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9

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Announce

# THE FIRST DEMONSTRATION

to the film Industry of

# TECHNIRAMA

at the

ODEON, LEICESTER SQUARE, W.C.2  
Saturday, June 1st, at 10.30 a.m.



# DELRAMA

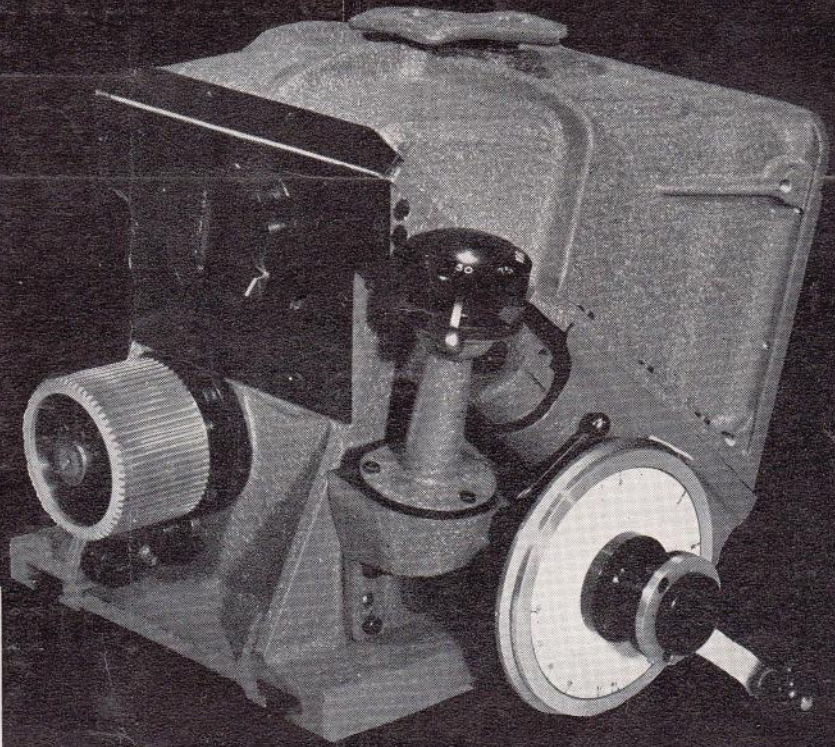
the anamorphic  
optics chosen  
for the

# TECHNIRAMA

camera

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After exhaustive tests, the Delrama principle was chosen for the exacting conditions of Technirama photography. A specially developed model, with a compression ratio of 1.5 to 1, produces unequalled sharpness of definition and an absence of distortion.



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## 'MOST IMPORTANT FORM OF POPULAR ENTERTAINMENT'

f2.0 and these may be used wide open if necessary to photograph at very low lighting levels.

In the studio it is quite convenient and very economical to work at f2.8 for medium and long shots and to stop down to about f4.0 for close-ups if it is desired to hold the background reasonably sharp. A noteworthy point is the extraordinarily fine definition, great depth and freedom from distortion right out to the very edges of the frame.

This enables the director to take full advantage of the very wide field of view for developing the action and telling the story, at the same time being close enough to the artists to see clearly the eyes, facial expression and important details. The director working with Technirama for the first time soon realises that this obviates the need for many individual close-ups and other covering shots, with the result that he achieves more screen time per day and finds that instead of using twice as much negative rawstock, as one would expect, he is only using 50 to 60 per cent. more than normal photography.

There is room for study of this special advantage by directors and it is expected that, when this is fully understood and exploited, it will actually be less expensive to shoot in Technirama than in ordinary, standard photography. In other words, the saving in shooting time because of fewer set-ups could more than offset the modest increase in cost of negative rawstock and developing.

Editing procedure for a Technirama film is simple and very economical. CinemaScope-type rushes are made in either black and white or colour. If black and white is chosen for reasons of economy, then colour "auto-pilots" can be made by printing a short section of the action of any required take, preceded by the slate for that particular scene.

These auto-pilots are admirable for checking all the colour values in a scene and, if they are subsequently joined up, more or less in the correct continuity, they provide an excellent guide to the producer, the cameraman and Technicolor, when deciding on the grading of the film for mood before answer printing.

Another point worth noting is that the separation masters required for making dissolves, since they are made on an optical printer, need only be slightly longer than the net length of the cut-in optical dupe; on an average film this results in a saving of about £1,000 compared with making masters the full length of the scenes involved, which is the usual practice.

