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MARGARET MITCHELL'S "GONE WITH THE WIND." Screen play by Sidney Howard; directed by George Cukor.

"THE ADVENTURES OF TOM SAWYER," a Technicolor production of the Mark Twain classic. Introducing Tommy Kelly. Screen play by John V. A. Weaver; directed by Norman Taurog.

"MERRY, MERRY MAIDENS," from the novel by Helen Grace Carlyle. Screen play Sonya Levien. Adaptation by Sonya Levien and Elizabeth Meyer.

Current Releases

CAROLE LOMBARD and FREDRIC MARCH in "NOTHING SACRED," a comedy in Technicolor by Ben Hecht, with Charles Winninger and Walter Connolly; directed by William A. Wellman.

"THE PRISONER OF ZENDA," starring RONALD COLMAN, with Madeleine Carroll and Douglas Fairbanks, Jr. Screen play by John L. Balderston; adaptation by Wells Root and additional dialogue by Donald Ogden Stewart. Directed by John Cromwell.

ON THE COVER

The excellent picture of Edgar Bergen, and his vocal if inanimate little pal, Charlie McCarthy, on the front cover of this issue, is from the set of stills by Robert Coburn, member of Local 659, IATSE, for Samuel Goldwyn’s “Goldwyn Follies” in which the Chase & Sanborn radio show favorites reach top billing on the screen. Bergen already had a series of shorts for Warners and is under contract to Universal for feature pictures.

Bergen’s success is due to his special skill as a comedy material writer, although he was well-known in vaudeville for years before the talkies and radio and its own inertia sent that entertainment medium into a fatal decline. Although, after the downfall of the variety shows and presentations, Bergen had made a new success for himself by adapting his ventriloquistic skill to night club entertainment, to Rudy Vallee and his famed Thursday night broadcast, goes credit for the real discovery of Bergen’s talents.

Like many another, Bergen and “Charlie” went on from the Vallee program to set a new national vogue on the Chase & Sanborn show and finally land among the screen’s aces.
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International Photographer, as the monthly official publication of International Photographers, Local 659, of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, not only represents the entire personnel of photographers engaged in professional production of motion pictures in the United States and Canada, but also serves technicians in the studios and theatres, who are members of the International Alliance, as well as executives and creative artists of the production community and executives of the manufacturing organizations serving the motion picture industry. International Photographer assumes no responsibility for the return of unsolicited manuscripts or material.

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Hollywood • California
BLONDE OR BRUNETTE...She's Still the Nation's Pet!

Mae West Leads "EVERY DAY'S A HOLIDAY" Before the Cameras

One of the glamour girls of the screen is Mae West, America's comical pin-up in the latest of her films, "Every Day's A Holiday." The first of this series of her own, "Evelyn Ankers," was so successful that it was followed by "Snoop," new Paramount Pictures quarterly publication aimed to sell candid shots of Paramount's outstanding product to editors, exchange and theatre men, first issue of which appeared last month. Terry DeLapp, studio publicist has armed his stillmen with Contax cameras and conducted a campaign of educating the studio's personalities to the value and convenience of properly made candid shots. Assembling of the material, in neat, effective layouts was supervised by Robert M. Gillham, Paramount's director of advertising and publicity in New York. At Paramount the candid pictures are serviced to editors and news services by Rufus Blair. A standard procedure of 8" x 10" enlargements from the 35mm. negative is followed. Front cover shot of W. C. Fields was enlarged from a natural color Kodachrome 35mm. negative. While Paramount's enlargements from the candid shots are aimed particularly at the slick paper publications and rotogravure, the studio stillmen are turning out much work that will stand newsprint reproduction.
Tradewinds

News of New Products

Although December brought no huge rush of new products due to concentration on the holiday season sales rush, such items as the new Super Sport Dolly and new Super Ikonta B model cameras, a new General Electric exposure meter, a new Filmosound and film cement from Bell & Howell, another new flashlamp from Wabash, and a new film rewind from Cinema-Arts-Crafts highlighted the new products.

Initial response to the new Tradewinds section, from both readers and manufacturers has been gratifying. We have tried to get blanks for submission of new products in standard form to all those making products used in photography or the motion picture industry. It is our sincere wish that any firm that has not received blank as yet will make use of the reprint appearing on Page 6 of this issue and by forwarding a news item of some new product will automatically be placed on our mailing list to receive blanks in the future.—Ed.

CINEMATOGRAPHY

Name of Product: New &H Filmosound.
Manufacturer: Bell & Howell Co., 1801 Larchmont Ave., Chicago, Ill.
Distributor: Sold direct, dealers.
General Description: Bell & Howell now is producing four standard models in connection with announcement of general improvements throughout entire line of Filmosounds. New features, lend greater flexibility, although maintaining same basic engineering principles of previous models.
Specifications: Numerous combinations and price levels are too detailed for condensed publication here. We suggest interested parties contact dealers for information on the four new models: 750-watt Filmosound 120-G; the 138 F; the 138 I; and the newest improved Filmosound, the powerful 1000-watt Auditorium model.

Name of Product: B & H Universal Film Cement.
Manufacturer: Bell & Howell Co., 1801 Larchmont Avenue, Chicago, Ill.
Distributor: Sold direct, dealers.
General Description: Developed after months of research combines the virtues of both B & H safety and standard film cements, which it supercedes. Makers claim it forms splice stronger than the film itself.
Specifications: Since most 16mm and 8mm film is of the safety or acetate type, and most standard film is on nitrate bases, new cement is convenient and certain for both. Universal usefulness as a result of new secret formula is big asset.
Prices: According to quantity.
Product: Agfa Supreme Negative Film.
Manufacturer: Agfa AnSCO Corporation, 29 Charles St., Binghamton, New York.
Distributor: G. King charms, incorporated, 6424 Santa Monica Blvd., Hollywood, California, (Hollywood 2918).
General Description: A new 35mm, motion-picture negative film which is fully two times as fast as Agfa Superpan negative. Supreme negative has a much finer grain size than Superpan and is slightly more brilliant. The color sensitivity is practically identical with regular Superpan negative. Supreme negative may be processed in any photographic developer which is satisfactory for use with regular supersensitive panchromatic negative emulsions. The keeping quality of Supreme negative is fully equal to that of Agfa Superpan negative. The new SI PREME negative is designed for general and special production uses.
Specifications: Width 35mm, standard perforation, 200 foot, 400 foot, 1000 foot lengths. Price: 49c per foot.

Product: Agfa Ultra Speed Pan Negative Film.
Manufacturer: Agfa AnSCO Corporation, 29 Charles St., Binghamton, New York.
Distributor: G. King Charm, incorporated, 6424 Santa Monica Blvd., Hollywood, California, (Hollywood 2918).
General Description: Ultra Speed 35mm, motion-picture negative is an extremely high speed material intended for newsreel photography and special studio photography under adverse conditions. Ultra Speed is fully three to four times faster than Agfa Superpan negative. The gradation is slightly flatter than Superpan and with the exception of being a little higher in the red region of the spectrum than a color sensitive material, Superpan. Ultra Speed has a slightly coarser grain size than Superpan, but this condition will not be found objectionable for most practical applications. The keeping quality of Ultra Speed is fully equal to that of Superpan. Ultra Speed may be processed in any photographic developer that is satisfactory for use with super-sensitive panchromatic emulsions.

LABORATORY

Product: Model AA-I 35mm, Rewind.
Distributor: (Same).
General Description: The new Cinema Arts-Crafts Model AA-I 35mm Rewind has been engineered for the studios of today. It has many new modern features using the finest materials obtainable. The Rewind casting is made of cast aluminum. The gears are made of bronze and chrome vanadium steel. Bronze and roller bearings are used. The handle is well counter-balanced and does not tire the operator's arm. Takes up 2,000 foot reels, and winds in the direction turned.
Specifications: Capacity, 2,000 foot reels. Material—Aluminum, Bronze, Chrome Vanadium Steel and Roller Bearings.
Prices: One at a time, $29.00; two at a time, $18.00; 6 or more at a time, $15.00.

PHOTOGRAPHY

Product: General Electric Exposure Meter.
Manufacturer: General Electric Co., Schenectady, N. Y.
Distributor: (Same).
General Description: Claimed to have many
new features, the new meter is intended for use with both black-and-white and color. With a wide range of ability to read light intensities, from dim interiors to brightest sunlight, the instrument is compact, of modern design, accurate and easy to use.

Specifications: Directional hood shades out overhead and side light, locks and slides into position. When closed hood gives complete protection to photo-electric cell and face of instrument. Needle scale appears in a horizontal window on the top side of housing. Price: $19.50.


General Description: Guaranteed by manufacturers for perfect foolproof synchronizing at high shutter speeds, particularly when used with new fast Agfa films, this new flash bulb from Wabash is hailed as smallest bulb ever made. Makers claim twelve will fit in a coat pocket, and that routine shots at 1/200th of a second produce brilliant, snappy negatives with lens stopped down to f:32 and f:45. Also claimed to synchronize effectively with focal plane shutters. So great has been demand for these new bulbs company is enlarging production facilities.

Specifications: Peak of flash in new midget

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Technical Jury New Product Record Blank

NAME OF PRODUCT:

MANUFACTURER:

Street) (City) (State) (Telephone)

DISTRIBUTOR:

Street) (City) (State) (Telephone)

GENERAL DESCRIPTION:

State purpose, aims and claims for product

SPECIFICATIONS:

(State size, dimensions, materials, standard accessories, etc.)

PRICES:

MODEL NUMBER:

(State if supersedes previous Model Number)

☐ PICTURES: If pictures of product are mailed under separate cover, mark check in the box. Good quality gloss prints, preferably 8" x 10" are welcome and afford additional excellent publicity for your product. Since these are news pictures, we prefer unretouched photographs. If any persons appear in pictures be sure to identify with legible captions reading from left to right.

---

Technical Jury,
International Photographer,
306 Taft Building,
Hollywood, California.

Gentlemen:

We are sending you under separate cover our... for inspection and use under actual production conditions.

☐ This item is worth less than $10.00 and may be destroyed or kept by you.

☐ This item is worth more than $10.00 and is still saleable after your inspection. Hence we expect its return after a reasonable period, but we assume all costs of insuring against loss and understand that International Photographer assumes no responsibility for loss or damage to the product.

(Signature of authorized executive or agent of manufacturer or distributor.)

With switches may be purchased Tee-Taps for $9.90 each, and 20-foot lengths of high-grade extension cord of No. 18 sheathed heater cord, with Belden rubber plug and receptacles attached. Prices: 6 am., $3.25; 20 am., $7.50; 40 am., $16.50.

Product: Argus Slidekit, Binder Kit and Projector. Manufacturer: International Research Corp., Ann Arbor, Mich. Distributor: Sold direct, dealers. General Description: These items are intended to be sold as a unit, although the other items can be purchased separately from the $15 group. Their aim is to provide low cost facilities for mounting, binding and projecting black-and-white and color shots.

Specifications: The Slidekit and Binder are simple and efficient, designed for easy and rapid mounting of pictures, as illustrated. Projector is of modernistic design, a powerful precision instrument, with special 100-watt projection lamp, full color, corrected four-inch focal lens, complete with slide carrier.


General Description: The new model Super Ikonta B now features the same as the Contax models, the range and view-finders combined in one large opening. This obviously adds to the speed and ease of focusing and centering the picture, especially when rapid action is required.

Specifications: New model is identical in all other respects to the previous Super Ikonta B, shooting 11 2½ × 2½ pictures on No. 120 roll film. Price: $150, with Zeiss Tessar f:2.8 lens in Rapid Compr shutter to 1/100 second.

R&P Stil Lab Open

Parrish and Reay operating complete still service for independent studios and publicity directors.

Equipping of a new and modern plant for the handling of all still department activities has been completed by Neville Reay, motion picture publicity and advertising executive for ten years, and Fred A. Parrish, still photographer and member of Local 639, who has been shooting celebrities for 15 years at all the studios.

The new company is called R & P Laboratories and offers the independent producer and publicity director full laboratory facilities, including negative developing, negative duping and enlarging, printing, enlarging, copying, and, for the production department, preparation of material for process work.

The company already is handling stills for five major independents. Free pickup and delivery service is maintained. A night shift is steadily employed so that proofs of each day's work may be delivered in the early morning. R & P Laboratories temporary telephone is Hillside 3917.

While Reay and Parrish are partners in the enterprise, they each will continue their own work and will employ a 100 percent union staff from Local 683, IATSE, to handle the processing work.
On this and opposite page are direct reproductions from the original prints of outstanding shots from new Longworth book.
1938’s Prospects for Stillmen

Publication by Longworth of outstanding collection of studio stills prompts discussion on ways of opening up new opportunities to improve still photography.

(Herbert Aller, managing editor of International Photographer, also is Secretary of International Photographers Local 659, IATSE. In this capacity he comes in direct contact with more photographers than any person in Hollywood. His comments contain an interesting follow-up on the pertinent criticism of the studio still situation by John LeRoy Johnston, veteran studio publicity man, in the September issue of International Photographer.—Ed.)

For the first time in some years, one of Hollywood’s army of ace stillmen, members of Local 659, presents in publication form a gathering together of his outstanding work. Bert Longworth is the photographer and the publication is his “Hold Still, Hollywood.” (highlights from which are illustrated on these pages) which has evoked much favorable comment since its appearance several weeks ago. This achievement by the veteran stillman, who is known particularly to the folks of the Warners lot, serves to bring out in sharp contrast the results obtained under favorable conditions by the expert Hollywood still photographer and the usual
experience of the average worker under the present still photography setup in the major studios.

There is no question but that there is room for considerable improvement in this field of motion picture photography work. The subject was opened up very ably from a critical standpoint by the veteran Hollywood publicist, John LeRoy Johnston, in an article published in the September, 1937, issue of International Photographer.

While I thoroughly agree with Mr. Johnston's premise that the still situation in Hollywood suffers from the heavy hand of conservative tradition in the equipment available, there is noticeable on various fronts, steps to improve this condition. However, many of the problems involved, as I have discovered in conversations with experienced stillmen, prompted by the points made in Mr. Johnston's article, are of method and routine, and these depend upon the human equation rather than better cameras, faster lenses or new super films.

It is my belief that an open and thorough discussion of the methods and practices now in vogue—from a frankly critical standpoint—with the aim of improving the quality and news value of stills emanating from Hollywood, is well worth while. This might well eventually take the shape of informal periodical discussions of the subject between cameramen and executives with whom they work. Presentation of these viewpoints is made with the hope that it will stimulate further discussion, both from stillmen and publicity men.

In the ranks of our stillmen in the motion pictures industry, we have many outstanding photographic workers. To mention a few in addition to Langworth, the names of George Hurrell, Ray Jones, Clarence Bull, Gene Kornman, Whitey Schafer, Ted Allen, Cliff Manap, Frank Powolny, Romann Freulich, Bob Coburn, Alex Kahle, Fred Parrish and Ernest Bachrach, come easily to mind because their work has appeared in recent issues of International Photographer as well as in many a national publication. Many more could be mentioned but this sample groups represents every type of skilled still photography from the subtle angles of capturing personality to the tricks of sharp action photography.

Yet these experienced stillmen—with the possible exceptions of Hurrell, Schafer and Jones—have comparatively little to say about their work after the original negatives are tossed into the publicity machine hopper. A situation has developed where decisions are constantly being made upon the manner of handling a negative without any attempt to correlate this with the aims and objectives in the mind of the mind who snapped the shutter. This naturally is resulting in much waste motion and bad photography.

Our studio stillmen, if given the same cooperation that is accorded the widely publicized artistic geniuses of photography in the employ of the big publications, and if given some sort of voice as to what the finished accepted still print will be, would be capable of turning out work of a much higher calibre.

For one thing they are closer to the work than most of their bosses and they shoot things at certain angles, speeds and stops for definite reasons, yet most of the time they are not given the opportunity to present those reasons when stills are selected. Thousands of stills are shot week in and week out during the course of the year that go to waste because the heads of the departments who choose the finished stills do not have the time to go over them with their stillmen, who should be able to make valuable suggestions on the handling of prints.

To the average head of a still department a negative is looked at for its complete details, but as so often happens, the stillman is obliged to put things in his picture which have nothing to do with the important part of the picture that he is trying to put over. In other words, if the stillman could report or suggest the main feature of interest on his negative, and have that enlarged to whatever the requirements are, I am sure that at least half of the thousands of negatives which are wasted could be saved, and many interesting angles and suggestions which in the past have been neglected could be brought out that would improve not only the finished product credited to the stillmen, but also the quality of the advertising and publicity emanating from the studios.

Most of the well-known photographers who shoot for the slick magazines such as Life, Vogue, etc., turn in only what they think is the best out of all their shots. They may make a great number of shots of the same subject, but submit only a selected few.

Another suggestion is that photographers working in the studios be brought
in closer contact with the representatives of the magazines and newspaper services, who in turn, should give them advice and even specific ideas on what the newspapers and magazines are demanding at the present time. This will not only save time and money, but also many wasted shots.

In the Hollywood studios we have men who are called upon to work not only on pictures that have action but also pictures that have very little photographic action—the more or less dialogue picture. Many of these have powerful entertainment values of the screen, but to cover them with still pictures that will tell a story much more thought and skill is required than most publicity executives believe is necessary. This is another reason why still photography should be given as much cooperation as possible in the way of having something to say in the selection of their work.

Our stillmen in the studios at the present time are men who have been doing this kind of work for years. They know a story when they see one and they can operate any type of camera if given the same opportunity that imported experts would be given. In the final analysis operating a camera is mechanical. It is the amount of intelligence and experience of the person behind the camera that results in pictures that will either tell the story or fail to tell the story. That applies to the use of cameras, whether they are candid cameras, action cameras, or 8 by 10 still cameras.

The year just ended was the most picture-conscious in history and 1938 bids fair to set a new record. I am sure that if studio stillmen are given more cooperation from all quarters during the coming year, that much money can be saved and superior quality pictures will result. Let’s get behind the still photographer and give him a wider range of opportunity to improve his work. To that end the pages of International Photographer are open for any constructive comments, suggestions or discussions.

HERBERT ALLER

Miniature Pointers

Some Do’s and Don’ts by a Local 659 veteran of pioneer days of still photography with 35mm. negative.

Like many thousands of others perhaps you have recently become interested in miniature photography or possibly found a new miniature camera in that Christmas stocking. To you then, this article is addressed. It is solely for the purpose of stressing or clarifying a few points so essential and yet so often overlooked—in this medium of photography.

First of all, the miniature camera has unfortunately been given the nick-name of “candid camera.” That is because it does this difficult type of photography well. But because you have a candid camera, do not believe that that is the limits of its capabilities. Don’t rush out and make candid photographs of all of your friends because it is surprising what this can do to friendship. A photographic faux pas on your part—and there ends a life time friendship. You will soon learn what even your best friends will tell you—where to go to make snap shots! Moreover, most candid pictures are merely the bad taste in photography.

If we had a book of rules for miniature photography rule one would surely be, HOLD THE CAMERA STILL! Most people get buck fever every time they shoot their camera and wobble it all over the place. You have to aim and shoot that little camera as carefully as you would a revolver; just squeeze the trigger, so to speak. After a little brushing up on the fine points of fancy camera shooting you will probably be able to draw a camera and flick off an exposure quicker than Wild Bill Hickok could ever make the Indians bite the dust.

However, in all seriousness, holding the miniature camera still is one of the essential things in miniature photography that cannot be stressed too strongly. It is not hard to do. It only takes a little practice. I find it very easy to hold my Leica still for an exposure of 1/5th of a second and under conditions demanding one second exposure I have been
able to make passable pictures on an average of about one out of four exposures. Naturally your subject must also remain still for this length of time.

In order to facilitate the holding of the camera still it is a good plan to hold your breath a few seconds before and during the exposure. However if you anticipate making pictures at slow shutter speeds, and you should if your shutter is capable of it, try to plan your camera setups where you can brace yourself against a wall, table, or chair. With modern high speed panchromatic emulsions, especially the new Agfa Supreme and Ultra-Speed, it is easily possible to make all kinds of pictures within the home and elsewhere at night using nothing more than the normal room lighting. Your exposures will run from about 1/200th to 1 second in duration, depending upon the speed of your lens and the amount of light upon your subject. As these exposures can be made with the carefully hand-held camera, much naturalness will result from the flexibility of your compositions.

One problem in holding the camera still over which we have no control, is heart action. The beating of the heart under strain of excitement sometimes makes it difficult to hold the camera still especially during the longer exposures. Of course one cannot stop his heart from beating but with a little concentration and by bracing himself much of this trouble can be overcome. I sometimes use a device for slow exposures called a Beltipod. It is a rod with a tilting tripod head attached to it. It fits over the belt or coat button and is extremely useful as an aid in making slow hand-held exposures.

Just why it is so important to hold the camera still in miniature photography can be readily understood when one stops to consider that practically all miniature negatives are enlarged at least 3 diameters (9 times their actual size) for post card size pictures, and a great deal more for larger pictures. Of course any blur of definition in the negative traceable to camera movement will be greatly noticeable in the resultant enlarge-

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The CINEMATOGRAPHER’S BOOK of TABLES

By Fred Westerberg

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SPECTRAL SENSITIVITY—WESTON CELL

RELATIVE SPECTRAL SENSITIVITY OF PHOTRONIC CELL USED IN WESTON EXPOSURE METERS

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Data by Weston Electrical Instrument Corporation.

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CAMERA CRANES

STATISTICAL DATA ON CAMERA CRANES USED IN THE HOLLYWOOD MOTION PICTURE INDUSTRY

<table>
<thead>
<tr>
<th>Studio or Rental Service</th>
<th>Weight in Pounds</th>
<th>Max. Height of Lens</th>
<th>CARRIAGE Dimensions</th>
<th>Height of Center Post</th>
<th>Length Crane Arm from Center Post</th>
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<td>Fox</td>
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<td>21' 4&quot;</td>
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<tr>
<td>Paramount</td>
<td>6,900</td>
<td>21'</td>
<td>4' 9&quot;</td>
<td>10' 2&quot;</td>
<td>7' 6&quot;</td>
</tr>
<tr>
<td>R.K.O.</td>
<td>7,600</td>
<td>21'</td>
<td>5' 9&quot;</td>
<td>11'</td>
<td>8' 9&quot;</td>
</tr>
<tr>
<td>Roach</td>
<td>2,000</td>
<td>9' 6&quot;</td>
<td>4'</td>
<td>5'</td>
<td>5' 8&quot;</td>
</tr>
<tr>
<td>United Artists</td>
<td>7,000</td>
<td>20' 6&quot;</td>
<td>5' 8&quot;</td>
<td>10' 6&quot;</td>
<td>9' 4&quot;</td>
</tr>
<tr>
<td>Universal</td>
<td>6,500</td>
<td>13' 6&quot;</td>
<td>5' 8&quot;</td>
<td>27' 3&quot;</td>
<td>8'</td>
</tr>
<tr>
<td>Warner</td>
<td>8,000</td>
<td>12' 6&quot;</td>
<td>6' 6&quot;</td>
<td>32'</td>
<td>10'</td>
</tr>
</tbody>
</table>

*Denotes solid tires. All others have pneumatic tires.
Heights relative to floor level.
Fox No. 1 and General Service cranes have extensions.
Data compiled by Roy Overbaugh and checked by International Photogatherer staff.
Data courtesy Selznick International.
BALANCED

IN EASTMAN Super X Panchromatic Negative the vital film factors of fine grain, high speed, and superb photographic quality are combined to give the finest results to be seen anywhere today. It is the admirable balance of these qualities that has made Super X the world's most widely used negative film. Eastman Kodak Co., Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN SUPER X
PANCHROMATIC NEGATIVE
ments. In making an exposure pull-down on the shutter release until it is about to trip. Do this slowly. Then when your subject has that "it" expression give the release a slight squeeze and it will trip. You'll catch the expression that you desire because however fleeting it was you were all set for it and what's more it will be sharper on your negative because your camera was held still.

The next rule in miniature photography like all photography is to use the correct exposure. To do this use a printed exposure guide or an exposure meter. In any event make an honest effort to expose your negatives correctly and not depend upon the wide latitude of the emulsion to compensate for your errors.

It really ought to be a rule in miniature photography that you must develop all of your own negative rather than rushing down to the nearest drug store and asking them how soon they can get the prints back. It would certainly stop the making of a bunch of needless exposures and would result in more thought being given to better photography. When miniature photography was new, all of us practicing it had to develop and enlarge our own pictures, simply because no one else could do it for us successfully. I am proud to say
that the results that we achieved proved beyond a doubt that the miniature camera had a very definite and useful place in photography. Besides if you really are interested in miniature photography you might as well have all of the fun. Developing a roll of miniature negatives is no trick at all and you can do it with as dependable results as you can get from any photo finisher.

To develop a roll of film you do not need a dark room. All you need is a developing tank, thermometer, graduate, developer, hypo, and the use of the kitchen sink for a few minutes. Naturally you will have to load your film in the developing tank in the dark (a few tanks can be loaded in daylight). Once the film is loaded in the tank all other developing operations are carried on in the light. The developing time of your negatives has all been figured out for you. So many minutes at so many degrees and it is all over. Just like baking a cake.

Perhaps you have been confused by all of this talk about fine grain. At the present time, forget about it. Of course the finer the grain is in your negatives, the sharper and better will be the definition of your negatives. However for all normal purposes and for the full enjoyment of your camera you need not worry about grain. I would like to suggest that at the start you choose a simple ready prepared developer like D76 or Rytol. They are easy to mix, keep well, give negatives of excellent gradation, and get the utmost out of every exposure. Most fine grain developers while they give fine grain are very lacking in other respects. Let me repeat again, for the full enjoyment of your camera you need not worry about grain. You can go into that after you have absorbed the fundamentals.

Probably the majority of your prints will not be enlarged more than post card size and with only an enlargement up to 11 x 14 inches for the best ones. This should be well within the grain size of your negatives. Remember that most all salon prints are made upon the more beautiful matt surfaces of paper and not upon one of a glossy surface. Let those whose special work requires extremely large prints or a high degree of definition on glossy paper, worry about fine grain. Let’s you and I have fun just making pictures.

As you possess the most versatile camera there is, you should not want for subject matter. You can make portraits, action pictures, landscapes, panoramas, stereoscopic pictures, copies, photomicrography, photomurals, astronomical pictures, etc. and etc. And when you finish doing them in black and white you can start right over and do them in beautiful color. If you’ve never seen any miniature photographs projected in color, you’ve got a treat in store for you. After all there are not so many DONT’S in miniature photography, but there are a lot of DO’S—and color is one of them.

CLARENCE W. D. SLIFER, 639, IATSE.

Super Fast New Agfa Films

Leathy of Hollywood Charney organization reports technical highlights and benefits of much-discussed new films.

In the following article the two new Agfa 35 mm. negative products, Supreme and Ultra Speed Pan, are described technically and an outline given as to the practical advantages derived from their use in motion picture production. As is already well-known, both types are the result of research on the part of Agfa Anseco engineers in Binghamton, New York, and are designed to increase photographic latitude without impairing the characteris-
Fine Grain Developing a Specialty

MORGAN CAMERA SHOP
6305 SUNSET BOULEVARD
HOLLYWOOD'S leading miniature camera store, where large cameras and photo supplies also are sold.

Agents for
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CINEX
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USED 35 MM.
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Mitchell, Bell & Howell, Akeley, Debric, Universal, Pathe Cameras, B & H Eyemo and De Vry, Portable Sound Recording Outfits, Holmes Projectors, Sound and Silent, De Vry Suit Case Model Projectors, Bell & Howell 1,000 ft. magazines at $50 each and Bi-pack adapters at $90 each, Stineman Developing Outfits, 16 and 35 mm.
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Hollywood, California
Cable Address: CAMERAS

DE BRIE AT SACRIFICE
New Type SUPER PARVO DE BRIE
Ultra Silent Camera No Eipim Necessary
Has built-in motor, automatic dissolve, pilot pins and anti-buckling device. Four 1000 ft. magazines—40 mm., 50 mm. and 75 mm. F2.3 lenses—Mitchell tripod, De Brie upright finder, set of front attachments. Leather covered carrying trunk and tripod cover. It's the latest type equipment... like new!

Thoroughly Guaranteed SACRIFICE... $2,250
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1600 Broadway
New York City
Tel. Circle 6-5080
Cable: Cinequip

Figure 2

153
154
556

Supreme
Superpan
Ultra Speed Pan

DEVELOPING TIME IN AGFA 17 DEVELOPER

<table>
<thead>
<tr>
<th>Time (mins.)</th>
<th>Supreme</th>
<th>0.39</th>
<th>0.59</th>
<th>0.77</th>
<th>1.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Superpan</td>
<td>0.30</td>
<td>0.56</td>
<td>0.71</td>
<td>0.98</td>
</tr>
</tbody>
</table>

AGFA BORAX DEVELOPER NUMBER 17

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water to make</td>
<td>1.0 liter</td>
<td>32.0 ounces</td>
</tr>
<tr>
<td>Agfa Metol</td>
<td>1.5 grams</td>
<td>22.0 grains</td>
</tr>
<tr>
<td>Sodium sulphite, anhydrous</td>
<td>30.0 grams</td>
<td>2.0 ozs., 300 grains</td>
</tr>
<tr>
<td>Hydroquinon</td>
<td>3.0 grams</td>
<td>45.0 grains</td>
</tr>
<tr>
<td>Borax</td>
<td>3.0 grams</td>
<td>45.0 grains</td>
</tr>
<tr>
<td>Potassium bromide</td>
<td>0.5 grams</td>
<td>7.5 grains</td>
</tr>
</tbody>
</table>

Figure 3

The comparable gradation of Supreme with Superpan negative is revealed by an examination of Figure 1, which also shows the improved toe section, assuring less distortion of fine shadow detail. This comparison, as well as the gamma data shown accompanying Figure 1, was obtained by tray development of sensitometric strips in the Agfa Borax Developer No. 17.

The color sensitivity of Agfa Supreme is practically identical with that of Superpan negative and the Supreme can, therefore, be used with the same illumination and makeup conditions.
INDOOR movies are easy to make nowadays—regardless of your camera’s lens speed. Film is faster. Lights are brighter.

Use whatever Ciné-Kodak Film you wish. Black-and-white or full-color Kodachrome, 8 mm. or 16 mm. There’s an exposure guide for each attached to Kodaflector—Eastman’s $5 twin-reflector lighting outfit. The guides tell you what aperture to use for various distances of lights from subjects. Decide upon the most convenient distance, set the lens at the specified “stop”—and shoot.

Indoor movies are as simple as that, when you use the right lights and film. The right light, of course, is Kodaflector—the most efficient lighting outfit devised for use with inexpensive Photoflood lamps. The right film is Ciné-Kodak Film. Make your choice from among the four types shown below.

Eastman Kodak Company, Rochester, N. Y.

- Ciné-Kodak Eight “Pan” Film, $2.25 per roll. Ciné-Kodak
  Eight Kodachrome Type A, $3.75 per roll. Ciné-Kodak Super-
  Sensitive “Pan” (16 mm)—50-foot rolls, $4; 50-foot magazines,
  $4.25; 100-foot rolls, $7.50. Ciné-Kodak Kodachrome Type A
  (16 mm)—50-foot rolls, $4.75; 50-foot magazines, $5; 100-foot
  rolls, $9. All prices include processing.

Great Fun... THESE INDOOR MOVIES
AGFA ANNOUNCES—

Agfa’s new Supreme Negative is twice as fast as Superpan! And—at the same time—the grain size, color balance and gradation of this supersensitive panchromatic film are better than Superpan!

"IMPOSSIBLE!" SAY THE CRITICS

UP to now it has been considered impossible to effect any great increase in speed and at the same time retain fineness of grain, gradation, color balance and keeping quality.

NOT ONLY RETAINED... BUT IMPROVED!

BUT—in Agfa’s new Supreme Negative these important features have not only been retained... they have been substantially IMPROVED... especially the gradation and fineness of grain!

The amazing speed of the new Supreme Negative permits stopping down to obtain more focal depth, thus extending the scope of background transparency photography, and of photographing medium close-ups where it becomes desirable to keep the foreground action and background action respectively in focus.

This new film is replacing Superpan. Samples of Supreme are now available. Get yours at once... and see for yourself what an ideal negative it is!

AGFA SUPREME NEGATIVE
Supersensitive Panchromatic
TWO GREAT NEW 35mm. FILMS!

Agfa's new Ultra-Speed Panchromatic Negative is three times as fast as Superpan! This degree of speed increase, heretofore inconceivable, makes Ultra-Speed the fastest film ever offered.

"IT'S TRUE!" SAY THE CAMERAMEN

ULTRA-SPEED, originally designed to answer the requirements of newsreel photography, won instant approval in New York, and is eagerly sought for all types of news-recording.

OFFERS MANY POSSIBILITIES

Its phenomenal speed—3 times that of any negative previously available—finds many fields of applications in the motion picture industry. It is being widely used in all sorts of emergencies when the greatest possible speed is desired.

BOTH AVAILABLE NOW!

Both of these great new Agfa Films—Supreme and Ultra-Speed... are available now for immediate delivery in quantity. Distributor is C. King Charney, Inc., 6424 Santa Monica Blvd., Hollywood and 245 W. 55th Street, New York.

Supreme and Ultra-Speed are made by Agfa Ansco Corporation in Binghamton, New York.

AGFA ULTRA-SPEED PANCHROMATIC NEGATIVE
ONLY THE FILLED SEATS DETERMINE WHAT THE PICTURE WILL GROSS

By encouraging theaters to show the product of the studio at its best, it is hoped to contribute to the general progress of the Motion Picture Industry. The reproduction below shows the most recent advertisement of the series now appearing monthly in leading exhibitors’ journals.—NATIONAL CARBON COMPANY, INC.

The heart of your business is the projection room. You deliver from there what the patrons pay for, the thing you are selling, the picture on the screen.

Audiences today are much more critical. They get around. In 5000 theaters high intensity projection is giving movie goers a new standard of picture quality which they will expect to see in your theater.

If you want to build steady patronage, to fill your house regularly, here is the quickest, surest way to do it.

With SIMPLIFIED HIGH INTENSITY projection you can have two to three times as much light on the screen as you get from low intensity — yet at a price you can easily afford. This greatly improved lighting and projection can be covered by only one more admission per show.

This is the way to fill the empty seats. Write for the new, free, illustrated book—"The Eternal Triangle In Picture Projection.

ECONOMICAL AND MODERN
NATIONAL CARBON COMPANY, INC.

SIMPLIFIED
High Intensity
PROJECTION
WITH NATIONAL SUPREX CARBONS

NATIONAL CARBON COMPANY, Inc.

Unit of United Carbon Co. and Carbon Corporation

CARBON SALES DIVISION, CLEVELAND, OHIO
General Office: 15 East 42nd Street, New York, N.Y.
that prevail with the use of present supersensitive panchromatic negative emulsions.

Figure 2 shows in two top strips the characteristic wedge spectogram of this film compared to Superpan negative.

No special precautions are necessary in the processing of this film type either in dark room illumination or in the developing and fixing process. Drying characteristics are the same as Superpan, and keeping quality, without the use of refrigeration or any other precaution necessary for hyper-sensitized products, is also assured to be equally as good as ordinary super-sensitive panchromatic emulsions.

Figure 3 represents a record kept at one of the major studios covering three shipments of Supreme negative received over a period of two months. It will be noted that the rolls tested were of three separate emulsion numbers and that the differences made evident on the graph are entirely negligible.

Figure 4 shows the multiplying filter factors of Wratten filters generally used for the two new film types.

The practical application of Agfa’s Supercine for both straight production and process projection work has revealed many desirable qualities. It has been found, under ordinary set lighting conditions prevalent today, that it will deliver at F:4 a negative with equal printing density to that obtained with current negative materials at F:2.3, plus the definition from the smaller opening and the fine grain quality which is inherent to the material. Long shots with foreground action and medium shots in which awkward grouping of characters is necessary, and which have, heretofore, been a focus stumbling block to cinematographers, are definitely improved. Carrying backwall definition along with standard line lighting has resulted in a marked improvement in the roundness of characters.

In many instances where circumstances require a reduction in light volume or a doubt exists whether sufficient light is available for large areas, Supreme negative has been found to be particularly efficient. It is a proven fact that a reduction of at least 40 per cent in illumination is possible with the use of this film, but a canvass of expressions from prominent cinematographers indicates a marked tendency toward a combination of a moderate reduction of light, coupled with openings of around F:3.5.

