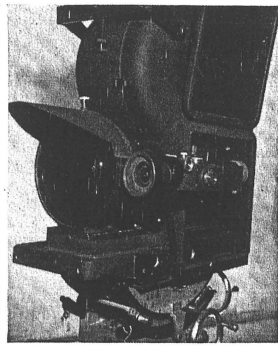
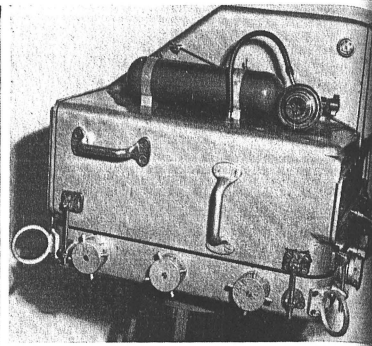


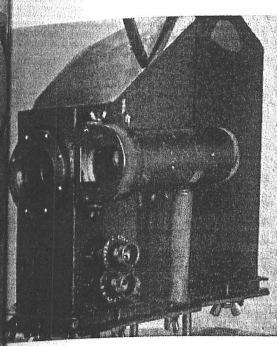
The Mitchell-built VistaVision camera.



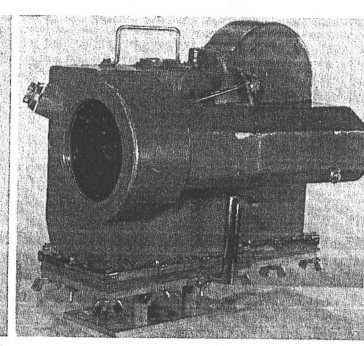
Todd-AO wide-screen camera.



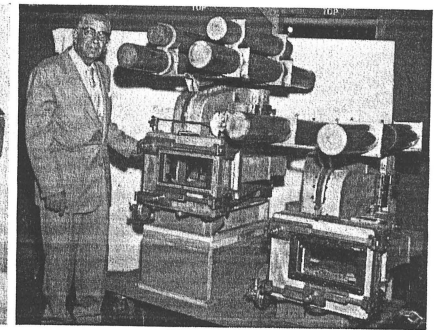
Disney-built underwater camera blimp.



RKO underwater camera.



Another RKO underwater camera.



John Arnold and MGM's underwater cameras.

## Technical Progress In 1954

Refinements and new departures in photographic technique and equipment highlight the industry's progress during the year just passed.

By ARTHUR E. GAVIN

MUCH OF THE TECHNICAL progress achieved by Hollywood's motion picture industry during 1954 is directly attributable to the frightening jolt it had received the previous year when the rather sudden advent of 3-D, Cinerama and CinemaScope almost brought production to a standstill. What was taking place, of course, is what has occurred at intervals before in the industry—a revolution and the dawning of a new era of technical progress.

This time it was the photographic phase of film production that was being affected. Stereo, Cinerama, and CinemaScope—all these "new" systems began with radical changes in the procedure of photographing a picture. By January of this year, 3-D was clearly on the way out as a popular medium of theatrical film presentation. Cinerama continued to gather popularity, and new Cinerama productions were already in the making. Fast footwork on the part of 20th Century-Fox executives had sold CinemaScope to the majority of the nation's exhibitors and they were already at work to effect a similar coup in Europe. By January 1st, 1954, CinemaScope had become a solidly established system of film production and exhibition.

The original anamorphic lenses which 20th Century-Fox had imported in order to shoot its first CinemaScope production, "The Robe," had been analyzed by Bausch & Lomb and greatly improved. Very soon B&L was supplying new and better CinemaScope lenses to Fox, which enabled the studio to expand its slate of CinemaScope productions. In all this endeavor, Sol Halprin, A.S.C., Fox Studio camera department head; Grover Laube, camera engineer; and Earl Sponable, the studio's technical director, made important contributions.