So much for the financial and technical aspects of making a Technirama film as compared with ordinary colour photography; the more these factors are examined in detail the more comparable they appear to be. But when we consider the all-important question of the quality of the release prints that are shown to the ultimate customers in the world's cinemas, then Technirama stands in a class by itself.

Technirama release prints are usually of the anamorphic type, compatible with CinemaScope, but for those theatres that have not been equipped with anamorphic projector lenses, non-anamorphic or unsqueezed prints can be made. These two types of print are made (via matrices) from the original negative only.

Thus we avoid the shocking degradation of colour, definition, gradation, grain, etc., seen all too often when bad prints are made from inter-negatives. This deterioration of colour film values in release prints is, in my opinion, a major factor in the return to black-and-white films during the past year or two. A degraded colour print is much worse, from the point of view of the audience, than even a poor black-and-white print.

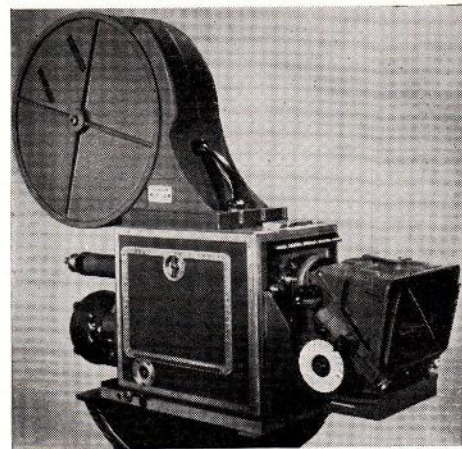
If more top film executives would take the time and trouble to see the films on which they have lavished loving care and unlimited expense at local theatres in foreign countries then something would be done about the deplorable travesties of their films that are offered to the ultimate customers in their names!

What of the future? I firmly believe that the

really big money will be taken in cinemas specially designed or refitted to show films with the optimum quality of picture and sound, coupled, of course, with personal comfort for the audience. Such shows (inappropriately at present called road shows) would provide for extended runs of good films in large centres of population before general release.

Technirama has been designed with this in view and double-frame positive prints, made directly from double-frame negative, such as was used for the premiere of "The Monte Carlo Story" in Turin in December, 1956, give a pictorial quality on the screen which has not yet been approached by any other means.

This kind of quality, plus high fidelity multi-channel sound, intelligently used, will re-establish the colour film in its rightful place as the most important form of entertainment for the general public.



Technicolor Technirama camera with coupled focus anamorphic lens and 2,000 ft. magazines

## GREATEST ADVANCE SINCE THE COMING OF SOUND

says JACK CARDIFF

**I**N this crazy mixed-up world of muddled ratios and confused presentation techniques, to use the idiom of our American cousins, Technirama is truly the greatest with the mostest on the ball.

I've seen a hundred "developments" come and, mostly, go. I've seen "progressive outlooks," I've seen the "ultimate technique," the ultimate death. I've seen a dozen "inventions" bloom in the hot glow of advanced publicity and wilt in the heat of studio practice.

I've seen enough to rob me of my enthusiasm and turn me into a hard, embittered cynic incapable of believing in anything which is labelled "progress" or "the ultimate technique."

And now Technirama. Since it was a Technicolor development I must confess I had more faith in its promised ability than most. Having now completed one film in the system, "Legend of the Lost," I can truthfully say I regard this as the greatest technical and artistic development since the coming of sound.

Here is an all-round development to satisfy all three sections of the industry. And that means positive progress.

From the cameraman's point of view it is especially welcome because it is a development with plenty of guts. We gave Technirama a stiff test on "Legend of the Lost." In fact, had we planned it I don't think it could have been tougher. We filmed in the Sahara desert, 500 miles from civilisation.

The elements fought us with the ferocity of a mad dog. On one occasion we were trapped in a fierce sandstorm which forced grit, dirt and sand behind the prism. Although we had only primitive facilities we stripped and cleaned the camera and had it in working order in time for the next day's shooting. Since we saw no rushes we lived on faith from that day on.

Now I have started work on "The Viking" —in Technirama, of course. To do this I have again postponed my directorial chances. I think it is going to be worth waiting for because meanwhile we are experiencing the greatest photographic revolution of all time. And I want to be a part of that revolution.