Used as material for montages and similar work which must later be duplicated. Supreme has been found to carry through to the composite product a far better definition and grain size than has been possible in the past. This is also true of miniature and glass shots where the value of an emulsion of high speed is self-evident when cameramen work above normal camera speeds.

The ever-present problems confronting the successful use of process projection shots have been materially reduced by the use of this film type. When used for the plate superior definition is obtained by smaller openings which, coupled with the fine grain quality, assists in securing a realistic effect. When the composite shot is made the combination of this plate, together with the foreground action, where again it is possible to stop down, produces a finished product which is a marked improvement over previous methods for this type of work.

Ultra Speed Pan Type 556 35 mm. Negative was designed as a special product for use in adverse light conditions and other circumstances where extremely high speed is essential.

The speed of Ultra Speed Pan is from three to four times faster than that of Superpan. This remarkable increase has been attained by only a slight alteration in color sensitivity as can be seen by an examination of the wedge spectogram shown in bottom strip of Figure 2.

The gradation of this film type is slightly flatter than either Superpan or Supreme. Sensitometric comparisons between Ultra Speed Pan, Supreme and Superpan can be seen in Figure 1 and can also be obtained from the following time gamma data which was secured by tray development of sensitometric strips in Agfa Borax Developer No. 17.

Filter factors of commonly used Wratten filters can be seen in Figure 4, in which the multiplying factors are given for Ultra Speed Pan, Supreme and Superpan.

Processing requirements are standard and any commonly used motion picture developer will give good results. No special precautions are necessary for storage and the keeping qualities of this high speed film is assured to equal that of ordinary super-sensitive panchromatic emulsions.

The grain size of this type compared to Superpan has been found to be slightly coarser, but in view of the special uses to which the film is applied it has not been found to be objectionable.

The general uses for which Ultra Speed Pan negative was designed are newsreel work, street and store night scenes made with natural illumination and all difficult day interiors where insufficient light is available.

In motion picture work this film has been found to be especially valuable for background plates of night street scenes in which intimate detail has heretofore been difficult to secure.

Experience has also shown that with the use of a very small amount of booster light, scenes employing characters can be photographed successfully on any well illuminated street.

The two new 35 mm. production negative types described above constitute a major step forward in the technical progress of the motion picture industry and it is with considerable pride on the part of the Agfa AnSCO Corporation that they are announced.

Wilson Leahy.

---

### Table: Figure 4—EXPOSURE MULTIPLYING FACTORS FOR WRATTEN FILTERS IN NORMAL DAYLIGHT

<table>
<thead>
<tr>
<th>Filter Used</th>
<th>Ultra Speed</th>
<th>Superpan</th>
<th>Supreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero No. 1</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Aero No. 2</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>3N5</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>5N5</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>K-1</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>K-11/2</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>K-2</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Minus Blue</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>G</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>23-A</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>25-A</td>
<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
</tr>
<tr>
<td>B</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>C</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>C-5</td>
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<td>12.0</td>
<td>12.0</td>
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<td>15.0</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
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<tr>
<td>N.D. .50</td>
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</tr>
<tr>
<td>N.D. .75</td>
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</tr>
<tr>
<td>N.D. 1.00</td>
<td>27.0</td>
<td>27.0</td>
<td>27.0</td>
</tr>
<tr>
<td>72</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
</tbody>
</table>

### Table: Figure 5—DEVELOPING TIME IN AGFA B-17 DEVELOPER

<table>
<thead>
<tr>
<th>Filter Used</th>
<th>Ulra Speed Pan</th>
<th>Superpan</th>
<th>Superior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td>12.0</td>
<td>18.0</td>
<td></td>
</tr>
<tr>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>0.6</td>
<td>0.73</td>
<td>0.64</td>
<td></td>
</tr>
</tbody>
</table>
BIG PICTURES: "A"

The story of the great traveler-adventurer, Marco Polo (Gary Cooper) (1), who opened the first trade routes between Europe and Asia, takes place during the colorful reign of Kublai Khan, greatest of all Chinese Emperors. It opens when Marco, youngest of the Polo Brothers, Italian merchants and importers, is sent (2) by his father (Henry Kolker) from Venice to China.

After a long and arduous journey (3) Marco Polo and his servant, Binguccio (Ernest Truex), reach Pekin. Marco carries the exhausted servant into the city (4) on his back. He amuses and impresses (5) the Great Khan (George Barbiere) and at the same time falls in love (6) with the Princess Kukachin (Sigrid Gurie) and although she is betrothed to the King of Persia, romance quickly develops between them.

However, a greater obstacle to Marco's courtship is the hatred of the cruel Saracen, Ahmed (Basil Rathbone), who also desires the Princess. On an apparently innocent journey into the interior, Marco is attacked by Ahmed's soldiers and narrowly escapes death — only to be captured (7) by Lord Kaidu, (Alan Hale) a general at war with the Khan.

Marco's personality impresses Kaidu, but when Nazuma, his wife (Binnie Barnes), attempts to vamp the young Italian (8), Kaidu, wishing to be less annoyed by his jealous wife, promises to keep Marco alive as long as he amuses her. As a precautionary warning (9) Kaidu shows Marco the fate of spies. Marco saves Kaidu from an attempt on his life (10) and is rewarded by being granted considerable freedom, although still a prisoner.

He wanders curiously into the laboratory (11) of the wizard Chen Tan, who has invented an explosive powder, fine for making
ventures of Marco Polo"

by Alfred Newman, with special music by Hugo Friedhofer. Cinematographer was Rudolph Mate; film editor, Fred Allen; sound recorder, Oscar Lagerstrom. Omar Kiam designed the costumes.

fire-crackers. Also, (12) Chen demonstrates with chop-sticks how to eat Spaghetti, later to become the Italian national dish. Chen and Marco become friends and so the latter may travel about more freely. Chen (13) disguises him as a coolie.

Back in Pekin, Kublai Khan, trusting Ahmed, leads his army (15) against the Japanese leaving Ahmed in full control. Knowing that the Khan and his army will be destroyed by a typhoon on the China Seas, Ahmed prepares to marry the Princess and declare himself Emperor.

Marco pleads with Kaidu to help him save the Princess from Ahmed. Kaidu is reluctant until Marco saves his life from assassination (17) by one of Ahmed's spies. In appreciation, Kaidu rallies his army to march to Pekin.

The whole army arrives in Pekin but is unable to storm the gates which are heavily fortified. Inside the Palace the Princess (16) is preparing to kill herself rather than submit to a wedding with Ahmed. Disguised as a slave, Marco gets to the Princess and convinces her that if she can delay the marriage ceremony long enough, Kaidu's army will attack and deal with Ahmed.

But Ahmed snarls the army within the city walls and traps it between two closed gates until it is only a question of time before Ahmed's hordes will wipe out Kaidu's army.

Marco, now suspected by Kaidu, succeeds in blowing up the Palace Gates with gun-powder, which up to now, the Chinese had used only for toy firecrackers, terrorizing the populace (20). After a tremendous battle within the Palace, Marco rescues the Princess and Ahmed is killed (19).

Marco succeeds in cementing peace between Kaidu and the Khan, gets his "trade agreements," and embarks upon a long voyage with the Princess.
PATENTS

Last month the following patents of interest to readers of International Photographic were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Falwater, well-known Los Angeles attorney, specializing in patent and trade mark counsel.


A printer in which the negatives and positives move through the same sprocket and pass over a control drum while held in frictional contact. No. 2,098,441—PHOTOGRAPHIC PROCESS WITH EXPOSURE DIMINUTION—Leonard T. Todd, deceased, late of Cambridge, Mass., by the Cambridge Trust Co., executor. Cambridge, Mass., assignor to Technicolor Motion Picture Corporation, Hollywood, Calif., a corporation of California by assignment August 10, 1933, Serial No. 684,546. 3 Claims. (Cl. 95-5-6).

A method of controlling the gradation of a photographic gelatin emulsion which includes uniform exposing the latent image to light adapted to photographically diminish the image. No. 2,098,442—PHOTOGRAPHIC PROCESS WITH EXPOSURE DIMINUTION—Leonard T. Todd, deceased, late of Cambridge, Mass., by the Cambridge Trust Co., executor. Cambridge, Mass., assignor to Technicolor Motion Picture Corp., Hollywood, Calif., a corporation of California by assignment August 10, 1933, Serial No. 684,546. Divided and this application November 16, 1933, Serial No. 50,161. 6 Claims. (Cl. 95-2).

A method of combining photographic record-utilizing the principles of the above patent.


Apparatus for the contact printing of multicolor photographic master originals of regular pattern multi-color-sound type on film of the same type.


No. 2,098,391—PHOTOGRAPHIC MATERIAL—Wilhelm Schneider, Dessau in Anhalt, and Gustav Wilmanns, Woffen Kreis Bitterfeld, Germany, assignors to Agfa Ansa Corp., Binghamton, N. Y., a corporation of New York. Application Nov. 16, 1934, Serial No. 755,390. In Germany Nov. 18, 1933. 4 Claims. (Cl. 93-8).

An algalation film.

No. 2,099,159—DEVELOPING APPARATUS—Ferdinand Rouge, Munich, Germany, assignor to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main, Germany. Application July 9, 1936, Serial No. 89,718. In Germany July 12, 1935. 7 Claims. (Cl. 95-5-3).

A portable daylight developing machine.


A film for color photography carrying a color-forming substance in the emulsion.


A sound projector with a novel compact assembly arrangement for its various parts.


A film in which the emulsion carries a substance the light decomposition products of which will tam the emulsion.


Another apparatus for securing uniform speed for the sound film.


A convertible camera projector with a double shutter.


A method of printing screen-plate color photographs including the use of a plurality of differently colored light beams.

No. 2,100,334—APPARATUS FOR PROJECTING LENTICULAR FILM—John Eggert, Leipzig-Gohlis, and Gerd Heyner, Wolfen Kreis Bitterfeld, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main, Germany. Application Nov. 24, 1934, Serial No. 754,656. In Germany Nov. 25, 1933. 2 Claims. (Cl. 88-16.4).

A projection apparatus for color film of the lenticular type.


A solution for discharging dye in the presence of silver and dissolving a silver image.


A composite screen for stereoscopic projection covered with a flat transparent screen, a peculiar resolving screen on one side thereof and a selective screen on the other side thereof.

No. 2,100,740—METHOD OF MAKING VARIABLE AREA SOUND FILES WITH LOW BACKGROUND NOISE—Rolf Gänisch, Berlin Lichtenberg, Germany, assignor to Klangfilm G. m. b. H., Berlin, Germany, a corporation of Germany. No Drawing. Application Feb. 6, 1935, Serial No. 52,529. In Switzerland May 8, 1934. 6 Claims. (Cl. 274-46).

Treating the developed sound track with a reducing agent.

LIGHTING-SETS

Nine Cameras Film Huge Set

Biggest night scene ever filmed is highlight of MGM's "Rosalie"; occupied 60 acres, used 1500 extras.

It took twenty-seven cameramen to catch the magnificence of the Romanza set, which was constructed for Metro-Goldwyn-Mayer's extravaganza, "Rosalie," currently starring Nelson Eddy and Eleanor Powell.

Large set ever to be filmed entirely at night, and one of the biggest musical production numbers ever staged, it was constructed on sixty acres adjoining the main studio. Nine cameras were used to film each scene, with a crew.
Stillmen Grimes and Carpenter, members of Local 659, caught these spectacular shots of the biggest musical set, which was photographed at night by nine cameras for MGM's "Rosalie" and is described in the accompanying story.

A third camera was situated about 100 feet from the ground to take in the whirling action of the 300 gypsy and Tartar dancers who whirled giddily around 15,000 square feet of gaily painted cement.

Fifty acrobatic dancers, trained for the number by Mme. Albertina Rasch for more than two months, were captured during their exciting number, by camera number four, some 50 feet from the ground. On an extended platform, the same height from the ground on the opposite side of the colonnaded Plaza, which is in the shape of a horseshoe,
Novel Lamp Set Up Solves Problem of throwing a spotlight against the background of white ice to follow Sonja Henie in her skating numbers. It was developed by Walter Strom, chief engineer at 20th Century-Fox studios. The speed at which Sonja skates in her current production, "Happy Landing," requires that the light be projected from quite a distance to allow easy handling, while the ice background necessitates a high degree of intensity as well as clear outline. After Strom had worked out the problem and completed the designs, it was constructed on the lot, using a Mole Richardson Type 170 light with projector lens. One lens is fitted over the face of the arc light, with the other lens extended out by means of metal rods. Midway between the two lenses is an iris which regulates the diameter of the projected light. On one of the catwalks high above the stage, this new type of high power spotlight is shown being manipulated by Electrician Charles Wise, member of Local 37, IATSE.

Sets Authenticity

Selznick International set decorator keeps photographic file for protection on smallest details.

Being a set-decorator in a motion picture studio is one thing, but being a decorator at Selznick International is quite another. David O. Selznick gives his personal attention to every tiny detail, which to him is as important as the picture as a whole, and so when he asks "why?" and "how?" and "on what authority?"—something on the set is being used, I usually run for a photographic file that I have kept for years and usually succeed in producing the proof.

Whenever a concrete idea is photographic I snap it with a Reflex Korlette that has an F:1.9 lens, using super speed film, and then file it away for future reference.

The set decorator differs from the modern version of interior decorator as we know them in our private homes in that he has to have a practical working knowledge of every country’s people, the way they live, their costumes, customs, and habits. He has to know what flowers grow there and when—a thousand years ago and a thousand years from now; how the Iowa farmer’s wife “sets” her Sunday table and how servants of the French Kings placed the silver and crystal at state banquets; gypsies’ superstitions and the little gadgets that they hang in their waggons when traveling—a million and one LITTLE things that tend to crowd your mind over a period of twenty years of studio detail in decoration.

I have in my files complete camera diaries of the three pictures that I have made for Mr. Selznick, “The Prisoner of Zenda,” “Little Lord Fauntleroy,” and “The Adventures of Tom Sawyer.” These diaries start with the location trips of the director and his assistants, include all possibilities as to where the settings might be built, run through the entire picture and cover each completed set and also many amusing side candid shots.

Just recently I made a trip into the interior of Old Mexico and added about 300 pictures to my collection. I photographed the interiors and exteriors of churches, homes, old carved stone facades, modern structures, markets, habits, religious ceremonies (I happened to be there during the Fiesta de los Muertos), the many types of thatched roofs, which were a total surprise to me, methods of “packing” their barros, fences, and any number of other shots that will come in handy at some future date.

Now all I have to do is to wait for Mr. Selznick to make a picture with a Mexican locale and I will amaze him with my superb knowledge of Mexico, and in ease of any argument I will show him Mexico as I saw it through my camera.  

Casey Roberts.
LABORATORY

Ousting Sludge by Filtration

Consolidated Film chemist tells successful method for extending useful life of film developing baths.

The useful life of a negative developing bath, especially one producing fine-grain by virtue of its low alkalinity, is considerably shortened by the accumulation of a colloidal silver suspension which adheres to the celluloid of film developed in the solution and is very difficult to remove. The sludge is the result of the reducing action of the developing agents on a silver complex formed by the solvent action of high concentrations of sodium sulfite on the silver halide of sensitive photographic emulsions.

The silver sludge is composed of such small particles that the solution cannot be clarified by ordinary filtration methods. Even filter paper such as is used in the chemical laboratory does not remove the suspended sludge. For this reason, filter installations of cloth bags, felt retainers, or similar materials which in the past have sometimes been applied to developing baths, are effective only as strainers in keeping the solution free of large foreign particles; they are completely ineffectual in removing sludge.

In seeking a method of obtaining perfectly clear solutions in the case of large quantities of developing baths such as are used in the film laboratory of Consolidated Film Industries, Inc. in Hollywood, various materials known as filter-aids were tried. Since the removal of fine suspended particles from liquids is a common industrial operation, a
Laboratory Executives!

Modern motion picture laboratory practice requires accurate recording and control of the pH values of solutions.

The new Allison-Bristol pH Recorder offers the following advantages:

* Instant Response
* High Sensitivity
* Continuous Record
* Permanent Standardization

A request on your letterhead will bring full details.

Standard pH Meter Co.
Beverly Hills, Calif.

• a beautiful negative and fine prints reveal ... picture value.

International Laboratory does the finest quality of 35 mm. developing and printing—with the most up-to-date facilities—operated under the safest conditions in the industry. A highly specialized staff of long years experience is continuously ready to serve you.

International Cinema, Inc.
6823 Santa Monica Boulevard
Hollywood, California, U.S.A.
Telephone Hollywood 3961
Cable Incinema

Flow rates of diatomaceous earth products of Johns-Manville Co.
Modern Lab at WB

New $500,000 lab setup at Burbank features every technical facility for film processing.

One of the largest and most modern film laboratories in the world will be in operation this month at Warners' Burbank studio, replacing the lab on their Sunset lot, which has been used for many years. The new plant will speed up handling of negatives for the 60 or more features made by Warners each year as well as all prints used on the West Coast. It is part of a general long range improvement and expansion program instituted several years ago at the Burbank studio.

The building was designed by Art Director and Architect Bert Teitlebaum, primarily for utilitarian purposes. It is strictly modern in appearance, with pleasing masses and lines. Two stories and a basement are included but the structure is much higher than the average two-floored building because two "theaters" are located on the upper floor, while the ventilating and air-conditioning systems, film elevators and supply tanks are all enclosed within the structure.

Fred Gage, chief laboratory engineer for Warners, and Al Tondreau and Red Munson, his assistants, took an active part in planning the new building. The plumbing was under the supervision of Otto Erbes and the whole job, one of the most highly technical in the history of studio building, was in the hands of an outside contractor under the general supervision of Henry Fuhrman, head of maintenance and construction.

Engineers familiar with the problems of designing film laboratories know that three vital problems must be met in such a building. It must, above all else, be as nearly fireproof as modern construction methods can make it. It must be dustproof and it must be so designed that air conditions inside are stable, with temperature changes limited, the year around, to not more than one-tenth of one degree, since film curls when subjected to sudden temperature changes.

The building is of concrete and glass-tile construction with walls impervious to outside temperature changes. It is of Class A fireproof construction. Only wood used is in the solution tanks of the developing room. Steel studding and metal bath were used in all partitions and all doors and window frames are of pressed steel.

All plumbing fixtures are of stainless steel with brass fittings to resist chemical action of acids used in processing. Floors are of tile or concrete covered with linoleum. All ornamental as well

this tank through the filter by a stain-
less steel centrifugal pump into the
main circulation tank.

When the filter has been cleaned or is being first put into service, the efflu-
ent from the filter is directed back into
the slurry tank until a clear filtrate be-
gins to flow. This indicates that an
adequate cake of the Filter-Cel has been
deposited on the screens of the filter.
The filtration is allowed to continue
until the pressure as indicated on a
bourdon gauge reaches 45 lbs., at which
point the rate of flow has been reduced to
about one-quarter the rate at the be-
ginning of the cycle. The filter pump
is stopped, and the filter is cleaned, pre-
coated, and put back into operation, the
whole interruption consuming about fif-
teen minutes.

The initial installation on the picture
negative bath having produced such
satisfactory results, similar installa-
tions were made on the positive develop-
ing bath and the sound track developing
baths. In the case of the positive bath,
a suspended highly colored sludge is
removed leaving a transparent yellow-
ish solution.

Our experience shows that use of
clarified developers has resulted in
cleaner negatives and prints and has re-
duced the tendency of the baths to build
up objectionable deposits of sludge in
the developing machines.

Sid Solow, Consolidated Film Industries

Bowser leaf-type filter.
as utilitarian iron work is chrome finished.

The building covers 19,000 square feet of ground and will house the technical research workers as well as the active laboratory crew of several hundred. Complete it will represent a total investment of more than $500,000.

To maintain the dustless interior so vital for film laboratory work, the air is washed three times before it is permitted to circulate through the building. First washing is through an oil soaked filter; second, through a blown glass filter; third, through a paper filter.

Fireproofing is made more complete by the installation of a sprinkler system with one sprinkler head for each 90 square feet of ceiling space. All electrical conduit is vapor proof and all lamps are the explosion proof type.

A silver reclaiming room, wherein discarded film is stripped of the valuable deposit, is another feature of the laboratory. Up to now the studio has sold its old film to reclaiming companies, receiving a share of the profit.

Upwards of a million feet of film, negative and positive, can be run through the plant each twenty-four hours, automatically developed, fixed, washed, dried and wound. There is enough equipment to take care of all contemplated increase in production for many years to come.

Film being developed or printed in the new plant is protected in every way possible. Should electrical power suddenly be shut off, the building has generators which cut in automatically and instantly. Everything is planned to make it impossible to ruin a valuable piece of film in the laboratory. The master prints of newly finished pictures often represent an investment of more than a million dollars and no studio can afford to take chances with them in the laboratory process.

### The LABORATORY BOOK of TABLES

By D. K. Allison

**ANALYSIS OF FIXING SOLUTION**

Sample as delivered to Laboratory
Filter if turbid; decant if clear.

<table>
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<tr>
<th>Take 10.00 ml sample. Dilute with 25 ml water, add 5 drops solution C titrate with 0.25 N iodine to first blue coloration. Record volume as &quot;Volume A.&quot;</th>
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<tr>
<td>Volume A — Volume B</td>
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</table>

<table>
<thead>
<tr>
<th>Take 10.00 ml sample. Add 10 ml 0.5 N Sr(NO₃)₂ solution. Filter, wash ppt. three times with 10 ml portions of distilled water. Combine washings and filtrate.</th>
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<td>Add 5 drops Solution C. Titrate with 0.25 N iodine solution to first blue coloration. Record volume as &quot;Volume B.&quot;</td>
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<td>Volume B x 0.25 = grams Sodium Thiosulfate per liter.</td>
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<tr>
<td>Note: for rapid work the filtration may be dispensed with and the titration made quickly with stirring.</td>
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**Electrolytic Method for Silver**

Place 50.0 ml sample in electrolysis cell equipped with platinum cathode and stirring anode. Electrolyze 6 hours at 1.05 volts.

Wash cathode carefully in water and alcohol; dry.

Gain in weight of cathode x 20.0 = grams silver per liter.

**Chemical Method for Silver**

Take 50.0 ml sample, add 10 gms. Na₂SO₄ and 2 ml Solution H. Add 2 gms. 30 mesh granulated zinc, boil 10 mins.; filter.

Residue Filtrate

**Photoelectric Method for Silver**

Treat sample as directed for the use of the Eastman Photoelectric Arsentometer. Report as gms. silver per liter.

**Analysis for Hardener**

When chrome alum is used as the hardening agent, the chrome alum content may be determined against chrome alum solution of known concentration, using the Dubosq Colorimeter taking care that the pH of sample and standard are within 0.1 pH unit.

<table>
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<th>Depth Standard</th>
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<td>Depth sample x Concentration standard = gms. chrome alum per liter.</td>
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(Note: Potassium alum may be determined colorimetrically.)

### DIRECTIONS FOR THE PREPARATION OF SPECIAL SOLUTIONS AND REAGENTS FOR THE ANALYSIS OF FIXING SOLUTION

- **0.5 N Sr(NO₃)₂** — 53 gms. Sr(NO₃)₂ per liter.
- **0.25 N Iodine solution** — Dissolve 65 gms. KI in 200 ml water; add 31.73 gms. I₂, make to 1 liter.
- **0.10 N KSCN** — 10 gms. KSCN per liter. Standardize against AgNO₃.
- **Solution C** — 6 gms. soluble starch triturated cold, made to 1 liter with boiling water, 10 gms. ZnSO₄ added.
- **Solution H** — 8N HNO₃.
- **Solution J** — Cold saturated ferric ammonium sulphate to which enough nitric acid has been added to cause disappearance of brown coloration.
- **N/10 NaOH** — 4 gms. NaOH per liter.
for a book on the subject. Such a book would have been out of date in a matter of months. However, while no one would dare to intimate that progress and change have ceased, nevertheless, it is obvious that the time has come to present some of the fundamental qualitative and quantitative relationships which have been observed and measured during the last few years.

“Studio sound” has grown out of the “rule of thumb” stage and is starting to obey applications of underlying theory expressed in the language of science and engineering mathematics. Thus, the presentation of an Engineering Handbook on Studio Sound by the Academy Research Council represents an important milestone in the progress of the technique out of the stage of the “arts and crafts” into the field of Science and Engineering.

A tremendous amount of work by a large number of people has gone into the book and the result is not only complete, but also very useful.

The following subjects discussed deserve particular mention as many of them are new developments and as such are unfamiliar to the majority of sound men:

Class A, AB and B push-pull recording.
Squeeze and Split Squeeze recording.
Bilateral and Duplex recording.
“Complementary Recording.”
“Split Channel” noise reduction.
Volume range Compression.
Peak limiters.
Projection Threshold limiter.
Unidirectional Microphone.
Two way horn systems.
Regular, Hi-range and Lo-range prints.
Radial Impedance of Shields.
Doubled reverberation.
New Condenser type dialogue mike.
Phase and delay distortion.
Ladder, Bridge Tee and Lattice pads.
Constant impedance equalizers.
Predistortion.
Constant impedance dividing networks.
Stabilized Feedback Amplifiers.
Linear Decibel Scale Level Indicator.

On a few minor points the book could stand some improvement but the reviewer is almost ashamed to mention these unimportant deficiencies in the face of the superlative chapters on filters, equalizers, noise reduction, light modulation, shielding, phase distortion and fundamental electrical theory. In all of these chapters material is presented which is largely available in no other book and I feel sure that communications engineers in the radio and telephone fields also will widely use this handbook for its practical presentation of wave filter and network theory.

The reviewer feels that the book, as a whole, is not as well edited as it might be and that the order of presen-
The SOUNDMAN'S BOOK OF TABLES
By J. N. A. Hawkins
Copyright, 1938, All rights reserved

The Decibel Table

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The discussion of the material could be improved. Some of this, however, is excusable. There is some overlapping and duplication but this could hardly be avoided as the book represents a collection of papers, rather than a unified textbook.

Also the matter of low frequency reverberation and its associated compromise between intelligibility and voice naturalness could have been discussed more completely. The whole question of dialogue equalization demands a great deal of thought and discussion as the problem is far from answered, at the present time.

The matter of head phone response as related to horn response is another question that could stand a great deal of discussion. Transient distortion and high frequency masking due to low frequency overload also could be expanded usefully. The field of film drive is very briefly mentioned and the present status of the non-slip printer could have been included.

While the field of film processing is well covered, considering its brevity, brevity seems out of place in this field and more quantitative data on amplitude distortion in both variable density and variable area prints could have been presented. Again, the discussion of the pro's and con's of ultra violet light for recording and printing could have been materially extended.

Another reaction is that a more practical discussion would be valuable, of the acoustic problem facing the mixer on production, with the effects of set resonance, mike panning, difference between loudness and overload ratios in different characteristic voices, variation in "presence" with distance from the mike, synchronizing problems arising from playback delay and the inherent variability of microphones.

The discussion of volume level indicators is very useful but again the material could have been usedly extended to cover a more complete description of the newer peak reading instruments. The material on stabilized feedback, while accurate, is not as complete as it might be, considering the importance of the subject.

However, while it is easy to suggest extensions and improvements on the 503 pages of useful data presented in this volume, the reviewer admits that there is little that he would want to cut out of the book, and that mainly represents duplication of material due the previously mentioned overlapping chapters. To sum it up; while some of the material is very elementary and some of the material is very advanced, it is all timely, up to date and useful and there is not a sound man in the picture business who will not be able to do a better job, whatever his work, after studying those parts of this Handbook which interest him.

Titles of the 39 chapters follow.

MOTION PICTURE SOUND ENGINEERING

PART I

1.—Basis of Motion Picture Sound.
II.—The Nature of Sound.
III.—Types of Film Recording.
IV.—Noise Reduction.
V.—Re-Recording and Preparation for Release.
VI.—Microphones.
VII.—Headphones and Loud-Speakers.
VIII.—Film Drive.
IX.—Film Processing.
X.—Reproducing Systems.
XI.—Sound Circuits.
XII.—Measurements in Sound Circuits.
XIII.—Phase Distortion.
XIV.—Transformers for Sound Circuits.
XV.—General Network Theory.
XVI.—Attenuation Equalizers.
XVII.—Equalizer Design.
XVIII.—Wave Filter Theory.
XIX.—Low-Pass and High-Pass Filters.
XX.—Dividing Networks for Loud-Speaker Systems.
XXI.—Vacuum Tubes.
XXII.—Amplifier Circuits.
XXIII.—Rectifiers.
XXIV.—Volume Indicators.

PART II

XXV.—Elementary Considerations.
XXVI.—Static Electricity.
XXVII.—Direct Currents.
XXVIII.—Electrical Power and Energy.
The Decibel Table

Most widely used figuring in sound work covered for practical use in latest Hawkins table.

The most widely used table in sound work is that which shows the relationship between the unit of sound intensity, which is the Decibel—and the ratio of change expressed in the electrical equivalents of sound—Volts, Amperes or their product, Watts.

It should always be remembered that the Decibel is not a unit of sound intensity, but only a unit of the change in sound intensity.

The associated Decibel table is particularly convenient to use in that no computation, mental or otherwise, is necessary for its use in practical work. The first column is Decibels. The second and third columns cover gain, or amplification, and the last two columns indicate loss, or attenuation ratios.

For those unfamiliar with sound fundamentals, it should be explained that the use of a logarithmic unit, such as the Decibel is necessary when dealing with events producing stimuli on the human senses, because of a peculiar characteristic of the human nervous system. The human mind, which responds to the stimuli of outside events through...
PROGRESS never ceases in the construction of newer, bigger and more modern buildings for the motion picture and its allied industries. Top shows the modernistic exterior of the new Hollywood headquarters of Electrical Research Products, which adjoins the General Service studio. Below is a recent shot of construction work on the new four-story administration building on the MGM lot in Culver City. It adjoins the studio at the East gate and, of steel frame and reinforced concrete structure, will be 346 feet by 220 feet; and with house 277 offices for writers and executives. It was designed by Architect Claud Beelman along modern classic lines; will be air-conditioned and have three elevators.

the eyes, ears and other senses, can only perceive proportionate changes in stimulus, rather than absolute changes in the amplitude of stimulus.

To the mind, a system of mathematics built around the series 1-2-3-4-5-6 etc., gives equal sensation increments between steps, while changes in stimuli which follow the series 1-2-3-4-5-6-7 etc., cause a constantly decreasing increment of sensation to be perceived by the brain.

In this connection it appears that the further development of television will necessitate use of the Decibel to express changes in light intensity, due to the fact that the contrast and definition, as perceived by the eye, will have to be expressed in a unit of logarithmic, or proportionate change, rather than in a linear unit such as foot candles.

J. N. A. Hawkins, 605, IATSE
JANUARY, 1938—35

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Close-ups

By ED GIBBONS

Ten years ago next month, International Photographer was launched on the stormy sea of journalistic enterprise by a small group of loyal and enthusiastic members of Local 659. Ira B. Hoke was editor, Art Reeves was advertising manager, and Charles P. Boyle, whose droll “Otto Phoen” column enlivened the magazine for many years, was treasurer. Seven of the advertisers in that first issue still make regular appearances in these pages; Smith and Aller and DuPont, on the inside front cover; J. E. Brulatour and Eastman on the inside back; Mole-Richardson, C. King Charney and Agfa, Fred Hoefner, Sam Landers, and Mitchell Camera Corporation.

During the past ten years, International Photographer has had many ups and downs, but never has it swerved from the constructive policies laid down by its founders. It has functioned primarily as a medium of good will and as a chronicler of technical progress. It has expanded its original meter until today it covers the news, not only of photography, but also of sound and laboratory practice, of sets, lighting, makeup, process and special effects, and of such fields closely allied to the motion picture industry and photography as radio, television and the graphic arts.

This expansion of news reflects indirectly the progress and development of the International Alliance of Theatrical Stage Employees, parent organization of International Photographers Local 659. Today in the Hollywood studios, sister locals; the huge Studio Mechanics Local 37, with over 7000 members, comprising the grips, gaffers, props, property makers, special effects, miniature makers, drapers, nurserymen, upholsterers and other skilled crafts; Sound Technicians Local 695; Laboratory Technicians Local 683; Makeup Artists Local 706 and Costumers Local 705 all operate under a closed shop condition, which is a tribute to the power and solidity of the I.A.T.S.E. as the dominant theatrical union organization.

And through the power and support of the I.A.T.S.E., other American Federation of Labor bodies, the musicians, electrical workers, carpenters, teamsters, painters, plumbers, and machinists Hollywood locals and the Screen Actors’ Guild, also enjoy closed shop union conditions.

 Prophetically enough the initial issue of International Photographer said: “The great machine of the ‘I.A.’ has been in operation for many years and its methods are JUST, FIRM and EFFECTIVE. We know that its policies are acceptable to the great majority of members of Local 659.”

Recent events have proven that the statement made in February, 1929, is as true today as it was then, and that it applied not only to Local 659, but also to the sister locals that have progressed to importance since then. Despite disruptive influences that would seek to destroy the organization, the singular spirit and tradition that always has marked the I.A.T.S.E. throughout its history in theatre or studio, still is carried on by its loyal members, united under the present able administration of International President George E. Browne.

To pause and take stock of the progress of the past ten years, to examine and recapitulate the marvelous improvements in technical facilities and methods that have been made during that period, International Photographer is setting aside its issue of March, 1938, as a “Tenth Anniversary” number.

This special edition will be published as an expression of pride in a ten years’ editorial record that is unblemished by either insincerity or prejudice, to mark the progress of International Photographers and the sister locals of the I.A.T.S.E. and as an expression of good will to the many friends of International Photographer in the motion picture studios and in the technical and supply fields serving the industry, whose fine support has contributed greatly to its successful publication during the decade just ending.
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Artistic exhibitors like Spyros Cardas of Loew’s State Theatre in Los Angeles display keen showmanship by featuring Technicolor as a marquee draw. For they know Technicolor is box-office. By the same token, producers such as Walt Disney, Samuel Goldwyn, Mervyn LeRoy, London Films, Metro-Goldwyn-Mayer, Paramount, RKO-Radio, Selznick International, Universal, Walter Wanger, Warner Brothers, Max Fleischer, Leon Schlesinger, Screen Gems (Columbia release) and others will bring to the screen more features, cartoons and short subjects in Technicolor during 1938 than ever before. They, too, know the box-office value of Technicolor.

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Medieval Color of "Robin Hood" Captured by Camera

These rich stills on Warners' Technicolor production of "Robin Hood" were photographed by Schuyler Crail, member of Local 659, IATSE. They effectively capture the colorful and lavish production values of this picture, first important Technicolor production with an expensive and spectacular historical background. Errol Flynn, Olivia de Haviland and Basil Rathbone, who are shown in above stills, have the principal roles in the picture as "Robin Hood," "Maid Marian," "Guy of Gisbourne."
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**A JOURNAL OF MOTION PICTURE ARTS and CRAFTS**

*Editor, Ed Gibson; Managing Editor, Herbert Aller; Art Editor, John Cornysh Hill; Business Manager, Helen Boyce.*


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**ON THE COVER:** The beautiful and unusual picture of Carole Lombard on the front cover bears all the distinctive marks of effective lighting, composition and general technique to bring out the star’s personality that identifies the work of George Hurrell, ace portrait photographer and a contributing editor of International Photographer.

**TRADEWINDS**

The New Argus 825 Model “C.”  
News of New Products.

**CAMERA**

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New Duplex Automatic Toning Machine.  
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**CLASSIFIED DIRECTORY**

**CLOSE-UPS**

5-6-7-8

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Entered as Second Class matter, Sept. 30, 1930, at the Post Office at Los Angeles, California, under the Act of March 3, 1879.

International Photographer, as the monthly official publication of International Photographers, Local 659, of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, not only represents the entire personnel of photographers engaged in professional production of motion pictures in the United States and Canada, but also serves technicians in the studios and theatres, who are members of the International Alliance, as well as executives and creative artists of the production community and executives of the manufacturing organizations serving the motion picture industry. International Photographer assumes no responsibility for the return of unsolicited manuscripts or material.

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News of New Products

First information on the new $25 Argus and the new Curtis Type "M" one-shot three-color back for view cameras highlights the news of new products this month. New Eastman Kodak items, Zeiss projection lenses, a Graphic back for 3½" x 4½" Speed Graphics, remote control for the Robot camera, an improved Model C Mendelssohn Speed Gun, portable dimmer banks from Otto K. Oleson, are other items reported on in handy factual form.