By June of last year, Bausch & Lomb had so improved its design of anamorphic lenses, that it now was supplying Fox and other studios with CinemaScope lenses in various focal lengths, ranging from a 12-element 40mm up to 152mm. These lenses possessed important new attributes, not found in the first CinemaScope lenses, including improved resolving power, greatly reduced distortion, enhanced definition and improved color correction.

Although, by early 1954, most of the other majors were swinging over to CinemaScope production, one studio—Paramount—believed it had a better system. This studio had for several

months experimented with still another new method of motion picture photography in which the film travelled horizontally, instead of vertically, and exposed a frame 8 sprocket-holes in width, equivalent to two frames of standard 35mm. (See Amer. Cinematographer for December, 1953, page 588.)

Paramount engineers, headed by Loren Ryder, were convinced that an

aspect ratio of 1.85 to 1 was not only more desirable from an esthetic standpoint but was more adaptable to the majority of the nation's theatres. (Many had been considered too narrow to accommodate the very wide screen required for the 2.55 to 1 aspect ratio of CinemaScope.)

Experiments began with a camera that had been built back in the 20's by William P. Stein for the old William Fox "Natural Color" system. This was a two-color system that required the negative to move past the gate two frames at a time. Paramount engineers turned the camera on its side, changed the aperture to take a lens that would cover an area two-frames in width, and after a series of tests, turned the camera over to Loyal Griggs, A.S.C., to use in filming Paramount's "White Christmas."

This new photographing system, which was originally dubbed the "Lazy-

8" by Paramount, had definite advantages. By starting with the extra large negative and reducing the image by printing on standard 35mm color print stock, grain size was reduced and greater clarity was achieved.

By April, 1954, Paramount, following the successful photography of "White Christmas" with the double-frame camera, was now definitely committed to the "Lazy-8" system, which now it had tradenamed "VistaVision." Leading manufacturers of professional motion picture cameras were invited to survey the system and to submit designs for a new VistaVision camera that would incorporate the horizontal film movement.

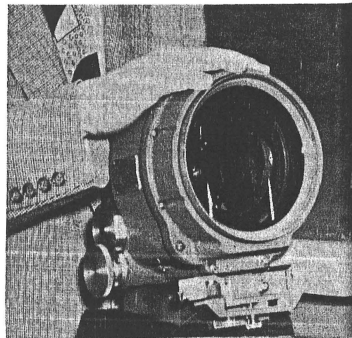
Mitchell Camera Corp., of Glendale, Calif., which had aided the studio in working out a satisfactory film movement for the modified Stein cameras, submitted a design for a VistaVision

camera based on ideas which had been submitted by Paramount studio engineers. Within a very few weeks, Mitchell was at work on a prototype of the new camera and by October 1st had delivered the first of six new VistaVision cameras to Jack Bishop, Paramount camera department head. (See Amer. Cinematographer for November, 1954, page 552.—ED.)

After a period of exhaustive testing by the studio camera department, three of the new cameras were shipped to the Cecil B. DeMille Company then in Egypt, where they were used by Loyal Griggs, A.S.C.; Wallace Kelley, A.S.C.; John P. Fulton, A.S.C.; and John F. Warren in photographing DeMille's latest epic, "The Ten Commandments"

With its VistaVision photographic problems now pretty well licked, Paramount turned to the exhibition phase of

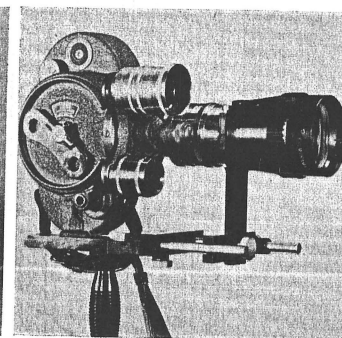
(Continued on Page 42)



New, improved CinemaScope lens built by Bausch & Lomb Optical Company.



Anamorphic lens adapted to Arriflex 35mm camera for photography in CinemaScope format.



