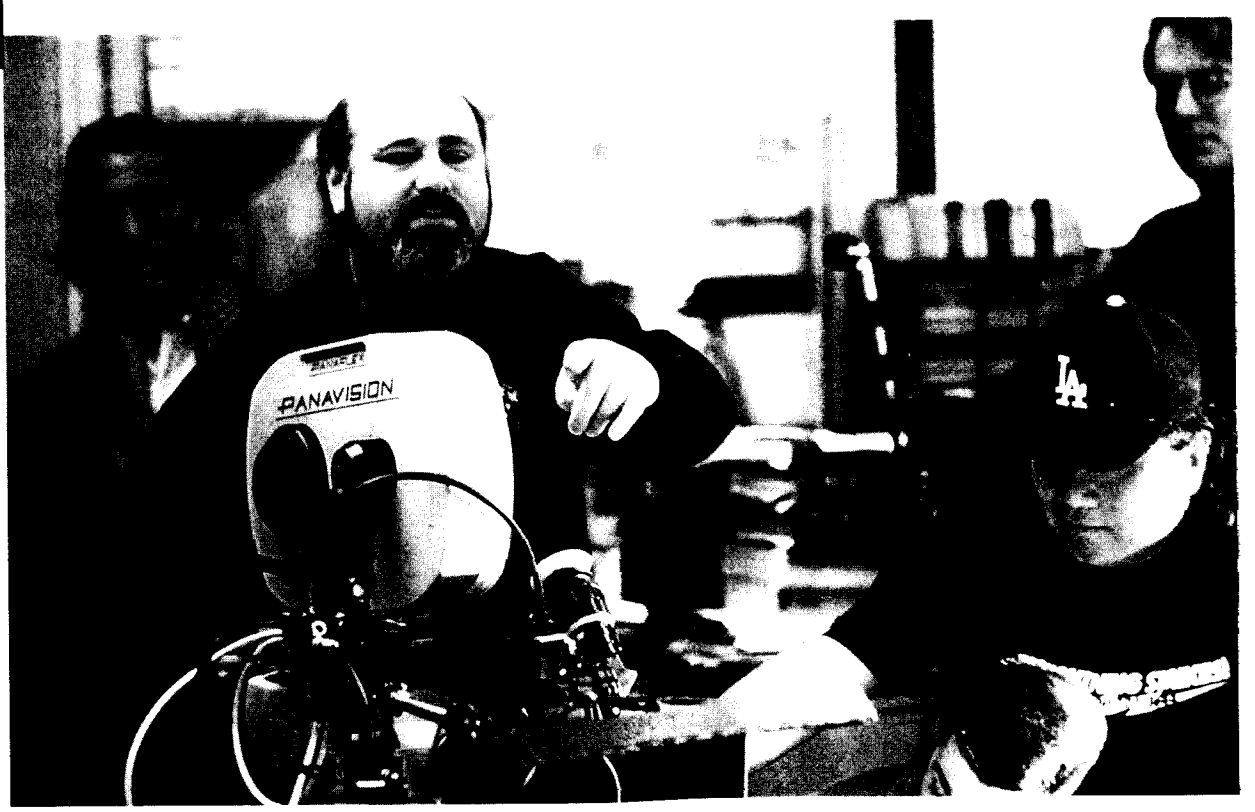
Reiner Speaks Out

Editor's Note: Rob Reiner will be presented with the annual Eastman Award for his impressive body of work at the 1992 Show East convention in Atlantic City. The following interview was conducted with him in late September.



What was the first movie you remember seeing as a child and did it have much effect upon you?

A. I think the very first one I saw was *Prince Valiant*. I was completely in awe of it. As a kid, you want to be everything; I wanted to be Prince Valiant. Films, you know, are very hypnotic. The whole experience just mesmerized me.

It seems that a number of people that go on to be extremely creative in their own right were profoundly influenced by their early experiences in movie theatres. What influenced you the most in terms of what you went on to become?

A. The biggest influence that I had was watching my dad work on *The Dick Van Dyke Show*. (Note: Rob Reiner's father is renowned producer-director Carl Reiner).

Did you spend much time on the set of* The Dick Van Dyke Show *as a child?

A. Yes, I spent an enormous amount of time on that set. In fact, I was there every single day during the summers of my fourteenth, fifteenth, and sixteenth years. I went to work right along with my dad each day.

Were you usually right around the camera or at different vantage points?

A. That particular show was shot before a live audience. It was shot with three cameras, a process

developed by Desi Arnaz for *I Love Lucy*. *Dick Van Dyke* was on a Wednesday through Tuesday schedule. They would rehearse all week and then shoot before a live audience on Tuesday night. The whole thing was done very much like a play and I would just stay around and watch them rehearse. My father wrote almost all of the episodes, and sometimes if the director was having staging difficulties or something wasn't working right, he would call my dad down to re-work the material and help the actors. I spent the whole week just observing, watching everything that they did and how it finally came together.

Misery, Castle Rock Productions

So would you say that it was films or television that provided the majority of that early influence?

Actually, it was theatre productions. When I saw *A Thousand Clowns*, I was seventeen years old and was working as a stage apprentice at the Bucks County Playhouse in Newhope, Pennsylvania. It was one of the first shows they had in the season and I watched it every night for its two-week run. I was just knocked out by it and I understood for the first time that you could really blend comedy with drama. It was a play that had a very serious core but yet it was handled in a funny way. I loved that they were able to strike that balance. I thought that if ever I got into theatre – I wasn't even thinking about films at the time – I would like to do something that makes the audience think about things, but laugh at the same time.

***I can certainly see that thinking about something like* Stand by Me.**

A. Right. *Stand by Me* is a good example of blending comedy and drama, and a film that is probably more representative of my personality than any I've done. But even if you look at something like *Misery*, it still has a lot of humor. There are a lot of laughs in that film, probably moreso than in any thriller you're likely to see.

You seem to have a deft touch which allows the humor in much of Stephen King's material to come through. He usually maintains his sense of humor even though he writes about some pretty terrible things.

A. Right. He does have a very good sense of humor and that's one of the things that often goes by the wayside when his books are adapted for the screen.

***Is Stephen King working with you on your upcoming production of* Needful Things?**

A. No, he doesn't really work on most of his adaptations. Once he sells the rights, he pretty much stays "hands off" as far as his own input. He's pretty happy with our association because he feels that we've done justice to his work.