Here's the first picture of what the new $25 improved Argus will look like when it goes on the market next month. Will be known as the Model "C," and is first 100 per cent American made and designed precision miniature camera. Dimensions are: 5½" long; 2¾" wide; and 2½" thick. Note the new type built-in range-finder near top right corner of camera. This newest Argus model weighs 24 ozs.

Subject to more rumor and conjecture than any photographic item in recent years, the new Model "C" Argus camera, retailing at $25, will be made available to dealers by International Research Corporation late this month or early in March. Production already is under way on the various parts, now that the designing job has been completed. The new camera will also have a complete line of coordinated accessories. It will be the first precision made popular priced All-American made miniature camera, and will contain many features based on the manufacturer's study of public reaction to the original Argus, which, despite its various handicaps and limitations, swept into sensational success during the past two years.

Highlights of the new Argus are presented herewith along with the first picture of the new instrument. Full specifications and complete illustrations of the camera's features will appear in the March issue of International Photographer.

The new Argus has a neatly proportioned and balanced case, trimmed in gleaming metal and polished plastic with black morocco leatherette covering. The striking appearance of the camera is enhanced by the use of diamond turned fittings of velvet smoothness. The inner case is of plastic mould, aiming at working precision with tough resilient strength and sturdiness, while avoiding excessive weight. The new model is compact, measuring 5½" long, 2¾" high and 2½" thick. It weighs 24 ounces.

The new Cintar f:3.5 lens necessitates accurate focusing and the Model "C" Argus is equipped with a built-in range finder. View finder and range finder eyepieces are placed side by side in a convenient position at the back of the camera. The optical view finder has a perfect infinity focus. The range finder is of the split sextant type and is built into the case body, making it an integral part of the camera where it is free from knocks or danger of breakage. Focusing the range finder is accomplished by a conveniently located knurled control knob. The image appears in full size with exceptional sharpness and distinctness.

The film is advanced by a large and easily accessible winding knob and exposures are recorded by an automatic counter. Any type of 35 mm. double perforated film may be used in either 36 exposure daylight loading cartridges or the Agfa-Argus 18 exposure spools. This camera is especially adaptable to all types of color work.

The Model "C" will be supplied with Argus Cintar f:3.5 50 mm. lens as standard equipment. A new triple anastigmat lens, it is extremely fast and sharp, providing negatives that will stand great enlargement. The lens is fully color corrected and has a circle of confusion of 1/2000" on axis. It is equipped with a front operated iris diaphragm. Entire objective system moves as a whole in a helical mount and focuses from infinity to 3½ feet. Additional spacer tubes for lengthening
New Curtis one shot three color back for view cameras, now being demonstrated at the major lots by Donald Hooper, member Local 683, IATSE, of the Curtis staff, is shown at Top Right attached to Anseo View Camera, with support to take weight off color unit; while Lower Right illustrates the color back removed from the camera and support. Top Left, Hooper is demonstrating the color back to Ray Jones, Universal still department head; and Bottom Right to Cliff Maupin of 20th Century-Fox still department, with Warner Baxter as the subject. (For details see report starting on this page.)

focus will be available for copying and close-up work. With the latest ultra speed film this 3.5 lens is deemed adequate for most photographic work.

The lens is quickly interchangeable and a series of different focal lengths are to be made available as additional equipment. The lens front mount is threaded to accommodate a new series of filters which screw into place. A new enlarger also will be marketed, on which the standard f.3.5 lens is used.

The Model “C” has a micromatic shutter of entirely new design and construction. It has a range of ten speeds from 1/5 second to 1/300 of a second including “Bulf.” Other slower speeds are obtained for tripod or rest position of “bulb” setting.

The new model’s shutter is of rugged construction with few moving parts and a simplicity that insures dependable operation. It is located directly behind the lens and permits the advantage of interchangeable lenses. The location and operation is similar to the professional type movie camera. The controls for focusing, range finding and shutter operations are placed so they are at the finger tips, when the camera is held in a normal position.

PHOTOGRAPHY

PRODUCT:  Type “M” One Shot Three Color Back for View Cameras.
MANUFACTURER: Thomas S. Curtis Laboratories, 2063-65 East Gage Avenue, Huntington Park, Calif.
Distributor: Direct, dealers.
GENERAL DESCRIPTION: Among special features of this new camera back are:

1. Focusing is done through the rear in the usual position most convenient to those accustomed to the ordinary view camera.
2. Illumination is but two stops lower than for ordinary black and white focusing and no filter is interposed to interfere with color composition on ground glass.
3. Red filter negative is made at top by reflected light and gives normal A filter red record negative.
4. Special treatment of glass before coating prevents any ghost image. Glass is so flat that register is perfect at all focal positions of lens.
5. Optical system is fully compensated for refraction errors and register is critical if negatives are properly processed and protected from dangerous heat in enlarging.
6. Color Unit is fully baffled for flare or color bounce and perfectly even illumination of all three negatives is obtained.
7. Unit is balanced for incandescent, photoflood or photoflash illumination without compensating filter by slight variation in development. For arc or daylight a special compensating filter in optical glass is supplied.
Three new items from Eastman: Left, sportsman’s type field case for Duo Six-20 Kodak; center, Twin Back for 3A Kodak; right, Cut Film and Pack tank, which handles wide variety of film sizes for developing in daylight. (See Page 7, Col. 3.)

8. Weston speed is from 2 to 4 in either artificial or daylight, depending upon contrast or flatness of lighting employed.

9. Camera can be operated with the same convenience as normal black and white; by leaving red filter holder in place, operator has merely to draw ground glass, place blugreen holder, draw two slides and expose.

10. All normal swing movements of view camera may be practiced.

11. Color Unit removed and replaced in vertical or horizontal position in ten seconds. Regular ground glass panel replaces Color Unit for black and white work on same view camera. Color record for guide may be shot on Dufay film through back aperture of Color Unit after separation negatives have been exposed and without removing Unit from camera, thus preserving lighting, angle and focus intact.

12. The new Type M Curtis Color Unit is made to take the standard Curtis Tripac 5x7 Holders, thus those who have a supply of such holders may not need to purchase additional holders when they buy a Type M Camera or Color Unit. Every user of 5x7 Curtis Tripac Holders, therefore, must have a 5x7 view camera which could readily be fitted with the new Color Unit.

Sizes: Complete Type M Curtis Color assembly, illustrated herewith, Color Unit fitted to special Ansco View Camera with support to take weight of Color Unit is supplied complete as shown, without lens at $225.00. With special color tested, B & L II B Tessa 12 inch focus in either Compound or Betax Shutter, complete at $405.00. Two registering standard Curtis Tripac Holders included with above.

Complete field unit consisting of camera and color unit illustrated, with lens, lens shade and filter holder, $2 registering standard Tripac Holders numbered and matched for register in pairs (to make 6 exposures) packed in handsome fitted carrying case for camera and a similar partitioned case for film holders, sells for $395.00. Excise tax included in above.

Color Unit alone sells for $50.00 with two standard Tripac Holders and ground glass panel registered to plane of holders.

Brace or support to take weight of Color Unit to attach to Eastman or Ansco Standard View Cameras, $10.00.

Adapter panels to fit Color Unit to Century, Eastman or Ansco Studio Cameras, $10.00.

(Special adapter panels to fit Color Unit to any studio camera made to order at commensurate prices.)

NAME OF PRODUCT: Cut Film and Film Pack Tank.

MANUFACTURER: Eastman Kodak Company, Rochester, N. Y.

DISTRIBUTION: Direct, dealers.

GENERAL DESCRIPTION: A new stainless steel developing tank for cut and pack film, incorporating a molded reel of novel design. It will accommodate all amateur film sizes from 1.5 to 3½ inches. Flexibility is obtained through use of two cores on which the molded reel flanges side. Notched markings on these core enable user to adjust reel quickly to any of 12 film sizes. Once loaded reel is placed in steel tank and molded cover
slipped on, developing, fixing and washing may be completed in daylight. Tank reel permits full circulation of solution and films are held in curved position to prevent buckling and contacting each other. Open design of reel helps avoid scratching film when loading.

Specifications: Tank accommodates 12 films up to 2½ x 3½ and six films of 2½ x 4¼. Internal assembly units may be purchased separately.

Prices: $10, complete. Internal assembly, $6. Tank with molded cover and steel cap, $4.50.

NAME OF PRODUCT: Kodak Duo-Six 20 Field Case.

MANUFACTURER: Eastman Kodak Company, Rochester, N. Y.

Distributor: Direct, dealers.

General Description: A new sportsman's type field case of the instant action type, similar to those recently brought out for Kodak Bantam Special and Retina II. Made in two sections and if desired the whole outer section can be removed and carried in pocket. Un-snapping a single fastener allows outer section to swing down, flap-fashion, out of the camera's field of view.

Specifications: Heavy case-stock brown leather. Inner section, which holds camera, lined with maroon velvet on over spring steel frame which clasps camera snugly. Neck straps attach to frame at upper corners, as illustrated. Projecting lens cover section attached to inner section by three glove-button fasteners. Price: $8.50.

NAME OF PRODUCT: Kodak 3A Twin Back.

MANUFACTURER: Eastman Kodak Company, Rochester, N. Y.

Distributor: Direct, dealers.

General Description: Cutting picture-taking costs in half is possible with 3A Kodaks, Series II, by using this new "twi-exposure" camera back. Permits taking 11 pictures 2½ x 3½ on roll of regular six-exposure film of size used in 3A. Can be installed at any good camera shop and replaces regular back. Made of metal. The inside camera window to smaller picture area and twin hase has two ruby windows for checking film numbers. Film is wound until number appears in first window, picture snapped, then film is wound forward until same number appears in second window, and so on to end of roll.

Specifications: New back as illustrated features special mask for smaller picture; swing cover to the left; furnished for ruby windows when supersensitive panchromatic film is used; slip on masks are supplied for the camera finder to outline area which smaller size pictures will include.

Price: $5.

PRODUCT: 3½ x 4¼ Speed Graphic Camera.

MANUFACTURER: Fothmer Graflex Corporation, 151 Clarissa St., Rochester, New York. (Main 3131.)

Distributor: Direct, dealers.

General Description: The above camera is now available with a Graphic Back (with spring suspended focusing panel attached) to accept Graphic Holders rather than Graflex Holders as previously supplied. 3½ x 4¼ Graphic Press Cut Film Holders are available for it. This gives the smaller camera the same versatility enjoyed by the 4½ Graphic. Specifications of the camera are unchanged except for the back which has been redesigned to accept the Graphic type holders. The new smaller Graphic Holders are patterned exactly after the 4½ Graphic Press Cut Film Holders.

Price: The camera without lens, with one holder is $89.00. Additional holders are $2.75 each.


PRODUCT: Robot Remote Control Release.

Distributor: Intercontinental Marketing Corporation, 10 East 40th St., New York City.

Price: $215.00.

NAME OF PRODUCT: Model C Speedgun.

MANUFACTURER: S. Mendelsohn, 202 E. 44th St., New York City. (Murray Hill 6-3298.)

Distributor: Direct, dealers.

General Description: An improved Model C Speedgun, similar in operating principle to the Model C Speedguns which have been in newspaper and professional use on Speed Graphic cameras, improvement consists of a permanent lens, a milled brass bar for the Magnetic Tripper which cannot become dislodged through use; permits raising or lowering of lens board without interference with timing. Model C Speedgun as now designed may be used with any standard make of flash bulb or between-lens shutter. No adjustments need to be made as Speedgun is set for immediate use at factory.


Prices: $14.25 ($1.50 higher west of Rockies).

LIGHTING

PRODUCT: Portable Dimmer Banks.

MANUFACTURER: Otto K. Olesen Illuminating Co., Ltd., 1560 Vine St., Hollywood, Calif. (GL 5194.)

Distributor: Rented and sold by manufacturer.

General Description: For control of lamps in motion picture stages. Aids in balancing, and for effects. Saves globes, eyes, juice. Banks are constructed with Ward-Leonard plates, mounted in steel frames, milled for accuracy and electrically welded for permanence of alignment. Constructed to stand hardest service. Each bank is housed in perforated metal for safety to personnel and protection of mechanism. Each plate is fused and may be individually operated. All plates of each bank may be interlocked or several banks may be interlocked for one-man control of every lamp on the set. Full length handles to chassis plus large hall-holding; silent casters enable one man to handle easily.

Specifications: Model A: Four plates, 5 K.W. each. Cadmium plated terminal bars, fuse for each plate and controls; all mounted on single side. Model B: Four plates, 3 K.W. each. Equipped with plug fuses and standard stage sockets. Rental: 30c per KW/day. Purchase prices on application.

PROJECTION

PRODUCT: Zeiss Ikon Kinospalt and Kiprostar lenses.

MANUFACTURER: Zeiss Ikon A.G., Dresden, Germany.

Distributor: (For U. S. A.) Eric W. Schumacher, 160 Fifth Avenue, New York City. (Chelsea 3-7170.) (Sub-agent for Calif.) O. Stapleton, 1384 W. Washington St., Los Angeles, Calif.

General Description: Although for many years the most widely used projection lenses in Europe, Zeiss Ikon projection lenses are now for the first time available in the United States. Both the Kino star and Kiprostar series are uniformly cylindrical and have exceptionally large free apertures. The lenses themselves are made of the famous Zeiss optical glass and are turned in precision workmanship. The Kino star series is achromatic while the Kiprostar series is both achromatic and anastigmatic.

Specifications: Kino star series, 52.5 mm and 62.5 mm in diameter, foci from 8 cm (3.15") to 20 cm (7.87"); Kipro star series, 80 mm diameter, foci from 12 cm (4.72") to 14 cm (5.51"), speed F1/9; Kiprostar series, 100 mm diameter, foci from 15 cm (5.90") to 20 cm (7.87") speed F1/9.

Prices: Upon application.
Camera

CINEMATOGRAPHY

For the further convenience of readers, International Photographer will in the future divide all news under the heading, "Camera," into two sections, one dealing with cinematography, the other with photography, under those sub-headings.

NEW TYPE MITCHELL CAMERAS, which recently went into production after years of experimentation and designing, are illustrated in top strip above, while bottom strip shows the new Mitchell mounted on a dolly for tests currently being conducted at Warner Brothers-First National with the view of adding a group of the new cameras to the studio battery. First cameraman in checked coat is Ernie Haller; Buddy Weller, assistant, is shown with hand on camera, while to his right is Wesley Anderson, second cameraman. Stills are by Madison Lacy, Local 659, IATSE. Testing of the new cameras is being supervised by Mike McGreal, studio camera department head. As clearly illustrated, the new Mitchell features convenient fool-proof operation. It also is unusually mobile, weighing but 140 pounds. Super silent action is the big feature of the new camera, which incorporates all standard Mitchell features. No blimp is required, hence, there's no shooting through glass and all controls of the camera are on the outside. New type mechanism on outside of camera automatically provides for parallax in using the finder, and focuses it while focusing lens. The camera also has an automatic dissolve. Operators can shift over from outside for focusing, and the very silent operation, through freeing operation of the camera from blimp restrictions, permits greater ease and efficiency in handling the new Mitchells on the set.

Technicolor System

Methodical routine developed in cooperation with Selznick International benefits all color productions.

Because Selznick International Pictures was the first major studio to adapt its production program to the extensive use of Technicolor, and for the past two years has been almost continuously engaged in Technicolor production, an effective and widely copied
PUBLIC ADDRESS SYSTEM is a feature of the camera shown in this novel still of Director H. Bruce Humberstone and camera crew, photographed from the actor's vantage point by Ray Nolan, member of Local 659 IATSE. The microphone inside the blimp and loud speaker visible at top form special set-up designed and built for Twentieth Century-Fox by the Capitol Radio Television Supply Company. It permits cameraman to instruct actors and technicians without removing head from inside the blimp. A special feature is a two-switch hook-up by which cameramen can instantaneously switch on or off either the amplifier or mike. Disconnecting the mike eliminates any amplifier hum during actual shooting and recording. Director Humberstone recently won many plaudits for his handling of the Chicago fire scenes in "In Old Chicago." He now is directing Jane Withers and Rochelle Hudson, shown above, in "Gypsy" for the same studio. Above Humberstone in checkerboard scarf stands cameraman Edward Cronjager, Jr.; with William Whitely, second cameraman to his right and Henry Cronjager, Jr., assistant, in front of Edward Cronjager, Sr. Extreme left, cableman Roy Martin.

This system of co-operation between studio technicians and Technicolor laboratory experts was developed at the Selznick lot.

The chief points of contact between the studio experts and the laboratory technicians of Technicolor, were more artistic than mechanical, however. Scene builders, set dressers and wardrobe heads had a lot to learn about the use of color on the sound stages.

Technicolor films are taken directly to the laboratory to be developed and printed, because exact performance of the manifold operations involved, could not be attained outside the Technicolor laboratory. For example, it may be noted that mechanical tolerances in a Technicolor camera must not exceed .0002 of an inch, and that careful adjustment of this delicately balanced and close fitting machinery is possible only at the Technicolor factory.

All color magazines, therefore, have to be cased at the plant, and the studio cinematographers have nothing to do but to check the color magazines out, and record the time the finished prints are returned.

The other studio technicians must cooperate more closely. The head electrician must be ready to produce the different kinds of lighting used in color pictures, and provide the necessary equipment. He must consult the Technicolor men each day, in preparation for the next day's shooting.

The head cameraman employed at the studio must have rather close professional relations with Technicolor's head cameraman. Not only must the Technicolor crew operate the cameras used—one to three on a picture—but the head cameraman for the picture must follow closely the suggestions of the experts on the Technicolor staff.

Members of the studio's wardrobe and set building departments must consult with the Technicolor men in order to learn of the latest discoveries in lighting and the use of color in various scenes.

The use of color on the screen is still a comparatively new art, and possibilities not yet entirely realized, may be controlling influences in the art tomorrow.

For example, although the eight existing Technicolor cameras, costing $10,000 each, are in daily use on three continents, there is reported to be a disinclination to build more of these costly instruments, because of new developments by Technicolor in the use of color films.

The Technicolor Company and Eastman are developing various phases of a new process which will permit all colors to be recorded on the same film, instead of on three separate ribbons as at present. (Int. Photog., July, Sept., 1937).

**MGM's "Test Pilot"**

**Studio's first air picture in several years had 35 days of location shooting to insure absolute accuracy.**

MGM's "Test Pilot," the studio's first air picture in more than two years, is a cameraman's dream. Nature of the story, dealing as it does with the most daring, reckless men in the world, lends itself to thrills. It was the cameraman's job to capture every one of those thrills, to bring them to the screen as
“TEN BEST” ON EASTMAN
FILM EXCLUSIVELY

EVERY one of the “Ten Best Pictures” selected in the 1937 critics’ poll of the Film Daily was “shot” on Eastman Super X Panchromatic Negative . . . . Release prints for all ten were made on Eastman Positive . . . . An impressive double demonstration of Eastman’s current contributions to motion picture quality. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN Positive and Super X Negative
they actually happened on a half-dozen landing fields.

When the studio bought Lieutenant-Commander Frank Wead's story, executives decided to make the film authentic to the last detail, to shoot as many scenes on location as the script permitted.

As a result, the "Test Pilot" company has ranged the airports of Southern California, utilizing Metropolitan Union Air Terminal and Mines Field in Los Angeles, traveling to Lindbergh Field in San Diego, and winding up with a two-weeks' stay at the Army Post, March Field, near Riverside.

The picture will be in production for 70 days. Thirty-five days were spent away from the studio, making aerial scenes, photographing every modern type of airplane.

Head Cameraman Ray June had a job on his hands. It was his responsibility to provide the spectacular aerial background for the romance between Clark Gable and Myrna Loy.

Taking no chances for the location scenes, June placed nine aerial photographers in airplanes, scattered nine other cameras at strategic points on the field. Every angle of the flight was covered by at least five of the cameras simultaneously.

Then June did something that few top-flight cameramen in motion pictures have attempted in recent years. Removing the cabin door from a big ship, he had a motion picture camera fastened to the fuselage, went up in the air himself for pictures. He didn't wear a belt, had no means of holding on except his camera. The camera was so stationed that it could sweep the sky from wing tip to rudder. The pilot of the plane was instructed to fly as closely as possible to other ships in formation, to go above them, drop below them.

June then did a seemingly foolhardy thing. Standing by that open door, with the camera his only means of holding on, he told the pilot to follow a test pilot in a power dive.

When the ship finally landed, June was exhausted, but he had the pictures he wanted. Later showing of "rushes" in the studio projection room proved that to his satisfaction. He had made the first authentic pictures, close-up, of an airplane being put to the test of the power dive. Other pictures had been made with telephoto lens, but June had stayed with the diving ship, getting his pictures first-hand.

During one day at March Field, June was in the air, standing by the open door, for eight hours. Field officials estimated that he had covered 1500 miles in those eight hours.

He obtained photographs of planes above clouds, shooting down from an altitude of 12,000 feet. He has thousands of feet of planes at sunrise and sunset, planes in formation, stunting, power diving and just plain flying.

"Test Pilot" marks a departure from the average aviation picture in that the flying scenes have benefited from modern improvements in photography and in aviation itself. Audiences will be treated to a startling and spectacular series of air sequences which were made by cameramen coached in aerial work.

PHOTOGRAPHY

Shooting Mob Scenes Stills

Motion picture stillman only professional photographer shooting big crowd scenes regularly for publication, and he does an excellent job under many handicaps.

Even a casual study of current publications, from newspapers to the slick magazines—and whether from the current crop or those of recent years—inevitably will reveal a great dearth of large group pictures, mob scenes, outdoor or indoor shots of many people, with the only outstanding exception of the batch of still pictures that come from the motion picture studios. Probably the only photographic group, regularly contributing professional work to the printed page who must ever be alert and competent to handle this type of photography, often under adverse circumstances, are the studio stillmen.

There are no retakes for the still photographer in motion picture work on such big scenes, featuring hundreds of extras in costly sets. These expensive sequences in productions generally are cleaned up in from several days to a week of shooting; and the particular combination of people and backgrounds is reassembled thereafter. Yet this sort of still picture is the most impressively convincing publicity and exploitation medium to get over to theatre operators and the paying public the production and eye appeal of costly motion picture productions.

Even with fast lenses and film, the
member of Local 659, IATSE, during production of the Norwegian skating star's latest picture for 20th Century-Fox, "Happy Landing," which was released last month. In the original negatives, the poses of Miss Henie varied slightly in size.

The CINEMATOGRAPHER'S BOOK of TABLES

By Fred Westerberg

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stillman's job of capturing interesting flashes of the big scenes for the exploitation records is one that presents many problems. It is to the credit of the studio photographers that under the circumstances they turn in so many fine exterior and mob shots in the regular routine of covering a production and the number of studio stillmen who can handle this type of photography constantly and expertly is not few.

Passing up the technical factors of photography, which in the final analysis either are matters of proven method or of personal taste, the stillman's problem, in shooting this type of picture primarily are those of judgment and proper timing in handling people. These problems are emphasized in that there are still much too many participants in motion picture production who regard the stillman as an interfering pest and delayer of production schedules.

Regardless of the type of picture, the studio stillman frequently is dependent almost entirely on diplomacy and tact in securing adequate poses for his pictures; but the situation is aggravated when the directors and their assistants—trying to save time and expense on huge sets—cause the stillman to be rushed about from pillar to post without a proper opportunity to record the production story in shots that will play a vital part in selling the picture. These single minded people frequently are prone, as John LeRoy Johnston pointed out in a recent article in International Photographer, to grievously underestimate the direct importance to themselves of a good set of stills, packed with selling punch for their pictures.

Shooting this type of picture also is complicated by the very nature of production activity and the constant helter-skelter and motion that takes place on a big set. The stillman's job primarily is to freeze everything within his view finder into a clear and reproducible negative. The picture suffers if but one or two persons happen to move when the shutter is snapped and thus blur part of the picture.

Consequently the success of studio stillmen in constantly turning in sharp, good quality pictures of opulent and heavily peopled scenes is accomplished by the use of scores of little tricks and stunts. It takes not only an accurate eye and a fast thinking mind but years of training and experience to record this type of scenes with assurance and success.

There is generally a point in every motion picture scene at which there is no given action, that is, one particular instant from the time they prepare to record the take until the actual shot is taken. The alert stillman watches carefully for this one second, or fraction of a second, when everyone seems to stand still. Set to make his shot at
Eyemo
unharmed by
800-foot fall!

Eyemo Camera Dropped by Newsreel Cameraman, Al Mingalone, in Sensational Runaway Flight Recovered Uninjured

The camera was later recovered, freed of the mud into which it had fallen, and found upon thorough inspection to be wholly intact without the slightest injury.

Lest we be misunderstood, we believe that in this remarkable instance Mr. Mingalone's thanks to the Eyemo's sturdy construction should be shared with a kind Providence.

The Eyemo owes much of its favor among professional newsreel cameramen to its sturdy construction, its ability to stand up in grueling newsreel service. Small and compact, the Eyemo permits getting scenes impossible with larger cameras, yet can be equipped with many of the refinements of studio cameras. Mail the coupon for detailed information.

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New York • Hollywood • London
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Please mail me a copy of your Eyemo catalog, Taylor-Hobson Cooke lens catalog.

Name
Address
City...State...

The new Eyemo, more versatile than ever before, is replete with such features as three-lens turret, focusing and diaphragm controls visible through eyepiece viewfinder, interchangeability of auxiliary electric motors and external film magazines, standard S.M.P.E. sound aperture, and accurate vibrationless speed governor. Send for complete description.
a speed, say 1/250 of a second, the veteran stillman frequently gets pictures of sharpness and quality and at the same time without movement of any of the characters to blur the picture.

In talking to Wally Wallace, he tells me usual success in getting group shots is attainable through an approach used seldom by the other stillmen, at least to my knowledge. Wally sets the camera, gauges the angle, gets everything ready and then just as soon as the director says "cut" he shoots the scene. It is his contention that when the word "cut" is uttered by the director the characters momentarily relax, yet the movement is comparatively so small a degree that it is possible to make the shot without fear of blurring the scene.

I have watched other stillmen do this kind of work too, and they tell me that they always resort to various unique methods and trick cues for themselves in taking this kind of a shot. Mickey Marigold, snapping many of the scenes for Warner's "Hollywood Hotel," would talk to a group of about 100 people in the scene and as he would finish saying "Hold it, now," would press the bulb and get the shot before the players were aware what he was doing. This way he caught them relaxed and natural yet in a quiet state. Had he repeated time and time again that he was about to take a shot, the natural tendency to strike a pose would have caused some of the people to move.

Often to cover himself a stillman will shout "Let's take another one—someone moved!" This is done as a matter of caution. It often results in a better still because the players when they hear of a thing like this, as is usually the cooperative tendency of motion picture workers on the set, will put forth their best efforts to help the photographer produce the finest results.

In filming many of the scenes of "The Buccaneer," which is illustrated herewith, much stress was laid on exteriors because these spectacular pictures with expensive production value require many good exterior shots to properly service newspaper publicity and lobby stills. And in this connection, the film's producer-director, Cecil B. DeMille, should be cited as a para-
FEBRUARY, 1938

The production of CINEMATIC ACCESSORIES such as Effect and Trick Devices, Vignettes, etc., has been our specialty for years.

The GOERZ REFLEX FOCUSER and the VARIABLE FIELD VIEW FINDER are precision instruments useful in MOVIE MAKING.

For further information address Dept. I. P. 2.

Local 659 Grads

Two International Photographs members, Miller and Dr. Sorenson, enter legal and medical professions.

Two veteran members of International Photographers, Local 659, have entered the professions and one has opened offices in Hollywood. Sidney Miller, who has been in the camera department at 20th Century-Fox, recently was admitted to the bar, while E. J. Sorenson, a veteran of silent picture days, who in recent years has been with the Mayo Brothers in Rochester, now is established as a medico in the Taft Building in Hollywood. Sorenson was active as an assistant and later as a first cameraman from 1923 to 1927, when he photographed Eric Von Stroheim’s “Wedding March.” In 1929 he was in RKO’s cutting department, but left in 1930 to join the Mayo clinic.

New Kalart Office

Synchroizer and range finder manufacturers opening Hollywood branch for sales and service.

Chandler Weston, son of Edward Weston, famed California photographer, has joined the Hollywood staff of the Kalart Company as technical and service man. West Coast offices of the rangefinder and synchroizer manufacturers will be opened this month, to provide the Coast dealers with sales and service facilities, with all deliveries f.o.b. Hollywood, under Lida Dubin, western representative of the company. Weston and Miss Dubin will visit camera clubs, schools and colleges on the Coast, delivering lectures and demonstrations on synchronization photography.

Kodabrom Liked

New Eastman enlarging paper, aimed to fill needs of commercial and press work making hit due to wide latitude.

Number of improvements evident in Eastman’s new Kodabrom enlarging paper is making a hit for the product with professional and commercial photographers and finishers. Its main feature is wide latitude, which suits it particularly to the needs of those who must handle many enlargements from negatives of widely varying densities, and still strive for uniform quality in prints, particularly for printed repro-
AUTOMATIC FINDER for Speed Graphic photography, illustrated herewith, was designed by Fred Parrish, veteran member of Local 659, IATSE, who currently is shooting stills at Republic. The attachment on Parrish's 4x5 Speed Graphic enables him to shoot this type of picture with virtually candid camera speed and positive assurance of accurate focusing, plus capturing everything seen in the viewfinder, when it is moved out from the infinity position. A standard type 8x10 finder was used by Parrish, and underneath the finder is a moving cam, fastened to the front board. By careful and detailed tests Parrish finally completed a cam, which though very simple, procures exceedingly accurate photographic results. The finder set-up automatically compensates for parallax as the lens is moved in and out for focusing. Users of Graphic Type cameras are familiar with the problems encountered in getting absolutely accurate focus away from the infinity point. As the photographer moves in for closer shots he must guess in allowing for head room and other composition elements, as he does not get what is seen in the finder on his negative. Parrish states that his device has never failed him in getting exactly what was seen on the ground glass. Shot of camera at right shows how finder is set (on top of camera) when lens is set at infinity; and left, how pulling out the lens allows the finder to drop down. Parrish's gadget is essentially an adaptation to still photography of methods used in motion picture photography, and he has applied for a patent on the automatic finder device. Above, Marian Marsh tries out Parrish's finder on Henry Wilcoxon, with whom she is featured in Republic's "Prison Nurse."

Using Kodabrom, a normally exposed negative will develop to full density and brilliance in 45 seconds, with particular richness and brilliance in its black tones. The paper also gets effective results from under-exposed prints, requiring three or more times the printing time.

Another feature is stability of contrast, since its four degrees of contrast in Nos. 1, 2, 3 and 4 are equally spaced. The new paper comes in surface textures and stocks particularly suited to turning out prints intended for reproduction. The single weight comes in two grades: F, a glossy, white stock; and N, a smooth lustre, white stock; while the double weight comes in five grades: E, smooth semi-matte; F, glossy, white; G, fine grain lustre, natural white; N, smooth lustre, white; S, fine grain lustre, old ivory. List prices are the same as for Eastman's Illustrators' Special, Vitava Opal or P.M.C. Bromide.

Developer recommended for the new stock is D-72 with 1 to 2 dilutions, with time range from 45 seconds to 1½ minutes at 70°F.
Sound

Mr. Stone Innovates

New Paramount director welds modern playback and pre-scoring technique into new shooting style that has possibilities.

There are a few shrewd students of motion picture production methods, who are familiar with the radical innovations introduced on the Paramount lot by Andrew Stone in his first directorial assignment, the recently completed "Stolen Heaven," who off the record are hazards the prediction that if Stone's slants meet the test of commercial success, the motion picture industry is in for a truly sensational revision of many ideas on production technique.

Stone's "new idea" is so simple that on first statement it seems unimportant. He has merely taken the pre-scoring technique familiar to the entire industry (particularly for musical scenes) and applied it to an entire picture, with the added method of photographing the entire picture by stop-watch timing to fit the tempo set up in the musical arrangement that parallels the shooting script.

However, anyone who takes time out from Hollywood's beloved practice of rushing through everything as though they were running for the winning touchdown to study over the Stone idea, will amaze themselves with the innumerable ramifications it opens up.

Technicians familiar with recent improvements in playback recording and reproduction technique (Int. Photog., August, October, November, 1937) have speculated casually on the possibilities inherent in the new acetate discs and better playback reproduction as the solution of many production problems; both in freeing the camera for greater pictorial opportunities and in welding music more closely and logically into story emotional values. Stone has taken these ideas out of the speculative and translated them into action.

His first step was made in answer to a specific need. He wanted to pre-score a script and shoot the action to fit in with the score. Sound on film was out because of the obvious time that would be wasted in trying to find particular passages for retakes, and for other technical reasons. The new type discs were the best bet but still unsatisfactory, so Stone worked out a device for controlling playbacks to almost instantaneously repeat any desired part of the score.

As illustrated, Stone's remodelled playback setup, which was designed and built on the Paramount lot to the director's ideas by Henry Fraker, a former Bell Telephone lab employee, now in the studio sound department, features a composition rubber arm which fits across the record from rim to spindle, and is marked with radial lines which line up with markings on the record, indicating various parts of the pre-scored music. This permits rapid selection of a particular passage for playback on the set by using sliding markers as guides in placing the needle. For protection, sufficient extra discs are cut to obviate any delays through breakage or wearing out of a disc.

The next important angle of Stone's invention (he already has applied for a patent) is instant control of the actual playback through a complicated arrangement. By pressing a button, Stone, while directing, can soften music so faint that it merely serves as a guide for players in their action; kill it entirely as dialogue is spoken for the recording devices on the set; or bring it up strong as a guide for group scenes.

Stone thus has a virtual robot assistant director and action prompter unsurpassed. And to the executive, director, writer and actor, who realizes the supreme importance of tempo to the motion picture, this opens up interesting possibilities.

Obviously, the most significant point about Stone's idea, is that if it clicks in picture making, something will be forced upon the industry that many people have been talking about but few ever expected to happen. That is that the director, writers, composers and production executive in charge will have to sit down together and cooperatively think out a story to its conclusion. They will have to deliver a completed script and score that will be much closer to the finished picture than we are getting today. And the bluffers, poseurs and buck-passers will have to make way for sincere, able and cooperative creative workers.

Of prime importance is the prospect that top production executives, who must assume the responsibility of approving the expenditure of huge sums on the shooting of scripts, will get a crisp, definite and specific completed
creative job upon which to base their decisions, instead of putting into production, as is so often the case, a story that they hope will sell on the set.

From one standpoint, Stone’s ideas have passed the test of knocking theory against practical facts. Coming to Paramount from an astonishingly successful production for Grand National of “The Girl Said No” on a budget of $70,000, Stone turned out his first picture for Paramount—unlike many theorists—with a minimum of temperamental pyrotechnics within budget and time limitations, yet without working in a maniacal frenzy of speed. Method replaced over-work as the efficiency factor.

Stone’s playback methods work smoothly during actual production. One rehearsed and set in their action by Stone’s stop-watch timing to the score, working in conjunction with his special type of script, featured players and actors can go through their scenes with confidence and greater mental freedom to concentrate on characterization. Dialogue spoken on the set is recorded as under ordinary conditions; with Stone or an assistant cutting off the playback sound during speeches. The playback sound is recorded, but is cut out of the track recorded on the set and the dialogue is dubbed in with the original master score.

Those who have studied the Stone technique, believe that instead of; as first might be assumed, restricting and hampering creative activity; it actually frees it by placing many routine matters under absolute control and promoting efficiency on the set.

Alert studio workers will be closely watching the Stone picture and also the new Sylvia Sidney-George Raft picture, “You and Me,” on which Fritz Lang started direction for Paramount late last month. The famed Austrian director is using the pre-recording and playback technique 100 percent and other Paramount directors and producers are evincing considerable interest.

“While this reverses the usual procedure of having the composer suit his music to the completed scenes, the usual method is wrong,” Lang insists. “That way the actors do not get the full benefit of the score. In this way they do. The music is constantly pacing their moods. Someone should have thought of it long ago.”

Lang points out that in silent days a director could guide his players throughout a scene by speaking to them; nowadays he has to keep silent till the scene is over. Through “pre-scoring,” however, he may have his ideas embodied in the music and then let the music direct the players.