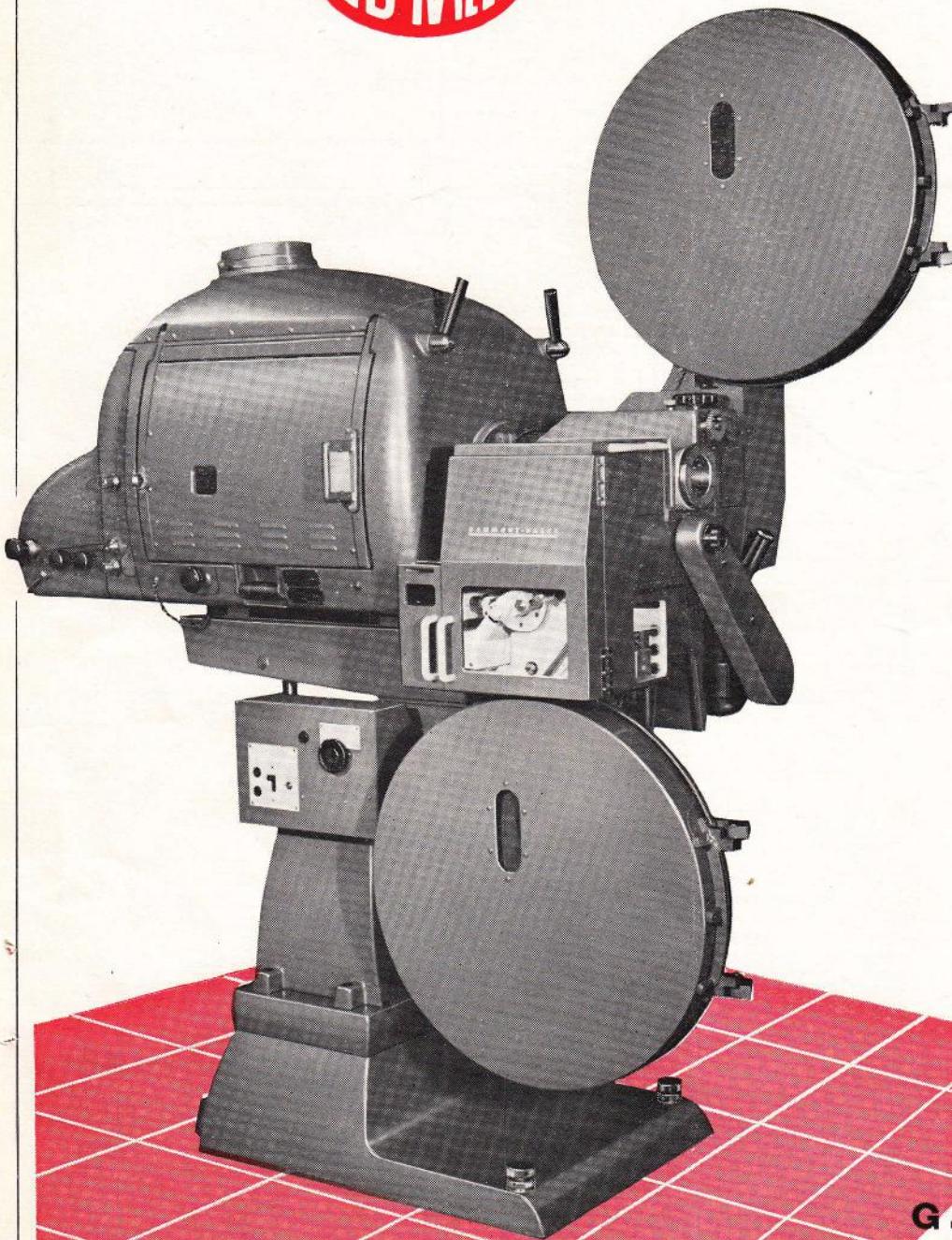


Jack Cardiff (left) who will introduce the presentation of "The Curtain Rises on Technirama" on June 1, discusses points on the new process with Hans Nieter, director of the demonstration film





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# NO TEETHING TROUBLES

*Maximum definition without tears in 'Davy'*  
—the first British Technirama film

WHEN it was announced that Ealing proposed to use Technirama, Technicolor's new anamorphic system for "Davy," nobody was more surprised than the rank and file of the Ealing production staff. Ealing policy, from the technical point of view, has always been somewhat conservative, inasmuch as technical treatment has followed the creative requirements of the script, not led it. Ealing stories have never been written around gimmicks but they have sometimes given birth to them.

In this manner, Ealing pioneered the mobile studio unit (for providing alternative location shooting during bad weather); the use of ultra-violet lighting and fluorescent dyes for trick work; radio telephones for location communications; use of synchronised ½ in. magnetic tape and so forth. The technical outlook on "Davy" however, seemed at first to be somewhat different.