Were there any directors other than your father who influenced you in your formative years?

A. Yes, Elia Kazan because his films were always character-driven, a real examination of human qualities. He was one of the most important directors for me. And, of course, for every film student, Orson Welles. Later on, Woody Allen became someone that I admired. Of the foreign directors, Francois Truffant had a big influence on me.

The average person thinks that a film director leads a kind of glamorous life. Could you tell us what the typical day in the life of Rob Reiner is like when you're behind the camera?

A. It's the furthest thing from glamorous! I get up at about 5:30 in the morning and get to the set around 6:30 or 7:00. I try not to work more than twelve hours. I go to dailies at the end of the day and usually get home about 8:30. I eat dinner and try to get to bed by 10:00 so I can start it all again the next day. That's pretty much how it goes for three to four months. It's not glamorous; it's really very intense.

We're eagerly anticipating your next directorial effort: A Few Good Men. *What kind of particular problems or pressures did you experience in bringing that to the screen?*

A. One of the things we had to deal with was the military. The Navy was interested and willing to help us. But the Marine Corps took a dim view of the project because the two villains in the piece happen to be Marines. We didn't look at it as an indictment of the Marine Corps; we looked at it as a plaudit to the military justice system and, in the piece, the judge is a Marine and so is the prosecutor. And they are both very laudable characters. So we didn't share the Corps' viewpoint, but they seemed to look at it in a very myopic way and wouldn't give us much support. We had to do a lot of fancy footwork and go around that in re-creating locations. Even the silent drill team that we used for the opening was from Texas A & M rather than the Marine Corps. I think that when they see the film they will realize that it is not an indictment of the Corps by any stretch of the imagination. It's just about an incident that happens in Cuba and how the military justice system is able to take care of its own.

How was it to work with Jack Nicholson and Tom Cruise and the rest?

A. That was the best part of it. That was great. I was a little bit worried that we might have a few ego problems working with big stars like that, but it wasn't that way at all. Everybody was an ultimate professional and they all worked very hard. They all came to work knowing what they were supposed to do and it made for a very, very easy creative experience. It was a pleasure to work with people at the top of their game and they were all there to give 100%.

When you function within your production company, what are the elements you typically gravitate toward in a script or a book?

A. Usually, I look for something that touches an experience I've gone through or something that I am currently involved with in my own life. *Stand by Me* was that and so was *When Harry Met Sally*. Even *Misery* was close to home. It seems odd, but it's about a writer who is trapped by his own success. I felt that very strongly after I left *All in the Family*. I was considered a TV actor and it was difficult to get people to think of me in any other terms. I really had to fight – it took me four years to get my first film made.

Do you have a desire to continue an acting career?

A. I like acting once in awhile. I'm not really driven towards it. I did a little part in a movie that was just finished called *Sleepless in Seattle* that Nora Ephron directed with Tom Hanks and Meg Ryan and that was fun. I had a small part in *Postcards from the Edge*. I also did a small role in *Regarding Henry* that got cut out.

> *"I was considered a TV actor and it was difficult to get people to think of me in any other terms."*

You mean that even you can end up on the editing room floor?

A. Yes, even me. I wasn't part of the story. And I always tell this to actors when they audition for a role: Any time you go out for a part, look and see if your part is really vital to the story, because, if it isn't, you could very easily get cut out. If you are part of the story, they have to keep you.

If we can move forward into the release process now: As you experience your films in theatres, in a double-edged way, as both a customer and the creator of what's up there on the screen, what do you think the theatres could do better? What do you think they are doing well?

A. For the most part, the sound systems and projection equipment are not as good as you find when you're on the dubbing stage or at the lab. If you go into the smaller towns, into the smaller theatres, it can be even worse. I remember seeing some films in Nevada when we were shooting *Misery*. I'd go in there and I could barely see the film. For whatever reason, they kept the light so dim that you could barely see the picture. I don't know if it was to save money on the bulbs or what, but it wasn't anything close to pristine conditions. But then there are a lot of good theatres who seem to take care to get good sound and projection and they're comfortable. But, by and large, you never see your film as good as when you're making it. It's kind of depressing for most film-makers after you've spent all this time getting the color balance just right and perfecting the way it sounds and when you go to the movies, it is just never quite all there. I think that might be changing in the near future because they're working on these digital sound systems that are separate from the film track. One of the problems you have with sound is that once your optical stripe is married to the film, it can never be as clear as you hear on the mixing stage because all the tracks are squeezed and put onto this optical stripe, so a lot of the sound is actually cut off. One of the new systems I've seen has the sound on CD's that are separate from the picture. It'll be a revolution in sound. It'll be the biggest advancement in sound since Dolby stereo. It should be coming in the near future.

"I always go to the movie theatre. . . I don't do it just to test audience reaction. That's the way I like to see the movie. It's fun for me because I'm with people that are enjoying the same experience."

Do you ever go into the back of theatres and watch crowd reactions to your films?

A. Yes, I certainly do. That's the only way you know what you've done. You go to all the premieres and screenings but that's not really a paying audience. You really have to see it with a paying audience to know how well a picture plays. Even when you're previewing, you get these research-invited audiences. And it's not exactly the same. Even though they're movie-goers, they still haven't paid their $7.00 or $7.50. And when somebody pays to see a film, their attitude is a lot different than when they're going for free. Besides it is one of the most fun experiences for a film maker – to go to see it in a real theatre with a real audience. As a matter of fact, I never go to screenings unless it's a friend's picture or something I have to see. I always go to the movie theatre. I always pay my money and watch the film because that's the way everybody else goes to the movies. And I don't do it just to test audience reaction. That's the way I like to see the movie. It's fun for me because I'm with people that are enjoying the same experience.

It's really refreshing to hear you say that you keep in touch with your audience. It's critical so that movie-makers aren't just making films for themselves.

A. I was raised that way and I watched my dad work and every week they went before a live audience with those little 23-minute plays. And when I was in *All in the Family*, 200 shows, each of those shows put me in front of a live audience. So I learned what audiences react to, what they like. And I think stage actors have it a lot better than those who were brought up in the film business because there is a connection with the audience. Film is an extension of theatre. You have to have that audience connection.

Do you have any ideas about promoting your films in theatres?