In “You and Me,” music is being given more importance than ever before in picture production. In a sense the com-
The SOUNDMAN’S BOOK of TABLES
By J. N. A. Hawkins

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Attenuation Network Data

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Loss in D.B | Voltage Attenuation Ratio | R_1 | R_2 | R_3 | R_4 |
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22—February, 1938

NEW PARAMOUNT SOUND CHIEF, Loren L. Ryder, at left, last month succeeded Franklin Hansen, right, who retired as head of Paramount's sound department. Hansen's department won several Academy sound awards in recent years. Ryder has been his assistant for some time. Hansen was presented with an inscribed cigarette case in token of the esteem in which he is held by fellow sound directors at a dinner in his honor at the Academy Research Council last month.

poser becomes the director's collaborator. Lang picked Kurt Weil, noted European stylist, whose original scoring of the stage play, "Johnny Johnson," attracted wide attention, for his prescoring assignment.

Although still a young man, Stone has been around Hollywood long enough to work in film exchanges, laboratories, and production offices. With the confidence of a man thoroughly familiar with his task, he works fast. Oscar Lau, property man on "Stolen Heaven," described him as "chained lighting." The cutters and photographers also were amazed. They made whispered comment on the number of feet of film shot in a day's time, or on the number of "set ups" before lunch.

Stone's big criticism of use of music in screen stories has been that it holds up the action. "When you see a person singing in the conventional screen musical," he explains, "it is the same as though on the stage they rang down the curtain in the midst of the dramatic action and brought a singer around in front for a solo. It's my personal theory that the audience, if it is interested in the story, and it certainly should be, objects to this business."

Stone seeks to overcome this by vari-
These shots from the still series photographed by Eddie Henderson, member of Local 659, IATSE, for Paramount's "Stolen Heaven," illustrate new production technique developed by Andrew Stone, featuring pre-scoring of the entire picture. Rehearsals and action were done to playbacks of a previously recorded score, which was timed with a new type script. Stone's invention to allow instant repetition of any particular part of the score—a special arm, with markings on the arm and on the records—is shown top left. Top right and bottom strip are scenes from the picture. Olympe Bradna and Gene Raymond, stars of the film, are shown at center left, while in center, Art Fehlman, playback director at Paramount, points out the setup of the playback equipment to allow for the Stone technique. Center right, Phil Boulle, musical director, instructs Lewis Stone in piano technique, and in oval is seen directing a scene for tempo, using the playback method.
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ous methods. One is to have the principal carry the song as long as it is natural for him to do so in the story and then turn the continuation of the song over to other voices.

“Stolen Heaven,” an original by the director, follows box office thriller formula: crooks, cops, and an exciting chase; but in addition there is an intelligent attempt to introduce novelty and quality, for this “cops and robbers” story revolves about the playing of the classic Liszt’s “Liebestraum.” The music, along with that of Johann Strauss, is not only heard in the background; but it becomes a vital part of the dramatic action to the extent that if you take away the music, then you take away the story. Paramount executives believe there has never before been a similar fusion of music and drama in a Hollywood motion picture.

Stone doesn’t stop at pre-scoring and mixing music and plot as innovations. His shooting script gives the time required for action down to half-second for many scenes. Other angles are musical dialogue by Olympe Bradna and Gene Raymond. The first is unlyric dialogue, spoken to music, and the second a series of images visually illustrating Liszt’s Second Hungarian Rhapsody.

Another novelty is the use of a “dancing camera.” This required the services of a musically trained “grip” for the movement of the camera. He was found in the person of Darryl Turnmeyer, a “grip” on Paramount’s “back lot,” who is a competent pianist by avocation.

In the shooting of one scene, Turnmeyer was called upon to change the position of the camera seven times, and each time on beat to a portion of a Moskowksi waltz danced through a household by Bradna and Raymond. Through this stunt Stone hopes to heighten the audience sense of rhythm.

Ed Gibson

Sound Table Series

Attenuation networks data to be covered in next six tables of series by J. N. A. Hawkins.

Attenuation networks data will feature the Soundman’s Book of Tables by J. N. A. Hawkins, member of Local 695, Sound Technicians, IATSE, and a contributing editor of International Photographer, starting with the current issue and continuing through five more tables. Initial table covers the voltage attenuation ratio to db loss on 500-250 ohms. Succeeding tables will cover these factors for 500-200; 500-50; 200-50; 250-200 and 250-50.

LOCAL NEWSREEL PLAN, instituted by Herman A. DeVry, Inc., of Chicago, as a substitute for bank night and other free gift promotions, is built around the complete production unit, illustrated above. The plan already has been tried in several cities, finding particular appeal in towns of smaller population where there is a keen interest in local affairs and personalities. General procedure is for a theatre and newspaper to make a tie-up on the stunt, with newspaper cameramen and advanced amateurs taking the shots, which are edited and paid for by the theatre. To support the sales campaign on behalf of their local newsreel setup, DeVry is making available service aids in the planning and editing of such newsreels.
Projection

Academy Sessions

Research Council's projection sound standardization committee holding confabs with service chiefs.

Joseph B. Kleckner, president, Ed Kennedy, chief engineer, and Herbert Richards, promotion manager for Motograph Company, were due in Hollywood early this month from Chicago for conference with the Academy Research Council's committee on standardization of theatre sound projection equipment characteristics.

The committee is meeting with representatives of various sound equipment companies for the purpose of more closely coordinating theatre sound equipment with studio sound recording practices; to acquaint these companies with the committee's program and to acquaint them with engineering ideas of the studio sound recording departments.

The advent of the several new sound equipment companies in the field has greatly increased responsibility of the

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Pres. H. A. DeVry
and Norman Alley
committee, which will in the near future issue a complete set of recommendations for theatre reproducing equipment.

F. C. Gilbert and G. L. Carrington, chief engineer and vice-president, respectively, of Altec Service Corporation, which has taken over the ERPI service business, are coming to Hollywood to confer with the committee later this month, while Herbert Griffin, sales manager, and George Friedl, Jr., chief engineer for International Projector Corporation, were here during January.

NOVEL NEON EFFECT, illustrated above, was used at 20th Century-Fox to highlight the band in the Sonja Henie picture, "Happy Landing." Neon is often used for effective combinations in lighting and stunt effects, particularly for musical pictures, and much of it is designed to studio specifications.

Lighting-Sets

Modern Still Light

Art Marion, veteran still photographer, to inaugurate series on still lighting with cooperation of George Teague.

So many changes and improvements in both the materials available and the technique of lighting stills have taken place in recent years, that virtually all recognized authoritative works on the subject are considerably out of date, except on basic fundamentals. The situation opens up so many possibilities for reporting and coordinating of technical and artistic data available today that International Photographer has received a number of suggestions that such information be gathered together in a series of well illustrated articles.

Such a series will be inaugurated in the April issue under the guidance of Art Marion, veteran still photographer, and long-time member of Local 659, IATSE. All illustrations for the series, which will cover all angles of lighting still pictures, will be made at the most modern still studio in Hollywood, recently opened by George Teague's organization. Teague's studio is completely equipped with all facilities, including his newly developed still projection background devices. All phases of shooting stills in black-and-white and color and with projection backgrounds will be covered in the series.

Cooperation on this new series by the majority of the lighting equipment and film manufacturers has been assured and we believe that it will make another important contribution to International Photographer's coverage of modern technical news angles.

Process

MGM's Effects Stage

New structure will feature indoor tank, hydraulic lifts and special air conditioning system.

Tentative plans and specifications for MGM's new special effects sound stage have been completed and actual construction will start late in March.

The building will measure 240 feet in length by 136 feet wide, and 66 feet in height, and will be completely air-conditioned. A tank will be constructed in the floor of the stage which will measure 90 by 90 and ten feet in depth for water scenes. A special portable floor section will cover the tank, so that when not in use, the tank will be covered with regular flooring. The air conditioning system is specially designed for the quick removal of fog or mist effects after "shooting" such scenes.

The stage will be the 30th sound stage to be erected on MGM's Lot 1. It will have a concrete floor instead of composition, and will be equipped with two hydraulic lifts specially designed for use during filming of special effects scenes.

The construction is under the supervision of William Koenig, studio manager, and John Tobin, plant superintendent. Arthur McArthur is the architect and Cyril P. Hubert is the structural engineer.

New Still Function

Still photographs used successfully at Universal for projection background shots in motion pictures.

A new function for the still photographer has been uncovered by George Teague, Hollywood's famed projection background and process expert, who also functions as head of Universal's process and special effects department. After considerable experimentation Teague has succeeded in using high grade still pictures for projection backgrounds for actual motion picture production. Teague recently developed modern equipment for pro-
jection background work in still photography and now is getting a practical combination of the still technique with motion pictures.

First systematic testing of this technique under actual production conditions was accomplished with gratifying results on Universal’s “Forbidden Valley,” a low budget feature. Director Wyndham Gittens and Teague carefully planned in advance opportunities to use this type of effects in handling their script. Prime value of the still background is restricted to scenes in which the background is static or for the adding of rare and unusual backgrounds that ordinarily would be obtainable by a motion picture location unit, into a picture. Slides for the still cinematography backgrounds are made from needle shaped 8x10 negatives photographed on location scenes by Universal's still cameramen, Ray Jones, Roman Freulich, Ed Estabrook already have accumulated a collection of valuable slides for this purpose.

A particularly efficient grainless developer which allows for great enlargements in projection is being used for these stills and a laboratory technician has been specially assigned to concentrate on this work.

The value of this method in solving a situation was illustrated in the last Deanna Durbin picture, “Mad About Music,” for which scenes from Norway were needed in a hurry and through the still system were worked into the picture with great speed and at considerable economy.

Another offshoot of the still background technique, which is expected to prove particularly valuable is use of pictures of set designs or famous locations to be recreated, projected to actual size, for the guidance of studio craftsmen, who previously have had to work from scale drawings and pictures.

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Laboratory

Enhancement of entertainment values in feature pictures by the use of tints and tones in "sepia platinum" and other pastel shades is rapidly getting out of the experimental stage. John Nickolaus, MGM's lab chief, was the leading spirit in reviving this technique early last year. Used by the industry during silent picture days, but dropped with the coming of sound, big problem of handling toning is not the development of formulae or technique, but the building of adequate equipment to process release prints under modern conditions. This month MGM completes installation of a battery of new toning machines, while the Duplex organization is completing a toning setup for a major studio, using latest materials and methods.

It is because of this interest in toning that the current Laboratory Tables by International Photographer's contributing editor on chemistry matters, Donald K. Allison, is covering the accurate chemical analysis and control of this type of solution.

Toning Battery

MGM laboratory near completion of four new toning machines built in studio's shops from designs by A. G. Wise.

Installation of a battery of four toning machines at MGM is near completion in a new wing of the laboratory. When in operation they will have a capacity of 5500 feet of print per hour.

The new machines will tone in the original "sepia platinum" effect (Int. Photog., April, May, 1937) perfected by John M. Nickolaus, and also in pastel shades in tone and tint subsequently worked out by the laboratory chief. With non-corrosion chemical tanks, and other parts of a special alloy of non-corrosive steel, the machines, built in the MGM shops, were designed by A. G. Wise, laboratory engineer.

Construction of the machines involved many other laboratory details. Air is heated, filtered, and pumped into the drying boxes. A total of 22 air-conditioning units, which first water-wash incoming air, then filter it and dehumidify with air-mat filters, have been installed. These have a maximum capacity of 60,000 cubic feet per hour in air used directly on film, and a total of 90,000 cubic feet per hour in the entire laboratory. Anti-directional turbulation to eliminate "chemical flicker," a special development by Nickolaus, is used in the new machines.

So delicate is the tint process setup

---

**The LABORATORY BOOK of TABLES**

By D. K. Allison  
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---

**ANALYSIS OF IODINE BLEACH-MORDANT**

Sample as delivered to laboratory: protect from light and air; analyze promptly.

<table>
<thead>
<tr>
<th>IODINE</th>
<th>POTASSIUM IODIDE</th>
<th>pH</th>
<th>OXIDATION POTENTIAL</th>
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</thead>
<tbody>
<tr>
<td>Take 50.0 ml. sample. Titrate with 0.10 N Na₂S₂O₃ to straw color; add 10 drops Sol'n C, continue titration with Na₂S₂O₃ to disappearance of blue color. Record as &quot;Volume A&quot;.</td>
<td>Take 10.00 ml. sample; add one-fifth Vol. A of 0.10 N Na₂S₂O₃. Dilute to 200 ml., place in glass-stoppered flask. Titrate with 0.10 N AgNO₃ with vigorous shaking until the ppt. collects together and supernatant liquid is colorless. Add additional 10.0 ml. AgNO₃; record total volume AgNO₃ as &quot;Volume B&quot;. Add 5 ml. Sol'n J, titrate with 0.10 N KSCN to pink color. Record volume KSCN as &quot;Volume C&quot;.</td>
<td>Measure pH of 100 ml. sample, using the CGR glass electrode technic.</td>
<td>Report as pH</td>
</tr>
</tbody>
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**DIRECTIONS FOR THE PREPARATION OF SPECIAL SOLUTIONS AND REAGENTS FOR THE ANALYSIS OF IODINE BLEACH-MORDANT**

0.10 N Na₂S₂O₃—24.83 gms. Na₂S₂O₃. 5H₂O per liter.  
0.10 N AgNO₃—16.99 gms. AgNO₃ per liter.  
0.10 N KSCN—10 gms. KSCN per liter; standardize against AgNO₃.  
Solution G—6 gms. soluble starch, titrated cold, made to 1 liter with boiling water; 10 gms. ZnSO₄ added.  
Solution J—Cold saturated ferric ammonium sulphate, to which enough nitric acid has been added to cause disappearance of the brown coloration.
that Carrier regulating equipment in the chemical solution circulation holds the temperature uniform to within one-tenth of one degree. Light regulation on the printing machines is regulated with equal uniformity, the motor generator sets providing current for the printing lights, being constant to a quarter of a volt.

**Duplex Automatic**

New machine built by Hollywood precision manufacturing organization meets modern toning demands.

The new automatic tinting and toning machine built by the Duplex precision motion picture machinery manufacturing organization is capable of holding 2500 ft. of film on each side, for a total capacity of 5000 ft., and is along modern lines with entirely chemical resisting materials throughout. For smoothness of operation it has approximately 2000 ball bearings.

Among its features are: variable speed control, which allows a latitude from 18 ft. to 120 ft. per minute; adaptability to use for developing purposes if the room is darkened, and as a combined developing and tinting and toning machine; take up constructed so that it is capable of handling either reels or rolls of film.

Emphasis on resistance to chemical action is a major factor in this type of machinery and among the materials used were bakelite, hard and pure gum rubber, pyrex glass, monel metal, stainless steel and special chromium plating in the drying compartments.

Many methods of tinting and toning film are used, but in most instances, and as followed in the Duplex design, the film travels steadily through a moistening bath and into a bleaching tank. It is then led into a wash tank before going into the tone. After another wash it is tinted and again washed before going into the drying compartments.

In the new Duplex machine the film is received from the developing rooms and is placed on a loading flange and attached to the leader. A second supply flange is also loaded with film so that no delay is ever occasioned in the continuous operation of the machine.
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OLD TIME NICKELODEON, shown above was operated during 1910 and 1911 by Floyd M. Billingsley and Tony Kornmann at Houston, Texas. Billingsley is well known to IA members today as International Vice President from the San Francisco Bay area; while Kornmann, member of Local 659, IATSE, now is engaged in the equipment brokerage business in Hollywood. A far cry from modern de luxe cine homes, the Billingsley-Kornmann emporium for the galloping tin types had a seating capacity of 90, which frequently was stretched to 150 with standing room. Usual admission was five cents to view half a reel of the primitive flickers, but occasionally the ante was boosted to ten cents and a song was added. In those days each reel was in two parts, in contrast to today’s 2000-foot reels. Run off of the one-reel films and warbling to slides generally took about fifteen minutes, but when the box office was clicking merrily the boys used to speed up the show to twelve minutes.

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Close-ups
By ED GIBBONS

New and Vital

While the motion picture industry has been making technical strides of amazing proportions since sound dealt an entirely new hand all around in production technique, the creative end of picture making has been playing its cards pretty close to the vest of late. That is not to say that there have not been many valuable new story trends, new approaches to characterization, new slants on stories and new ideas in scripts and direction insofar as the old-line methods of pushing these twists through the production hopper is concerned.

But while technicians have been tossing microphones, recording devices, cameras, lights and other important gadgets into the ash-can in favor of better ones; writers have continued to write their scripts in the familiar scenaristic molds; directors, by and large, have been shooting traditional setups, sparingly interspersed with touches of montage, odd angles and novel effects; film editing, in particular, follows the straight and narrow of the familiar; and the increasingly important army of musical contributors still are puzzling as to why they are called in at the last minute to knock out in a few days a score for a picture they might have been working seriously and successfully on for weeks. Hollywood, in short, wears all the stigmata of its curiously persistent creative and intellectual inbreeding.

The one significant highlight is a more or less general realization that while sound is here to stay, the story must be told with the camera, although only a few seem to be excited enough to do much about it. A corollary realization touches the importance and entertainment value of musical backgrounds, a factor that brings with it as many production problems as it does entertainment benefits.

Under the circumstances, the news of any new and important contribution to action, rather than vague theorizing on these matters, is a heartening note. Consequently, there is scarcely an executive or creative worker in the industry, who can not benefit from the reading of the story beginning on Page 20 of this issue of International Photographer about the activities of Paramount's new director, Andrew Stone, and a subsequent investigation of the significance of his directorial and production innovations. Here is a man who jumps right in with the technicians in an enthusiastic attempt to wring everything possible in a creative way out of their contributions to the picture making routine. Even if other executives and creators borrow merely Mr. Stone's example, a move in the right direction will have been made.

The New Argus

Charles A. Verschoor, progressive head of International Research Corporation, and his cabinet of modern minded assistants deserve all the encomiums they will receive if their new Model "C" Argus camera is as big a success as they expect. A preview flash of the new instrument convinces that this much-discussed and long-looked for $25 version will sky-rocket to even greater success than the company's sensational initial model, which in two years has made the most astonishing hit in recent photographic marketing history.

The new camera is the result of much careful study and planning. It is an attempt to meet the needs and desires of the average photographic fan and it will have a resounding effect upon the entire popular photography market.

For years people have been asking: Why doesn't someone manufacture a strictly American made miniature camera with the important features and versatility demanded by the average user at prices within reason for the camera and its essential line of accessories? Many have been the explanations and evasions, but International Research is the first company to answer the question with action instead of words.

If Verschoor's organization can take all the bugs out of such a camera line at the price they announce they will be accomplishing one of the most progressive steps in recent photographic history, both for the photography fan and the American camera industry. For there is no question—using the sensational success of the original Argus as a premise—but that the new model will result in a wide revision of present practice. It will simultaneously result in the junking of many currently sold medium priced miniature cameras and so-called miniatures that are neither fish, flesh nor fowl; and it also will stimulate a healthy competitive situation by virtually forcing other American firms to enter the same field.

If International Research turns out in their new model, a reasonably priced miniature camera to meet modern needs—a simply operated, sturdy and fool-proof instrument—they will deserve a hand not only from camera fans but also from their competitor manufacturers in this country. It's about time for the American industry to start out and really demonstrate what it can do. And International Research is making the first move.

Notes at Random

One of the inside topics of conversation in sound circles is the astonishingly successful results obtained with comparatively antiquated equipment by the United Artists sound department, and this group is being boomed for the Academy award this year. . . . the Society of Motion Picture Engineers will hold its spring meeting in Washington, D. C., April 25-29 this year, while the fall session has been set for Detroit, with dates still to be determined. . . . keen interest in color photography prompted Paramount to have ace cameramen form a class in color photography during production of "Her Jungle Love". . . . every first cameraman on the payroll was required to spend three or four days learning color angles from Ray Rennahan, veteran Technicolor expert.

Hollywood's famous American Legion fight stadium is the central spot of a picture for the first time in Republic's "Hollywood Stadium," which features Evelyn Venable, wife of veteran Local 659 member, Hal Mohr, and gives radio announcer Jimmy Wallington his first featured film role. . . . we visited the Republic lot last month with Herbert Yates, the company's president, and noted an unusually fine spirit of cooperation in all departments. . . . this independent concern seems headed for its best year in 1938 under Yates guidance. . . . Harold Lloyd is reported planning to use the stereoscopic stunt, which has clicked so well in Pete Smith's shorts, for some hair-raising scenes in "Professor, Beware," his latest for Paramount.

Walt Disney's "Snow White" was photographed entirely through Bausch & Lomb lenses. . . . Carl L. Bausch of the Rochester firm has been conferring with Disney on the improvement of his novel "multiplane camera" . . . installation of special equipment now permits Agfa Anso to supply duplicates on reversible films in any length from their New York laboratory.
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Six telephotos and one wide-angle lens are interchangeable with its standard 1-inch lens by the simplest method ever devised. Direct eye-level finder system serves all eight lenses.

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With fast Kodak Anastigmat f/1.9 lens, the Magazine Cine-Kodak is $125. See it at your dealer's.

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Vol. X  Contents for March, 1938  No. 2

ON THE COVER. This month's cover is an unusually effective job of engraving by the Brown-Caldwell Company, in securing a rich color effect with two color plates made from a black and white montage, created by Ernie Bachrach, RKO still chieftain, and member of Local 659, IATSE, especially for INTERNATIONAL PHOTOGRAPHER. The cover ties in with the interesting stories in this issue's Camera and Projection sections, and one of the technical highlights of Walt Disney's "Snow White and the Seven Dwarfs."

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International Photographer, as the monthly official publication of International Photographers, Local 659, of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, not only represents the entire personnel of photographers engaged in professional production of motion pictures in the United States and Canada, but also serves technicians in the studios and theatres, who are members of the International Alliance, as well as executives and creative artists of the production community and engineers of the manufacturing organizations serving the motion picture industry. International Photographer assumes no responsibility for the return of unsolicited manuscripts or material.

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NATIONAL CARBON COMPANY, INC.
Tradewinds

The new Duplex Super Camera, an adaptation of a Hugo Meyer Cine lens for miniature photography, the new Leica gun for telephoto photography and the Balsley & Phillips newly engineered system for adapting good silent projector equipment for 16 mm. sound, are featured in this month's TRADEWINDS news.

Product: Duplex Super Camera.
Manufacturer: Duplex Cinema Equipment Co., 4572 Santa Monica Blvd., Hollywood (MOningeside 14717).
Distributor: Direct dealers.

General Description: The new Duplex Super Camera is an easy to operate, light weight camera which features a 220 degree shutter opening and eliminates the shaking over to view image. Designed for professional production use in the studio and for commercial work where silence and perfect steadiness is essential, it features pilot pins and pressure pads designed to insure sharpness and steadiness. Small and compact, easily operated, it is ideal for newsreel work, expeditions and commercial, aerial and location photography, and is particularly valuable for obtaining background shots for projection background work under adverse conditions. Direct focusing is accomplished by shifting a small lever which gives the operator a correct, right side up, magnified image; and the finder also give a right side up magnified picture. Entire gate assembly may be easily removed for cleaning; and the entire movement is lubricated from one point. A new type cam movement, which operates in oil, has been perfected so as to obtain a quick pull down by the double claw, thus allowing the pilot pins to remain in position for a long exposure. The 220 degree shutter opening permits work under adverse lighting conditions; and in the studio eliminates some of the excessive lighting. The three-blade shutter is hand dissolving, and may be operated at will.

Some outstanding features of the new camera are:
1. Small size and light weight.
2. Strong and durable carrying the Duplex guarantee.
3. Accurately manufactured to the highest degree.
4. Easily threaded.
5. Ample room for Bi-Pack films. (12 negatives.)
6. Has Pilot Pins and pressure pad release.
8. Door cannot close unless spirit roller pilot pins and gate are correct.
9. Footage counter and reset easily viewed.
10. Means of focusing without racking over or disturbing the lens position.
11. Magnified erect image view finder, and built-in magnified erect image focusing telescope.
12. Revolving turret with locking mechanism which accommodates three lens mounts.
13. Three-blade dissolving shutter with range from 0 degrees to 220 degrees.
15. Sun Shade arm directly attached to the camera rather than to the tripod.
16. Built-in hand dissolve lever and dial showing shutter openings.
17. Ball bearings throughout.
18. Perforated automatic frictionless light trap mechanism.
19. Equipped with standard motor mounting which will adapt a gear reduction type motor or a direct drive motor.
21. All parts accessible for rapid cleaning if necessary.
22. Camera movement completely lubricated from one point.
23. Magazines are ball bearing equipped throughout.
24. Magazine covers have built in lugs for easy removal.
25. Small spoon in magazine take-up, and high speed movement.

Specifications:
Weight—Approximately 20 pounds with three lenses and view finder.
Dimensions—61/4 inches by 7 inches by 71/2 inches.
Capacity—1000 ft., 400 ft., or 400 ft. Bi-Pack Magazines without belt changing available for 35mm. film.
Shutter—Three blade 220 degree hand dissolve shutter.

Focusing—Focusing is accomplished without racking through a telescope upon ground glass.

Cha'iner D. Sinkey, Universal Newsreel staff cameraman, well-known member of Local 639, IATSE, in Hollywood and Seattle, shown here with his Duplex Super Camera, says: "After giving the camera some four months of consistent workout, I am convinced that it is just 'what the doctor ordered' for news and feature men."
The Duplex camera with bi-pack threaded in. Note the buckle-switch and reset knob and pilot pins in registering position; while the double claw is just about to leave the perforations. This "overlap" of the movement assures the vital steadiness so indispensable in photographing scenes for projection background work. The magazine clamping screw is in position in this picture. It assures the operator a light proof mortised joint between camera and magazine, which shows the aperture image right side up and magnified six times. The shifting of the prism into position makes this feature possible.

Aperture—The aperture plate is of hardened steel which is hard chromium plated. It is polished and lapped to a mirror finish to which emulsion will not adhere to scratch film.

Construction—All working parts are accurate to one ten-thousandth part of an inch.

Portability—As it is small and compact and very light in weight the Super Camera boasts of its extreme portability.

Built in features—A buckle switch and reset, and the focusing prisms are built into the camera. A Veede foot counter, conveniently read, is also part of the furnished equipment.

Lens mounts—Lenses mounted are carried in revolving turret which accommodates three lenses, and which may be revolved to any desired position. The mounts are especially designed for hard and accurate service. They are graduated in feet, and are also graduated for Bi-Pack film.

Tripod—Any standard tripod may be used with the Duplex Camera, or our own light-weight, free-head tripod, which is sturdy and well built, proves ideal.

Carrying Cases—Carrying cases are made up to meet our customers requirements. Strong, serviceable, yet light and easy carrying cases as suggested.

Sun Shade and Filters—A Sunshade which is fastened to the extension arm of the camera itself allows the use of two inch filters in the holder provided. The simplicity and ease of operation of this system is unsurpassed.

Duplex magazines are constructed of cast aluminum alloy with ball bearings throughout, and have capacities of 4000 feet, 1000 feet and 400 feet of Bi-Pack film. A special frictionless light trap is incorporated which is automatic in operation. Loading is very simple and quickly accomplished. The base of the magazine forms a light proof mortised joint and is secured to the camera by a knurled clamping screw. The 1000 foot magazine weighs 10 1/2 pounds. The 400 foot magazine weighs 6 pounds. The Bi Pack Magazine weighs 11 pounds.

Duplex camera motors are designed to meet the requirements of the Duplex Super Camera. They have standard spots for mounting, and are fastened into position in a moment with no effort. Reliable in operation and with reserve power they fulfill all the Duplex expectations. Synchronous motors may be used, or: The 110 volt AC-DC motor, control, and tachometer unit weighs 11 pounds complete; the 12 volt DC motor, control and tachometer unit weighs 11 pounds complete, and both types fit into the connection at the rear case for camera, $27.50; carrying case for magazines, $20.00; 110 volt AC-DC wild motor and tachometer, $185.00; 12 volt DC wild motor and control, $195.00. All prices F.O.B. factory and subject to change.

Product: Cine Triplan Lens.

Manufacturer: Hugo Meyer & Co., 245 West 55th Street, New York, N. Y.

Distributor: Direct, dealers.

General Description: Adaptation of a Meyer cine lens to miniature photography aimed at securing needle-sharp negatives, the Cine Triplan 105 mm. f:2/8 lens is fully corrected for astigmatism, coma, color and spherical aberration, and delivers crisp, brilliant and sharp negatives. The lens is precision mounted in an accurately made focusing mount that synchronizes with the autofocal range-finder of the Leica camera. In spite of its speed for focal length, the complete lens weighs only 10 oz., due to durumium construction of the focusing mount.

Specifications: Overall length, including sunshade furnished with lens: 4 15/16". Without sunshade: 4 2/16". Barrel diameter: 1 10/16".

Prices: 105 mm. Triplan f:2/8: $106.00; 1:4.5: $76.00.

Product: Leica Gun.

Manufacturer: E. Leitz, Wetzlar, Germany.

Distributor: E. Leitz, Inc., 730 Fifth Avenue, New York, N. Y.

General Description: Provides sportsman, naturalist and newsman with a compact outfit for using a long focus lens without the necessity of employing a tripod. As illustrated it is a completely designed unit, not just a camera mounted on a gun barrel. Focusing is accomplished on the ground glass of the mirror reflex housing, the image corrected, horizontally and vertically by the second mirror, being led back to the eye by means of the telescopic sight so that it is right side up and correct as to left to right. Lens is focused as usual by the lens barrel. Rifle stock has a pistol grip and two triggers. Forward trigger releases the shutter, making the exposure, while the rear trigger, connected with the camera take up by means of a ratchet, winds the shutter and brings a fresh section of film into position. This allows for rapid action as fast as it is possible to pull the triggers. Hands do not leave the natural position at any time, left hand being used for focusing, while right

Above and below are views of the Duplex camera with 400 ft. bi-pack magazines and wild motor unit. The top view shows the drive arrangement of the magazines and the adjustable brakes on the other spools. The hand dissolve lever and dial showing degrees of shutter opening from 0 to 220 is shown in the top view, located above the hand crank and just to the right of the wild motor control unit. The focusing telescope, which is visible in all the pictures on this page, is of a new design. With this type, no racking over of the camera, nor shifting of the gate, aperture or lens position, is necessary. The correct image is reflected by means of prisms, so that the cameraman sees the image right side up and magnified six times. A small lever on screw camera door operates the device, which is the preferred method for focusing.

In this view the gate assembly has been taken out by removing the thumbscrews. The aperture plate now may be easily cleaned, also the gate assembly, pilot pin etc. This shot at the magazine removed which is accomplished by loosening the clamping screws. The job of keeping this camera in perfectly clean condition and of changing magazines is rapidly and easily done.
About to be put on the market is this new Leica gun for telephoto photography, shown in long shots and closeups. Easily detachable for reloading, it features right side up focusing through a telescopic sight at top. Front trigger makes the exposure, while rear trigger winds shutter and moves film, allowing for rapid action photography. Lens is focused with left hand with the barrel as customary. The gun outfit weighs 8½ lbs. Lens shown in the Leitz 200 mm. Telyt.

makes exposure and rewinds shutter. For reloading, the camera is easily dis-assembled by means of two knurled screws. When these are released, the entire assembly of lens, camera, reflex housing and viewfinder, comes off the gun stock in one unit.

SPECIFICATIONS: The gun weighs 8½ pounds, and can be held easily at shoulder level. It makes use of the Leitz 200 mm. Telyt lens.

Price: Still to be determined.
Product: Balsley & Phillips 16 mm. Sound System.
Distributor: Direct.
General Description: This sound system was engineered and developed so that owners of 16 mm. silent projection equipment would be able to salvage their investment in the silent equipment and convert it to up-to-date sound at a nominal cost. Addition of the sound system also includes a complete overhauling and reconditioning of the equipment with no extra charge, except replacement parts at cost. The Balsley & Phillips system is manufactured under Western Electric and A. T. & T. patents and is the only equipment

Right and left side views of an Ampro silent projection machine after it has been reconditioned and adapted to modern type sound projection with the new Balsley & Phillips system, specially engineered to salvage good silent equipment for sound use.
Camera

Gable Becomes Newsreeler

MGM star works with “News of the World” staff under IA permit to gather firsthand material for role in new picture.

The newsreel cameramen cover Florida fashion pageants, Washington politicians, flood disasters, riots and war atrocities with the same fundamental approach: “Get the news in the can and rush it to the boss.” They are emotionally closer to the gentlemen of the press than to the latter photographic brethren of the show business. Competent technicians they must be, else they would not procure as daily routine so many noteworthy photographic records of events, yet they are essentially reportorially minded. They are trained to get to the meat and the punch of the story and get it on the film, and to get it regardless of the hazards.

The spectacular doings recently of several distinguished members of Local 659 in the newsreel field made front page history throughout the world and it was inevitable that the raw drama of such incidents soon would be shaped into motion picture form. MGM studio will feature Clark Gable, who is not a stranger to newsy roles, in such a feature, “Too Hot to Handle,” and it was my pleasure to present the star with a working permit in our local so that he might get first-hand study under actual working conditions of the newsreelers’ psychology and mannerisms to guide him in an accurate portrayal.

JOAN CRAWFORD, top-ranking MGM star, photographed in a strikingly lighted pose by George Hurrell, ace portraitist member of Local 659, IATSE, and a contributing editor to INTERNATIONAL PHOTOGRAPHER.

In order to learn how the news of the day is captured for the screen, Gable is spending a number of days with Joe Hubbell, the Pacific Coast manager for News of the Day and cameramen Sam Greenwald and Roy Kluver. Under the guidance of veteran Hubbell, who was one of the first newsreel cameramen in the business, and two of his proteges, Greenwald and Kluver, Gable is to have a real opportunity to work with newsreel men in action.

The writer had the opportunity of discussing with Gable his reaction to his part in the picture and what his opinion was of a newsreel cameraman’s life. He welcomed the opportunity and thought the work of the newsreel cameraman was one of thrill and adventure, to be envied by many. Gable is seriously intent on doing a good deal of research in connection with this part and I feel sure that this portrayal on the screen should give us a true characterization of what the newsreel cameraman is, how he lives, what there is about his work that urges him to continue to be a one-man show, for that essentially is his status.

It is a certainty that Gable will conclude his experience with the newsreel boys with a much greater respect for their unusual combinations of initiative, tact, technical skill and ability to handle photography and people under varied and often, adverse conditions.

CLARK GABLE, who’ll star in “Too Hot to Handle,” newsreel picture, for MGM, gets working permit in Local 659, so he can study for role under actual work conditions, from Herbert Aller, secretary of the International Alliance local, and managing editor of International Photographer.

For the newsreelers handle every assignment as part of the daily routine and they must handle each one well. To them every assignment is an interesting new experience and any incident with human interest means news. The burden of deciding what should be shown on the screen and what must
stay on the cutting room floor is left to the editors.

This determination to get the news on film is best illustrated in the coverage of current war activities. Only a small part of the actual horrors of war, recorded by the camera, has been shown to theatre patrons, because of the restrictions imposed by good taste and fear of shock to more sensitive natures from the astounding scenes. Beginning with the Ethiopia-Italian war, followed by the Spanish civil war, and culminating in the terrific Sino-Japanese struggle, newsreel men were on the job.

Many of the scenes shown, though newsworthy and instructive, were of a shocking and repulsive nature, and there is no question but that they were obtained with great danger by the intrepid photographers. Much material also was eliminated because basic news-reel policy calls for a rigid attempt to try and tell the straight news with no partiality of any sort.

Unquestionably, the most sensational news story of the newsreel men in recent years was the spectacular job done by Norman Alley of Universal and Eric Mayell of Fox-Movietone, when they were aboard the now world famous Panay. Disregarding their personal safety, concentrating on doing the job in hand well, they ably took pictures of an incident that shocked the world, illustrating how the Panay was bombed, fired upon, what occurred during the bombardment, the scramble to shore, how the victims fled for safety, tramping through the marshes and swamps. During this trip the rolls of negative on which they were grading assumed international importance.

These newsreel men know no fear, or if they did, they didn’t let it interfere with their work. They had a job that must be done and I sincerely believe that most of them have the same attitude—adventure and thrills mean little to them—absorption in their work. They can find as much excitement in peaceful scenes, photographing sports events, competing for news scoops in safer fields. In fact, the Panay incident was marked by a great scoop being tossed aside because of professional loyalty and the mutual promise of two brother IA members.