## CHARACTERISTICS

Were we now jumping on the anamorphic band-wagon, shaping our stories to fit the 2.35:1 screen? The answer was in the negative—metaphorically and physically! In "Davy" we had a human story with Covent Garden Opera House and music hall background which definitely called for the 2.35:1 shape and for colour. Which system could meet this requirement and at the same time have the following desirable characteristics:

- Absence of distortion during panning and tracking of cameras.
- Avoidance of apparent widening of actors' faces at certain distances, from the camera.
- Top quality opticals—dissolves and fades—without resorting to the expensive method of duping complete scenes.
- The availability of several sets of colour negative facilities without risk of degradation due to duping.
- Extreme sharpness without need for excessive amounts of studio lighting and the stopping down of the camera lens.
- All of the above points to be covered using standard 35-mm. Eastman Color negative.

We had been watching the progress of quite a number of anamorphic systems for some time. We were impressed by the first experimental shots of Technirama, which compared very well with the highly expensive wide-gauge systems and seemed to have many practical advantages in operation—including all of those specified above. Sir Michael Balcon made the decision that "Davy" should be made in Technirama—the first British production to use the process.

## TECHNICALITIES

To short circuit many technical queries, I circulated a short and simple technical description of Technirama to the Ealing production staff. This gave a simple explanation of how Technirama worked and what we hoped it would achieve in carrying out the specific script requirements of "Davy."

One of the points which had to be emphasised was care in the use of film stock. Film travelling at double speed would seem to imply that double the amount of film stock would be consumed. Consultations with Basil Dearden and Michael Relph, and with the lighting cameraman, Douglas Slocombe, made me revise this axiom. The high picture definition we would expect from Technirama enabled shooting to be planned with less camera set-ups, and the freedom from the usual anamorphic distortions allowed great mobility for the camera and for cutting.

Finally, instead of an increase in negative footage of 100 per cent. as compared with the

footage that would have been used if it had been shot in normal black and white, it was estimated for budgeting purposes that the increase would be about 65 per cent. This estimate proved to be generous, because the footage actually shot—including "short ends"—reached only 46 per cent. above normal black and white. The bogey of double footage had been laid.

Ealing Films was the first British company to use the Technirama process and, with the greatest respect to Technicolor, we anticipated that there would be a few teething troubles, so we crossed our fingers and started work.

## SMOOTH PROGRESS

Shooting on the production proceeded smoothly. At first, only 1,000-ft. magazines were available for the Technirama camera, which necessitated frequent interruptions for reloading and resulted in a large quantity of "short ends." It will be realised that with film travelling at double speed, it is rarely safe to start turning on a dialogue scene with only 200 ft. in the feed magazines.

A rule was therefore made to scrap "short ends" of less than 50 ft., to retain those of 50 ft. to 150 ft. for mute inserts and to can up and retain "short ends" of 150 ft. to 250 ft. for short dialogue scenes of minor importance. Not many days passed before Technicolor was able to provide 2,000-ft. magazines, and this eased the "short-end" position and speeded up floor shooting.

Picture composition was primarily composed for 2.35:1, but the camera operator had to bear in mind that an "unscrambled" 1.85:1 version might be required for some territories. Therefore, important characters and props were moved from the 1.85:1 border line in the viewfinder, either within it or completely outside of it. It is the "half-in and half-out" position which might cause difficulties with multiple versions.

## REMARKABLE

For a large area negative system, lighting intensities used by Douglas Slocombe were remarkably low. It was the small sets, with split focus problems, which called for stopping the lens down and piling on the light up to about 600 foot candles. Many of the long shots, particularly those without artists in the foreground, were shot at f2.8. This applied to several remarkable shots taken in the Covent Garden Opera House.

Technicolor provided daily Eastman Color pilots of the first 10 ft. of each slate, but rushes were viewed in black and white. When the production is finally edited and the negative is cut, Technicolor will prepare the usual color facilities for printing high definition 35-mm. imbibition prints. An advantage in this respect is that equally good colour facilities can be provided for making prints in different territories. The degradation of colour quality which results from duping is avoided.

Several times during shooting, colour pilots were viewed on the huge screen of the Empire, Leicester Square, and elsewhere, and were compared with first-class examples of more conventional anamorphic photography. The results were always the same: the "Davy" colour pilots were so sharp in comparison that they almost cut you!

As a matter of fact, with very long throws from the projector to the screen it was not easy for the projectionist to make the most of the definition that was available.