A. I think they do a pretty good job of that. Most theatre owners are pretty savvy, putting standees and one-sheets in the lobby and trailers on the screens. It's a rough business, a real high-risk crap shoot. They never know whether a film is going to be a hit or a bomb and they have to play it either way and that's tough. One important thing the theatres can do is make sure their equipment is clean and updated. Nobody likes to go into a dirty theatre. But I've noticed in the last few years that a number of the theatres seem to put in a longer time period between showings of the picture so a crew can actually get in and clean the theatre before a new audience comes in. I remember as a kid that I'd go to the movie theatre and there would be crap all over the floor and pop spilled everywhere. Your feet would stick to the floor and all of that. Most of the chains that I have personal experience with like AMC, Loews, Mann, and Cineplex make sure those crews get in there and clean the place between shows. It makes a big difference.

When Harry Met Sally, *Castle Rock Productions*

It's great to hear that you're such an avid movie-goer.

A. I'd rather be in a movie theatre than anywhere else.

We've thought so for a long time and it's heartening to hear someone that is a frequent movie-goer as well as a major film-maker affirm our beliefs about theatres.

A. I think all the theatre chains are starting to think in terms of total experience and customer satisfaction. The only thing I don't like in some of the "plexes" is that some of them are so tiny that you really don't have the film-going experience. I think you need at least 200-250 seats to really get the sense of watching a movie with an audience. Seventy-five or eighty seats doesn't give you that feel. It's like you're in someone's living room. You go to the theatre for a big feeling and that's very important.

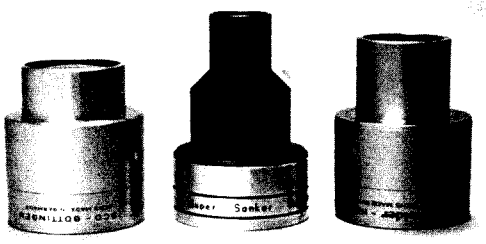
Through the Looking Glass

The Magic of the Cinema Projection Lens

by Glenn Berggren
Cine-Consultant

A. *What is Expected of the Projection Lens in the Cinema? Yes, the Audience Expects Magic!*

Because of the unsurpassed image quality of 35mm or 70mm film, the modern projection lens is expected to recreate an exact duplicate of the film image on the screen, with no problems, no fuzz, no fringing, no loss in image resolution or contract, and with no undue loss of light as it passes through! That, of course, is a massive requirement, and lenses do that on a scale of 1 to 10, with a 10 having yet to be achieved! Actually, the 'new crop' of European Super Resolution Air-spaced, Multi-coated (ESRAM*) lenses available only since 1978 are much closer to a "10" than any previous design. If measured in optical bench resolution, or in test lab MTF (Modulation Transfer Function), the 'new-crop' rates high, probably in the 8.5-to-9.5 group, while older American-made lenses (all of which were designed around 1950 or before) are closer to a 5-to-7 on the 1 to 10 scale.



New Japanese and German Lenses (left to right)
ISCO Ultra 115 mm f/2 – German
Super Sankor f/1.8 2" – Japanese
Schneider Super Cinelux 90 mm – German

Older black-barrelled 4 element lenses rated a poor 2-4. *This acronym is invented for this text only.

Projectionists and theatre management often expect that the lens will conquer "all problems" and make the screen image appear perfect. But screens, projectors and lamphouses, etc., can also help or hurt the image. For example, the lens cannot correct for the film-holding gate/trap that is twisted as little as 0.005" causing some part of the screen to be out of focus. Likewise, a bad alignment situation will cause fuzz and color fringing problems. Later we discuss "How to Get the Best Out of the Lens."

B. *What is a Standard Lens?*

For most projectors, the lens must meet the SMPTE/ANSI standard #243 for diameter, marking, threads and outside shape. This is so the lens will actually fit all the various types of projectors in use. The 'standard lens' is 70.6mm (2.782") diameter in the clamping collar area. The collar distance from the film is to be about 4" ± ¼", so that the reduced rear areas will clear castings and other projector structural parts. The 'standard lens' has a 36 thread/inch coupling thread, same as anamorphic attachments and magnifiers so they will actually fit together. Essentially all lenses of the ESRAM type meet the 'standard lens' specifications. Although there is no industry-wide standard for the lens' optical performance, the accepted quality must exceed 50% MTF at 50 cycles.

Older lenses (1946-1980) might have either 36 or 32 thread/inch coupling, and some lenses might be 4" diameter, (however are no longer made), or be 62.5mm diameter for European projectors only. Even older lenses might be the old uncoated Series I diameter of 2", in use in the 1930's.

C. *Is a Cinema Projection Lens Like Other Types of Lenses?*

Most people assume that projection lenses are like other lenses; like camera lenses, or telescopes, and so on, but the answer is NO! Projection lenses for motion picture film are a separate 'breed,' and not like any other lenses. There are a few similarities to movie camera lenses (which are far more expensive), but the modern projection lenses are designed as follows:

1. To perform best at wide open aperture usually near f/2.0. (Camera lenses perform best around f/5.6 or f/8.)
2. To have no iris adjustment. (Camera lenses need an internal iris to control film exposure.)
3. To have its best performance at long distance, perhaps 30 to 300 feet projection distance, while camera lenses are often best at short distances, perhaps 3 to 30 feet.
4. To have a smooth, fixed barrel diameter with focus adjustment as part of the projector. (Camera lenses often incorporate the focus adjustment.)
5. To have large aperture, usually f/2.0 ± 0.4, for efficient use of light, yet hold focus.
6. To have optical coverage for the diagonal of the 35mm (or 70mm) format, otherwise the corners might be dark. (Lenses for 70mm film are specifically so marked.)
7. To have a designed-in image curvature which equals and cancels the 'heated' film curve in the projector gate, so that focus can be obtained for the entire screen area.
8. To have excellent corrections of coma, spherical & chromatic aberrations, and the other optical aberrations that might be a problem. Tangential and radial resolution readings must be coincident otherwise resulting astigmatism will damage screen images.
9. To have all air-spaced lenses so that no internal cements can be damaged by the intense radiant energy from the xenon arc.
10. To be multi-coated on all optical surfaces to increase transmission efficiency, and reduce lens flare that reduces image contrast.

Items 5 to 10 have been fully addressed in lens designs only with the recent ESRAM lenses, while older lens designs had coatings of lower efficiency & more flare, more astigmatism, and image fields that were too flat or too curved, and so on. The arrival of the ESRAM type of lenses was the largest single improvement in screen image quality in about 40 years.