The Bell & Howell "FimoRama" anamorphic lens mounted on a 16mm film camera.



Len Roos, ASC, demonstrates the new Kinevox-Kay Lab electronic viewfinder.

shooting, since it would have required considerable time to remove the lead sheath and other coverings of the cables at the location site and make the cable sections ready for splicing.

We followed the accepted practice of shooting all shots from the same camera angle at the same time (or same camera setup), and as a consequence confused the cable splicers working in the picture. In quick succession, we shot all the full shots at this location, then all the medium shots, and finally all the closeups. As the plot of the film unfolded, less and less cable pairs would be unspliced. Then, after we changed our camera setup, we would take some of the spliced pairs, unsplce them, and start over

again. This was done to make the continuity match, but to the cable splicers it made no sense whatever!

On the afternoon of the last day of the production, cameraman Ken Barron and I went out on location to shoot scenes of an actual toll cable. These scenes were to serve as an opening sequence for the picture. We had already taken "Shot 1" twice along with some other shots; but we still had 25 feet of film left in the camera, and Barron, not being satisfied with the shots he had previously made, suggested we make a third attempt. Oddly enough, it was this third take that we selected for editing into the film. And that is how the first shot in the picture happened to be made last.

### TECHNICAL PROGRESS IN 1954

(Continued from Page 25)

the system, and by late summer had demonstrated VistaVision projected from full double-frame prints, using a special projector in which the print travels horizontally past the gate, the same as does the negative in the VistaVision camera. (Amer. Cinematographer for November, 1954, page 574.)

While Metro-Goldwyn-Mayer studio is employing CinemaScope for its wide-screen productions, it has been working on its own version of wide-screen. At intervals during the past two years rumors have emanated from M-G-M that its engineers were at work on newer and greater wide-screen cameras. However, as yet, none of these rumors have culminated in a public demonstration of the equipment.

It can be said, however, that M-G-M, which has continuously encouraged its executives and engineers in research and development to improve the technical quality of motion pictures, definitely has some startling and solid developments to reveal. John Arnold, A.S.C., head of the studio's camera department for more than 30 years, has developed a new camera having horizontal film travel on the order of Paramount's VistaVision camera. However, Arnold's design provides for readily interchangeable film movements, affording a range of frame dimensions from six to ten sprocket holes in length.

Another development by Arnold for M-G-M is a camera that uses 35mm film which appears like super-size 16mm in that there are just two sprocket holes—one at either side—at each frame line, instead of the conventional four in standard 35mm film. This permits extending the picture area—making it wider—right and left into the area normally occupied by the sprocket holes.

Arnold and his studio technical associates are presently working on an even more advanced motion picture camera, which will record the largest picture area yet—a frame dimension  $1\frac{3}{8}$ " in height by  $2\frac{1}{4}$ " in width. Such a large negative image, it is claimed, would enable the studio to make reduction prints of great clarity and sharpness in any aspect ratio, including CinemaScope, without resorting to the use of an anamorphic taking lens.

An account of cinematographic accomplishments in 1954 should include also an appraisal of the Todd-AO system, and especially of the Todd-AO camera itself, which was described in the October, 1954, issue of American Cinematographer. While developments on this camera had begun prior to 1954, it was not until early last year that the present Todd-AO cameras were completed and put into use in the shooting of the Rodgers and Hammerstein production, "Oklahoma!" at Metro-Goldwyn-Mayer studios.

Todd-AO is the only one of the new super-wide-screen systems that employs film stock of larger dimensions than standard 35mm. Todd-AO cameras use 65mm film for negative, which is printed on 70mm stock—the additional width accommodating the sound track.

On the same order as Cinerama in screen size, but considered vastly superior, since it is photographed with only one camera and projected with only one machine instead of three, Todd-AO gives the spectator a terrific sense of audience participation. Aspect ratio is 2 to 1, and projection is on a curved screen having a high reflectance surface. As with Cinerama and CinemaScope, stereophonic sound is employed.