But even if focusing was more critical for absolute optimum results, it always resulted in a picture sharper and less grainy than any other 35-mm. colour system we had seen to date. With Technirama, we had succeeded in achieving the maximum definition without teething troubles and without tears.

by  
BAYNHAM  
HONRI  
technical  
supervisor of  
Ealing Films



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"LEGEND OF THE LOST" ..... *Batjac Productions — United Artists.*  
"DAVY" ..... *Ealing Films Ltd. — M.G.M.*  
"LES MISERABLES" P.A.C.—*S.N. Pathe Cinema (Paris). Serena Films (Rome).*  
"PARIS HOLIDAY" ..... *Tolda Productions, Inc. — United Artists.*  
"THE VIKING" ..... *Brynaprod — United Artists.*  
"NIGHT PASSAGE" ..... *Universal International*  
"ESCAPADE IN JAPAN" ..... *R. K. O.*  
"SAYONARA" ..... *Goetz Pictures, Warner Bros.*  
"SLEEPING BEAUTY" (Cartoon) ..... *Walt Disney Productions. Buena Vista.*  
"FAREWELL TO VALLEY FORGE" ... *Walt Disney Productions. Buena Vista.*  
"SEVEN HILLS OF ROME" ..... *Titanus — M.G.M.*

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of motion picture  
entertainment**

**TECHNIRAMA**



*An appreciation by R. HOWARD CRICKS, FBKS, FRPS*

## SOON WE SHALL WONDER HOW WE ENDURED THE PICTURE QUALITY OF TODAY'S FILMS

**T**ECHNIRAMA restores to the cinema screen the pictorial quality which was lost when the new projection techniques appeared. Granularity and loss of definition which results from an undue magnification (anamorphic or otherwise)—the loss of sharpness which seems unavoidable with the ordinary anamorphic optical system—are eliminated. With Technirama we get back to the picture quality of five years ago.

This claim may seem reasonable when we are discussing the horizontal projection of a double-frame contact print; it may seem a little rash when considering the projection of an imbibition print having a frame little larger than the standard 4 x 3 frame upon a screen of double the former area; yet I believe the claim is fully justified.

### FUNDAMENTALS

Technical details of the system are given elsewhere. Here is a brief summary of it: Mechanically, the camera is practically identical with that of VistaVision, the 35-mm. negative travelling horizontally, producing a double-frame image, but the camera carries a Delrama anamorph having a squeeze ratio of 1.5 to 1. Fundamentally, that's all there is to it.

Technirama is purely a camera process. What use the producer or distributor makes of his negative is entirely up to him. He may make contact prints from the double-frame negative, which can be projected upon a VistaVision-type projector fitted with a special Taylor-Hobson projector anamorph which, instead of magnifying the picture horizontally, compresses it vertically and, used in conjunction with the Vistatal backing lens, produces a screen image of the highest quality.

For general release, the Technirama negative will more often be optically reduced to a standard anamorphic print, additional anamorphosis being introduced in printing to give the standard squeeze ratio of 2:1. If the print has an optical track or magoptical tracks, the aspect ratio will be practically the same as that of the negative—2.35:1 instead of 2.4:1. A very small amount of cropping at top or bottom will give a frame of 2.55:1 aspect ratio, suitable for four-track magnetic prints. (To avoid confusion in booking, we badly need two omnibus terms to cover optical and magnetic anamorphic prints.)

Yet another possibility is to "unscramble" the

negative image to produce unsqueezed prints for normal wide-screen projection.

The principle of introducing additional anamorphosis into the printing operation is itself quite important. A couple of years ago Dr. Leslie Knopp lectured to the Royal Photographic Society on the new techniques and discussed the problems of picture definition on a mathematical basis. He concluded by advocating two alternative systems which gave practically identical picture quality: one was substantially anamorphic VistaVision, the other substantially Technirama, except for a lower anamorphic ratio which would have produced non-compatible prints.

Although not indicated in the printed paper (*J. Phot. Sci.*, May/Apr., 1956, p. 50), Dr. Knopp, so far as I recall, urged the introduction of anamorphosis in the printing operation on the grounds that even with a double-size frame the coarser grain of the negative emulsion was not capable of containing so much image information as a compressed and reduced image on the finer-grained positive stock.

The first examples of Technirama which I saw on the screen were some colour pilots from "Davy" (the first British film to be shot in the process), which Sir Michael Balcon was good enough to show Graham Clarke and myself at Elstree. Baynham Honri was justifiably enthusiastic at the results. For the first time we saw a picture in the 2.35:1 ratio absolutely sharp to the extreme corners, with a depth of field comparable with that of a black-and-white picture.