D. *How Do Projection Lenses Work?*

Projection lenses are a specific optical type called 'objective' lenses. Designed with multiple elements, the lens will have a specific focal length, (anamorphic attachments and magnifiers do not), and are designed to magnify the original film image by many hundreds of times for both width and height (of course in area, it might be 300,000 times magnification). In the process of doing this, it inverts the image top-to-bottom, and also left-to-right. Ideally, the lens will focus to a sharply defined image (all light rays from a point on the film should converge to a corresponding point on the screen). In reality, no lens is perfect, but modern designs come quite close!

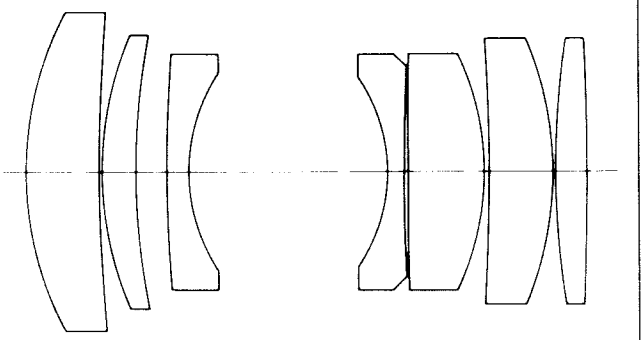


Illustration
*Cross section of the ISCO Ultra Star * HD Lens (f=85 mm)*

The light collected by the usual round collector/mirror is directed toward the lens in a solid cone shaped beam, such that the cutoff circle at the film plane is at least as large as the film format (or corners will be dark), and with the point of the cone beyond the film, perhaps into the lens. Of course, the magnified arc has actual size, so each ray of light in the cone has a cone of magnification becoming larger as it reaches the film.

This sometimes causes 'overshoot' around the sides of the back 'window' of the lens. The lens design must handle each and every ray, (even the vignetted ones which can cause color fringing on lettering), and hopefully permit all to pass through the lens. Of course, if the lens is an f/2.0 design, and a larger collector mirror is f/1.7, then the cone rim between 1.7 and 2.0 will not go through the lens; and if it did, it would most likely soften the focus sharpness, damaging the screen image. (Both ISCO & Schneider have lenses at f/2.0.)

In modern projection rooms, with film platters, the same projection lens is used for about 2 to 3 hours at a time. If there is no heat filter, not only will the film flutter more, but the lens will heat up during the showtime. If it heats up too much, the barrel of the lens might expand, and cause the focus to drift during the show (usually only a problem with shorter focal lengths). Such focus-drift should actually be called heat-drift. Some of it might occur in the heat effect on the gate/trap combination, too, making the problem worse. For this reason, the trend from 1978 to 1992 has been a reversal of the earlier trend from f/1.6 and 1.7 lens design (which were more subject to the focus/heat drift,) toward the ESRAM lenses of f/2.0, even f/2.4, which are far more focus-stable than the 1.6 to 1.7 types. Efficient heat filters in the lamphouse are essential for minimizing heat effects and optimizing image quality.

E. *How Does the Lens Squeeze or Unsqueeze an Image?*

Anamorphic lenses are used for about 20% of feature films (with names such as Panavision, Cinemascope, etc.) and usually higher budget films. These lenses are the 'squeeze' and 'unsqueeze' types. The anamorphic camera lens is the 'squeezer' and the anamorphic projection lens is the 'unsqueezer.' The word anamorphic means an optical effect in which the magnification in one plane is different than in the perpendicular plane. In projection lenses, the usual anamorphic attachment has a vertical magnification of 1.0, but a horizontal magnification of 2.0. Other anamorphic

Modern Anamorphic Lenses (left to right)
ISCO "Cinema scope" Anamorphic Ultra Star
ISCO Reverse Anamorphic 1/2x
Kowa Anamorphic 2x

lenses could be 1/2 in the vertical and 1.0 in the horizontal (that is reverse anamorphic).

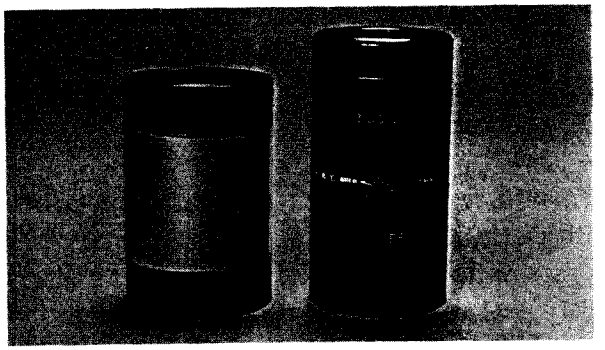
Although in the 1950's, many anamorphics were made with pairs of prisms which unfortunately were prone to color fringing. Since the 20th Century Fox introduction of Cinemascope in 1953, the usual, and preferred lens type is a cylindrical anamorphic. Between 1953 and 1991, all cylindrical anamorphics were 4 element, but in 1992, ISCO introduced a new 5 element anamorphic design with less color fringing and greater clarity.

All cylindrical anamorphics have a distance setting to adjust for the astigmatism created by the two magnification planes. There is the possibility that the two planes of magnification might cause the resulting images to focus at two different distances, which is the definition of astigmatism. The usual "Distance Ring" adjustment on the anamorphic attachment is actually an "astigmatism reducer," to hopefully reduce the astigmatism problems to zero. In practice, even a slight out-of-round of the collector-mirror can add to the astigmatism problem, and cause the distance ring to be set at a number other than the actual distance to the screen.