Todd-AO's major accomplishment was

in perfecting a lens system whereby it could pick up with a minimum of distortion a scene having a 2 to 1 aspect ratio and put it on 65mm film. The front element of many of the Todd-AO lenses is about the diameter of an average dinner plate. Whereas the company began with a camera having a single lens, there is now a choice of four lenses that may be used. Unlike the lenses used on standard 35mm cameras (such as the Mitchell), which vary in focal length, the Todd-AO lenses are classified according to their angle of coverage, which ranges from 128° to 37°. Robert Surtees, A.S.C., ace M-G-M director of photography, has the distinction of being the first to photograph a full-length feature with the Todd-AO system. This is the Rodgers and Hammerstein production, "Oklahoma!" still shooting at M-G-M. (See Amer. Cinematographer for October, 1954, page 494.)

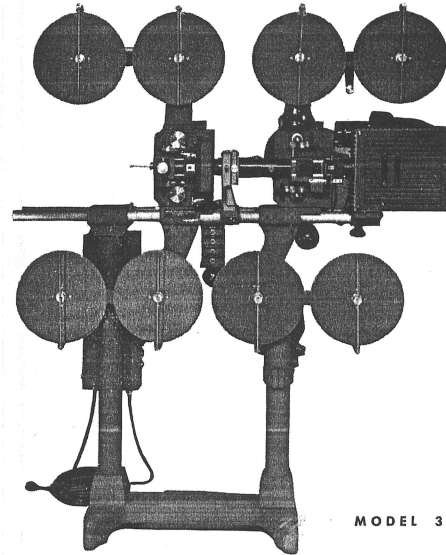
In the realm of motion picture photography, other notable accomplishments during 1954 included the development by Bell & Howell Company of a practical anamorphic lens for CinemaScope-type photography with 16mm cameras. Bell & Howell's lens, tradenamed Filmorama (See Amer. Cinematographer for October, 1954, page 504), is said to be patterned after the 20th Century-Fox CinemaScope lens. It can be used on all existing 16mm cameras.

Arnold & Richter, of Germany, makers of the Arriflex camera, made a major contribution when it developed an anamorphic lens for its 35mm camera, permitting cameramen to make handheld shots in CinemaScope with comparative ease. (See Amer. Cinematographer for July, 1954, page 344.)

Thanks to the Bell & Howell and the Arnold & Richter anamorphic lens developments, it became possible this year for the first time for 16mm producers to make quality CinemaScope-type films; also, for many of Walt Disney's roving cameramen to gather super wide-screen footage for coming Disney short subjects in the CinemaScope format without having to use the larger studio camera equipment.

Last year saw an unprecedented number of underwater photographic assignments for Hollywood's directors of photography. The most renowned, perhaps, if not the most challenging, was Walt Disney's color and CinemaScope production, "Twenty Thousand Leagues Under the Sea." The underwater scenes were photographed by Till Gabbani (Amer. Cinematographer for June, 1954, page 282). For this assignment, Disney engineers designed and constructed a very efficient streamlined, pressurized, underwater blimp to take the Mitchell

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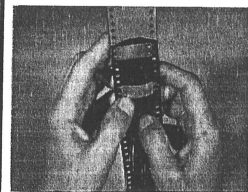
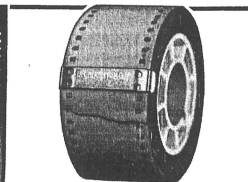
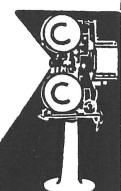
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camera with a CinemaScope lens. This has a built-in power source for the camera motor, and precise external remote controls for rackover, setting the lens stop, and focusing.