### NOTICEABLE GAIN

Next, "The Monte Carlo Story" was trade shown at the London Pavilion with never so much as a mention of Technirama except in the credits. I sat in the fourth row of the stalls. Never has the Riviera been portrayed in such superb photography; but perhaps the most noticeable gain from the process was the gleam of the polished woodwork and the details of the rigging of the yachts. The graceful and un-grandmotherly figure of Dietrich suffered no distortion when she was photographed in close-up.

Then a party from the KINE. went down to the Technicolor laboratories and saw a selection from a number of films. A point vividly brought home was the need for pin-point focusing by the projectionist; in the Technicolor theatre remote focusing is provided in the auditorium and occasional adjustments had to be made to maintain the quality of picture on the screen.

We also saw the Technirama camera, built in the housing of the old three-strip camera and

fitted with the ingenious mounting of the Delrama which provides simultaneous focusing of the backing lens and of the Delrama prisms. The viewfinder was masked to an aspect ratio of 2.35:1.

Finally, I was able to see double-frame projection at the Savoy, Hayes, Middlesex, which seats 2,350.

On the 40-ft. screen definition was again superb. However, critical focusing is still vital; Ken Grey, of Technicolor, who accompanied us, sat with the remote-control focus knob on his knee, occasionally giving it a twist to bring the picture into pin-point focus.

The projector at the Savoy is not the machine described elsewhere, but an adapted Century, lying on its side. To the right is the take-off box and the optical soundhead, and to the left the take-up, from which it follows that the sound is ahead of the picture instead of behind it—actually 18½ double frames in advance. The illuminant is the new Mole-Richardson Gaumont-Kalee mirror arc, which, running at 115 amp., produced a picture which meter readings indicated was slightly above the BSI standard of brightness.

### LOWER COST

Hitherto, the prints I had seen had been in Eastman Color. Douglas Slocombe, who photographed "Davy," assured me that prints by the new Technicolor imbibition process were indistinguishable from Eastman Color. The major factor in this improvement is that matrices are now made by separation direct from the Eastman Color negative. If experience proves the quality of imbibition prints to be adequate the whole industry will gain, thanks to the lower cost of prints.

When the principle of anamorphosis burst upon the film world insufficient attention was paid to its practical implications. Technirama, on the contrary, is a scientifically engineered principle, employing the latest developments in optics and capable of producing results of the highest standard. It is a universal process, since from the negative can be made prints in practically any desired standard. As Baynham Honri makes clear in his contribution, the additional cost in production need not be as high as might be expected.

Finally, Technirama is not just a new plaything for the studio boys. The marked improvement in picture quality will be evident to every discriminating picturegoer. Before long we shall be wondering how we endured the picture quality of many present-day films.

## THE DIRECTORS AND STAFF OF STUDIO FILM LABORATORIES

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# DELRAMA—THE TECHNIRAMA CAMERA ANAMORPH

**I**N the attainment of the high standard of definition demanded of the Technirama process, a major factor was the optical system of the camera. Tests made by Technicolor, both in London and in Hollywood, with anamorphic systems of the cylindrical lens type showed that none of them was capable of complying with their stringent requirements in regard to picture quality.

Attention was directed to the Delrama principle; this consists of two curved reflecting faces (either mirrors or prisms) arranged in the form of a periscope. It has an outstanding advantage over any other anamorphic system: that it makes use of reflection and not refraction (even though the type actually used employs prisms, these act as reflectors, not refractors).

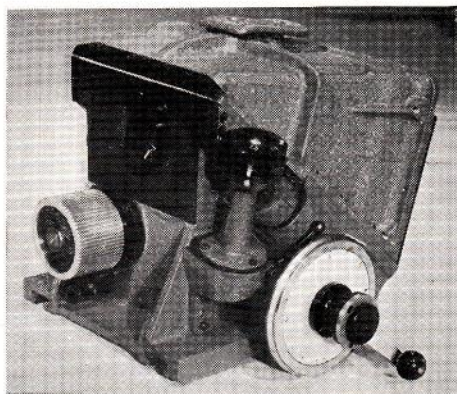
One major shortcoming of other systems was immediately overcome: chromatic aberration. This defect, common to all refracting systems, whether lenses or prisms, is completely absent from a reflecting system. It appeared also that other failings of refractive systems might be obviated: geometrical distortion, internal reflections, etc.

Having made preliminary tests with a standard Delrama system, Technicolor decided to investigate more fully the possibilities of this unusual optical principle. The representatives of Technicolor, with Frank Durban, general manager of J. Frank Brockliss, Ltd., the British distributors for the Delrama, visited the Oude Delft factory, in the old Dutch town of Delft, and stated the problem to Dr. A. Bouwers, inventor of the Delrama.