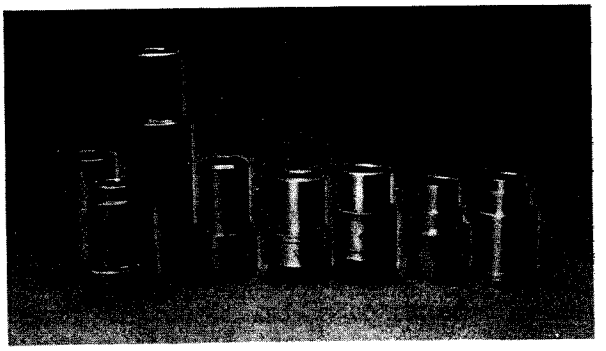
Anamorphic attachments are needed in the movies, because the standard anamorphic film format aperture shape is approximately 1.175 wide to 1 high (ratio) and the needed screen shape 2:35:1, so the added anamorphic lens of 2.0X factor does in fact provide the full 2.35 width to height "scope" ratio. The commonly used 1.85 aspect ratio is not anamorphic, and does not use all the film available, which causes

light loss and increased grain because it is much higher in overall area magnification than the anamorphic film format. The usual 70mm film format is already 2.20 width to 1 height ratio, and does not need an anamorphic, (although a special anamorphic of 1.25X ratio was in use with *Ben Hur* to expand the aspect ratio to 2.7 to 1). A good quality projection system with constant screen height for both formats will have better focus, more light, and less picture 'jump' with the anamorphic format than with the 1.85 format.

Series I & II lenses which were used prior to the 1960s. Series II lenses are still the standard today. (Bausch & Lomb, Kollmorgen, Kowa, Projection Optics, Wollensak)– in alphabetical order.



Close-up of Series I lenses–mainly used prior to World War II (Bausch & Lomb Cinephor, Kollmorgen Snaplite).



Lenses of the 1960s and 70s, many still being used today. (Kollmorgen, Bausch & Lomb, ISCO).

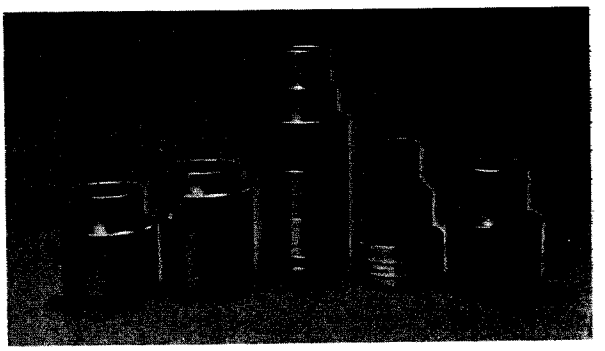
Of course, 70mm will give the best image quality of all, especially if taken from a 65mm camera negative.

F. *Older Lens Names and Types.*

For you theatre historians, the lens names in use in American and Canadian movie theatres include: Wollensak, Projection Optics, General Scientific, Bell & Howell, Ilex, Benoit Berthiot, Zeiss, Kowa, Taylor-Hobson, plus Kollmorgen, Bausch & Lomb, Schneider, Sankor (Nissin Optical) and ISCO-OPTIC, and perhaps many more. Most of these were phased out before 1957. Of the 14 names mentioned, only the last three supply new lenses today. The well-known Kollmorgen and the Bausch & Lomb lenses (both with origins in the 1920's) both phased out production in 1973. Projection Optics also phased out in the 1970's. At present all new Cinema Projection Lenses come from either Japan or Germany.

G. *Current Lens Design Types and Approximate Resolution.*

There are several basic lens types from the optical designers point of view, as regards projection lenses. First, and older are the 4 element 'Petzval' designs, which can be altered in design to have a fifth lens element. Second, and of much higher quality are the Double Gauss designs which have 6 elements, with improved modifications by adding a seventh, eighth or ninth element. All the current ESRAM lens types are the advanced Double Gauss types, and some with added elements, so that currently available are 6, 7, 8 and 9 element lenses.



Modern 1980s & 90s lenses (ISCO, Sankor, Schneider).

As a rule of thumb, the ESRAM 6 element lenses can have a 'bench' resolution of 150 to 175 Line Pairs per mm, the 7 element lenses for 35mm are more usually 170 to 200 LP/mm, and 8 element lenses can easily be 175 to 225 LP/mm. The currently available 9 element lenses are for the larger 70mm film format, so that fully uniform light levels and fully uniform resolution across the broad film diagonal can be obtained. (The older 4 element lenses, similar to the old Kollmorgen Snaplite or the ISCO Kiptar or Berthiot Neo-Cinestar in the black barrels, might have resolution of 50 to 90 LP/mm).

Always observe the following seven rules of lens cleaning.

H. *How to Clean a Lens*

First, clean a lens when it is dirty, that is, if it has a fingerprint, oil deposit or dirt particles on the outside glass surfaces.

Second, never clean the optical glass surfaces with dry materials.

Third, use a very soft material, preferably lens tissue.

Fourth, dampen the lens tissue (not dripping wet) with an approved photographic lens cleaning solution. Be careful not to get solution into the lens.

Fifth, wipe in gentle circular motions, and allow to air dry.

Sixth, the damp lens tissue can be used to clean the outer metal parts, after the optics are cleaned.

Seventh, gently blow away any loose dirt or particles with canned air if available.

NOTE: The scratches on lens surfaces damage the screen image, and are usually caused by improper cleaning. Never disassemble a lens – return it to the manufacturer if there are internal problems.

I. *How to Get the Best Images from Modern ESRAM Projection Lenses-Part I*

First, the lamphouse and screen must be properly selected and installed to have enough light. If there is not enough light, no amount of adjustment or modification of the lens will solve the problem, as lenses do not create light. The lamphouse creates the light, and the screen can help too. When using "gain" screen, install it with the proper curve (see SMPTE document #RP-95). Gain screens must be installed curved to obtain the "gain" improvements at the sides of the screen. A gain screen mounted flat will often create a 'hot-spot,' and the projectionist will usually readjust the xenon bulb to 'flatten' out the light (to reduce the 'spot' and bring up the sides), and in doing so reduces the efficiency of the system to the extent that it would have been better to have installed a matte (no-gain) screen in the first place. Further, 'flattening' the light can cause image problems.

Selecting a lens only for getting 'more light' will usually damage image quality and contrast. It is an idea left over from the 1950's when the screen sizes grew without lamphouses being upgraded. In those days, obtaining a 'faster' lens might improve the light situation somewhat, but usually left the picture focus soft, particularly for anamorphic films.

Second, regardless of the type of lens, projector or lamphouse, it is necessary to create an accurate optical alignment of the three items. In other words, the optical axis of the lens, the exact center of the film format and the optical axis of the lamphouse collector/mirror must be on the same axis in order for the lens to function best for the image, and also to get the most light through the lens. There are many types of alignment systems including the string, or the rod systems, left over from carbon arc days, or sighting devices (like alignment telescopes) or 'beam' devices, such as a precision laser unit in the lens holder, and a precision target in the collector/mirror. Such devices are used by theatre engineers today to assure precise alignment of all optical components.