Norman Alley’s fine gesture in guarding the film of another newsreel company while in shipment from Shanghai to the U. S. A. was a splendid example of how a pact between two brother newsreel cameramen is carried out despite the fact that the men are competing against each other. When the bombardment commenced, neither Eric Mayell nor Norman Alley knew who would come out alive, but being fellow workers and loyal to each other, an understanding was made and when circumstances developed as they did, Alley carried out his promise in fine sportsmanship style.

In talking with Joe Rucker, who had just returned from Shanghai and is the same newsreeler who achieved world recognition with Byrd’s first Antarctic Expedition, I put this question to him in a straightforward fashion: “Joe is there anything more to being a newsreel cameraman that keeps you there besides the thrill and adventure?”

In his usual modest manner Joe smiled and said, “There is a certain satisfaction in being your own boss. Photography is my life work, but the newsreel cameraman has an opportunity to do more than just photograph a picture. He directs it. He arranges all the contacts. He interviews the people, discusses the phases to be photographed and even, in many instances, goes so far as to edit the entire picture photographed by him.”

“You see, Herb,” he said, “newsreel cameramen are in reality a one-man studio. Everyday there is something new on the horizon, different people, different countries. It’s like reading a different book every day yet a book written to always hold your interest and leave you with an everlasting impression.”

Joe Hubbell, Pacific Coast manager for “News of the World,” under whose direction Clark Gable will learn the tricks of the newsreel photographers daily routine.

**New Aerial Lens**

Bausch & Lomb’s Metrogon permits plane photographers to fly much lower and capture much more detail.

A new photographic lens, called the Metrogon, which enables a single photographer taken straight down from an airplane to show three times as much...
area as has previously been possible from the same altitude, was demonstrated last month by engineers of the Bausch & Lomb Optical Co. at Rochester.

Previously it has been necessary to fly higher in order to cover more ground but haze and other factors introduced by high altitude have reduced sharpness and accuracy in aerial mapping. With the new Metrogon fitted to the camera, a plane can photograph three times as much ground without flying any higher or farther than has been necessary with the average lens previously used.

While lenses covering wide angles are not new, the combination of very wide angle with sharpness and freedom from distortion at the relatively high speed of f:6.3 is regarded as an optical achievement. The Metrogon covers 90° of field and has a focal length of 5\(\frac{1}{4}\)".

So clear is the definition it gives that a photograph made from a height of one mile can show separate railroad ties anywhere within a two-mile circle beneath the plane. The fineness of detail which the new lens can record at the center of the picture is limited only by the graininess of plates and films.

Standing under a warning sign that assumed new ominous significance recently in China are the Local 659 "Three Musketeers," whose newsreel work during the Sino-Japanese conflict made front page history and prompted MGM's new feature starring Clark Gable. Left to right: Joe Rucker of Paramount, Norman Alley of Universal, Eric Mayell of Fox-Movietone.

MARSHALL ON COLOR AIR FEATURE

Ace aerial photographer assigned to William Wellman's Paramount epic in Technicolor, "Men with Wings."

Charles A. Marshall, ace Hollywood air photographer, now is with Paramount, shooting aerial sequences for the company's spectacular air epic in Technicolor, "Men with Wings," which William Wellman, who made the successful silent air film, "Wings," is directing. The picture is slated as one of the most important on Paramount's program.

Aerial photography in color for important productions is just being mastered as the larger Technicolor camera presents a number of difficulties that the technicians are just surmounting. The first important air scene in a big picture in color was as recent as the sequence in Selznick International's "Nothing Sacred."

While making the first flight for the Paramount picture, Marshall had a special wind shield designed to break the force of the slip-stream off the big
Technicolor camera, and it almost resulted in tragedy. The device worked well enough for what it was intended, in fact, too well. It disturbed the slipstream to an extent that it set up terrific flutter on the plane's tail surfaces.

To save himself and the pilot from disaster, to prevent the tail from virtually vibrating off the ship, and to make it possible for the pilot to control landing the ship, Marshall was forced to smash the shield out with his hands while the plane careened at a height of 5000 feet. Both men spent some uncomfortable moments until he broke it loose. Marshall received a badly lacerated hand.

Marshall was a pilot in the Army Air Service during the World War and handles a camera in the air with the same technique and accuracy as the average top-flight cameraman does in a sound stage. He just finished considerable air work on MGM's "Test Pilot," during which it was necessary for him to work at a speed of 180 miles per hour 50 to 75 feet off the ground in shooting the very fast backgrounds for the thrilling air race sequence in this production. At that speed in an open cockpit ship working under the physical handicap of a 250 miles-per-hour slipstream; it was with great difficulty that he obtained the backgrounds going around the Bendix Pylon where it was necessary for him to tilt the camera up in synchronized motion as pilot Paul Mantz banked up 60 to 90 degrees in rounding the pylons.

While Ray June, first cameraman, was doing the interiors and some air shots, Marshall was in the air completing many sequences, working from Union Air Terminal, Metropolitan Airport, Santa Ana, San Diego, and March Field. MGM assigns Marshall to do practically all their air work. Numbered among his previous productions at that studio are; "Hell Divers," "West Point of the Air," "Night Flight," "Today We Live," "Hell Below," "Flying Fleet," and "Test Pilot."

New Kalart Clips

Synchronizer concern supplying new clip and improved protective packaging.

The Kalart Company has a new reflector clip now in production and are enclosing it without charge with their

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**The CINEMATOGRAPHER'S BOOK OF TABLES**

By Fred Westerberg

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### MAZDA LAMPS FOR PORTABLE PROJECTORS

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### EFFECT OF CHANGE IN VOLTAGE

#### MAZDA LAMPS

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### EFFECT OF CHANGE IN SOCKET VOLTAGE ON LIGHT, LIFE AND WATTAGE OF GAS-FILLED MAZDA LAMPS

#### 115 VOLT LAMPS

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#### 120 VOLT LAMPS

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<tr>
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<td>56.7</td>
<td>1,280</td>
<td>77.9</td>
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Data by General Electric Co.
A superb instrument by which the utmost in 16 mm. sound projection is realized

ADD hearing to seeing, and 16 mm. showings take on new life, new fascination.

Do it so well that the audience is kept completely unaware of the mechanism, and the illusion of reality becomes complete. This is the achievement of Sound Kodascope Special—the finest 16 mm. sound projector.

The men who created Sound Kodascope Special were told to produce the finest possible 16 mm. sound projector, regardless of cost. The highest excellence was their sole consideration. Radically different, totally new is the result of their work.

CERTAINLY you will want to see and hear this remarkable projector at the earliest opportunity. Your dealer may already have Sound Kodascope Special to show you. But if not, drop a line to the Eastman Kodak Company, Rochester, N. Y. Literature will be sent to you at once and information concerning the address of the nearest Ciné-Kodak dealer ready to exhibit the perfection in 16 mm. sound projection represented by Sound Kodascope Special.

EASTMAN KODAK COMPANY, ROCHESTER, N. Y.
NEWLY PROMOTED to chief of Castle Films camera department is John A. LaPanne, veteran IATSE member, shown above in a Leica shot made by Jimmy Murray, member of Local 659, IATSE, who assisted LaPanne on production of advertising films for Sunkist and Southern Pacific during recent months. The Castle organization produces both home movies and commercial films and has branches throughout the country. Castle’s new camera chief was impressed with the cooperation and efficiency of IATSE technicians in the west during his visit, and was particularly appreciative of the cooperation extended by Herbert Allen and members of Local 659.

$13.50 Micromatic Speed Flash, as well as with the $11.25 Speed Flash. The company has also redesigned the container in which they send out the Micromatic Flashes. The new style is of sturdy construction and features partitions to keep the reflector, battery case and synchronizer from damage during transportation.

Another new Kalart development is an arrangement with the Hughes-Owens Co., Ltd., of Montreal, distributors for Carl Zeiss, in Canada, to distribute and install the Kalart line in the Dominion. The company has branches in Winnipeg, Toronto and Ottawa. This setup will eliminate much red tape Canada camera owners had to undergo in shipping their foreign made cameras, in for installation of accessories.

VETERAN HAIR STYLIST is Sylvia Wacker Berkeley, member of Local 724, IATSE, and a leader in the Motion Picture Hair Stylists Guild, shown above with Ann Dvorak. Miss Wacker is widely known in the studios for her own special process of applying liquid gold to dark hair to allow the photographer to bring out highlights. Made to a secret formula, the liquid gold is applied carefully with a small brush.

translated

means...

"One picture is worth ten thousand words"

(old Chinese Proverb)

try it... in your advertising

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FINE grain, solver of many a photographic problem, has finally overcome the problem of duplicating. Eastman Fine Grain Duplicating Films are capable of making "dupes" that cannot be distinguished from originals. Now the original in the laboratory and the duplicate in the vault can be actually equal in quality. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN Fine-Grain
Duplicating Films
Perennial favorite and consistently a steady draw at the world’s box-offices is the peculiarly American film product, the western, known also as the horse opera. These action pictures are typical of the feeling for dramatic punch that distinguishes the Hollywood product, and despite the lowly regard in which they are held by many of the cinema intelligentsia, they frequently afford fine moments of photographic and motion picture values, which might be and often are emulated in the more expensive pictures.

Some of the ablest photographers in the industry, and scores of assistant and second cameramen, who are trained and experienced in the particular problems of such productions, are engaged almost wholly in western and outdoor productions. And they play important roles in churning out the vehicles for such favorites with the western fans as Buck Jones, Gene Autry, Bill Boyd, Bob Steele, John Wayne, George O’Brien, Tom Keane, Dick Foran, Johnny Mack Brown, and other horse opera heroes.

Prominent among these members of Local 659 are Harry Neuman, Archie Stout, Gus Peterson, Allen G. Thompson, Russel Harlan, George Meehen, Paul Ivano and Jack Marta, while such able stillmen as Milt Gold, Earl Crowley, Don McKenzie and Warner Crosby are regularly turning out many beautiful and colorful shots of action scenes and beautiful exteriors.

The spirit of adventure that is an essential ingredient of the western pictures, however, has in the past few years spread over into the more expensive productions and there generally is reflected among production executives a keen realization of the need for broad.
The colorful action shots in the top strip of Buck Jones, Columbia western star, hitting a stiff pace along a desert trail, were made with a Speed Graphic by Milt Gold from speeding camera car, as illustrated in picture at right. On opposite page is a spectacular action shot of Gene Autry, Republic's popular singing horse-opera hero, photographed by Warner Crosby. The picture below of Bill Boyd, who stars in Harry Sherman's "Hopalong Cassidy" series for Paramount release, was snapped by Don McKenzie; while the shot of Lou Gehrig, New York Yankee's famed first baseman and hero of many youngsters, who invaded the western lead ranks recently for Grand National, was made by Fred Morgan. In the picture with Gehrig is Allen I. Thompson, veteran member of Local 659, and one of the ace photographers of westerns. All the still photographs are by members of Local 659, IATSE.
romantic, sweeping stories, frequently of a historical nature as relief from the stagier and more sophisticated type of drama.

Consequently, we find the spirit of the horse opera blazing lustily in big time productions, which on first glance might not seem to have so much in common, pictures such as "Marco Polo," "The Plainsman," "The Buccaneers," "Wells Fargo," "In Old Chicago," "Robin Hood," "Gold Is Where You Find It" and "Fengal Lancers."

This same feeling for the broadly romantic type of story with plenty of action and spectacular outdoor effects, also is reflected in current trends to aviation stories, and in another direction is taking up the U. S. Civil War again as a theme because of the tremendous public interest aroused by "Gone with the Wind."

The westerns, in other words, are not only the bread-and-butter product of the independent producers, but their continued and persistent success in spite of frequently recurring predictions that "the day of the horse opera is about over," emphasizes that they typify a type of bold, exciting entertainment of which audiences will never tire, whether turned out on regular schedule by the producers who specialize in horse opera, or dressed up with fancy production values and more subtle story treatment as smashing spectacles.

Despite their broad popular appeal, however, much credit for the continued box-office success of the better western pictures is due to the producers, directors, writers and the many technician members of the International Alliance, who specialize in this field, to constantly improve their product and keep one step ahead of public demand.

HERBERT ALLER.

Disney Multiplane Camera

Technical details of new technique which solved problems of adapting cartoon production to feature length.

Probably no development in cinema-camera practice recently has provoked as much discussion as the new multiplane camera with which Walt Disney's organization was able to overcome the handicaps of cartoon picture production in satisfactorily for the first full-length cartoon feature, "Snow White and the Seven Dwarfs." The new technique for animation production with this camera combines precise mathematical control with much greater elasticity of action and photographic effects. Many tricky obstacles were surmounted by the Disney organization in devising a workable camera to fit the specifications they had set for themselves.

The following description of the Disney camera is technical enough to satisfy the demand of experts for information about this new technique, while still readily understandable by those with only average information on the photographic processes.

The Mechanical Construction

The camera crane itself consists of four vertical columns. This camera carriage is provided with four spur gears located in the extreme corners of the carriage. These engage the racks on the four columns, thus enabling the camera carriage to be raised and lowered on the four vertical columns by means of a mechanical arrangement of gears. The camera carriage is counter-weighted at its four corners with the actual counter-weights suspended within each of the hollow columns. Sheaves are provided at the top of each column, through which is passed the cable which connects the camera carriage with the counter-weight itself.

In the camera carriage is incorporated a platform on which the photographing camera is positioned. The camera platform is further mounted on dove-tails which permit a transverse movement of the platform. These dovetails are in turn assembled to another set of dove-tails which permits a lateral movement of the platform. Between the camera platform and the first set of dove-tails is a flanged ring with roller bearings, which permits the camera platform to be rotated through an arc of 360 degrees. This is designed so that the center of rotation of the platform is coincident with the optical axis of the camera lens when the camera is in the photographing position. Every movement described is calibrated in terms which are correlated to the studio's particular production technique, so that requirements during actual photography may be anticipated and plotted with a high degree of accuracy, and by the same means it is possible, at any time, to repeat and re-establish any given set of conditions.

The camera platform is further provided with a synchronous driving motor, a new departure transistor for producing variable speeds of exposure, a Hilliard clutch electrically operated to enable exposing of one frame of film at a time, and a set of reversing motors to enable driving the camera forward or backward. The platform is further equipped with a Selsyn Interlocked Motor, which is used in the drive of the control mechanism, which will be described later.

In addition to the camera carriage itself, several other elements may be installed between the four columns, and these elements carry the various components which go to make up the cartoon picture. There are two general classifications; one known as the action element planes, and the other as a background plane. These planes are so designed that they may be removed at will from the camera crane. They are also provided individually with spur gears which engage the vertical racks on the columns, thus making possible, through a suitable gear mechanism, to move the planes vertically to any desired vertical position on the four columns.

The action planes contain all the elements of a standard cartoon photographing table in that movable top and bottom peg bars are provided, as well as a movable background plate. This action plane is also provided with a platen which is operated by means of compressed air. The action planes also are equipped with their individual lighting equipment.

The background planes are somewhat simpler in construction in that they provide a means of holding sheets of glass which can be moved from east to west and in the same manner as described for the action planes, and also may be raised or lowered, while the vertical columns. The background planes also carry their own individual lighting equipment. As in the case of the camera carriage all the movable elements of both the action planes and the background planes are calibrated.

With this device has been accomplished an improvement in photographic technique in that normal background can be broken up into several elements, to-wit: A foreground element, a middle-ground element, and a background element. With this breakdown of the background into several elements, and due to the fact that they are separated and at different positions from the camera, there is a control of illumination on each element, which was not possible before. Also there is further control of the depth of focus of the photographing lens and, therefore, the studio can produce soft focus effects.
Complicated equipment necessary for modern cartoon film production is clearly illustrated in this shot of the Walt Disney multiplane camera, used for the production of the first feature length cartoon, "Snow White and the Seven Dwarfs."

The foregoing improvements are also possible on a still scene. With the use of a pan shot, we can produce a very marked and realistic three-dimensional effect. With our present day technique, when a pan shot is attempted, the foreground and the sky move at exactly the same rate of speed, which is contrary to all laws of nature. With this new camera set-up, it is possible, by breaking down the background into various elements, to cause the illusion of the foreground portions of the composition to move concurrently with the character and the intermediate and distant background elements to move at a very much slower speed, such speed being determined by the correct perspective relationship of the elements depicted by the artist.

Control Equipment

Due to the fact that in the normal operation of this camera, the services of one to six operators may be required, and their efforts must be coordinated, and the possibility of human error eliminated, there has been provided all the controlled indices with special illuminating lamps. While the operator is preparing his various controls for photography, these lamps permit him to read the indications on the various control counters. When he has set all his controls, he pushes a button, conveniently located on his particular plane, which turns out these lights, making it impossible for him to read his counter settings. When he pushes this button, he trips a specially designed relay which cuts out the illumination of his indices and places the electrical circuit in such a condition that when all the planes have thus functioned, then, and only then, can the master operator trip the camera.

These special relays are connected by a series method so that all the relays from the various planes in operation must be closed before the master operator can energize the electrical mechanism which trips the camera. When the exposure is completed to the master operator's satisfaction, he pushes another button which restores all the planes simultaneously, so that the individual operators may proceed with the establishment of setting for the next exposure.

In view of the detailed manipulation for the multiplane technique, it has been found necessary to work with a master control sheet, which has on it which would be impossible under the standard system of photography, and would be extremely difficult to paint or to create by any artistic medium. Further, in the case of a perambulator shot, by causing the background to move concurrently with the camera carriage, is produced the effect of trucking up on the foreground elements and, while at the same time, maintaining the same perspective relationship of the background elements as would be the case in real life.

For example: Were we to have a character in the foreground, with a moon in the background, and it is our desire to truck up on the character, in the normal technique the moon would enlarge on the screen at the same rate as the character does. With this new camera we can maintain the character at a constant position on the camera crane, and as we move the camera carriage down to stimulate a truck up, we can move the moon background simultaneously with the camera, maintaining its distance to the camera constant while we reduce the distance between the camera and the character, thus creating a very normal and accurate condition.
the settings for each plane for each successive operation. It is made out in duplicate. The duplicate sheet is split up and the portion carrying the camera carriage instructions is given to the camera operator; the portion carrying the instructions covering plane “A” is given to the operator of plane “A,” and so on, and the original master is placed on a master control board immediately in front of the master control operator.

In order to eliminate errors on the part of the master operator in knowing at just what exposure he is working, a Selsyn Interlocked Motor has been incorporated in the camera mechanism. The second Selsyn motor is incorporated in the master control board. The second motor operates a glass ruler device and indicates to the control operator just what exposure he is working on. In other words, when a new control sheet is placed on the board, the glass ruler is returned to the first exposure, the interlocking motors are energized and this master ruler is driven by the camera, regardless of whether the camera moves forward or backward, so that there is no opportunity, except in the case of electrical failure, for the master control operator to go wrong.

In view of the fact that the Disney studio is using projection type lamps, and for the Technicolor process it is required that they be burned over voltage, their life is necessarily short. To circumvent this condition, they have arranged an electrical circuit which introduces a resistance in the main line of the illumination source, and reduces the voltage on these lamps to around 85 to 90 volts during the time that changes and camera set-ups are being made. Immediately before the camera is ready to make the exposure, this resistance is cut out; the lamps are brought up to correct voltage; the exposure is made; and immediately following the exposure, the resistance is cut into the circuit again.

In order to further increase the life of the bulbs, as well as to reduce the heat element in the area of the camera, it was necessary to incorporate suction air flow at the back of the lamp house. This equipment was designed to give one change of air per second in the lamp house, and has been quite successful in increasing the useful life of the lamp, besides removing practically all heat conduction through the lamp house. It has the added advantage of keeping the area within the camera clear of dust and other foreign particles which are suspended in the air.

Light Measuring Device

In the development and design of the light sources used on this camera, it was necessary to develop special photometric equipment due to the acute angle of the light source to the photographed area, which averages about 27 degrees.
None of the commercial photometric devices were satisfactory. The device perfected for this particular function contained a caesium photoelectric cell in a vacuum tube volt meter circuit. This photo cell was mounted so that its cathode looked at a small disc of heavily ground glass which was suspended about 5 inches below the photo cell itself. The glass disc is held in position by means of a piece of glass tubing about 2 inches in length, the glass disc being centered at the bottom of the glass tube. The glass tubing is suspended in a piece of brass tubing about 3 inches in length, interior of which is entirely opaqued and rendered non-reflecting.

The photo cell and tube are suspended by means of a double trunnion of a design similar to that used in the suspension of a ship's compass. The outer pair of trunnions in this device are established in a ring, and in this ring are set three posts so that the ground glass disc is suspended about one-quarter inch above the illuminated surface to be measured, and the three supporting legs are so positioned as not to cast any shadows on the ground glass disc. This device permits very accurate measurement of the perpendicular light which represents the useful photographic light. It was necessary to go to this device in order that the reflected surface remain absolutely horizontal at all times because a slight deviation from the level would cause a wide discrepancy in measurements. It is useful only in the setting of an over-all illumination, and is impractical for the establishment of light levels for the actual photography.

The View Finder

In view of the many elements that go to make up a single exposure on a camera of this kind, it was found necessary to be able to maintain a visual check on the progress of the work. The usual parallax camera finders were useless. It was necessary that the view finder coincide exactly with the optical axis of the photographing lens. This can be done, of course, by racking over a camera of the Mitchell type, but such was not practical. Therefore, a view finder was devised which followed in general idea a periscope.

A reflecting prism was established immediately below the photographing lens and, through a series of other prisms, produced an image on ground glass as the camera lens would see it at a remote point. The reflected prism immediately below the camera lens was arranged so as to move out of the optical path of the camera lens immediately prior to the actual exposure of the camera. This is the same principle as employed in the Graflex camera, and immediately upon the completion of the exposure, the prism returns into position.
Cooperative Job Ahead

Projection practice must advance and modernize to handle properly latest type productions as typified by Walt Disney's "Snow White" feature.

Walt Disney's "Snow White and the Seven Dwarfs" is in the forefront of the campaign to improve the coordination between the technical facilities now available to the studios and the present state of affairs in projection practice. Everything possible has been done in the way of making this first feature length color cartoon the most modern and satisfying presentation that money and technical skill and application could produce, with special cooperation from the Technicolor company.

It was necessary to create special new equipment, including the multiplane camera (technical details of which are presented for the first time in the Camera Section of this issue of International Photographer): new equipment and recording methods to reproduce sound that would be pleasing and natural; and softer lighting and more subdued coloring to prevent any possibility of eye strain and resultant fatigue in witnessing the picture.

What will happen to a production of this type when it reaches the theaters depends upon two factors: the equipment and the projectionists. We are certain that IATSE operators throughout the country will bend every sincere effort to accord this picture as close to its potentialities as they can; and we hope that they and the picture will benefit from the tips in this article.

However, as many projectionists will agree, particularly after a study of the accompanying data on the equipment and technique used at the Carthay Circle theater in Los Angeles for "Snow White," there is a great preponderance of projection equipment throughout the country that is not modern enough to fully utilize the fullest values of the superior technical qualities now being put into our pictures in the studios.

This situation is a major proposition with the film industry today, to the extent that a coordinated campaign is being evolved to bring projection up to a par with modern sound recording. It is a program in which the studio technical leaders, the equipment manufacturers, the Academy Research Council, the Society of Motion Picture Engineers and the International Alliance of Theatrical Stage Employees, whose members, especially in the theaters, are charged with so much of the actual responsibilities for projection quality; all are playing cooperative and effective parts.

This program calls for a hand-in-hand campaign to improve and modernize existing projection equipment and to widely disseminate the best and most authoritative information from the studios and the manufacturers. International Photographer, as the official technical spokesman for the International Alliance in the studios, will join

Projection Tables

It is a pleasure to herald the full recovery from a serious pneumonia attack of International Photographer's contributor on projection affairs, Paul R. Cramer, member of Local 150, IATSE, with his interesting stories on Walt Disney's "Snow White and the Seven Dwarfs" and the Disney multiplex camera in the current issue. With this timely resumption of projection news, International Photographer plans an expansion of this department as outlined in Mr. Cramer's accompanying article. At the same time we are delighted to announce the early bow-in of another important regular contributor in William Comyns, well known to projectionists in Southern California as director of operators' local night schools, a national authority in the electrical field and a valued member of the staffs of the California state and Los Angeles city school boards. Mr. Comyns joins Fred Westerberg, B. K. Allison and J. S. A. Hawkins, authors of International Photographer's current Cinematography, Laboratory and Sound tables, with a new series of practical and important tables for the projectionist.

We feel that the signal success of Fred Westerberg's "Cinematographer's Book of Tables," soon to go into a second edition, and the interested reception accorded the Allison and Hawkins tables since their start several months ago, will be well-matched by Mr. Comyns contribution. His tables, and those of Allison and Hawkins, will eventually be published in handy pocket form similar to the Westerberg book. Mr. Comyns also will contribute from time to time, pertinent articles on projection, sound and allied electrical angles of show business.
whole-heartedly in doing everything possible to further this constructive program, and we have assured all leaders on various fronts of the campaign that our space and assistance are readily available.

In addition to articles such as the following, a program of news coverage is being worked out so that projectionists will be informed of the new advances in equipment and technique as they are being tested and developed at the studios; and in cooperation with the leading manufacturers, most of whom currently are making important changes and improvements in their product, a series of well-illustrated articles will cover the hot news of developments in the equipment field.

Another welcome feature in this connection will be the addition to our regular contributors of William Comyns, whose authoritative voice on projection and electrical matters is well-known to Southern California members of the International Alliance.

The following information on "Snow White" was developed with the helpful cooperation of the Walt Disney and RKO-Radio staffs, Gerald Rackett of Technicolor and the projection staff of the Carthay Circle.

All the latest developments in sound were incorporated in the recording of "Snow White." In fact, the sound track represents a very faithful recording of the original orchestra. The characteristics of each instrument were preserved with remarkable fidelity.

The picture was recorded with the ultra-violet system. The sound stage was especially treated with the latest processes in acoustics which greatly improved the recorded quality of the music. The idea of a sound-proof stage was completely abandoned, and all acoustic absorption treatment removed from the walls and floors. This was done in order to be able to introduce reverberation in the recording of the music.

The stage was reconstructed with hardwood floors and with a solid hardwood back wall, splayed, in order to produce a minimum of echo and interference waves. The roof at the same end of the stage was also built up with hardwood paneling. The orchestra was placed immediately in front of this wall and under this part of the ceiling.

In the re-recording as many as eight sound tracks were recorded simultaneously. Much time and effort was spent with the laboratories to produce the finest sound quality in the prints used for this recording purpose.

In the actual recording, a first attempt was made to record about a 30-35 db volume range on the film without permitting any portion of it to be over-loaded. This required that, for best reproduction, the fader setting in a theatre be raised from 6 to 9 db above normal. With these conditions the dynamic range of the sound track produced excellent dramatic effects. However, it was realized that a great many theatres would hesitate to run a film of this character at a sufficiently high level. If the fader were raised 6 to 9 db to produce good sound level of the weaker passages, the smaller theatre equipments would not be able to take the fully modulated portions of the track without overloading the power amplifying system and possibly bringing about the destruction of the loud speaker units. In addition, raising the fader setting to this point also brought up the system noise, if present, to a disagreeable point.

The first recording of this picture was ideal from a dramatic point of view, but unfortunately, at least at the present time, it was not practical. Subsequently the picture was recorded with the volume range suppressed to about 20-25 db. Certain loud passages were allowed to overload about 3 db. This was a sacrifice to a slight degree on the over all sound quality and dynamic range, but necessary in order to service the maximum number of theatres with a minimum of objectionable features.

The volume range possible is definitely controlled by the inherent characteristics of the film plus the ever-present factors of dirt and system noise.

Considerable cooperation must be obtained from the projectionist in order to overcome these barriers with which studio sound technicians are faced. The ideal system of presenting a sound picture would be for the studios to record everything with a 100 per cent sound track. Cue sheets would then be supplied to the theatre, which would have specially trained operators sitting with a fader during the presentation of the show to raise and lower the volume in accordance with demands of the action on the screen as indicated by the cue sheet.

By such a system the ground noise factors would be negligible and if the cue sheets supplied by the studio were faithfully followed, a much finer presentation would result.

It is absolutely essential that before any theatre can render the present day sound recording satisfactorily they must have adequate amplifying equipment in order to handle the low frequency spectrum which gives vitality and feeling to music. This particular subject will be thoroughly discussed in subsequent issues of International Photographer.

It must always be kept in mind that for true sound reproduction, the sound emanating from the loud speaker must approximate the sound levels that would be heard if the same orchestra which recorded the music were playing in the theatre. A 70-piece orchestra may be

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used in the recording but when it is reproduced in the theatre with insufficient amplifying capacity, the result is that the faders are turned down and the audience hears something which might as well have been recorded by a ten-piece band. It is heartbreaking to spend good money and time on the recording of a good orchestra and the subsequent processing of the film, and to obtain a gratifying result with the studio equipment, only to hear this same music later in a local theatre reproduced at a level that you have to strain to hear the music. One sometimes wonders what kind of showmanship can be responsible for such presentation.

The case of color in “Snow White” parallels that of sound. During the making of the picture many months were spent in the selection of colors. Much expense went into the production of backgrounds. Considerable effort was spent in photographing the subjects in order that the efforts of the artists could be faithfully reproduced on the screen. The Disney technicians feel that under proper projection conditions they have accomplished this end, but how many audiences will see the result is another question. The proper rendition of a colored subject requires high quality projection equipment and special care on the part of the operator.

Following are a few of the essentials which, if employed, will give the audience the correct rendition of the color:

1. Fully colored corrected projection lenses should be used in order to insure sharp focus and proper color rendition.
2. The screen should be evenly illuminated with not less than 11 foot candles.
3. The arc trim should be maintained constantly and accurately during the projection of a colored picture and never permitted to go out of blue side. The light on the screen should be clean and white at all times.
4. At no time should color be run on a grandeur screen unless the projection equipment is so arranged as to maintain a light level value of 11 foot candles.
5. Correct the focus of the lens system when changing over from a black and white reel to a colored reel.
6. The screen should be well and evenly illuminated for improved projection. The density of the average Technicolor print is controlled to produce a satisfactory screen image, and is not as light as may be supposed from the preceding.
Four shots of the Carthay Circle theater projection equipment, with which Walt Disney's "Snow White and the Seven Dwarfs" was projected for its premiere run. This ultra-modern equipment is fully described in the accompanying article by Paul R. Cramer, Local 150, IATSE.

It might be assumed, from the foregoing and the illustration, that to thread this type of dummy would be a lengthy and tedious process, but such is not the case. It has been found that with a little practice it is possible to thread up the complete set of two films in a little more time than for one film, and it is not nearly as complicated as it sounds.

The shot at top right on Page 25 shows the central and master control station in the projection room of the Carthay Circle Theatre. There are five stations, two to the right and two to the left of this station. To let you in on what all the gadgets are I will start from the top and work down. First, you will notice a hand knob on the uppermost square box, just to the left of the port hole fire shutter. This knob controls the master selector switch. As you can see, it is marked RC for right center machine, RL for the right and left machines, and LC for the left and center machines. With this selector switch it is possible to run a picture on any one machine and the sound on any other machine; not that it has ever been necessary, but it is possible and quite practical. As will be noted, it is very handy for the projectionist at this station to change the sound,
while directly below this apparatus is the machine level, sometimes called the preset control.

With this type of control, as used with the RCA sound system, the projectionist can set the volume control on the amplifier panel board and cue the picture with the present control. This is practical only when your cues are within 20 db of normal. The preset control is set up in steps of 0.25; 5, 71/2; 10 either plus or minus. However, it is quite simple for one to raise or lower the volume control with the remote control buttons just below and to the left of this preset control. Notice the buttons that say raise or lower. Just a touch of these buttons will raise or lower the volume on the main amplifier, giving the projectionist complete control of the volume at all times. This was used quite a bit for Samuel Goldwyn's "Hurricane."

The volume of each machine can be preset so that when the sound change-over is made there is no last minute moving of the master volume control, and the sound change-over can be made with less than one db volume increase or decrease.

Sound reproduction at the Carthay Circle Theatre is accomplished by the regular methods used by RCA in all their P.G. 92 installations with alterations to render the system more flexible. These alterations in no way alter the principles of the standard RCA installation but rather increases its efficiency in that it allows the projectionist to select the frequency peaks to be cut off at any desired point and gives him the further choice of increasing the power output of his system to the horns. Perhaps the reader would better understand the sound system at the Carthay Circle if we outline the layout and discuss the component parts as we come to them. First, however, it should be understood that it is not the purpose of this paper to give a technical description of the equipment. This has been covered many times. We will only concern ourselves with its arrangement and operation.

The sound on film is picked up by the regular RCA M.I. 1070 push-pull or standard sound heads and connected to the input of the voltage amplifier M.I. 1237, thence to the power amplifier, net work, horn switches and then to the horns back stage. The amplification channel is set up in duplicate which, of course, provides security against delays in the show. This feature has proven itself to be a very worthwhile investment and reflects credit on the engineering department of the operating company for its farsightedness in providing this item of safety.

In the shot at lower left on Page 25, the arrangement of the amplifier rack may be seen. Each track is a complete sound channel. At the top may be seen the pilot lights which indicate the on or off position of the power supply units which are located elsewhere in the projection suite. Over the amplifier at the right are located the throwover switches which directs the output from any of the three projectors into either of the amplifier channels. Each channel has mounted directly under these switches the voltage amplifiers. Under the voltage amplifier on the rack on the left is mounted the radio input panel which permits the projectionist to play any broadcasted program over the theatre horns. This feature is never used, however, without the consent of the broadcast company and then only on special occasions such as a premiere when the opening program outside the theatre may be picked up from the air and played in the theatre. This panel is not in the rack on the right. Under this panel and opposite each other in each rack is the crossover network switches which enable the projectionist to alter the characteristics of the system so that the frequency response may be cut off at any predetermined point to best reproduce the subject being presented.

The next panel down on both racks contains the main A.C. switches for the amplifiers. These switches allow for the connection of both power amplifiers to either voltage amplifier employing the combined outputs of both power amplifiers. This will deliver one hundred and six watts as compared with fifty-three watts with one power amplifier. It is seldom necessary in this theatre to use more than the fifty-three watts normally delivered from either channel. However, this switching arrangement is well worth while and has proven itself to be practical. The illustration gives an excellent view of the racks and by following the foregoing description the reader should be able to obtain a fairly clear picture of its operation.

The final picture in the layout, lower right Page 25, shows the projection room of the Carthay Circle Theatre from another angle. On the left are set the three projection machines, while to the rear left is the largest preset type set of dimmer banks west of New York, that is located in the projection room. There are three rows of dimmers with fourteen dimmers in each row and three sets of preset switches on each dimmer. These dimmers are all run from remote control switches, one on each of the five control panels located on the front wall of the projection room, described in full in the account of the master control station illustrated at top on Page 25.

Just to the right of this dimmer bank is the general projection room switch-board, while to the right of that, at the extreme edge of the scene, is the door to the shop or work room, where also are located all of the fuses and relays of all the lighting circuits in the house.

Paul R. Cramer, Local 150, IATSE.

Patents

Last month the following patents of interest to readers of International Photographer were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and the switches which allow for the connection of both power amplifiers to either voltage amplifier employing the combined outputs of both power amplifiers. This will deliver one hundred and six watts as compared with fifty-three watts with one power amplifier. It is seldom necessary in this theatre to use more than the fifty-three watts normally delivered from either channel. However, this switching arrangement is well worth while and has proven itself to be practical. The illustration gives an excellent view of the racks and by following the foregoing description the reader should be able to obtain a fairly clear picture of its operation.

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Paul R. Cramer, Local 150, IATSE.
Lighting-Sets

Super Light Sought

MGM Electrical Chief follows path of Stanford U. scientists in experiments with ultra power light sources.

Spots of light so intense they rival the face of the sun, are the latest subjects for experiment by Hollywood's wizards of electricity. Intensive research into light higher in intensity than ever used before in any place outside a physics laboratory, is being conducted by Lou Kolb, chief electrical engineer at the Metro-Goldwyn-Mayer studios, in the hope of evolving a new light quality and speed for photography.

"High light from small points of origin," Kolb believes, "may mean intense light without a great deal of heat, thus making possible powerfully lit sets for color photography or for super-speed photography in interiors. Fast films so used are apt to lose photographic quality through not penetrating shadows, but with intense light, cool enough to be practical, speed plus absolute detail will be possible."