They required an optical system having an anamorphic or squeeze ratio of 1.5 to 1, instead of the customary 2 to 1. It must be capable of covering the large diameter of lens needed for a double-frame negative, and of embracing a horizontal angle of view of at least 60 deg. It must give exceptional sharpness in every point of the picture, to the extreme corners. It must be free of geometrical distortion of the foreground image.

Dr. Bouwers and his computer vanished into their design office. Within a couple of hours they reappeared stating that the requirements could be fulfilled. The system would be of the prismatic and not the mirror type, as used in cinema projection; the curved surfaces of the prisms which produce the squeeze effect would be neither spherical nor cylindrical, but of a specially computed curvature.

The construction of a couple of prototypes



The Delrama camera attachment

was commissioned forthwith. Manufacture of the prisms had to start from scratch, with specially selected glass mouldings. The production of the special curves of the reflecting surfaces necessitated complicated modifications to the grinding and polishing machines.

But these prisms could not be considered in isolation: they had to be married to the camera which was being built in the Technicolor camera department. Provision had to be made for the prisms to be adjusted at the same time as the lens was focused. By close co-operation between

Technicolor and the Dutch opticians, aided by Frank Durban's engineering experience, a prototype mounting was evolved which provided the necessary adjustment between the two prisms.

In the photograph reproduced, the handle working over a calibrated scale adjusts the setting of the prisms, and simultaneously, the gear seen at the left engaging with the mounting of whichever lens is in use, operates the focal adjustment. The knob on the vertical shaft is adjusted according to the focal length of the lens in use. However, it is more usual to adjust the focus by a Selsyn remote control.

One of the prototypes was tested by Technicolor in London, and the other was sent to Hollywood. Exhaustive tests, including special definition charts, demonstrated that at last an ideal optical system had been found. For the first time an anamorphic picture was photographed, perfectly sharp to the extreme corners; there was a complete absence of flare, and of geometrical distortion of the image as the lens was focused for close-ups—a characteristic which in practice means that a glamorous actress will not suddenly put on weight as the camera moves in to close-up.

So completely successful were the tests that Technicolor entered into a contract with Oude Delft and J. Frank Brockliss, Ltd., for the exclusive rights throughout the world for the new Delrama. As a result, Technirama will be the only process able to make use of this unique optical system.

While a final model of the mounting was being perfected by Technicolor, the manufacture of a quantity of prisms was commissioned, sufficient to cater for the needs of the whole world. Final acceptance tests were put in hand on Italian locations, and as a result, the first film to be completed in Technirama was "The Monte Carlo Story." For the first time, cinema audiences saw a picture in the modern format, with the sharpness of definition of the 3 x 4 picture—a standard of photography which removes the reproach that in magnifying the picture we have lost its pictorial qualities.—R. H. C.

## HOW THE DOUBLE-FRAME SYSTEM WORKS

**T**HE versatility of the Technirama process makes it applicable for projection in any of the established methods and ratios. It is claimed, however, that the acme of performance is reached when it is used in conjunction with double-frame projection as demonstrated at the Odeon, Leicester Square. The system incorporates a new appli-

cation of anamorphosis, in that anamorphic correction in projection is achieved by vertical compression of the image, instead of by horizontal expansion.

The Technirama double-frame process utilises the inherent advantages which have been proved in both the VistaVision and anamorphic processes.

These advantages have been explained more fully elsewhere, but new optical projection equipment has now been developed that yields the high standard of performance which will do justice to the inherent capabilities of the process.

Hitherto the expansion of the compressed print image necessary to restore the subject detail to its correct proportions has been achieved by the use of horizontal expansion anamorphic attachments which can be considered as wide-angle attachments operative in the horizontal plane only. For a given screen width and projector gate width, this demands the use of a projection lens whose focal length is greater than that required for straightforward projection.

In general, the optical disadvantages of this method are that the expansion characteristics of the anamorphic attachment exaggerate any lack of sharp definition produced by the projection lens alone and the anamorph also introduces its own deterioration of image quality to a significant degree. An advantage, however, follows from the use of longer focal length projection lenses, since these will be covering smaller angular fields of view.

Before the introduction of the Vistal range of double-frame projection lenses, developed by Taylor, Taylor and Hobson, the standard of definition and uniformity of screen illumination

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## THE DOUBLE-FRAME SYSTEM—contd.

tended to deteriorate rather rapidly with increasing angular field. This led to a situation in which the advantages to be gained from an increased projection lens focal length out-weighed the other two disadvantages described above.