RKO studio achieved a somewhat less artistic job but a nonetheless efficient one in the construction of two blimped cameras for filming underwater scenes for its production of "The Big Rainbow." This production, as did others like it, posed the problem of providing sufficient power to drive the cameras for long periods of time without need for power fed from above by cumbersome cables. RKO engineers utilized a compact non-spillable wet storage battery, which was built into the camera blimp. (Photos of the two cameras appear on page 25.—ED.). During the production, approximately 45,000 feet of film was photographed in color over a period of approximately six weeks in the studio tank and, later, 2 weeks in Hawaii.

Perhaps the most advanced and successful undertaking in the matter of underwater camera blimp design was achieved last year by Metro-Goldwyn-Mayer studio, whose technicians designed and constructed two for the photography of underwater scenes for the M-G-M color and CinemaScope production, "Jupiter's Darling." (See Amer. Cinematographer for September, 1954, page 440.)

These blimps were unique in that they had tubular stabilizers attached at the top which controlled and maintained position of the cameras while underwater. The feature permitted tilting the cameras at an angle, up or down, right or left, and operating them in such positions without the need for supporting them on a tripod.

An interesting development last year was the follow-focus attachment for Mitchell cameras, which now enables owners of Mitchell NC, Standard, and 16mm cameras to broaden the scope of their photography by including follow-focus and dolly shots. Easy to install and remove, the attachment couples the finder directly to the camera lens, and assures full control of picture framing and lens focusing, particularly at close, critical ranges.

The use of an electronic viewfinder with studio cameras, such as the Mitchell, has been under consideration for some time. Last year, the idea came a step closer to fruition when Len Roos, A.S.C., demonstrated the first of the Kinevox-Kay Lab electronic finders, now undergoing further refinement. The finder, which is virtually a miniaturized television camera, is mounted on studio cameras in place of the standard Mitchell viewfinder. Its lens has the same range as the film camera lens and the image is reproduced on a TV screen at the rear

of the finder. "Slave" or monitor receivers may be placed at convenient points on the sound stage or near the camera, permitting the director of photography and others to observe the scene during lineup and shooting without going near the camera.

(Al Simon, of McCadden Corp., Hollywood, producers of TV films, has a similar development under way which may be ready for demonstration early this year.)

Most outstanding development in film, of course, was Eastman Kodak Company's Tri-X, which went into first practical use in the industry last year. Following demonstration in Hollywood of highly interesting Tri-X tests, several of the industry's cameramen have already employed it in the production of television films. More recently, director of photography Stanley Cortez, A.S.C., used Tri-X in photographing 98 percent of the Leonard Goldstein production, "Black Tuesday," marking the first time this film has been used in photographing a major Hollywood feature. (See story elsewhere in this issue.—ED.). At this writing, Tri-X is also being used in a second feature production, "Blackboard Jungle," which

### TRI-X IN FEATURE FILM PRODUCTION

(Continued from Page 33)

After reading the script the first time, I saw possibilities in Tri-X film as the medium best suited for interpreting this stark drama. Having previously seen many tests which had been made by other cameramen with this film, I felt that we could get a certain dramatic quality with Tri-X that could not be achieved as easily nor as effectively with any other available emulsion.

It was proposed to the late Leonard Goldstein that Tri-X be used for filming "Black Tuesday." After he had seen one test shot in particular that I had made with it in which only a single tallow candle had been used to illuminate the closeup of a girl (it was the first time such a shot had been made, I understand), he approved use of the film for the picture. It should be emphasized that Tri-X was not selected for its great speed alone nor to permit working with extremely low-key light, but rather to get the most in the way of increased depth of field by using smaller stops than we otherwise would do with other negative stock.

In evaluating the potentials of this film for feature productions, perhaps I had an advantage over some cameramen in that I had, many years earlier, used a similar film which was the forerunner of today's Tri-X. This was while I was in

Russell Harlan, A.S.C., is photographing at M-G-M.