Kolb is experimenting with light sources which produce enormous amounts of light from a point of origin of very small area, such as a point hardly the size of a pinhead producing hundreds of candlepower. The studio experiments follow along the same lines as a series of research experiments that originated in the Stanford University laboratories, and recently were widely publicized.

The idea is still in an experimental stage, says Kolb, and he cannot predict

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yet to what extent it will be practical in studio work.

"Scenes like the great courtroom in 'Marie Antoinette'," he points out, "have to be so intensely lighted that the heat becomes oppressive, and doors have to be opened and stages ventilated at frequent intervals. The same is true in the opera house set of that picture. Similar intense lighting marked the Monterey fiesta sequence in 'The Girl of the Golden West'.

"Hollywood has for years been seeking a light that would furnish actinic illumination with a minimum of heat. The idea of intense light from small origin points should solve this question, as much of the heat generated would be dissipated in the air about the source of light, leaving comparatively cold rays where the light falls on the photographic object."

A high-intensity electric current, says Kolb, would be used but under rigid control. Laboratory tests now are being made to determine whether the ideas developed in the university laboratory may be practically adapted for motion picture production.

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**Laboratory**

**Water Lab Table**

Current Allison table covers system of chemical analysis to insure accurate control over water used in lab. This month's Laboratory Table deals with the analysis of water. The importance of obtaining and maintaining the supply of pure water to the processing laboratory is thoroughly realized by film laboratory superintendents and film technicians. The accompanying table with its system of chemical analysis, as prepared by D. K. Allison, Interna-

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**The LABORATORY BOOK of TABLES**

By D. K. Allison

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**ANALYSIS OF WATER**

<table>
<thead>
<tr>
<th>HARDNESS</th>
<th>pH</th>
<th>TOTAL ALKALINITY</th>
<th>CHLORIDE</th>
<th>TOTAL SOLIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take two 50.0 ml. samples. Treat one according to Procedure 1; other by Procedure 2.</td>
<td>Determine pH, using Bio, or Industrial Model Allison pH Meter.</td>
<td>Take 50.0 ml. sample. Add 10 drops Methyl Orange Solution. Titrate with 0.02N HSO₄ to first pink coloration.</td>
<td>Take solution from &quot;total alkalinity&quot; determination. Add 1 ml. Soln L. Titrate with 0.10 NAgNO₃ to first pink coloration.</td>
<td>Evaporate 50.0 ml. sample to dryness in weighed beaker on water bath. Weight residue.</td>
</tr>
<tr>
<td>Procedure 1. Heat to boiling for 5 min. Cool. Titrate with Soln. K to first permanent lather. Record as &quot;Volume A&quot;.</td>
<td>Report as pH</td>
<td>Volume H₂SO₄ x</td>
<td>Volume Ag NO. x</td>
<td>Gms. Residue x</td>
</tr>
<tr>
<td>Volume A</td>
<td>x</td>
<td>20</td>
<td>7.1</td>
<td>0.02</td>
</tr>
<tr>
<td>p.p.m. CaCO₃ &quot;permanent hardness&quot;</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>p.p.m. CaCO₃ &quot;temporary hardness&quot;</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
</tr>
</tbody>
</table>

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**PREPARATION OF SPECIAL SOLUTIONS AND REAGENTS FOR WATER ANALYSIS**

| Solution H—8N HNO₃ | Solution K—Dissolve 10 gms. pure castile soap shavings in 700 ml. 60% ethanol. Filter. Standardize against CaCO₃. Adjust volume that 1 ml. = 1 mgm. CaCO₃. Determine volume Soln. K to produce permanent lather in 50.0 ml. distilled water. Subtract this figure from volumes A and B when making above calculations. | Solution L—50 gms. K₂CrO₇ per liter. | Solution M—0.865 gms. Fe(NH₃)₆(SO₄)₃·12 H₂O + 20 gms. H₂SO₄ per liter. |
| Solution L—50 gms. K₂CrO₇ per liter. | Solution M—0.865 gms. Fe(NH₃)₆(SO₄)₃·12 H₂O + 20 gms. H₂SO₄ per liter. | Methyl Orange Solution—1 gm. methyl orange per liter. | Methyl Orange Solution—1 gm. methyl orange per liter. |
| 0.10N AgNO₃—16.99 gms. AgNO₃ per liter. | 0.10N AgNO₃—16.99 gms. AgNO₃ per liter. | 3.02 N H₂SO₄—0.981 gms. H₂SO₄ per liter. | 3.10 N KSCN—10 gms. KSCN per liter. |
Multiple Toning

MGM Laboratory working toward greater elasticity and effectiveness from chemical toning and tinting processes.

Greater elasticity in the handling of toning and tinting now is being developed in MGM's laboratory by John Nickolaus and his staff, with the completion of the installation of the studio's new battery of toning machines. Possibilities of six or more different combinations of tints and tones for one film, based on a study of the emotional qualities sought for in various sequences in the picture, are now being checked up. Nickolaus and several directors are experimenting with various treatments and it is expected that the multiple toning may be first used along present modern lines in "Girl of the Golden West," starring Nelson Eddy and Jeannette MacDonald.

Greater richness of effects is also possible with combinations of tone and/or tint in a single sequence, now that the modern equipment installed is capable of handling the chemical toning efficiently and rapidly. Such effects would be obtained by chemical control so that certain shades of black and white with an affinity for one tone would be treated and those darker shades with affinity for another tone would get a different effect.

Nickolaus continues to insist that the toning revived at MGM, and since used by 20th Century-Fox, Columbia and Samuel Goldwyn, is not in any sense, nor was it ever intended to be, a substitute for color. Its sole purpose is to get away from the harsh coldness of straight black-and-white and create a pleasing but unobtrusive effect of rich photographic values. Samuel Goldwyn is reported to be highly pleased with the sepia toning job done by the MGM lab on his "Marco Polo."
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By J. N. A. Hawkins
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Attenuation Network Data

\[ Z_1 = 500 \text{ ohms} \]
\[ Z_2 = 200 \text{ ohms} \]

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Close-ups

By ED GIBBONS

International Photographer usually goes to press in time to appear around the 5th of the month, and generally holds open for as much late news as possible, hence it was planned to thoroughly cover the annual awards banquet of the Academy of Motion Picture Arts and Sciences, scheduled for March 3. The Southern California flood disaster caused postponement of the banquet for one week, and it was felt that it would be unwise to delay publication of the magazine until the middle of the month. Hence, awards news will appear in the April issue.

**Magazine Pic Credits**

The question of credits to still photographers on pictures emanating from Hollywood to the national magazines is being investigated by  HELENE ALLER, secretary of Local 659, IATSE, and managing editor of this publication. This is a sore spot with many studio photographers. A very cooperative disposition has been evidenced by such important publications as Life, which makes a particular effort to try and proportion credits properly. However, while some publications are not so inclined to extend the photographer due credit, the big problem lies with the studios. In many instances, the stamping of proper credits on the back of prints, which would be the easiest solution of the matter, is overlooked for one reason or another. It is to be hoped that this is a situation that will adjust itself through a cooperative spirit on the part of all concerned.

**Photoflash Interest**

SAMUEL ZAGET, partner in the KALART Co., who recently returned from his annual visit to the British Isles, reports that after years of indifference to flash photography, the English camera fans in recent months are becoming quite enthusiastic over its possibilities. Arrangements were made with the GEORGE H. POTTS of London to distribute KALART products for Great Britain and shortly after Mr. ZAGET's return, a hurry-up trans-Atlantic phone call was put in for a rush order of synchronizers.

**A Note of Warning**

From Henry J. HENNSBACH of C. P. GOERZ comes a memo that should be heeded by all photography fans. "Great care should be exercised by the buyer of second-hand used photo-lenses before parting with his money," says HENNSBACH. "Such lenses are apt to be out of adjustment through careless handling without this damage being evident to the casual observer. The prospective purchaser should be wary especially of English lenses which appear to be "new" and yet are offered at greatly reduced prices. Unless the buyer has the fullest confidence in the responsibility of the seller, he should make the purchase of a used lens subject to a check-up by the lens manufacturers for any possible defects in adjustment. We are certain that every reputable lens manufacturer will gladly do such checking up of his own product free or at a nominal charge."

**British Annual**

Photography Year Book, 1938, published by the British monthly journal Photography, reached us last month. It is an interesting and complete record of much outstanding photography of the past year, including a main section of pictorial and commercial photography, interesting highlights of trick photography, a section on applied photography, such as murals, photos, posters, show cards, display material, etc., and a representative section on photography in advertising art, classified by industries. More than 1600 prints were selected by the British journal from the thousands it received during the year. There are 575 names listed among the contributors. The introduction is in three languages, English, French and German, and contributors are from 21 countries. U. S. readers who desire to may order the Photography Year Book through INTERNATIONAL PHOTOGRAPHER. It is priced at 83.

**Gossip**

June 20-23 dates have been set for the eighth annual National Conference on Visual Education by the conference council, and the place again will be the Francis W. Parker school in Chicago. Invitations have been extended to prominent speakers in the educational and advertising fields. The committee is lining up open forums, film exhibitions and discussions of production and distribution problems. Dr. I. E. Deer, representing WILL HAYS and the motion picture producers, will outline present and forthcoming plans of Hollywood in connection with educational films. In conjunction with the conference, a banquet will be given, honoring HERMAN A. DEVITR's 25th anniversary in the motion picture equipment manufacturing field.

The third annual U. S. ROLLEICORD-Rolleiflex salon will open May 2nd at Rockefeller Center, New York, with exhibitors from all parts of the country expected to participate, and April 16th is the final deadline for entries, which should be sent to BURLEIGH BROOKS, Inc., 127 West 42nd Street, New York. . . judges are ADOLF FASSBENDER, MARGARET BOURKE-WHITE and HERBERT C. MCKAY . . . memo from the Social Security board reminds that if you change your name by marriage or any other method, you should be sure to see that your Social Security record is revised . . . DANIEL S. MYERS, formerly in charge of dealers sales in the east for BURLEIGH BROOKS, moved to the coast last month to assume charge of the western territory, including California, Washington, Oregon and neighboring states, and will make his headquarters in Los Angeles, where he was well known until he joined F. LEITZ in the east in 1928 . . . he has been with BURLEIGH BROOKS since 1936.

Steadily improved business has brought the removal of J. BURGI CONTINER'S MOTION PICTURE CAMERA SUPPLY, INC., to larger quarters at 723 Seventh Avenue, New York . . . they now occupy the penthouse at the same address and have added a new and larger laboratory . . . readers of our recent article about the Flo-Lite continuous projector, now being manufactured in Louisville by a concern headed by JACK MORANZ, will be interested also in the MOVING WORDS PROJECTOR, an electro mechanical device, now being exploited by a Chicago firm of the same name . . . it is well adapted to theatre marquee stunts and will be described in detail in an early issue of INTERNATIONAL PHOTOGRAPHER.

The April issue of INTERNATIONAL PHOTOGRAPHER will be our 10th anniversary number and we want to remind manufacturers that we welcome notes and news pictures of progressive developments during the past decade. Editorial deadline for the issue is March 20th.
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You have done good work these ten years . . . brought us the latest "dope" out of Hollywood, and kept us informed upon matters that are vital to us all.

We, of the DeVry Corporation, wish you many years of continued service. For we know your journal is read by cameramen and executives alike. We know that your reports of latest developments in motion picture production technique are accurate, your news-items timely, your pictures interesting, your editorials authoritative.

And so, International Photographer, we wish you continued success and good luck!

DEVRY, TOO, HAS AN ANNIVERSARY

DeVry Corporation celebrates this year its 25th anniversary . . . with a new additional building to accommodate increased manufacturing and office facilities, and an enlarged sales force.

We have grown up with the industry. DeVry Corporation saw movies in its "flicker" era—built the first practical news-reel camera, pioneered many of the major improvements in theatre projection.

Today, DeVry Cameras and projectors are known the world over. Discriminating professionals and amateurs alike have learned "You're Safe When You Buy DeVry."

Cameramen, newsreelers, explorers still favor DeVry Sound and Silent Cameras. Proud owners of DeVry Cameras include Admiral Byrd, Captain John Craig, Dr. William Beebe, Captain Carl Van Hoffman, Frank Buck, Newsreeler, Norman Alley, Nicol Smith (explorer), Carveth Wells, Captain Patrick Smith, and many others.

CAMERAMEN, EXECUTIVES, PRODUCERS

Don't miss the National Conference on Visual Education and Film Exhibition to be held in Chicago, June 20, 21, 22 and 23. Important industrial films, "educational" to be screened. Participate in the intensive educational film "clinics"; hear outstanding authorities on visual education.

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ON THE COVER. The 10th Anniversary cover, symbolical of a decade of publication in this magazine of the technical news of cinematography and allied arts and crafts, was composed photographically by Paul Allen from pictures supplied by James Murray, member of Local 659, IATSE, and the camera manufacturers. The modern cameras in the bottom strip are from left to right: 20th Century-Fox, RKO-Radio, the new silent Mitchell and the new DeVry newsreel camera. Seen on the Landers & Trissell rental crane, left to right, are: Andy McIntyre, assisting; and Tom Galligan, operating.

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Entered as Second Class matter, Sept. 30, 1930, at the Post Office at Los Angeles, California, under the Act of March 3, 1879.

International Photographer, as the monthly official publication of International Photographers, Local 659, of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, not only represents the entire personnel of photographers engaged in professional production of motion pictures in the United States and Canada, but also serves technicians in the studios and theatres, who are members of the International Alliance, as well as executives and creative artists of the production community and executives and engineers of the manufacturing organizations serving the motion picture industry. International Photographer assumes no responsibility for the return of unsolicited manuscripts or material.

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Marysville-----Local 216 IATSE.
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San Francisco--Local 162 IATSE.
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Harrison Forman reached Shanghai on the very day that hostilities opened there and remained to make priceless motion pictures of the conflict for The March of Time.

Intimate, living, moving pictures of the Far East are Harrison Forman's most vivid vehicle for bringing home to us the impressions that he has gathered in his explorations of enigmatic Asia. Brilliant as is the outpouring of his pregnant pen, Mr. Forman takes for a truth the old saying of the Chinese whom he has so understandingly photographed, "one picture is worth ten thousand words."

In Tibet, Mongolia, or with Chinese Communists—wherever his expeditions have taken him—the Eyemo has been a supplement to his written notes, and his 35-millimeter, Eyemo-made movies make his lively illustrated lectures second in their vividness only to first-hand observation.

Among explorers and newsreel cameramen everywhere the Eyemo is a favorite—unmatched for its sturdy dependability and versatility. From a handy, spring-driven hand camera it may be quickly converted by attachments to cope with every professional demand.

Write for literature describing the new Eyemo in detail—it will be mailed without obligation.

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Manufacturers and service organizations contribute a distinct service; new ideas tried and proved under practical conditions.

It is often customary, when referring to the technical foundations of the motion picture industry, to refer sadly to Hollywood as being dependent upon sources located elsewhere for the development and improvement of its technical sinews. There was a time when this concept was literally true, but that was long ago. Today, a corps of specialists in every line of engineering related to motion pictures is active in Hollywood, developing and proving new materials and equipment for use in its studios and in every other center of production the world over.

Some of these specialized technical men are on the payrolls of the studios, but a large and important group are the contact engineers of firms supplying the industry with technical products. They exist not merely to sell their firms' products, nor merely to serve as "trouble shooters" when things go wrong, but to make the men on the production firing-line active partners in the evolution of products and equipment specifically suited to their problems. When the manufacturer must often plan his product for a broad usefulness, these specialists bend their energies to adapting existing products or developing new ones to solve individual problems. Some of the keenest technical minds in the world are to be found among these experts.

Probably the senior technical services in Hollywood are those maintained by the three great raw-stock manufacturers, Eastman, DuPont and Agfa. Huge investments in factories producing amateur films and allied products as well as motion picture film keep the manufacture of these products centralized in the east; but these firms' Hollywood experts learn at first hand what film characteristics Hollywood's cameramen need.

The manufacture of motion picture projectors has always been centered in the east. It might be expected, then, that projectors for projection background photography would have been developed there. Instead, virtually all of the process projectors used in the world's major studios have been designed and built by two firms in Hollywood: Teague, and Neumatz. The reason is simple: a projector may be relatively steady for theatrical work and yet wholly unfit for the more exacting demands of the projection background process. Developing machines have been made in many parts of the world. But when a major laboratory in this country or abroad wants such a device, they seek out one or another of a handful
of men who have designed and built machines which have in actual production use in meeting Hollywood's major studio tests proved themselves the world's best.

Yet another field in which this specialized technical service has actively advanced the industry is in the field of lighting equipment. While the firms purveying incandescent globes and arc carbons do their manufacturing in the east, they maintain resident experts in Hollywood to cooperate with cameramen and studio electricians.

The light sources themselves are not Hollywood products, coming from General Electric and National Carbon, but the lamps in which they are used to light studio sets are designed and built in the film capital. Responsible for a major part of these lamps are the engineers of Mole-Richardson, Inc., who for more than a decade have cooperated intimately with the men who have made lighting itself an art. While a recent entry in this field, Bardwell & McAlister, also is making valuable contributions. G. E. and National Carbon, however, maintain regular service and research cooperation.

The two major sound organizations, RCA and ERPI, also have staffs of able service and research men, while anything in cameras and other adjuncts to professional photography is always readily available from Mitchell, with its main plant in Hollywood, Bell & Howell, with a fine Hollywood branch, Duplex, Art Reeves, and Fried. Contributing to the many accessories and special contrivances so necessary in major studio production are firms like Studio Equipment Company, Al Grimley, O'Hara, Fred Hoefer.

The world-known Moviola film editing devices are Hollywood products, while the names of Scheibe and Harrison & Harrison, both film capital firms, mean tops in filters. And make-up leadership in the professional field is dominated by
the Max Factor organization, a pioneer Hollywood institution, which shares honors with the Westmores in hair-styling and wig creations.

Regardless of all promises on the horizon from other quarters, when you talk color, for all practical purposes it means but a handful of firms, with Technicolor and Cinecolor, both centered in Hollywood, in the dominating position. Eastman's Kodachrome, the subject of wide amateur use, is not yet developed for professional purposes, but under a special agreement, Eastman and Technicolor are cooperating on research toward such development.

Another feature of the Hollywood technical community is the rental and service group. Every type of photographic and allied equipment is available from such firms as Landers & Trissell, Faxon Dean and Henry Kruse; while the two big camera shops, Hollywood Camera Exchange and Camera Supply Company, also specialize in professional rentals, both for use and as props. They have extensive lines of historical interest.

Art Reeves, who last month took over direction of the latter company, which he owns, also has expanded his manufacturing plant. With 7000 sq. ft. of floor space, Reeves now has 12 mechanics busy, and has added his own glass blowing department and also is manufacturing developing machines.

Morgan Camera Shop, specializing in miniature photography, carries an extensive line and specializes and prints service, while a new still lab, owned by Neville Reay and Fred Parrish, member of Local 659, is specializing in fast service with a large capacity. Sound facilities also are available from such organizations as Glen Glenn and Balsley & Phillips, in addition to the General Electric and RCA facilities on the bigger rental lots.

An interesting special service is that of Jack O'Hara, who features camera cars and electrical horses.

Max Factor's modernistic Hollywood plant.

These shots of the Hollywood headquarters of Smith & Aller, distributors of Dupont film, were published in International Photographer for December, 1929, when the building was completed and opened for service.
UNUSUAL LIGHT SETUP. This weird shot, captured by the still camera of Bert Six, member of Local 659, IATSE, at Warner Brothers, shows one of the largest setups for projected shadows ever made in a motion picture studio. It was the idea of Bert Longworth, veteran 659 still photographer, seen at his camera at the right. The electrician is Martin Murphy, member of Local 37, IATSE. Players are Claire Trevor and Edward G. Robinson. The illustration is for Warners' "The Amazing Dr. Clitterhouse."
Camera

Three shots of the new type portable silenced camera designed at RKO-Radio studios with a companion easily operated dolly.

PHOTOGRAPHY BACK ON TOP

Technical progress in improving quality plus freeing lens from restrictions of microphone restores camera to prime spot as story telling medium of industry.

Progress in photography during the past ten years has been the victory of an army rather than spectacular achievements by a few heroes. This is most clearly evidenced by the fact that the pictures which won the Academy awards in the first half of the past decade, today would not rate technically with the average "B" picture. The difference must be attributed to many factors.

The cameraman and soundman today have smoked the pipe of peace and with the aid of a score of new refinements, improvements and a sincere attempt to coordinate their work, have returned to the camera the prime job of telling stories on the screen. The efforts of hundreds of experts in all lines from equipment manufacture to the film laboratory, have resulted in getting the camera out of the icebox booths that were the trade-mark of the early sound era.

Panchromatic film, which came into vogue from 1924 on, reached its peak of development during the past decade. The perfected emulsions, with their faster and finer grain, much more evenness and stability, the better constructed and more efficient light sources, both incandescent and carbon, the progress from the rack and tank system to developing machines in the laboratory, plus better formulas, temperature, and dust control, all in the hands of experienced technicians; fine cooperation by set designers and property departments in the blending of paints, construction and arrangement of sets advances in make-up tech-

Compare the light modern cameras on these pages with the huge "ice box" that housed this Mitchell camera in 1930. This picture was published to illustrate a device developed by Joseph Walker to accurately focus outside the bungalow.
The silent DeBrie, brought out last year, in action on a set at 20th Century-Fox. Director in center is H. Bruce Humberstone.

ground photography, and the coincidental development of truly precision equipment, even to the construction of cranes and dollies such as cameramen of previous years never would have dared to imagine; and the editing efficiency of the Moviola must not be overlooked, nor the Cinex light tester.

Today the cameraman is freed from many restrictions, and is assured by other departments of technical excellence for which he alone previously was responsible. He, therefore, may concentrate his attention upon photographic composition and effects that will have outstanding pictorial and dramatic values.

The motion picture camera itself, today is a superb piece of designing and construction, fitted with precision lenses and control devices designed for maximum efficiency under motion picture production conditions. Mitchell, Bell & Howell, RKO-Radio, 20th Century-Fox, DeVry, DeBrie and Duplex cameras, illustrated herewith, are the last word in photographic efficiency with 35 mm. film.

Precision construction of the working parts of modern cameras, to very minute tolerances, has resulted in much quieter action and steadier photography and projection reproduction. Speeds available have been increased, due to the progress in adapting the camera from the nominal silent speed of 60 feet per minute to the 90 feet per minute demanded for synchronization with sound on the film.

Constant speed was another necessity for sound and color. The motors now used to run the cameras are super efficient for their bulk and weight. Due to

The light and extremely portable blimpless camera developed during the past two years at 20th Century-Fox. Note the comparative size alongside blimped camera.

The brand new silent Mitchell camera, now in use at Warners-1st National.
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EASTMAN SUPER X
PANCHROMATIC NEGATIVE
the increase in speed it was possible to increase the capacity of the film magazines from 400 to 1000 feet and eventually, to coordinate studio and projection practice to the new technical advances, the industry adopted a standard 2000 foot reel for release purposes, which was sponsored by the Academy of Motion Picture Arts & Sciences Research Council in 1935-36.

Lenses available to the oldtime cameramen were improved greatly during the past 20 to 30 years, but it was during the past decade that finely designed and corrected lenses, as fast as F:1.8 were developed to match the new motion picture emulsions. Also, a much wider variety of focal length in lenses is available today.

The combination of high speed lenses and faster emulsions, not only extended the cameraman’s work day and allowed him wider range in the use of filters to secure more artistic effects, but it also was responsible for the great success of miniature still photography, which came into vogue during the past ten years.

The pioneers, Leitz and Zeiss, with their Leica and Contax cameras, made the so-called “candid photography” an international by-word primarily through the manufacture of cameras that took advantage of the readily available, nominally priced 35 mm. motion picture film—with its great variety of all types of emulsions, and the new super lenses developed to meet the problems of cinematography. Today there are over 100 makes of miniature still cameras on the market, while during the past three years, International Research Corporation, after considerable success in the popular priced radio field, invaded photography with the first complete popular priced miniature photography line, the Argus.

The first Argus, at $12.50, followed this year by a new Model "C" with built-in range finder at $25, has forced a radical revision in camera design in the brackets below the super-precision expensive models such as the Leica and Contax and their competitors, and the direct view Kine-Exakta.

Motion picture progress also made color available to the 35 mm. field with Eastman’s Kodachrome and Dufay’s Dufaycolor, both one shot natural color films available throughout the world to miniature fans.

While the studios, recognizing the vogue for candid shots, but on the other hand realizing the dangers to expensively built up personalities through indiscrimi-

Bell & Howell deserves considerable credit for development of 16 mm. motion picture photography. This pioneer company, which played a major role in the trend to precision design in photographic machinery, made many important contributions to camera manufacturing. A typical example is this motor driven Filmo, which was brought out in 1933, and was described in detail in the August, 1933, issue of International Photographer. The numbers in the above illustration refer to:

1—Knob for turning over motor by hand for threading.
2—Starting button.
3—Lever to throw gravity catch in or out of engagement.
4—Handcrank socket on camera.
5—This pin is operated by closing door latches. It opens magazine valves when camera door is being opened.
6—Magazine locking screw engages here.
7—Screw which locks motor in place.
8—Range finder dial.
9—Range finder lever “in” position.
10—Prism on eyepiece to enable user’s head to clear the magazine.
11—Optics of range finder.
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This finder adds to magazine-loading and interchangeable lenses, two more important features characteristic of the professional motion picture camera—positive precision focusing and visual determination of field covered by the lens. These advantages are especially desirable for close-ups, telephoto shots, and in titling. The Finder is slipped into the camera in place of the film magazine, between shots, and is effective with any of its eight interchangeable lenses—and at any distance. Of cast aluminum, weighing 8½ ounces, the Focusing Finder for Magazine Ciné-Kodak is $20.

Whether your filming plans are making simple personal records—or more ambitious productions, you won't outgrow the Magazine Ciné-Kodak. Through a full line of precision accessories, it will keep in step with your increased demands. See this remarkable camera, its accessory lenses and the Focusing Finder at your Ciné-Kodak dealer's.

EASTMAN KODAK COMPANY, ROCHESTER, N.Y.
nate and unattractive candid photography of the stars, adopted miniature photography for still work to assure a reasonable control of this type of printed art, the backbone of studio still photography is the familiar 8x10 view camera, in a number of makes, and the ever reliable Speed Graphics.

Equipped with modern range-finders such as the Kalart company's excellent device, and utilizing the improved photoflash equipment and bulbs now on the market, these rapidly handled cameras, favored by press photographers, are getting excellent results, particularly with the fast new Agfa and Eastman films introduced during the past few years. Here again, still photography has benefited from the research of the motion picture film technicians for faster emulsions that still would have fine grain and quality.

Studio stillmen are called upon to supply an ever increasingly large number of pictures for publication in newspapers and magazines and an army of expert cameramen, all members of Local 659, is engaged in this work. At the present time, there is a definite trend toward bringing the larger still cameras up to date in design and efficiency. An example of the type of planning under way along these lines, is the new light and versatile 8x10 camera, designed by Gordon Head, member of Local 659, IATSE, on Page 24 of this issue.

While the industry had its steady progress in gaining control of sound, projection background photography, modern precision equipment and in improving still photography and mastering the candid camera craze, color went up and down like an elevator.

During the early days of sound, enthusiasms for other technical ideas were many and color and wide film were the two big rages among the prophets of progress. Wide film faded into oblivion but color, after a fadeout that seemed permanent, came back strongly during the past few years, principally through the determination and fighting spirit of Dr.

In the May Issue

Jack Aloin, veteran fan magazine photographer, member of Local 659, IATSE, who is noted for his speed strip photography, gives pointers on how to get the best results with this type of work.

Modern streamlined major studio portrait gallery is typified by these Columbia studio scenes illustrating the headquarters presided over by Whitey Schafer, member of Local 659, IATSE. In addition to modern lighting and prop facilities, the gallery has dressing rooms and professional makeup facilities.
Herbert T. Kalmus and his Technicolor organization.

During the first few years of sound every studio tried color, but while sound progressed, color and musicals finally became anathema to production heads. Warner revived musicals as we know them today with "42nd Street," while Technicolor brought back color photography with its three-color process.

The revival of color also was aided by Eastman's progressive step in throwing its natural color single base Kodachrome on the market for sub-standard and candid photography, thus finding a great experimental field and awakening the industry to the eventual prospect of practical color photography that would be close to black-and-white shooting conditions and could be speedily and economically processed.

Since color is as much dependent upon the processing as upon the photography, the major technical points of color progress will be found in this issue's Laboratory Section, written by Contributing Editor D. K. Allison, who has been chemical research consultant to most of the important color organizations during the past ten years.

Coincidental with Kodachrome and the
In the May Issue

Charles R. Hoffman, veteran member of Local No. 683, IATSE, (Laboratory) who has an extensive background in practical work on color still separations, starts a series of informative articles on this much-discussed subject.

Good color photography, transmitted into good engraving and offset plates, and excellent billboard lithography, have been available to the graphic arts trades for some time. But they are expensive processes. Generally for publication purposes they have been restricted to advertisers with big budgets and the slick magazines.

A number of outstanding photographic artists in the eastern advertising centers, and in Hollywood, such men as George Hurrell and Jimmy Doolittle, members of Local 689, IATSE, have been making outstanding color shots for commercial purposes. But this high type of work, costing far beyond comparison with even the most expensive black-and-white, was not suitable to meet the rush toward color, particularly by the nation's newspapers, who have become increasingly color conscious during recent years with the development of good color printing on newsprint and in rotogravure.

Since 1933, there has been an increasing heavy pressure on studio publicity departments from the press and magazines for color news pictures. Kodachrome and Dufay separations, one shot cameras of all types, and scores of pro-

three-color Technicolor came an international upsurge of interest in natural color still photography for graphic arts purposes. This field has probably been exploited with more vigorous bunkum and wild promises than any aspect of pho-

This is the biggest motion picture camera lens ever made, a 58-inch Telephoto f/8, manufactured by Taylor and Hobson, Ltd., of Leicester, England, for the English firm, W. Vinten, Ltd., and used to photograph last year's Coronation for Pathé Gazette.
cesses for getting three and four color engravings have been experimented with. Thousands of dollars have been invested by the major studios in experimental laboratories, the construction of color cameras, costing $5000 and up.

While some progress has been made in various directions, the color situation with regard to stills, is as yet chaotic and uncertain. This is a field that will well repay serious and cooperative investigation by the industry’s technicians. Recently there have been signs of a more realistic and practical approach to the problem.

Color stills today are in the headache classification, and intelligent exploitation executives are beginning to realize that the only sane solution is the training or acquisition of competent technicians in all branches of the work from the actual photography to the laboratory processing.

The most important angle on color still photography is accurate and consistently standard control of every operation from the click of the shutter on. To insure such control, an orderly program of gathering and arranging technical data must be undertaken.

The color still situation can be said to have been solved only when photographers can shoot pictures and know definitely what the finished result will be; and when materials and methods have been brought under control so that color stills in volume will not extravagantly exceed the cost of black-and-white. This problem should offer an interesting challenge to the skill and determination of photographers and research technicians.

In the May Issue

D. K. Allison gives directions for electrometric titration in laboratory practice, using the pH control meter.
1937 ACADEMY HONORS

The 10th annual awards of the Academy of Motion Picture Arts and Sciences were presented at the Biltmore Bowl in Los Angeles, March 10, honoring outstanding achievements in motion picture production during 1937. The awards honors were so thoroughly reported in the daily and trade press, that this digest of the awards recipients is published merely for the record:

Best Production—"The Life of Emile Zola," (Warner Bros.).


Best Supporting Actress—Alice Brady in "In Old Chicago," (20th Century-Fox).

Best Supporting Actor—Joseph Schildkraut in "The Life of Emile Zola," (Warner Bros.).


Best Assistant Director—Robert Webb, "In Old Chicago," (20th Century-Fox).


Best Art Director—Stephen Gooson, "Lost Horizon," (Columbia).

Best Sound Recording—Thomas Moulton, "The Hurricane," (Samuel Goldwyn).


Best Dance Direction—Herman Pan, "A Damsel in Distress," (RKO-Radio).

Best Film Editing—Gene Havlick and Gene Melford, "Lost Horizon," (Columbia).

Best Scoring—"100 Men and a Girl," (Universal).


Thalberg Plaque, to Darryl F. Zanuck.

Special awards—Mack Sennett, Edgar Bergen, W. Howard Green, Museum of Modern Art Film Library.

Scientific or Technical Achievement Awards:

Report of the Board of Judges. After a careful consideration of the devices, developments and equipments submitted for consideration for recognition for Scientific or Technical Achievement, the Board of Judges, with the approval of the Academy Awards Committee, has agreed that Awards for Scientific or Technical Achievements should be granted as follows:

AWARD IN CLASS I (Academy Statuette and Plaque):

To: The Agfa Ansco Corporation for their Agfa supreme and Agfa ultra speed pan motion picture negatives.

The Agfa Ansco Corporation, in making available to the motion picture these two new panchromatic films has provided the production cameraman with a means of reducing working lens apertures, resulting in increased definition, and has provided a tool to obtain, under adverse conditions, high quality photographic results heretofore impossible.

In addition, the use of this film increases the latitude, the realism, and scope of process projection work.

The development of these two films represents a major achievement in research and emulsion manufacture, reversing what has long been considered an axiom by manufacturers and users of film stock, namely, that an increase in speed is always associated with increased grain size.

These two new panchromatic films retain to the full extent the qualities of panchromatic emulsions and at the same time provide a much higher speed while maintaining former grain quality. Thus, the Agfa Ansco Corporation has provided the motion picture industry with a product which increases the photographic quality of production and tends to lower lighting costs.

AWARDS IN CLASS II (Plaque):

To: Walt Disney Productions, Ltd., for the design and its application to production of their Multi-Plane Camera.

The multi-plane camera is a development of the Walt Disney Studios which has greatly improved the photographic quality and illusion of depth in color cartoons, simplified process work, and is believed to be capable of extension to process and transparency background problems normally encountered in studio production.

To: The Eastman Kodak Company for two fine-grain duplicating film stocks.

It has been recognized that duplicating films of sufficiently improved characteristics are of value in protecting against loss through damage to the original negative, as well as for making additional complete copies of the negative from which release prints may be made, and for use in optical printing.

In these two duplicating emulsions, the Eastman Kodak Company has made available duplicating stock which is an improvement over any previously available, permitting duplication quality very closely approaching that of the original and at the same time markedly reducing the effects of grain size formerly found to an objectionable degree in such duplicating films.

To: Farciot Edouart and Paramount Pictures, Inc., for their development of the Paramount Dual Screen Transparency Camera Setup.

The Paramount Dual Screen Transparency Camera Setup consists of two synchronized photographic cameras driven by a single motor, mounted side by side in such manner that adjacent edges of the two fields of view are coincident regardless of distance (from the camera to infinity), permitting close screen action and a screen area of twice the width of the normal camera setup.

This unit, by providing transparency backgrounds of twice the area of a single screen, has increased the scope of process background photography and proved of definite economic value in motion picture production. It photographs, with absolute synchronism, action taking place across the two screen areas, regardless of distance from the camera, thus permitting a perspective and panoramic effect not otherwise possible in greatly enlarged projected pictures.

To: Douglas Shearer and the Metro-Goldwyn-Mayer Sound Department for a method of varying the scanning width of variable density sound tracks (Squeeze Tracks) for the purpose of obtaining an increased amount of noise reduction.

The application of "squeeze" to variable density recordings affords an increased amount of noise reduction over that available with other current methods, resulting in greater reproduced volume range in the theatre.

With this method, the scanning width of the variable density sound track is reduced during periods of normal low modulation and accompanied by a corresponding increase in
the percentage of modulation, often resulting in the recording of a truer wave form.

The use of this method leads to an increased volume range in the theatre, lending an added color and naturalness to certain types of productions.

AWARDS IN CLASS III (Honorable Mention in the Report of the Board of Judges):

To: John Arnold and the Metro-Goldwyn-Mayer Camera Department for their improvement of the semi-automatic follow focus device and its application to all of the cameras used by the Metro-Goldwyn-Mayer Studios.

This device facilitates camera operation by correlating the focusing of the shooting lens and finder lens and simultaneously correcting for parallax, with such precision that the position and sharpness of focus in the finder may be relied upon to indicate corresponding properties of the photographic image, thereby materially increasing the speed and accuracy of production photography, particularly in follow focus shots.

To: John Livadary, Director of Sound Recording for Columbia Pictures Corporation, for the application of the Bi-Planar Light Valve to motion picture sound recording.