Using SMPTE 35-PA (RP-40) resolution test film (the black & white section), the quality of alignment

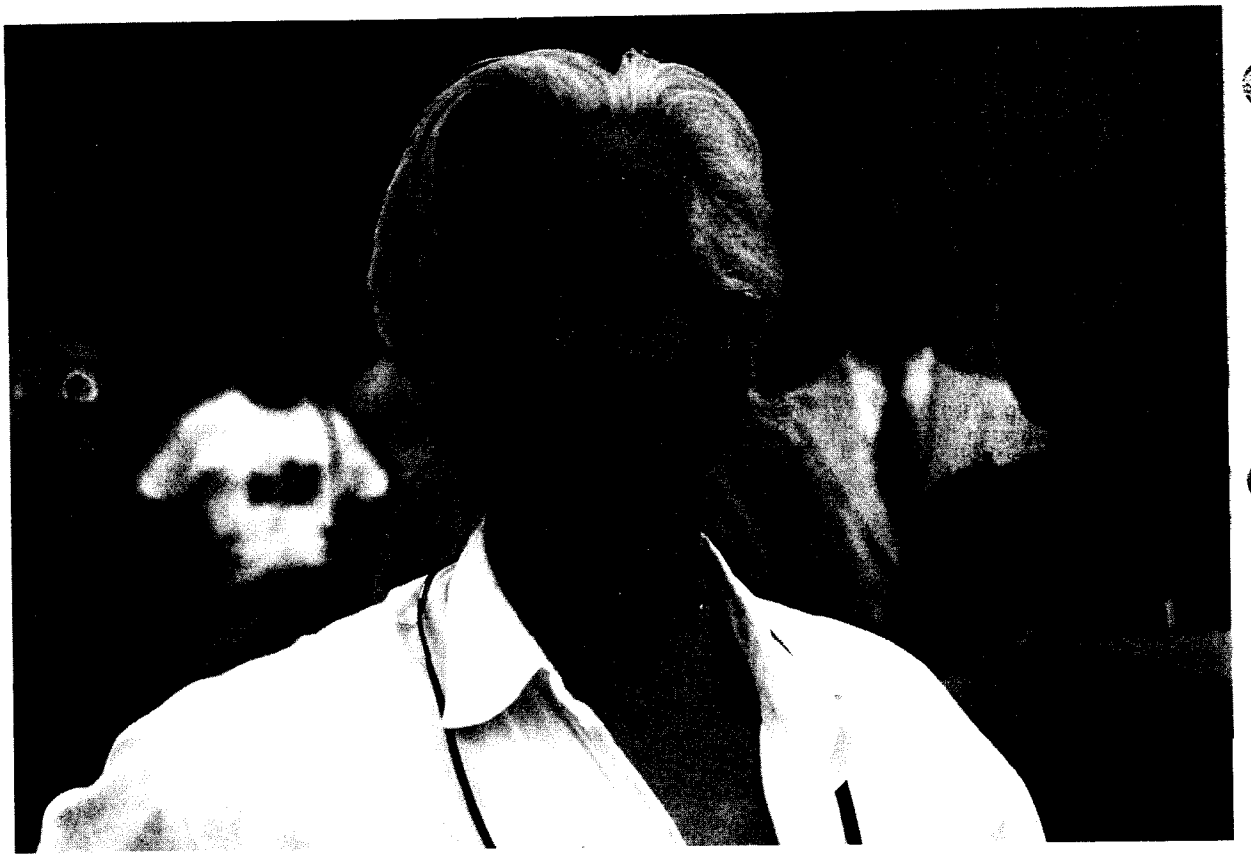
can be determined. Using the anamorphic lenses, focus the image on the screen carefully, then standing within a few feet from the screen, inspect the vertical and horizontal lines in the center diamond of the test film. There might be some color fringing on these two lines. If the left & right sides of the vertical line have different colors, then there is a left-right error in alignment. If the top & bottom sides of the horizontal line have different colors, then there is an up-down error in alignment. Note: often the small blocks on the RP-40 test film image on the screen might have a dark blue fringe around them, which is due to slight chromatic aberrations in the lens and not misalignment.

With alignment done properly, be sure that the RP-40 test film is sharp on the screen in anamorphic format, adjust the focus exactly for the horizontal lines only and then without touching the focus knob, adjust the 'Distance Ring' slightly so that the vertical lines seem in the best possible focus. Then lock the 'Distance Ring' in place. This procedure will provide better focus quality than simply setting the Distance Ring at the distance number, because this procedure also reduces the other astigmatism factors, such as out-of-roundness of the collector/mirror, etc.

Only after these adjustments are finished, judge, in anamorphic format, the sides and corners of the screen picture. If the Distance Ring adjustment, and the alignment, are correct, then the screen image should appear clear and sharp. There might be some focus error at top or bottom, or the right side may not appear as sharp as the left side, with the center sharp. This is a matter of 1, 2 or 3 thousandths of an inch (0.003" is equal to common paper thickness) in the gate fit in the projector. The lens can not correct this problem, although some like to turn the lens 180 to see if it provides different results. With Simplex and Century curved gate projectors, the gate rails can be loosened and a piece of thin brass shim stock can be inserted, particularly to solve the left vs. right focus difference. The shim adjustment can be made quickly, and it becomes permanent, provided that the alignment and lamphouse collector/mirror are not changed. Once having solved the 35mm anamorphic focus differences, you will find that 35mm 1.85 format will also look better, because the alignment and the gate shim hold for both formats. Note: you might have a situation where the sides, plus top & bottom of the picture look better than the center, and that is because some of the ESRAM lenses have resolution so high at the sides, that the center looks soft by comparison, where the film flutter in the center softens the focus, while the sides are held firmly by the gate rails.

The next article will discuss how to get the best quality from lenses and other "tricks" to enhance the "Magic"!

The "Distance Ring" on the anamorphic lens is used for focusing vertical lines, and then locking it into place.



Richardson, JFK and Oscar

During the past six years, Oliver Stone has directed *Salvador, Platoon, Wall Street, Talk Radio, Born on the Fourth of July, The Doors,* and *JFK.* All of these films are dramatized reflections upon the realities of contemporary life. Art and official versions of history sometimes collide in these circumstances.