In the realm of set lighting, two important developments of 1954 include a new carbon developed by National Carbon Company designed to balance lighting to 3200° for color photography, when used in conjunction with incandescent lamps. General Electric Company's lamp division announced the development of a series of new "noise-free" incandescent lamps for motion picture set lighting. These include a 1000-watt general service lamp, a 1000-watt 3200° K lamp for photography, and a 2000-watt spotlight, also for photographic use.

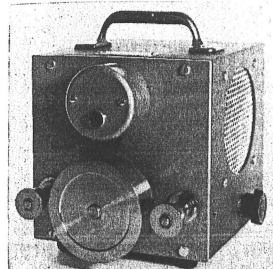
Sizing up the industry as a whole for 1954, it can be said it made tremendous strides forward. The achievements cited here are selected from among the most important related directly to the photography of motion pictures. Twelve months hence, we should be able to look back over the year and reflect on accomplishments eminently as important, judging by the enthusiasm that prevails and the impetus toward a bigger and better motion picture business which 1954 gave the industry.

the Army and had been assigned to photograph the Yalta Conference. This conference, as readers probably know, was held in the ancient Czar's Palace. As we had been informed that no special lights were to be permitted for photography, the special "ultra-fast" film was supplied for the recording of this very historic event. The result we achieved with this film was remarkable not only for the way it enabled us to obtain excellent exposures in inferior light, but for a rare and unusual image quality it gave.

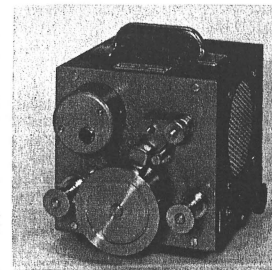
In a similar way, Tri-X gave us superb results when we filmed a sequence of scenes on location in a downtown Los Angeles bank for "Black Tuesday." Because of the great speed of this film, we were able to get excellent exposures using only a minimum number of studio lights augmented by the light from practical fixtures.

Tri-X's remarkable quality potentials again were demonstrated in the scenes we photographed on the sound stage, especially so on the set representing the interior of the warehouse, where the killer and his gang were holed up, following discovery by the police. Here we had to film scenes that represented day as well as night, with a gradual transition to night being evident as the

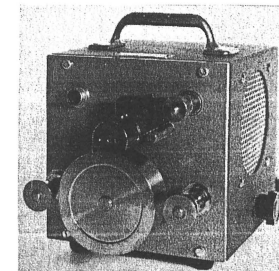
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story progressed. Because it was necessary to achieve the maximum depth of field in the shots made within the huge warehouse interior, the ability to shoot at small stops was a decided advantage. It meant we could achieve the necessary pictorial result without resorting to more costly lighting, could maintain more freedom of movement with the camera without becoming too involved with placement of lights.

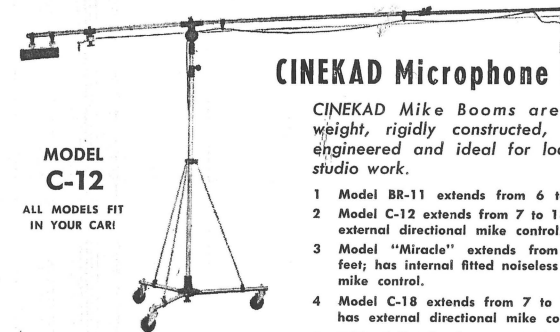
Some of our most dramatic lighting accomplishments appear in the sequence where the police lay siege to the gang imprisoned in the warehouse. As night falls, the police rope off the area surrounding the building and bring up batteries of high-powered searchlights, which are placed at strategic points to throw light into the warehouse interior.

Long fingers of the powerful searchlights probe through every crack of the building, lighting it enough to reveal the horrified group within—further dramatizing their actions and their emotions as the police close in.

Throughout the picture, we worked at apertures ranging from f/2.8 to f/16. Our negative was processed at the Pathe Laboratory in Hollywood; developed to a gamma of 0.65.

Naturally, with a negative film of such great speed, there are precautions

(Continued on Page 47)



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