The bi-planar light valve eliminates a serious form of electro-mechanical distortion caused by the striking together of the valve ribbons during the recording of high-amplitude modulations.

To: Thomas T. Moulton and the United Artists Sound Departments for the application to motion picture sound recording of volume indicators which have peak reading response and linear decibel scales.

This type of volume indicator portrays with greater accuracy the form factor of an electrical wave, and permits extension of the usable scale of volume indicating instruments.

To: The RCA Manufacturing Company, Inc., for the introduction of the modulated high-frequency method of determining optimum photographic processing conditions for variable width sound tracks.

To: Joseph E. Robbins and Paramount Pictures, Inc., for their exceptional application of acoustic principles to the sound proofing of gasoline generators and water pumps.

The application of advanced engineering principles to the sound insulation of generators and other accessory equipment has made possible the operation of these units at high efficiency, at points relatively close to the microphone, without noise interference.

To: Douglas Shearer and the Metro-Goldwyn-Mayer Sound Department for the design of the film drive mechanism as incorporated in the ERPI 1010 Reproducer.

This is an efficient means of obtaining a flutter-free film motion for use in studio recording and re-recording operations, the design of which was completed at Metro-Goldwyn-Mayer Studios.

SMPE Spring Sessions

Feature color and sound in meetings at Washington, D. C., April 25th to 28th.

The Society of Motion Picture Engineers' 43rd semi-annual convention at the Wardman-Park Hotel, Washington, D. C., April 25th to 28th, will pay particular attention to color and sound recording and reproduction. Three sessions will be devoted to sound in all its phases and there will also be com-
GAGS

No business in the world is as full of oddities as the picture business. Above, George Teague's perambulator which allows actors to seem to be walking in projection background scenes. Left, a rain-storm ready made. Below, oldtime titles from the "flicker" days, and giving the rhino a touch of make-up.

complete sessions devoted to papers dealing with developments in photographic and laboratory processes; optics and projection developments; 16 mm equipment; new apparatus; and educational and industrial motion pictures.

An informal luncheon will be held on the opening day at which Daniel C. Roper, Secretary of Commerce, Senator William G. McAdoo of California, and Col. Dan I. Sultan, Engineer Commissioner for the District of Columbia will speak. The semi-annual convention banquet will be held Wednesday evening, April 27th, at which Dr. C. E. K. Mees, vice-president of Eastman Kodak, and other leading men of the industry will talk. Mrs. Franklin Delano Roosevelt will be hostess to the women attending on Monday afternoon at the White House. Special sightseeing trips are being arranged for members.

With the tremendous advance that has been made in motion picture film stock in recent months particular attention will be devoted to photography during which such papers as "Problems in the Use of Ultra Speed Negative Film," by P. H. Arnold, of the Agfa Ansco Corporation;
Corrections

Two important corrections on items in the March issue of International Photographer should be noted by readers.

In the advertisement of the Ruthenberg Color Company, 3x4 color prints from 16 mm. were listed at 95 cents. This should have read $3.95.

In D. K. Allison's Laboratory Book of Tables, under Total Solids, instead of "Gns. Residue X 0.2," it should have read "Mgs. Residue X 20.0."


On Monday evening H. E. Ives of Bell Telephone Laboratories will present a paper entitled "The Transmission of Motion Pictures Over a Coaxial Cable." Six paper will be presented on Tuesday on the subject of color, among which "The Theory of Color Reproduction," by A. C. Hardy of the Massachusetts Institute of Technology; and "The Multiphase Camera," by W. E. Garity of Walt Disney Productions, should be of particular interest.

During the two sessions on sound, recent developments in ultra-violet recording will be presented by G. L. Dimmich, L. T. Sachtelen and J. O. Baker of the RCA Manufacturing Company. H. G. Tasker of Universal will present a paper on "Multiple Channel Recording," and G. Friedl, Jr., of the International Projector Corporation will describe "A New Sound System." E. C. Manderfeld, Electrical Research Products, will describe a "Permanent Magnet Four-Ribbon Light Valve for Portable Push-Pull Recording," and G. R. Crane of the same company will present "Variable Matte Control (Squeeze Track) for Variable Density Recording." R. Vermeulen of Eindhoven, Holland, will describe "The Phillips-Miller Method of Sound Recording."

As is International Photographer's regular custom, abstracts of the papers presented and news and pictorial highlights of the S.M.P.E. sessions will be published in our May issue.

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HOLLYWOOD, CALIF. Hollywood 6235
Background projection pioneered by Teague, outstanding development of decade; new Motion Pictures Process Corp. enters background field, taking over Neumatz.

No other branch of motion picture production has evidenced such creative and technical initiative as the special effects and process departments. Since the early days of the industry workers in this field have consistently accomplished the "impossible" in the regular routine of doing their jobs.

While most of their work may consist of tricks, insofar as the finished product is something different than the action actually enacted before the camera, nevertheless this so-called trickery cannot be described as faking, because this one department of the industry has done more than any other to lift the motion picture as an entertainment medium from the photographing of virtual stage play action to a compelling art form.

Not only have the projection and trick departments made possible the most spectacular dramatic effects, but they also have resulted in saving millions of dollars in the cost of production. One of the most stupid ideas ever broadcast about the motion picture industry is the belief in some quarters that projection process, trick and miniature work should be considered as an attempt to deceive the audiences.

There had been many types of processes and effects in use throughout the industry up to 1928, but the greatest progress shown in this field has been made since then.

The keystone of effect photography during the past ten years has been the projection background process popularly known as "rearprojection." George
Teague, now head of the Universal studio process and special effects department, and also operating a manufacturing plant and process service under his own name, is generally credited with being the father of projection backgrounds, as they now are known, although a number of people contributed to the achievement of this process, namely Ned Mann, Frank Williams, L. S. Brainard, J. S. Dowley, Ralph Hammeras, Willis O'Brien, William Newman, William Matz, and Roy Davidson. The latter is now associated with Motion Pictures Process Corporation, Teague's principal competitor.

The first successful projection background photography of the modern type to be used in a major picture was in "Liliom," at Fox, in 1929, followed by its first big success in that company's spectacular music production, "Just Imagine." This pioneering was under Teague's direction.

Projection backgrounds were made possible during 1929 and 1930 by several important technical developments, including:

(1) Perfection of the interlocking motor by Electrical Research Products, Inc.; this permitted the shutter of the camera to synchronize with the shutter of the projector, eliminating flicker in the projected backgrounds; previous experiments had encountered serious difficulties in synchronizing motors of both projector and camera, although prior to the interlock motor Willis O'Brien had had some success in operating both the projector and the camera from the same shaft.

(2) Introduction of high intensity projection lamps, pioneered by Clarence Ashcraft, for the Grandeur 70mm film, which passed into oblivion after creating a fur-

(3) The development of the present super-efficient cellulose screen, now manufactured under a patent agreement between the Flat Light Screen Company and Warners-First National; these marvels of technical research overcame the "hot spot" that was the outstanding weakness of the ground glass in similar type projection background screens used in the early days of the process.

These factors, however, still would be

valueless had it not been for the trend of the motion picture industry in the previous decade toward precision equipment, pioneered by Bell & Howell. Regardless of other technical assets available, projection background photography would have been impossible—because of the absolute need for steadiness in the projector, camera and printer—had it not been for the adoption throughout the entire industry of the most minute standards of tolerance in the machining of parts for the precision instruments from camera to laboratory. Also of equal importance was the development by the film manufacturers of emulsions with increased speed and finer grain which allowed satisfactory composite work that would have a realistic effect. Greater depth of field also was made possible through modern lenses and the faster emulsions by stopping down.

Laboratory work in developing and handling the process film requires unusually careful and rigid control. Frank Williams, whose organization pioneered in different process effects that preceded rear projection, now handles a majority
of this work, having built up a reputation for particular attention to process film handling.

Closely related to the work of these organizations is special effects and title work in which Ray Mercer, Consolidated Film Laboratory and Pacific Title are leaders. Mercer was one of the first to organize a special effects company serving all the studios and during his association with the late Max Handshegel in the late 20's in working on method of adding color to pictures that preceded our modern color systems, evolved many methods of handling effect and trick work. Mercer also specializes in miniatures combined with photographic action to give a realistic effect. He also does montage sequences for many pictures.

The immediate future of projection background process, with regard to improvements, lies in the direction of quieting the projectors in an attempt to match the silence of the modern new cameras and the development of even more powerful illumination sources so that larger background images may be projected. Leaders in the process projection field believe that the problem of steadiness had been substantially solved.

Many are those who have contributed to progress in effects and in addition to the pioneering of Bell & Howell in precision design of equipment, such men as Paulus, Bill Rudolph, Harry Cunningham and Karl Thalhammer made important contributions. In photograph Irvin Willat, Victor Fleming and George Scott were known as pioneer specialists in trick photography. These early cameramen did many of their tricks in the camera. Willat generally is credited with the first multiple trick effects. The cleverness displayed by Willat and Fleming in this field won them promotion to the directorial ranks. Other important contributors to effects were Walter Hall at Paramount, with glass shots, and in the miniature field besides Mercer, Art Smith, Fred Jackman and Willat. Ferdinand Pinney Earle did outstanding pioneer work in title backgrounds.

In the more advanced stages of special effects, Frank Williams, the Dunning and Roy Pomeroy of Paramount, with their transparency system; Ned Mann; Rolly Flora; Mercer and Handshegel were outstanding specialists. During this period Lew Physioc, Frank Garbutt and Roy Klaffki were credited with making valuable contributions to laboratory efficiency in connection with trick work.

At the present time the leaders in the studio process departments are Bill Thomas and H. F. Koenekamp, Warner Brothers - First National; John Arnold and Arnold Gillespie at Metro-Goldwyn - Mayer; James Bassevi and Bob Layton, United Artists; Kit Carson and Emil Oster, Columbia; George Teague, Universal; Ralph and Ed Handshegel, F. M. Senes and Rolly Flora, 20th Century-Fox; Vern Walker and Lynn Dunn, RKO; Farclo Edourt, Paramount.

Projection background equipment dominance goes to two Hollywood organizations, those of George Teague and Motion Pictures Process Corporation, which took over the Neumatz organization recently. UFA in Germany and De Brin France also manufacture projection process equipment. Two new entrants into the field are Mitchell Camera Corporation with a new projection head, announced last month, and International Projector Corporation, which is experimenting in an attempt to make the Geneva type movement practical for rear projection. Mitchell and International Projector demonstrated their equipment before an Academy Research Council meeting of studio special effects chiefs early in April at the RKO studio. Complete details of these new equipments and also of the new Teague and Motion Pictures Process Corporations' products and facilities will appear in the next three issues of International Photographer.
Motion Pictures Process Corp.

The latest and most highly developed equipment available for doing all types of composite photography, both motion picture and still, in either black-and-white or color.

We are also equipped to handle all forms of still photographic background process for studio photographers and for fashion, travel and similar branches of commercial and advertising art.

Our plant in Hollywood features a projection process stage, with latest type lighting equipment, dressing rooms, film vault, dark room, projection room and shop. These facilities are supplemented by a complete film library and still background library.

We also are equipped to photograph background material in Hollywood or in any part of the world.

Motion Pictures Process Corporation personnel consists of men who have had many years experience in the process and composite field, men who have contributed to such impressive productions as “Lost Horizon,” “Mr. Deeds Goes to Town,” “It Happened One Night,” “Hell’s Angels” and many others.

Our new plant at 1117 North McCadden Place, in Hollywood, now is nearing completion and will be in full operation on or before May 15.

We use and are the exclusive agents for the Neumatz Process Projectors and we use the Flat Light screens in all composite work.

Estimates gladly furnished on all types of miniature and scale models and trick photography in general.

STUDIO
1117 No. McCadden Pl.
Hollywood, Calif.

E. Roy Davidson
Technician

Temporary Phone:
Hillside 6375

Cable Address: MOPIC
Addition of sound and “March of Time” influence outstanding in progress of newsreels; organizations and technicians in field tops in initiative.

The basic purpose of the newsreel has not changed much in the past ten years, but its importance and the attention to efficiency and rapid service to the nation’s theatres, have been marked by great strides. During the same period, the interpretive treatment of news was developed by the editor of Time, patterning after their “March of Time” broadcast, to achieve sensational sales success and to win a special Academy award for outstanding contribution to screen progress.

The development of sound and the “March of Time” idea greatly influenced changes in format and format of news presentation on the screen. Commentators joined with the cameramen, sound men, editors, and one comic commentator, Lew Leh of Fox-Movietone, won great popularity.
Reels

Incidental with the technical and showmanship assets, came a period of sensational news development. One astounding news event followed the other, often interwoven with the rise of the dictators in Italian states and the growing menace of another war. The Italo-Ethiopian struggle, the Spanish Civil War, and the Sino-Japanese conflict, have been intelligent reported in celluloid by newsreel cameramen working out of different bases in the United States. 

News of the Day, Pathé, Paramount, Fox Movietone, and Universal, all have established bases of their own. For example, on the Pacific Coast, Seattle, San Francisco and Los Angeles are considered bases. Coasts occurring at sea, off the Pacific Coast or up to the Chicago region from Canada to the east are covered by newsreel cameramen stationed at one of the three bases. Thus the freelance man of lesser importance each day and more so because of the speedy train, the often-used plane and modernized automobile that transports the newsreel cameramen at the rate of 80 and 90 miles per hour.
IATSE, with three important locals in the United States and one in Canada. Local 644, New York, with Charles Downs as business representative, takes care of the Eastern territory. Local 666 with William Strafford, business representative, handles middle western affairs and Local 659, with the writer as secretary, handles Pacific Coast affairs. The Toronto territory is covered by Local 665. An amicable relationship exists between all locals and as bitter as all newsreel cameramen may be in trying to out-scoop each other, they are steadfast and firm in upholding the traditional policy of the organization to which they have pledged themselves.

Even a casual study of the enterprise burial services for Panax victims. Bottom, a tribute to the Paramount News photographers from their friends of the Byrd Antarctic Expedition.
shown by the newsreel organizations from executives on down the line, will show that this branch of the industry is amazingly progressive. They are geared and organized for rapid-fire coverage of anything from a football game or a style show to a major war. And the rapidity with which they get the news beats on the theatre screens is even more amazing than the appearance of tomorrow's news on the streets tonight.

A veteran of the newsreel game is Joe Johnson of Paramount and I am indebted to him for the following account of the development of newsreels. I also am indebted to Al Brick, photographer, and William McGrath, soundman, of Fox Movietone for information in this story and in other articles in this anniversary issue of INTERNATIONAL PHOTOGRAPHER. Johnson's notes follow:

'To compare the newsreel of today with that of 25 years ago would be like comparing a modern newspaper with Poor Richard's Almanac, for then the 'News Weeklies,' as they were called, consisted mainly of parades, cornerstone layings and the like; news events of vital importance were the rare exception and not the rule. When the writer came to California in 1919, the reels still went in for apricot and walnut harvesting.

'The man most responsible for changing the newsreel for a 'filler' to a 'feature' was Emanuel Cohen of Paramount. He was the first to realize the importance of showing real news, human interest and occasional thrill subjects. Twenty years ago, the newsreel cameraman was considered a nuisance and many were the obstacles he had to overcome to gain en-

This picture was made in April, 1914, near Vera Cruz, Mexico, on railroad between Vera Cruz and El Tovar. It was shot at time of the occupation of Vera Cruz by the U. S. Army, Navy and Marines. Hand-car was stolen by cameramen for transportation. Top row, left to right: Jimmy Hare, photographer for Collier's Weekly, Joe Rucker, Universal Animated Weekly; bottom row: a N. Y. Tribune reporter, Adrian Duff of American Press Association, Wallace of Hearst Newsreel, and Willbur Durbrough of N.E.A.

trance to places or obtain permission to shoot his story. Today, they beg him to come. One of the hardest jobs of the man on the desk is turn people down without offending them, when they want their 'event' covered by the newsreel.

'Of course the biggest change that came to the newsreel, the change that lifted it to the spotlight of national importance, came with the advent of sound, about 1929. Immediately more care and thought were given to both the taking and editing of the pictures. Interviews with people of world wide importance, such as the President of the United States, added immeasurable prestige and caused the newsreel to be a medium sought by those who were after publicity.
— and the cameraman and soundman were welcomed everywhere with open arms. Today, the great majority of theatre patrons you may choose to question will tell you that to them, the newsreel is the best part of the show.

"Popular newsreels started in 1910 and Pathe was the first in the field—followed by a dozen others, a few of which have survived to the present day but most of these fell by the wayside. Some of the earlier efforts in the newsreel field were Mutual Weekly, Gammon’s Weekly, Screen Telegraph and the Selig-Tribune which latter sprang up in 1915 sponsored by the Chicago Tribune and headed by Max Annenberg. All these died a natural death years ago. It is not generally known, but Paramount had a newsreel in 1915; they called it Newpictures: but that, too, was a short lived enterprise. Later Selzuck News and Kino grams popped into the field for a short sojourn and Henry Ford started one which he abandoned after a few years trial.

"The business finally simmered down to the big five, which are still going strong—Paramount, Fox, Pathe, Universal and Hearst. The Hearst reel was the second in the field, being started about 1912 but it has operated under many nom de plumes in its 26 years of activity. Once it was known as the Hearst-Selig News; later it combined with Pathe and was called Hearst-Pathe. About one year ago the name of the Hearst reel was changed to News of the Day and it is still sailing under this banner.

"The modern cameraman would be amazed at the equipment used by the newsreeler of 25 years ago. Of course some of the old-timers around the studios used this equipment when they started in the game. The camcorders in vogue at that time were, principally, the Moy, Pathe field model, the Prestwich, Universal and Schustik. Joe Rucker had one called the Chronic, which was really a fine well balanced piece of machinery and Gus Johnson got some ideas from it which he embodied into the present Mitchell camera. Joe sold the Chronicle in Japan about ten years ago. The Moy was an unusually wooden box and looked more like a wardrobe, but the Pathe Field Model was a fine piece of work and this writer would like to have one of them right now. When the Akeley made its appearance about 1920, it was a deep mystery. An Akeley operator was ‘some punks,’ believe you me, and I remember Archie Stout got double the salary paid at that time because he was an Akeley expert.

"One difficulty that newsreels had in the early days was caused by the ‘framing of pictures.’ Some cameras framed on the perforations and others framed between the perforations. Since the newsreels obtained their film from cameramen, who used various type cameras, the final make-up of the reel would embody all kinds of framing. This kept the theatre projectionist busy keeping the picture on the screen.

"In 1914, Pathe Weekly decided to start a ‘Daily.’ Each day, they would select their most important news event (some big parade or high school frolic) and print up one hundred foot length on non-flam film, which was mailed special delivery to theatres around the country. This burst of enterprise soon proved too costly, but it was a forerunner of the enterprise of today when we take a picture in Los Angeles today and show it on Broadway, New York, tomorrow night.”

**Herbert Aller.**

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**Patents**

Last month the following patents of interest to readers of INTERNATIONAL PHOTOGRAPHER were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and trade mark counsel.

**No. 2,110,406—SUBMING PHOTOGRAPHIC FILM.**
George S. Babcock, Rochester, N. Y., assignor by mesne assignments, to Eastman Kodak Co., Jersey City, N. J., a corporation of New Jersey. Application Feb. 26, 1936, Serial No. 65,873. 10 Claims. (Cl. 95-8) A photographic film comprising a cellulose organic ester support, and in order thereon, a layer comprising a mixture of synthetic resin selected from the group consisting of polyvinyl resins and alkyd resins and a hydrolyzed cellulose organic ester, a gelatin layer, and an emulsion layer.

**No. 2,110,875—FILM FEEDING MECHANISM.**
Arthur J. Holman, East Orange, N. J. Application December 10, 1934, Serial No. 756,764. 10 Claims. (Cl. 271-2,3) In a film feeding mechanism, a unit comprising two rotatably mounted sprockets, means for maintaining constant spacing between said sprockets, means for rotating said sprockets, and an idler supporting member common to and hingedly mounted between said sprockets.

**No. 2,110,930—RECOVERY OF VALUABLE METALS FROM PHOTOGRAPHIC FILM.**
George Doffin, Holcot, France. Application Dec. 17, 1935, Serial No. 54,906. In France Dec. 20, 1934. 2 Claims. (Cl. 204-16) A process for recovering from photographic fixating baths, which comprises maintaining the tension between the electrodes at a value slightly below the critical value for which a silver deposit assumes a brownish colouring in an electrolysis bath containing less than 0.1 gramme of silver per liter, this critical tension ranging between 0.3 and 0.5 volt.

**No. 2,111,012—CAMERA SUPPORT.**
Albert W. Tompsett, Holdenville, Okla., assignor to United Research Corp., Long Island City, N. Y., a corporation of Delaware. Application Sept. 21, 1934, Serial No. 744,952. 3 Claims. (Cl. 246-1,2) A camera free-head comprising a pair of axes on a rotatable base; a camera plate spring mounted on said axes.

**No. 2,111,665—STEREOSCOPIC MOVING PICTURE DEVICE.**
William S. Thebes, Chicago, Ill. Application Oct. 12, 1935, Serial No. 44,649. 2 Claims. (Cl. 88-16.6) A stereoscopic moving picture camera having a single lens in front of a moving film, a plurality of stationary reflectors spaced apart along a line perpendicular to the axis of the lens for reflecting images from spaced points into the lens, means for moving the camera in a cyclical path in the line of said reflected rays, and means having alternate light intercepting openings movable in timed relation with the exposures of the film to produce a multiplicity of line images on each exposure of the film.

**No. 2,111,445—METHOD OF PRODUCING MOVING PICTURES OF THE STEREOGRAPHIC VA- RITY.**
Edgar J. Fuller, Dallas, Texas, assignor to John V. Corp., Dallas, Texas. Application May 20, 1935, Serial No. 22,462. 6 Claims. (Cl. 88-16.6) The method of producing stereoscopic motion pictures which comprises forming two stereoscopic images of the scene from slightly spaced view points, recording the images separately and alternately on a film, forming a line series of the position of the camera and recording said images alternately on the film, all of the images being taken at the same distance from the object but each at a different angle, and at a rate to provide persistence of vision, and projecting said images onto a screen and diffusing the projected image at the screen into small uniform alternately, laterally and forwardly spaced line elements.

**No. 2,111,741—FILM GATE.**
Frank E. Range, Oaklyn, N. J., assignor to Radio Corp. of America, a corporation of Delaware. Application Dec. 31, 1935, Serial No. 118,518. 1 Claim. (Cl. 88-17) A pressure shoe for a film gate including a spring mounted plunger coating with a slotted bracket for removably retaining said shoe in operative position.

**No. 2,111,759—FILM DEVELOPING MACHINE.**
William L. Doudin, New York, N. Y., assignor to Radio Corp. of America, a corporation of Delaware. Application Aug. 31, 1934, Serial No. 742,205. 6 Claims. (Cl. 95-94) In a developing machine, a liquid receptacle, and a film treating chamber closed at its upper end and extending upwardly therefrom and adapted to contain a liquid maintained by atmospheric pressure, whereby film may be passed continuously through the region of reduced pressure at the upper end of said receptacle.

**No. 2,111,806—UNITARY MOUNT FOR SOUND HEADS.**
Ernest Ross, Elmhurst, Long Island, and Paul H.auge, Island Park, N. Y., assignors to United Research Corp., Long Island City, N. Y., a corporation of Delaware. Application Nov. 5, 1935, Serial No. 48,278. 7 Claims. (Cl. 179-103) A film unit comprising a combination of a base plate, a flanged impedance roller mounted on said plate, a guide roller mounted on said plate at a predetermined position with respect to said impedance roller, and a drive sprocket, a drive sprocket, and a film gate mounted on said base plate having pressure roller and said impedance roller and said sprocket.
Sound Problems Overcome

Persistent research has extended frequency range, improved quality, given portability and simplified production methods; stereophonic sound prospect for near future.

Sound recording and reproduction is a subject upon which volumes could be written and quite a few have. There has been so much technical literature on the subject, that to attempt to resume developments during the past ten years in any thorough manner would be repetitious and would require more than the space available in this entire issue of International Photographer.

Unquestionably, the most important single development in the motion picture industry since its inception was the adoption of electrically recorded synchronized sound slightly more than ten years ago. This radical change had its effect on every department of production and played a great part in the industry’s technical departments switching from guess-work methods to scientific procedure.

Two principal objectives have occupied engineers since sound burst upon the silent picture industry. One was the goal of flexibility and portability of equipment so that the microphone would not restrict the camera from telling the story with the proper tempo and freedom of screen artistry. The other was the extension of the recordable range along with refinements in the quality and realistic value of sound in dialogue, music and incidental effects.

It can safely be said that in less than ten years, the army of experts from manufacturing company engineers to studio sound department technicians have worked the seemingly impossible. Studios today can record sound that is as near the goal of satisfactory results from an entertainment standpoint as was dreamed of in the late 20’s; and although theatres are not yet equipped to handle the super sound, a definite campaign is under way to bring about a coordination between theatre equipment and the better type sound now possible.

Meanwhile, stereophonic sound has been demonstrated as practical and will be made available when theatre equip-
brought recorded sound to a high stage of technical development include: push-pull recording, the Shearer two-way horn system, pre- and post-equalization methods, hill-and-dale in discs, RCA's ultra-violet recording and non-slip printer, high fidelity from both RCA and ERPI, multiple channel and re-dubbing.

The frequency range has been extended from the approximately 100-4500 of early sound days to 40-8000 and is constantly being extended.

Directional microphones, portable equipment, improved playback materials and methods, have permitted the sound man in the studios to cooperate to the fullest with the cameraman. All such work in the studios is done by members of Local 659, IATSE, under the existing basic agreement between the studios and the international unions.

ERPI and RCA still dominate the sound equipment field as they did at the start of sound, although RCA has made considerable inroads against ERPI's studio contacts. While a number of companies, including Bell & Howell and DeVry, with new steel and 16 mm., Eastman, Ampro, Balsley & Phillips and similar firms are concentrating on the sub-standard field, which has swept to increasing importance with the recent emphasis on visual education and the use of film for sales and promotion. Art Reeves in Hollywood and the Canady organization of Cleveland are the outstanding firms among the independents. Mitchell Camera Company also is entering the recording field.

Reeves and Mitchell are well known to readers of International Photographer over the past ten years, while Canady only recently started exploiting his products through this medium. Both Reeves and Canady are veteran "I. A." men.

Canady is the only producer of sound-on-film equipment who actually manufactures recorders, re-recorders, recording lamps, etc., so as to provide a complete service. The Canady DeLuxe recorder has been furnished for either 35 mm. or...
16 mm. work but due to increased interest in 16 mm. use, a new recorder built especially for 16 mm. work will be available this month.

The new Noise Reduction Unit ("Noiseless Recording") announced by the company in this issue is the result of several years work. The unit can be used with any existing equipment without rebuilding amplifiers. All glow lamp equipment can be brought up to date and can produce sound with a minimum of background noise by the addition of this unit. It is fully protected by Canady patents.

The only industry in which the rapidity of technical and artistic change compares with the motion picture industry is radio. In fact, it seems that radio may have moved farther during the last ten years than has the picture industry. Ten years ago the movies were wordless but at least there were movies, while radio broadcasting was just creeping out of the experimental stage.

The average radio receiver of ten years ago was a massive and expensive thing, generally operated by bothersome and leaky batteries capable of reproducing music barely recognizable as such. Chain broadcasts were practically non-existent and such radio advertising as existed was almost entirely local in character and entirely lacking in the showmanship that surrounds most of the commercial plugs on the air today.

High-powered stations on cleared channels were just being thought of ten years ago and anyone living more than 50 miles or so from a station could not count on enough signal to have any real entertainment from radio.

Set manufacturers were busy arguing whether a decent receiver could be built and sold for less than $100; but most popular sets sold from $175 to $300. The big names in the radio field were Kolster, Fada, Grebe, Majestic, Silver-Marshall, Sky Raider, Remler, Stromberg-Carlson, Stratton, Kellogg and RCA. A tiny firm in Philadelphia were trying to sell a gadget called the "Transitone" radio for use in a motor car. The first ones were only meant for use when the car was standing still as ignition noise drowned out the feeble signals when the motor was running.

The technical advances made in the art of radio and particularly broadcast communication during the last ten years are nearly as marvelous as radio itself.

Ten years ago a high fidelity broadcast transmitter had a frequency response range from about 100 cycles to 4000
cycles per second. They were capable of about 50 per cent distortionless modulation in station the high ground noise and hum on the carrier limited the usable volume range to about 20 decibels. Today a modern broadcast transmitter has a flat frequency response from about 40 to 8000 cycles per second, the modulation capability is pretty linear to about 90 or 95 per cent modulation and the ground noise on the carrier is close to 50 decibels below 100 per cent modulation. To average ears this type of reproduction could rarely be distinguished from the original if the broadcast receivers were as good as present day broadcast transmitters. However, while the receivers have been materially improved they still are behind the transmitters in quality of reproduction.

Television existed ten years ago in the laboratory but scanning methods were crude and the reproduced pictures had very low detail and definition. Television today still is in the laboratory but it is much farther advanced now than radio broadcasting was ten years ago. Pictures of quality, brilliance and size comparable to good 16 mm. home movies are now practical—if someone can be found to pay for them. The names of Farnsworth and Zworykin, and perhaps duMont, will be remembered as the great developers of television. Any mention of the names of early pioneers in the field of facsimile transmission would be very unfair to the newspaper of the future. A very short time should see a cheap attachment to present radios, utilizing the radio equipment during the night hours from midnight on for printing a facsimile newspaper to be ready and complete with ads, cartoons and halftones by daylight next morning. Very few problems remain to be licked in the facsimile field and several broadcast stations are now installing transmission equipment for this purpose.

The future of television technically is difficult to forecast. However, several rather radical simplifications of the equipment and transmission medium are bound to appear as soon as enough smart young minds start playing with the problem. Chain television programs are rather far off right now, and the use of motion picture film, rather than wire lines, will probably serve to make program talent available to the whole nation.

While television will obviously compete with motion pictures as a way to spend an evening, it will also help the picture business in offering a perfect means for plugging new pictures and new personalities. Television will draw extensively on motion picture technical and dramatic talent as the problems involved in creating a television show will be very similar to those of motion picture production. The smart motion picture producers will get in early and avoid the rush for station licenses, technical talent and patents because there are only so many television channels available. When these are gone there will be no more.

New York and Los Angeles will be the first and foremost centers of television activity for some time to come for technical, artistic and financial reasons.

Television can expect its share of fly-by-night promoters and many headaches are lying in wait for those who jump in blindly hoping to make a million overnight. The motion picture industry might take a leaf from the book of the Don Lee Broadcasting System, which has been quietly and rather inexpensively experimenting with various television systems for several years and has actually been broadcasting television programs so that when commercial television frequencies are finally allocated by the Federal Communications Commission they can justifiably apply for choice of the available channels.

At the present state of the art there is only room in the ether for about six television stations in the Los Angeles area, and as NBC, Columbia and Don Lee are certain to account for three of these someone is obviously going to be left out.

Meanwhile, with Hollywood assuming a dominant position second only to New York as a major network program source, Columbia Broadcasting System is nearing completion of a new headquarters right on the site of the old Christie studio at Gowen and Sunset, while National Broadcasting is rushing construction on the site of the old Paramount lot at Vine and Sunset. Technical details of Hollywood's new "Radio City" will appear in early issues of International Photographer.

J. N. A. Hawkins, 695, IATSE

New ARC Report

After 18 months of tests and research, Sound Projection Equipment Standards Committee makes recommendations.

The Academy Research Council early in April sent the report of its Committee on Standardization of Theatre Sound Projection Equipment Characteristics to engineering departments of each of the companies participating in the Council's cooperative technical program. The report contains recommendations covering the various parts of the theatre reproducing system, resulting from approximately 18 months of tests and experimental work by the Committee.

Appointed by the Council in November, 1936, the Committee, under the chairmanship of John Hilliard of MGM set out to prepare standards and specifications for theatre sound equipments which will permit the best possible re-

production under general operating conditions of the recordings of all studios in all theatres, regardless of the type or manufacture of the sound reproducing equipment.

The specifications and recommendations contained in the report have been prepared for the guidance of the engineering departments of the producing companies participating in the Research Council cooperative technical program, and the engineering departments of the associated companies affiliated with these producing companies, in purchasing new sound projection equipment.

Copies have been distributed through each company's representative on the Council to the proper officials of each producing company.

Copies are also available upon request to all sound equipment manufacturers, to be used as a guide in designing, testing, or manufacturing new equipment, or to theatre servicing organizations and exhibitors who may be interested in the opinions of the Council on sound reproducing equipment.

The Committee installed several complete reproducing equipments in the Filmarte in Hollywood where, through cooperation of Fox-West Coast Theatres, a series of experimental tests were conducted on each of these equipments under identical operating conditions.

Two sub-committees were appointed to assist the Standardization Committee; one, a Horn Test Steering Sub-committee under the chairmanship of Homer Tasker and consisting of John Hilliard, Don Loye, William A. Mueller and Wallace V. Wolfe, which drew up all of the test plans, and the other a Test Operating Sub-committee consisting of John Hilliard, Chairman, John Aalberg, Lawrence Aicholtz, Lloyd Goldsmith, Don Loye, K. F. Morgan, Gordon Sawyer, William Thayer, S. J. Twinning, John Volkman, Samuel A. Waite and Wallace V. Wolfe, which actually conducted all of the tests from which the conclusions in the attached report were drawn.

In addition to producing companies and Fox West Coast Theatres, Electrical Research Products, Inc., RCA Manufacturing Company, International Projector Corporation and the Ashcraft Lamp Company all cooperated in the test program.

The Committee's report is divided into six parts and contains general recommendations on each of the following classifications:

The Sound Head and Associated Equipment.

Volume Control Equipment.

Amplifiers and Filters.

Loud-Speakers and Dividing Networks.

Studio and Preview Theatre Requirements.

Details of the report will be published in next month's International Photographer along with comment from various authorities on the proposals.
Two jumps in the march of progress to the present effective and artistic lighting technique. At left, the Jesse Lasky studio, about 1914, using the overhead diffusing screens, when natural light was California's big talking point; at right, 1934, twenty years later, a scene at Paramount from the Bing Crosby-Carole Lombard musical, "We're Not Dressing."

**PAN AND SOUND PUT INKIES ON TOP**

Mole-Richardson and Bardwell & McAllister dominate in studio lighting equipment field; General Electric and National Carbon make vital contributions.

Ten years ago motion picture lighting was in the midst of a revolution. A new light-source—the incandescent filament globe—was displacing arc and vapor-tube illuminants which for two decades had been supreme.

It has often been implied that this change was brought about by the coming of sound, and its attendant need for silent sets, but sound merely influenced and accelerated the change, and was not its primary cause. Actual cause was the popularization of panchromatic film, which took place some time before Al Jolson met the Vitaphone. The bluer light of the earlier illuminants was excellent for use with the strongly blue-sensitive orthochromatic emulsions which had little sensitivity to yellow and none to red. With the coming of panchromatic film—sensitized also to yellow and red—the warmer radiation of the Mazda globe became a distinct asset.

Even before panchromatic had proved itself for major production use, a few forward-looking cinematographers and engineers had essayed experiments with incandescent lighting. Most of these early experiments, however, remained merely experiments because there were neither globes of adequate power nor lamps in which to employ them for motion picture lighting.

Outstanding pioneer experimenters were Peter Mole and Elmer Richardson, at that time in the employ of one of the leading manufacturers of arc lighting equipment. They had the vision to see the handwriting on the wall as panchromatic film made its initial bow. They interpreted it, moreover, into an inevitable need for incandescent studio lighting equipment. Urging such research they were met with the attitude typical of many of the more conservative minds of the day: that the arc was the one light-source ideally suited to motion picture lighting, and that money spent experimentally with any other illuminant—especially Mazda globes—would be wasted.

Far from accepting this dictum, Mole and Richardson had such confidence in the inevitability of Mazda lighting that they resigned their positions and joined forces, forming a new firm under the name Mole-Richardson Company. It is significant that none of the firms which a decade ago dominated the studio light-
other enterprising firm, Bardwell & McAlister, but a few years old, as a leading competitor.