All seven of these films were photographed by Bob Richardson. The cinematographer's collaborations with Stone are based upon both fate and trust. Richardson is a native of Cape Cod, Massachusetts. He became interested in film-making at the University of Vermont and continued his studies at the Rhode Island School of Design and later at the American Film Institute. After completing his apprenticeship at AFI, he did occasional insert work and second unit camerawork for features, but his primary occupation was with documentaries.

That experience sharpened his skills for working creatively with whatever resources may be available. More importantly, it refined his natural instincts for capturing the moment of truth on film. This has a lot more to do with why scenes are visualized in certain ways than how.

Salvador was his first feature film. The chances of a director like Stone choosing a young documentary cameraman to shoot a significant, albeit low-budget, feature film are slim. But Stone liked the look of one of Richardson's documentaries shot in *Salvador* for an English TV channel. Midway through the production of *Salvador,* Richardson was invited to shoot *Platoon.*

Bob Richardson has compiled ten major theatrical credits in six years. Perhaps there are a dozen cinematographers in the United States who can make that statement. He received three Oscar nominations

(*Platoon, Born on the Fourth of July,* and *JFK*) winning the coveted prize for *JFK* earlier this year. He has been nominated for three Independent Spirit Awards for *Salvador, Platoon,* and *Talk Radio* from the Independent Feature Project/West. Very few cinematographers gain that degree of peer approval in a lifetime and Bob is just getting started!

"Some people have cautioned me about doing so much work with one director," Richardson says. "However, it has its advantages. You know just what is expected, and it becomes easier to communicate. You have to dig a little deeper and give more of yourself every time."

Oliver Stone makes the type of films cinematographers want to shoot. There are intelligent scripts, interesting stories, and provocative images are used to communicate feelings and establish moods. The fire scenes which symbolize Jim Morrison's encroaching maelstrom are some of the most powerful in recent memory.

Richardson first heard that Stone was considering *JFK* just after he had begun shooting *City of Hope* with John Sayles. The film Stone envisioned was based mainly on the experiences of Jim Garrison, former district attorney of New Orleans. The angle that intrigued Stone was not how Kennedy was killed, but why.

JFK was principally shot at practical locations in Dallas and New Orleans with some sequences in Washington, D.C. The locations were remarkably as they were in 1963. It was as if time had stood still. Much of the period look involved vintage cars, costuming by Marlene Stewart, and production design by Victor Kempster. For example, Kempster faithfully recreated settings in the Texas Book Depository where Oswald allegedly fired the fatal shots at Kennedy.

> ***"The locations were remarkably as they were in 1963. I was as if time had stood still. Much of the period look involved vintage cars, costuming and production design..."***

Richardson brought no ready-made impressions of the Kennedy assassination to the project: he was a young child when it occurred. Rather, he immersed himself in the ample literature about the period, including two books which were cornerstones of Stone's script, Garrison's *On the Trail of the Assassins*, and Jim Marrs' *Crossfire: The Plot that Killed Kennedy.*

> ***"The documentary material established a concrete foundation of factual reality, and we wanted the audience to move through the material without ever doubting its authenticity."***

Richardson knew that many people in the audience would have vivid recollections of their own of the time Kennedy was killed. It was a seminal event in their lives. They saw the Kennedy and Oswald shooting on television and remember everything about the day the shooting occurred and the events that followed. He had to account for those expectations.

The medium is part of the message in *JFK*. The film opens with a six-minute montage of images of the Kennedy assassination in Dealey Plaza and the subsequent shooting of Oswald. Stone used vintage TV news footage: the Zapruder super 8 film of the actual shooting of Kennedy and the videotape of Jack Ruby killing Oswald. Richardson augmented those images with new super 8, 16mm, and 35mm film, in black-and-white and color, all woven into a visual tapestry that mimics reality.

He used seven cameras and fourteen film stocks, including Kodachrome and Kodacolor film, in Dealey Plaza. Stone wanted the audience to see the scene from multiple vantage points, much as they had on TV. "The documentary material established a concrete foundation of factual reality," Richardson explains, "and we wanted the audience to move through the material without ever doubting its authenticity."

Richardson describes the Kodachrome super 8 blow-ups as "horrendously grainy," but the film texture matched the public's visual memories. The intercutting of different film formats in color and black-and-white is often jarring, but that was the intention as it evokes the audience memory.

"The intercutting of different film formats in color and black-and-white is often jarring, but that was the intention as is evokes the audience memory."

The Dealey Plaza and New Orleans footages were framed somewhere between 1.33:1 and 1.85:1 aspect ratios. Richardson accomplished that by masking the edges of the frames. As the story moved forward to 1967, he expanded the scope of the film by shooting in anamorphic. It was like giving the audience a visual clue that the documentary portion of the film was over and he would begin taking some poetic license henceforth.

There were other visual transitions. The Kennedy and Oswald assassinations were filmed without diffusion or filters on the lenses. Richardson didn't want to put anything between the audience and those images. He wanted to capture stark reality. Later, during the anamorphic usage, there was some substantial use of diffusion which added a hint of dream-like quality.

The Dallas and New Orleans sequences were captured on both black-and-white and color film. The use of bright colors was sparse and color images were desaturated, as though the post-assassination film was symbolically drained of blood. Overall, there were 70 to 80 black-and-white shots in 35mm format and hundreds on 16mm film.

Early in the film, individual faces are masked in shadows or they are partially hidden behind objects. Often, they are at the edge of the frame peering in, or they are blurred by rapid motion. It's voyeuristic, like a peeping Tom sneaking a look at people's private lives. As Garrison's investigation unfolds, Richardson progressively reveals faces and eyes. The camera becomes more subjective. It frequently shows the story from Garrison's point of view.

Once Richardson moves into shooting in the anamorphic format, there's a feeling of hope. The investigation is making progress, life goes on, color returns. There are cherry blossoms in Washington and green trees in New Orleans. There are pinks, blues, greens, and other bright colors in settings and costumes.

In this main segment of the film, almost all interiors and all night exteriors are recorded on Eastman EXR 100T film 5248. It is a 100-speed film balanced for exposure in 3200 K tungsten light. The imagery is smooth as velvet and nearly devoid of any hint of granularity. Bob describes it as "a cleaner look."