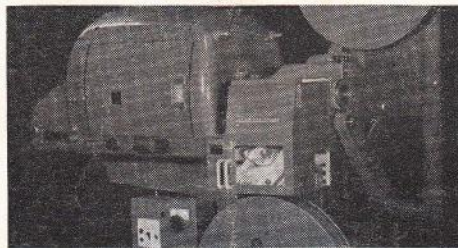
The optical projection equipment used at the Odeon, Leicester Square, breaks away from these traditional methods of anamorphic projection by the adoption of a new anamorphic principle which can be used to its full effect in conjunction with the new range of Vistatal projection lenses.

Short focal length Vistatal projection lenses are capable of covering large release print areas without the sacrifice of definition and illumination towards the edges of the picture which, in the past, had been considered inevitable. The existence of this type of lens means that there is no longer an advantage to be gained from an anamorphic system which demands an increased projection lens focal length; and alternative systems can be considered.

It has been found that if the compressed horizontal geometry of the film image is compensated by vertical compression in projection instead of horizontal expansion then the anamorphic attachment will reduce the effects of any small residual errors in the projection lens and, at the same time, its own contribution of errors will be greatly reduced.

Vertical compression is best achieved by a prismatic type of anamorphic attachment. The optical construction of the Vistatal projection lens includes an unusually large rear glass diameter close to the film plane which collects the full amount of light emitted from the corners of the projector gate.

The Vistatal lenses are produced in thirteen focal lengths covering the range 3 in. to 6 in. in  $\frac{1}{2}$  in. steps. They cover the Technirama projector gate size of 1.42 in. x .88 in. and have a relative aperture of f/1.9. The vertical compression anamorphic attachment has a compression



Gaumont-Kalee double-frame projector

ratio of 1.5 and it is designed to cover this range of lenses without vignetting.

The Odeon demonstration uses the new vertical compression anamorphic attachment in conjunction with a 4 in. Vistatal lens to produce a picture of approximately 45 ft. x 19 ft. with a throw of about 125 ft.

The Gaumont-Kalee double-frame projector in use at the Odeon is not just a conventional 35-mm. projector turned on its back; it is of an entirely new design.

The frame area of the new projector is about 800 sq. mm., which is just  $2\frac{1}{2}$  times that of the old standard projector frame.

In order to conform with Technirama, the film has to run through the projector from left to right viewed from the screen, whereas in a conventional projector turned on its back, the film would run in the opposite direction.

The film goes through the soundhead before the picture head, and accordingly the feed spool box is now at the bottom and the take-up at the top. The spool box capacity is 6,000 feet (approximately 1,800 metres), so that a maximum of 30 minutes' continuous running is possible. The film is drawn up from the bottom spool box and passes through the soundhead, above which it is twisted through 90 deg. to pass horizontally through the projector. At the far end of the projectors.

The intermittent sprocket is twice the diameter

of the four-picture sprocket used on conventional projectors, and in order to keep its inertia to a minimum, it is machined from a high-duty light alloy. It is subjected to a surface-hardening treatment to ensure a long working life.

The projector shutter is of the single blade type, rotating at twice frame speed. The edge of the shutter blade thus moves very rapidly across the light beam, and the total angle of obscuration of the shutter is less than it would be if a two-bladed shutter were used, rotating once per frame.

In accordance with normal Gaumont-Kalee practice the mechanism is oil bath lubricated, is fitted with an electrically operated change-over device, and embodies a long picture gate to maintain adequate control of the film. The gate is of the front opening type, and can be opened without disturbing the projection lens.

The lens mount (which also has provision for remote control focusing) is 4 in. in diameter and is thus suitable for accommodating lenses of large diameter, with rear components sufficiently large to do justice to the performance of this machine.

Provision is also made for water-cooling the rear part of the gate and, in addition, high velocity air jets are directed at the film to reduce its temperature and stabilize its position.

The soundhead is a separate unit, two designs of which are available—one for optical sound only, and one capable of handling both optical and magnetic sound.

Provision can also be made for multiple channel stereophonic reproduction with follower heads and Selsyn interlock control gear.

This new equipment is capable of projecting pictures of very high quality on to quite large screens. For a light source, there is the new Mole-Richardson Gaumont-Kalee 16 in. mirror arc lamp having an optical speed of f/1.9 and an axial magnification of 7 x. This lamp burns 11-mm. positive carbons in a rotating head at 130 amps, and includes a heat filter between the arc and the projector.

A screen illumination of approximately 19,000 lumens can be obtained with no film in the gate but with the shutter running.

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