Stone is not a particularly easy director regarding lighting. "Oliver disdains convention," Richardson explains. "He tries to force you into things that are provocative and not classic." The use of various lighting modes and film stocks evoked certain 'looks,' underscoring the mood. Richardson used 50-speed EXR 50D film 5245 for many daylight exteriors, and 250-speed Eastman 5297 film in interior mixed lighting situations. The higher-speed 500 Eastman EXR 5296 film was used in only a few scenes – a couple of large night-time exteriors and for a particularly dimly-lit night interior.

Richardson's use of lighting was the result of Stone's ongoing desire to stretch traditional use and paint very distinctive pictures. For instance, there was a surrealistic scene where a witness remembers Oswald meeting with possible co-conspirators in a small room. Richardson bounced keylight off a single table and low, hard edge light coming through a window. Faces around the table range from two-thirds to a full stop over-exposed to a stop and a half under-exposed. That was in color. There was a black-and-white

"The use of bright colors was sparse and color images were desaturated, as though the post-assassination film was symbolically drained of blood."

scene in Dallas where they are preparing to transfer Kennedy's coffin to Air Force One. He chose harsh, white ambient light from overhead bouncing off the coffin to create a nightmarish quality by way of moody contrast.

Richardson worked closely with gaffer Ray Peschke to control the quality, angle, and color of light in ways that punctuated the emotional content of *JFK*. In Garrison's home, he used soft, warm colors to create an empathetic feeling of a safe nest. In his more hostile encounters, Bob used hard edge light with blue tones to provide an unfriendly look bursting with tension.

Many sequences intercut dialog with flashbacks. These are often interpretive and serve to illustrate the dialog. For example, a witness describing his view of the assassination flashes back to a grainy series of images—shot at six frames per second—which provides a unique insight into someone's visual memories.

In the final courtroom scenes, Richardson used a wide aspect ratio to fill the screen with images in the courtroom. He puts the audience right in the jury box and places them eye-to-eye with Garrison as he pleads his case. It's a daring visual strategy, filling the screen with intimate one-shots. It leaves no margin for the slightest error. But it makes this scene an intense personal experience for every person watching.

Stone presents Garrison as a flawed character, driven by his belief in the system and love for his country, who strives to prove there was a conspiracy to kill Kennedy. His critics say that Garrison was driven by personal ambition. The movie does not resolve that dichotomy. But, together with master cinematographer Bob Richardson, the director succeeds in making the movie-goer squirm in his seat and confront the choices.

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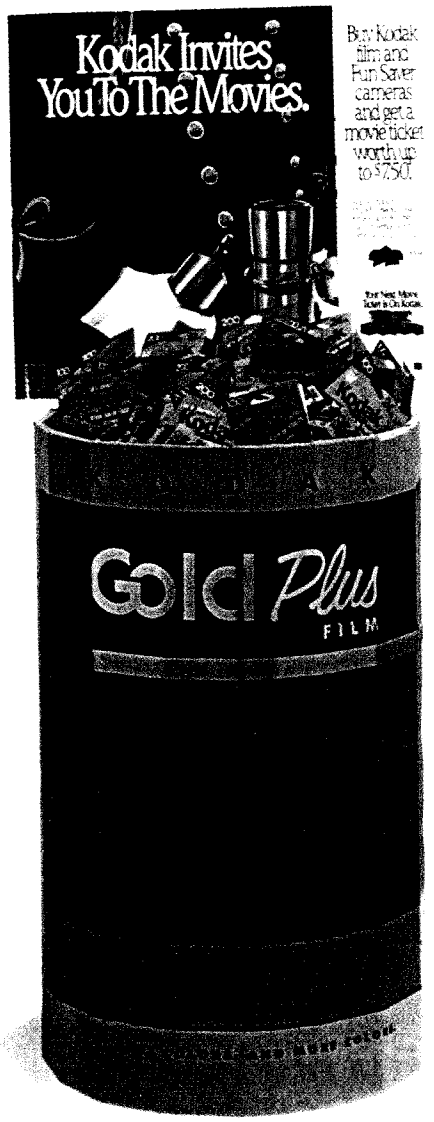

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[1]Source: Motion Picture Association of America.

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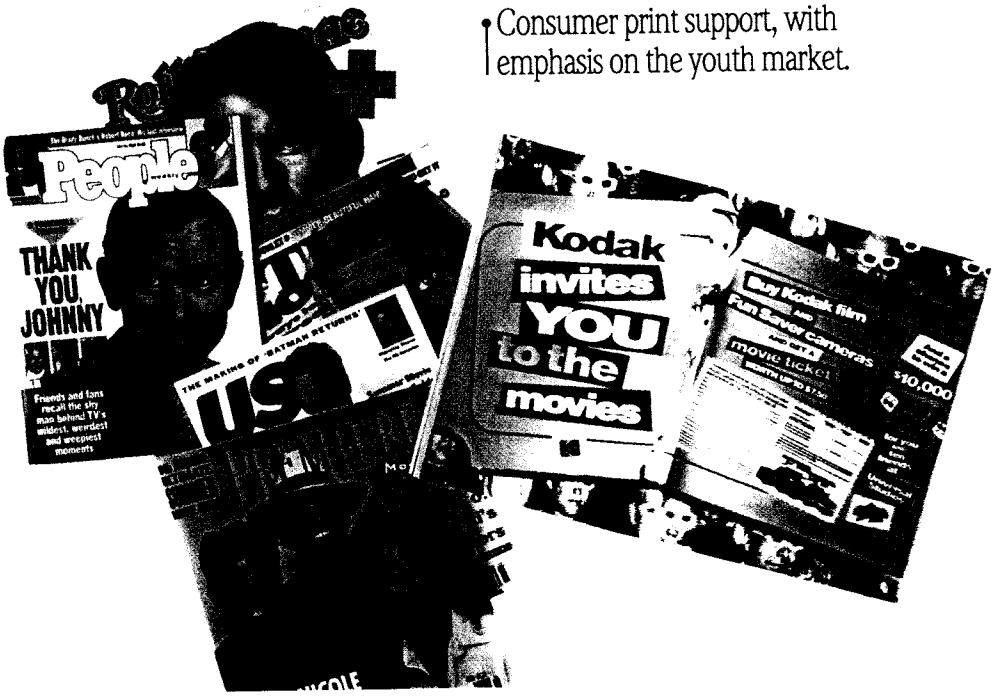

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