The first incandescent unit developed commercially was one analogous to the arc broadside universally employed for "general" and "filler" lighting. These first "inkie" broadsides borrowed much from arc practice. Reflectors surprisingly like those used for arc broadsides housed, in these earliest designs (MR Types 19 and 20) first one and then two 1000-watt tubular projection-type incandescent globes. These produced a wide flood of light of adequate intensity and fairly satisfactory distribution. Cooling these tubular globes in the relatively restricted space of the lamp-housing proved a considerable problem, and the higher working temperatures seriously affected the burning life of the globe.

These units, however, pointed the way to the possibilities of incandescent lighting, and brought the globe-design engineers of the General Electric Company's lamp division into consultation on the problem of making globes suited to studio use. The tubular globes soon were supplanted by the now familiar pear-shaped globes of 1000 and 1500 watt capacity.

The next units to appear were a range of condensing-lens spotlights built around incandescent globes of 1000 and 2000 watts (MR Types 35 and 25, respectively), and somewhat later, the first "Baby Spot" (MR Type 129) which used a 500 watt globe. Viewed in comparison to the arc spot lighting units of the day these first "inkie" spotlights were a revelation in the simplicity of their operation and in the smooth, flickerless beams they projected. Cameramen speedily discovered that incandescent lighting could be enormously flattering to the stars.

Two Bardwell & McAlister inks. At left is the 2000-watt Keg-lite Spot and at the right the popular T-5 Studio Spot.

Trucking up on T-5 Spot to show construction of auxiliary optical system.
Two Mole-Richardson inks. At left a "H.I. Arc," very valuable for color photography; and at right, the M-R 5KW Senior SolarSpot.

At about the same time, a new and better unit for general lighting was evolved. At the time, it seemed little short of revolutionary, though today it has so completely superseded the incandescent broadside for general lighting that it has become a familiar commonplace. This unit was the "Rife Lamp" (MR Type 211). It used a single, pear-shaped globe of 1000 or 1500 watts, which was burned in a horizontal position. The reflector was a deep, bowl-shaped shell into which was fitted a glass mirror imprinted with a special pattern of spiral corrugations suggestive of the rifling of a gun, from which the unit derived its name.

Outstanding advantages of the "Rife" lay in the fact that it projected its smooth, soft flood of light over an angle of 60 degrees both horizontally and vertically, thereby overcoming a weakness of the early broadsides, which illuminated a shallow vertical angle and often failed to illuminate adequately the lower parts of the foreground. The "Rife" lamp has remained unchanged for nearly a decade; only modifications in the design being structural improvements and substitution of a metallic reflector for the somewhat fragile glass one. The present, modernized "Rifle" (officially MR Type 45) has become one of the most widely employed lighting units in the world.

Following this development, the "inkie" range was extended by the introduction of a series of high-power, reflecting spotlights. These served much the same purpose as the famous Sun Arcs, and were accordingly called "Sun Spots." They were made with 18, 24 and 36 inch mirrors, using 2000 watt, 5000 watt and 10,000 watt globes especially developed for the purpose. They were known as MR Types 220, 226 and 360, respectively. These incandescents were evolved at the psychological moment. As incandescent lighting equipment became available, first one and then another cinematographer decided to take the risk of filming a full production on panchromatic film, and only one firm—Mole-Richardson—had developed incandescent lamps suitable for studio use.

Cameramen and electricians throughout the studios ranged themselves into two camps, for or against the new lighting system. Finally, during the winter of 1927-28, the industry as a whole through the Academy Research Council cooperated in putting the new film and lamps to systematic tests, as nearly as possible under service conditions. Producers donated studio space and current; film manufacturers donated film; cameramen and other technicians donated their time in a memorable series of tests which ultimately convinced the industry that the new light was technically and artistically superior, and actual production indicated that it offered substantial economies, as well. In a paper presented at a convention of the Society of Motion Picture Engineers soon after, it was remarked that in comparison with the normal use of arcs at that time, the cost of incandescent equipment represented a saving of almost 55 per cent; operation, a saving of nearly 58 per cent; and in current used, an economy of close to 65 per cent.

These facts alone, when added to the more pleasing results obtained on panchromatic film with incandescent lighting, would in time have brought about a complete change of lighting equipment. But at this juncture came sound, to accelerate the change.

The sound technique of those days demanded quiet sets and, in addition, often involved extremely long "takes" during which the illumination must be free from flicker. The only lighting units available to meet these demands were the new "inkies." Inevitably every studio as it changed from silent to talking pictures, changed also from arc to incandescent lighting.

For the next several years the chief problem of the lamp manufacturers was that of filling the industry's demand for inks. Detail modifications were made in the lamps as practical experience indicated possible advances. Constructing lamp housings largely of aluminum castings and of metal parts all of which had the same factor of expansion served to eliminate the previously unimportant crackling noises made as lamps warmed and cooled. The use of faceted ("aplanatic") metal reflectors in the mirror spotlights somewhat improved the distribution of light as the beams were flooded. "Spill rings" minimized the problem of "spilled light" from the mirror-projectors, allowing only projected—and therefore controlled—light to pass.

During this period, too, a considerable variety of special-purpose lamps were developed, generally to solve a specific problem of some individual cameraman on a particular production. Among these was the familiar "Lupe," which proved so successful it became a standard part of the Mole-Richardson line under the name "Handilamp" (MR Type 127). Another was the "Sky Pan," evolved at the request of a cameraman faced with the problem of lighting unusually large backgrounds. The "Cinelite" and "Photolite"
Above, two products from Beattie's Hollywood Hi-Lite division of Otto K. Oleson. Left, Boom-lite, flexible source of light for portrait photography; right, Hi-Key 1000-watt Spotlight. Below are the Mole-Richardson Junior and Senior Solarspots.

were developed for industrial filming, where portable lighting equipment was needed.

Other developments, not so intimately connected with lighting, included microphone booms, camera dollies and rolling tripods, silent wind-machines and the like, while in the field of auxiliary electrical equipment may be mentioned remote-control panels and dimmers for controlling lights, and portable, gasoline-powered electric generators for generating current for location use. Some of the latest of these generators provide enough current to light and power a town of 2500 population, yet fit compactly on a single motor truck.

During the period of the depression, the research facilities of the Mole-Richardson organization concentrated on the problem of developing a new type of lamp which would be free from the faults inherent to the conventional parabolic-mirror Sun Spots. These latter units were efficient only when their beams were concentrated in a tight spot; thereafter, as the beam was flooded, the inescapable characteristics of the parabolic mirror created an increasingly large shadow in the center of the beam, surrounded by a ring of intense illumination, sometimes 300 per cent stronger than the central portion of the beam.

The solution was ultimately found in the Fresnel or echeleon type of lens, a condensing lens of large diameter (or high speed) in which the surfaces were rearranged in the form of concentric, lenticular circles, eliminating excess thickness and minimizing breakage risks. A special lens of this design was finally developed and became known as the "Morinc" lens.

The first unit utilizing this lens was introduced in the spring of 1935 and was named the "Junior Solarspot" (MR Type 210). It utilized a 2000 watt globe, and formed its beam by means of the "Morinc" lens and a small auxiliary spherical mirror which reflected the rear-ward rays from the globe forward through the lens. Radically different from any previous lamps in appearance, it was equally different in performance. The distribution of light within the beam was smooth at all beam-spreads, while the range of divergences was greatly in excess of any-
thing possible with the older mirror spotlights, from a tight spot-beam of less than eight degrees divergence to a flooded spread of 45 degrees.

Similar units of both larger and smaller capacity followed. These include the 5000 watt "Senior Solarspot" (MR Type 214), a 1000 watt Solarspot (MR Type 208) and a "Baby Solarspot" (MR Type 206) of 500 watts.

Coincident with this development, and paralleling it, was a program of special research undertaken with the National Carbon Company's experts for the Technicolor Motion Picture Company. When the present three-color Technicolor process was brought forth, it was found necessary that adequate lighting equipment be available for it. A fundamental problem of any system of natural-color photography is that of the color of light illuminating the subject. If the process is to achieve commercial flexibility, it must be possible to use the same cameras, without adjustment, for both exteriors filmed by natural light and interiors filmed by artificial light. The light used for the interior scenes must therefore be of a color closely matching the "white light" standard of normal daylight.

Due to their high yellow, red and infra-red radiation, the usual incandescent lamps cannot be used for this purpose without the application of corrective filters which absorb considerable light. Moreover, for the early requirements of the Technicolor process, higher levels of illumination were necessary than could be supplied by the incandescent units available.

It was determined to standardize on arc lighting for Technicolor photography. The first units developed were 'Side Arcs' (MR Type 27) and 'Scoops' (MR Type 29) for general lighting. These lamps were immense improvements over any previous units of their types. They are twin-arc units, using special carbons which emit radiation almost perfectly matched to the daylight standard. These mechanisms are such that they burn noislessly, and with virtually no flicker. They burn steadily for long periods with a minimum of attention, and produce 250 percent more light than previous twin-arc broadsides.

The next unit was a high-intensity arc spotlight based on the same optical principles as the incandescent "Solarspot," and known as the "H.I. Arc" (MR Type 90). It is a high-intensity, rotary carbon arc spotlight operating at 120 amperes, which burns silently and steadily, and casts the same smooth beam as the Solarspot. A larger unit, the 150-amperc "Ultra H.I. Arc" (MR Type 170), followed. A still larger unit was designed, but, due to improvements in the Technicolor process which greatly reduced the amount of light needed, was never built. The final lamp in this series was a relatively small spotlight of 65 amperes (MR Type 65) which completed the necessary range. All of these high-intensity arc units radiate light slightly more blue than is desirable for natural-color photography and are accordingly used with a very light straw-colored gelatine filter which corrects their light to the daylight standard.

These units are used exclusively on all Technicolor productions, wherever made, and to an increasing extent the "H.I. Arcs" are finding application in monochrome cinematography as well. In this latter field they are used for the production of sunlight effects and strongly-defined shadows. Of late some use has been made of incandescent units—chiefly Solarspot—in Technicolor photography. For this usage the General Electric Company has developed special high filament-temperature globes in various wattages. They are in principle similar to the familiar photoflood globes, and are designated as "C.P." (color photography) type globes. Used without any corrective filters, these units are employed for lamb-light, torchlight, firefight and other warm-toned effects. With the special blue corrective filters they are used for normal effects in positions where it may not be convenient to place an arc.

With all this, the Mole-Richardson Company, "inkie" pioneers, has expanded to serve virtually every important production center. Agencies are active in New York, Cairo, Egypt, and Bombay, India, while affiliated companies manufacture Mole-Richardson products under license in England and now also in France. It is a significant fact that the factory of Mole-Richardson (England), Ltd., is almost double the size of the plant which housed the parent company at its inception in 1927.

It is also significant that all of the firms supplying lighting equipment to the American studios have been located in Hollywood rather than elsewhere. Chief among the other firms manufacturing studio lighting equipment, and practically
the only one still active, is the Bardwell-McAlister group which has within the past year introduced a 2000 watt spotlight, the "Keg-lite," which utilizes the echelon-lens principle. Bardwell-McAlister has also developed a series of parabolic-mirror spotlights in which a small echelon-type lens is used in place of the conventional "spill ring," thereby adding considerably to the flexibility of this type of equipment. Among the other firms which have been in this field during the past ten years may be mentioned also the "Laco" and "Arro" organizations.

The firm of Bardwell & McAlister, Inc. was originally organized for the purpose of supplying generators to the studios. In 1935, seeing the need for better equipment, they expanded into the business of manufacturing and renting motion picture electrical and lighting equipment. During these few years this firm has adopted many new and progressive ideas in design of their equipment, striving to cut time of placing and operating equipment on the set where minutes mean dollars.

Among the first pieces to be pioneered was the Zephyr Wind Machine, a silent machine of sufficient power and flexibility to be especially adaptable for use on inside sets. Its mechanism employs the Sirracco blower instead of the conventional aeroplane type propeller. A convenience of this type of blower is the practicability of using ducts to pipe the wind to remote parts of the set or at any place away from the machine.

Following this came a new and revolutionary addition to the incandescent class, the Triple-5 Studio Spot. This lamp, same size and shape as the 24-inch sun spot, employs a Fresnel type lens before the globe in place of the spill ring. The lens projects light formerly shielded off as waste, into the field where it supplements the light from the 24-inch mirror located behind the globe. A differential focusing screw keeps the globe and lens in proper focal relation at all spreads. The lamp gives an even field of light devoid of dark spots, shadows, or hot rings, and possesses an intensity more than double that received from the old 24-inch sun spot with spill ring. Old style 24's can easily be converted into T-5's by the addition of the necessary parts. Hence a studio may equip itself with these up-to-date lamps by modernizing rather than obsoleting their present 24's. The T-5 has proven very popular with the motion picture industry, not only for its greater light output, but for the smoothness of the field, with no time being lost on the set balancing out shadows and hot rings.

Almost simultaneously a new Fresnel type lens was developed, called by one of its characteristics, "Leak-Proof" lens. As the name implies, this lens gives no side spill light. This startling result is accomplished by especially processing the under sides of the prisms in the manufacture of the lens. This lens is used in the T-5 and also in the Keg-Lite, a 2000 watt unit which is ideal for key lighting and other critical places where the absence of spill light is essential. Embodied in this lamp is the new patented quick focusing device, which eliminates the old screw focus. This enables the operator to change the intensify or follow a figure during a scene quickly and smoothly.

In addition to the above, Bardwell & McAlister, Inc. carry and manufacture a complete line of generators, cable, spiders, power wind machines, and other electrical equipment demanded by the studios.

The basic technique of lighting has changed remarkably little during these ten years of equipment progress. As faster film and better lamps appeared, there has been a marked tendency to reduce the amount of light used. The most noteworthy change has been the development of the so-called "key lighting" technique. This has almost completely eliminated the maze of general or floodlighting units which formerly encumbered stage floors. Instead, a relatively few units, placed rather high, and usually positioned beside the camera, take care of the principal or "key" lighting of the players, while the burden of light-

**Make-Up**

**NOW AN EXACT ART**

Modern make-up materials and technique are keyed to the progress made in other departments of production through switch from greasepaint to panchromatic.

With many varying changes of light, camera, and film, it has by the same token been necessary for many definite changes to be made in the art of make-up in material, in application, and in execution during the past decade.

Ten years ago the industry was using orthochromatic film, with which it was necessary for the make-up artist to use the heavy stick make-up made by Stein, Lechner, Warnseron, Meyer, Lockwood, and Plucker & Aarons. These grease paints were of a heavy consistency and were applied by first using some emollient substance on the face usually cold cream and then by rubbing the stick on the face applying a heavy-mask-like surface. This, in turn, was smoothed out and blended to the best of the ability of the individual to give an even consistent surface. In color it varied from a very light pink to a very deep yellow. The photographic result was about the same regardless of
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color. Eyeshadow was a light blue, a
green, or a black.

In creating characters there were very
decided limitations in that colors of ma-
terials used were extremely limited and
they were unsatisfactory as to consistency
color contained in manufacture. These
discrepancies, coupled with the type of
light used wherein cold arc light or a
Cooper Hewitt Vapor light created a very
ghostly effect both on and off the screen.

This was followed in turn by the early
panchromatic film with which it was ne-
necessary to change the light to the incandes-
cent lamp as explained in the article on
lighting in this issue of INTERNATIONAL
PHOTOGRAPHER (Page 43). This lighting
change was also necessary with the advent
of sound. It also became neces-
sary to change the make-up bases from
what had been a thick heavy substance to
a monotone and the monotone was brown.
The monotone developed and distributed
by the Max Factor Corporation became
the basis of our present day Panchromatic
make-up material.

In comparison, present day make-up is
as different from make-up of ten years
ago as the difference between day and
night. Today the base is of a fine, flex-
ible, thin material which can be applied
evenly, quickly and thoroughly over the
entire face giving perfect actuation to all
muscles and features of the face. Decreas-
ing the diameter of material used also re-
duces the amount of powder necessary to
fix the make-up. Today there is a vast
color range in bases used for make-up, a
vast color range in materials used for
high-light and shadow, a flexible color
range in eye-shadow, a reduction in the
color depth used for pencilling; and in
all a complete departure from the old ma-
terial and methods of application.

As to the changes brought about in the
application of make-up, where ten years
ago the application of make-up was not
a fine art and the make-up artist was a
very minor production factor, today the
art of make-up has developed into what
is indeed an exact art. This is well borne
out in such recent releases as "Life of
Emile Zola," "Lost Horizons," "Good
Earth," "Marco Polo," "Prince and the
Pauper," "Pasteur," "Parnell" and similar
pictures. It is also noticeable that in the
past few years the actor winning the
Academy Award has invariably played
a character to which a make-up artist,
member of Local 706, has contributed
greatly.

One could go into great detail and
elaborate at great length on the various
mediums used to create these characters,
the substances, materials and appliances
required to bring about these characters.
By comparison it is indeed a far cry from
"The Hunchback of Notre Dame" of Lon
Chaney to the Sam Jaffe Llama in "Lost
Horizons," both very good, but very aptly
illustrating the changes brought about and
the reality of the characterization shown
in the improvement of the art of make-up.

Screen make-up is better understood
when it is remembered that the normal
head is nine inches, while a big head
close-up on a theatre screen is approxi-
mately thirty-nine feet or a magnification
of the head to a dimension increase fifty-
five times. It is obvious of course, that
an eye-lash assumes the proportion of the
thickness of one's wrist and by this same
token any variation in the blending and
applying of varying colors of make-up to
the face or any lines applied to the face
would photograph as lines, therefore,
there can be no lines, but all effects must
be carried out as shadows.

This anniversary issue resume, how-
ever, is intended purely as an introdoo-
tory dissertation on the art of make-up,
for a further, more thorough and com-
plete history and technical elaboration, on
the ways and means of make-up by my-
self and leading members of our local,
now is being developed to appear regu-
larly in coming issues of INTERNATIONAL
PHOTOGRAPHER.

Vern Murdock, Local 706, IATSE
Addition of sound and color brought radical change in laboratory practice, centering around accurate measuring and control of the developing and printing processes.

The advent of sound into the motion picture industry is of course the significant event of the past ten years, and from it stem all of the major changes which have taken place during this period. Laboratory men have been called upon to solve many obstacles in order to reach the present high quality of sound reproduction.

In the pre-sound era, visual judging of picture quality was in most cases adequate to maintain a reasonably uniform picture quality on the screen. Contrast and density could vary throughout wide tolerances before affecting picture quality to a troublesome extent. As a result, both the negative and positive processing were relatively simple. Likewise, the rack-and-tank type of machine had served admirably for many years for development and fixation, even though its capacities were being somewhat taxed by the constantly increasing volume of product required by the growing industry.

And then pictures suddenly found a voice. Laboratory processing was hard pressed. Technical men had to learn many new concepts, and had to learn them fast. No longer could the eye be trusted as a measure of contrast; instead the quantitative “gamma” with its merciless density-exposure requirements became the law. A multitude of sensitometers and densitometers blossomed where none had bloomed before. Within the next several years all film laboratories adopted the use of sensitometry as the major yard-stick in their control.

With the increasing use of accurate measuring methods and instruments, it...
soon became apparent that the old rack- and-tank machines, already approaching obsolescence because of its limited capacity, was further doomed because of the inferior quality of processing. Continuous single- and multiple-strand machines were used in constantly increasing numbers, and for the past several years have been the sole processing equipment in use in Hollywood.

A second great change which has come into laboratory processing has been the perfection and widespread use of color photography, and especially the use of three-color photography. Although two-color photography has sporadically flourished for many years, notably during the two-color Technicolor and Multicolor periods of 1928 to 1933, it remained for Technicolor to perfect its triple-imbibition process and make three-color prints available to producers. First seen in cartoon form in 1932, and in action sequences in "La Cucaracha" in 1935, the beauty of this process infused new life into the color industry, to the extent that even Dufaycolor, and the final commercialization of the direct-color process (described first by Fisher in 1915) under the leadership of Eastman with Kodachrome and Agfa-AnSCO with Agfacolor, the latter still in the laboratory stage.

Large-scale color processing is the ultimate test of the efficiency of the laboratory staff and equipment. The manifold operations and processes through which the images are produced require a nicety of control and precision far greater than black-and-white processing. Nevertheless, the laboratory staffs of the color companies have been equal to their problems, and the quality of color produced by the difficult Technicolor process and the even more difficult Kodachrome is indeed a tribute to the perseverance and skill of the men in charge of operations.

A third change which has entered the industry in the decennial period just closed is the photograph of continuous electrolytic silver recovery. Pioneered notably by Eastman Kodak Co., the continuous electrolytic recovery units are largely replacing the older recovery methods, and are paying their way many times over. Most laboratories report that the silver recovered from the hypo (in the neighborhood of 1000 g. per million feet processed) more than pays for all chemicals used in development and fixation.

After this cursory glance at the developments in the film laboratory during the past ten years, let us venture a guess at the probable course of future developments.

First, we may expect the gradual realization of the value of rational chemical control in the laboratories, whereby chemical analysis of the processing solutions will make it possible for us to anticipate difficulty before it develops, and to rationally correct incipient trouble.
pH control represents the ultimate refinement in motion picture processing and the

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Second, we will find increasing use of physical chemical methods of pH and redox in increasing the efficiency of all processing operations, both black-and-white, and color.

Third, we will find increasing use of recovery and regeneration processes, whereby the financial efficiency as well as the chemical efficiency of solutions and operations will be greatly increased.

Last but not least, we will find a steady increase in the use of color, accompanied by a constantly improved color quality, and lowered costs.

D. K. Allison

These are the new automatic developing machines for 16 and 35 mm., just completed by the Fried Camera Co. They will be described in detail in the May International Photographer.
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Fundamentals of 20 years ago still basic in projection design; new era of refinements and coordination to improve sound quality on horizon.

These anniversary numbers always bring back the days when, but it also brings to the fore the knowledge that the motion picture industry as it is today is still in the diaper stage. At the present time we like to refer to the days B. S. (Before Sound) which was just such a short time ago. I still have a little yellow card from the erstwhile ERPI telling me I was qualified to run Movietone and another one telling me I could run Vitaphone, when it was necessary to have an aperture that was adjustable to both films.

But going a little farther back—let’s say another twenty years—just about the time your projection reporter was projectionist at the old Automatic Theatre on Main Street out here in Los Angeles, we were running the latest thing in projection equipment, as the pictures on this page show. The fine, modern Edison Kinetoscope! What did it matter if there was no back in the lamp house; that we had to squeeze the carbons together with a small hammer and pliers; that we had no ventilation in a booth just big enough to get into with not room for two people; and had to make patches with one hand and crank the projector with the other and feed the arc with what was left, as well as kick the basket that caught the film from under the machine so that you could run a slide and thread up at the same time; and that once or twice a day, maybe oftener the man in the little room upstairs would scramble out between subjects to dash madly to the front of the house, while the audience wondered what was holding the show up.

All of this was thirty years ago, 1908. Now, suppose you take a real good look at the accompanying photos of old-time projectors and compare them with your new modern Moviographs and E-7 Simplexes. The original ideas are still used, we have not as yet been able to get away from the intermittent movement though we have improved and smoothed it and protected it against the old hazard of fire. But that is not all. We use the same type makeup on the lower magazine, although the similarity ends there. The rotary shutter is still used. More blades and a fan system are included to draw away
all heat from the aperture. The star and cam action of the intermittent movement is practically the same as when we used to drop oil on it when in motion, and have the oil thrown over the film and onto the condensers in the lamp house, while now we fill the oil reservoir of the movement with oil and it is taken care of for days.

Remember the old type arc lamps, and rectifiers, transformers, then the motor generator sets? Compare them with the latest thing and, the new streamlined Copper Oxide Rectifier, using the latest Westinghouse copper oxide plate, illustrated on page 49. The wheel on the front is to increase or decrease the amperage. Had we had a thing like that in 1908 or even in 1918, the manager would have put it in the lobby in a glass cage. Nevertheless, the Mercury arc rectifier, as of 1910, with modern improvements, still is in use in many small houses in the rural communities, and the motor generator sets are just as popular as ever.

One particularly outstanding improvement in the finished product on the screen during the last decade is found in light sources. We have witnessed the evolution of the low intensity or mirror lamp from a laboratory experiment into a light source of sufficient intensity to deliver screen illumination in the range of eight to fifteen foot candles reflected light depending upon the size of the image and the reflective properties of the screen. This singular advance was made possible, as lamp manufacturers are the first to admit, by the development of carbons of small enough size yet having sufficient carrying capacity to conduct sixty to ninety amperes without penciling. Well within these limitations are the National Carbon Co.'s product which has been named "Suprex." This product has done more to increase the screen illumination than any development that has thus far forged its way along the rocky road that leads to national recognition.

Further assistance was rendered by Bausch and Lomb, who perfected a reflecting mirror which is sufficiently immune to the terrific heat encountered within the lamp to be practical. The lamp manufacturers have made excellent use of these developments and have added ingenious feeding mechanisms which largely overcome the inherent weakness of all mirror lamps, that the field is affected by the slightest variation of crater placement. The success of the lamp is dependent upon the maintenance of the luminous ball at the tip of the positive carbon at the exact focal point at all times. Any variation of the position of the carbons while they are being consumed will immediately cause a brown, uneven field on the screen. Late type lamps have almost completely mastered this shortcoming and they maintain a uniformly brilliant screen during screening with a minimum of manual adjustment by the projectionist.

Since this type of lamp has been on the market it has been adopted as standard equipment by several of the largest circuits of theatres in the country and bids fair to completely supplant all other types previously used. Its advantages are many. Chief of these is, of course, its clear white light. The fact that it uses little enough current to allow the use of copper oxide and other current rectification devices or of a very small generator. They have the added advantages of low cost in carbon consumption and a minimum of heat in the projection room.

Taken as a whole, the outstanding advancement in projection equipment since the "good old days" is the lamps we have just described in detail. This is to be considered as one man's opinion as of this date. As we delve into other phases of modern equipment for discussion in this publication in the months to come, I may even change my mind. Until then I believe the most important NEW thing in high class projection is the reflector lamp.
From the sound standpoint, while much progress has been made by comparison with the helter-skelter years when sound first was linked to the camera, there still remains much constructive work to be done. For the first time, technical experts are beginning to gain a degree of mastery over the major problems surrounding first class sound reproduction. New equipment allowing much wider latitudes and finer showmanship now is in use at the studios and a few theatres are equipped to take advantage of the modern trends.

I do not believe that most of the craft will wish to be bored in this space with a mere recapitulation of the situation in terms of generalities and guesses into the future. It is the opinion of most of the technicians I have talked to since joining INTERNATIONAL PHOTOGRAPHER'S contributors, that this subject is one for thorough news coverage month by month. It is our plan to do just that in this Projection Section of INTERNATIONAL PHOTOGRAPHER.

At the present time, we are entering an era of refinements and improvements in sound reproduction in the theatre, which if not hampered by a severe business recession, will produce enough news each month to fill several issues of INTERNATIONAL PHOTOGRAPHER such as

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Don’t Miss the start in the May issue of the Projectionist’s Book of Tables by William Comyns internationally known authority on electrical training, and the director of official school of Local 150, IATSE, and cooperating Southern California projectionist locals.

Portable Booth
While last month talking to Merril Chamberlain, chief of projection at MGM, about what was to be had in the way of something new in projection equipment, I saw two prop men rolling a square box onto one of the stages, and seeing a rewind attached to the front, naturally my curiosity was aroused. I followed along behind to see where it went and what was to be done with it when it arrived at the end of its short journey.

To make a long story short as possible this box with myself in tow ended up on one of the large stages in the presence of Director W. S. Van Dyke. No sooner had the two prop men stopped than several other men took charge. There was plenty of action from then on. Some of the men started to connect various cables to outside terminals; another started to erect a 41/2x46 foot portable screen, another cleared a space for the audience on the set to see the picture as well as hear what was going on.

About this time a very important individual walked up and inquired as to

Compare this continuous loop Edison Projecting Kinetoscope first made about July, 1896, with the modern MGM studio continuous setup on next page. This type of projector sold outright for $75 and could project a picture for 50 feet. Note the spool bank which held 15 to 40 feet of film running continuously. It was made under the Edison and Armat projection patents and followed the introduction of the sister projector, the Edison Vitascope, which was made exclusively for renting on a states right basis through Raff & Gammon.

Paul R. Cramp, Local 150, IATSE
where the film was. This was forthcoming at once from the cutting room. Then I found out what this thing was all about and who the important looking gentleman was. He was the projectionist and the square box that I had followed was a portable Moviola-projection booth. Film to be shown was a scene taken the previous day, around which there was considerable discussion, so this equipment was called into action to project a picture as well as run a separate sound track on either 16 or 35 mm. film.

In the accompanying picture layout you will see this equipment. Note that the sound head on side facing camera threads just the opposite to the projection head on the far side, can be run backward as well as forward at any speed, just in case there is a necessity for a check on synchronizing. The projection head is equipped with a 3½” lens which throws a 4½x6 foot picture on a screen 8 feet away. In this case the horns are set beside the screen and a Mazda lamp is used for illumination. Interlock between projection head and sound head in this case is necessarily mechanical. You will also notice that there is no room for the projectionist in this little room, which is absolutely sound proof when running. This is one of Brother Chamberlain’s designs, created by experience for the needs of the moment during production.

After the scene had been run forward and backward for a while it was finally approved and Brother Chamberlain asked me if I would like to see the new loop rack machine over on the synchronizing stage, so over we went to the next block and to a much smaller stage where there were mixers, recorders, projection machines and mikes all over the place, but the machine I wanted to see was off by itself, and quite individual, as the accompanying illustration shows.

**Versatile Loop Racks**

This device is used for synchronization of either effects or dialogue. The loop is used so that any number of takes can be made without rewinding or retreading. The loops vary in length, but this machine can handle up to an 80 foot loop and is electrically interlocked to
the recording machines so any sound effect or dialogue recorded in synchronization with the loop can be re-projected with the same loop. The best takes are selected, then loops and selected sound takes are re-cut into the working print of the picture. You have no doubt wondered time and time again how the dialogue was taken in mob scenes, fights, windstorms, and various other places where it is impossible to hear one talk let alone make a recording of it. Well, this machine is the answer.

The machine, itself, is not so complicated, but the uses it can be put to are too numerous to try to tell you about in this issue. The complete equipment consists of (from top to bottom) a rack to hold the rollers that guide the film, rack being interchangeable, according to the size of the loop, thence through the standard rear shutter type Powers projection head and into what was once upon a time a lower film magazine; over this roller then back out and up to the loop rack again. Note just below this magazine on the bottom, the position of the synchronous motor. This motor is set perpendicularly and drives straight up, with only one gear to connect it to the projection head.

From this stage Brother Chamberlain took me to another projection room where he was making some tests with a new projection screen. There I met Engle of the Flat Light Screen Company who was assisting in making this test in comparison with other projection screens now in use.

They pick various screens at random and put them side by side, showing half a picture on one screen and half on the other. We were very pleased to note that there was approximately 30 to 35 per cent more brilliant on the Flat Light screen than on the other one. Using a Weston Photometer we were able to measure one foot candle more and a fraction under one foot lambert more of brilliance on the Flat Light screen, than on the comparison screen.

While talking to Mr. Engle after the test and listening to his enthusiastic sales talk, I find I must disagree slightly with some of his assertions, but as a whole the screen proved highly satisfactory from all tests, as far as projection is concerned.

To explain to you some of the radical departures of this screen and why, in my estimation, it proved more superior:

First, the screen is seamless; it is made of two gelatinous masses. First or base is a yellowish hue, about the color of orange Jello; second coating is of a sort of creamy consistency when applied but later on turns snow white. Due to its non-porous nature it absorbs practically no dirt and can be washed with Ivory soap and lukewarm water, without harm to it.

Second, we find that there is very little distortion at a viewing angle of 45 degrees on either side. This is due, as you will note from the accompanying picture, to the innumerable little cones protruding from the screen, which have an unusual power of reflection, thereby practically eliminating distortion from the sides. This screen should be exceptionally fine for houses with a short throw and a wide auditorium. In his letter which I have before me, Mr. Engle claims that this screen will eliminate keystone, but we have found that it will eliminate only a certain amount of the keystone illusion, but that it does have a tendency to improve the quality of the picture, especially color pictures, and also seems to have a slight stereoptic effect.

The lamp used with this text was a Peerless Magnarp lamp, using Suprex carbons, drawing approximately 90 volts and 68 amperes, with a throw of about 90 feet on a 14x17 screen. This screen has not been fully tested and approved for sound as yet. Complete report for sound will be in the May issue of International Photographer.

New RCA Motor

Coming back from MGM that day, I dropped in to see Brothers Bramel and Moelle, members of Local 150, IATSE, to see a new installation they had called about and found that RCA was putting out a new motor, as the accompanying photograph shows. Advantages are quite numerous but space this month permits me to review only the most salient improvements.

The new flywheel, now located between motor and projector head (as the arrow indicates) gives a much smoother and slower start, doing away with the fluctuations due to varying line voltage. The small knurled wheel that was on the shaft between the motor and projector head now has been moved to the head end of the motor (as the cross indicates) which makes it very handy to reach to turn motor over by hand. Also, owing to the fact that this flywheel will naturally make the machine coast farther when power is shut off (15 feet) RCA has installed a very fine hand brake (located in the circle).

Under the projector head is a new sump or oil pan that is quite an improvement over the old one in that it really catches the oil, leaving the sound head clean and dry, and is so arranged that the oil runs off into a receptacle built into and a part of the motor housing. This receptacle has a heavy brass petcock to drain it when full, and last but not least the motor bearing nearest the projector head increases d only every three months and with a grease gun.

There are several installations at the present time in Hollywood and in every case the projectionist is very well satisfied with the performance of this new motor.
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You'll give your Speed Graphic, 9x12 cm, or 2½"x3½" film pack camera the convenience of an expensive mamiya when you install a Kalart Synchronized Range Finder. It gives your camera automatic focus plus all the advantages of man-size negatives. Always accurate and dependable, the Kalart Synchronized Range Finder makes the "guess focus" shots things of the past.

Model K, $20.50 installed, now available for 36 different 2½x3½ and 9x12 camera and lens combinations. Model G, $27.50 installed, for 16x35, 35x45, and 4x5 Speed Graphics, Special installation for 3½x7 Speed Graphics and 9x12 Linhof cameras, $52.75.

NEW KALART MICROMATIC SPEED FLASH
Fits practically all cameras...$13.50

All Kalart Equipment made in U. S. A. See your dealer or write: 619 Taft Bldg., Hollywood, Calif., or The Kalart Co., Dept. T-5, 915 Broadway, New York, N. Y.

BOLEX selects GOERZ LENSES
for WIDE-ANGLE and TELE-PHOTOGRAPHY—
We are pleased to announce that our

GOERZ

KINO-HYPAR F2.7 15 mm WIDE-ANGLE LENS
and the

KINO-HYPAR F2.7 75 mm (3") for LONG-DISTANCE SHOTS and CLOSE-UPS

can now be had as Standard Equipment with the BOLEX 16 mm MOVIE CAMERA. Other focal lengths can also be supplied.

The distributors of the precision-built BOLEX camera made this choice after a thorough test of the American-made GOERZ LENSES to assure their customers of the best possible picture results.

Specify GOERZ LENS EQUIPMENT when purchasing the BOLEX CAMERA from the American Bolex Company or authorized Bolex Dealers.

For further lens information address Dept. I.P.5

C.P. Goerz, American Optical Company
371 East 41st Street
New York City
Already more than 5000 theaters have installed high intensity projection. With high intensity projection in one theater out of every three, audiences are rapidly becoming aware of the difference. They are seeking out the theaters that provide better picture quality on the screen, more comfortable seeing and more pleasant general illumination. With old style low intensity projection there is seldom enough light on the screen for good, comfortable seeing even in the best seats. At the back of the house, screen brightness is so much reduced that pictures are dim and unsatisfactory.

Modern fast action and the new color pictures call for Simplified High Intensity projection. “Simplified” means new type lamps and “Suprex” Carbons. These have so reduced the cost per light unit on the screen that any theater can now afford high intensity projection.

The illustrated booklet, “The Eternal Triangle in Picture Projection,” will tell you about it. Write for a copy.

CAPACITY PERFORMANCES BENEFIT THE STUDIO AS WELL AS THE THEATER

The studio, as well as the local theater, gains profit and prestige from increased attendance. An important factor in building theater patronage is better projection. Here is a reproduction of the current trade journal advertisement in the campaign for improved motion picture presentation.—NATIONAL CARBON CO., INC.
Tradewinds

News of New Products

Leica Model G

Improvements in the new 1938 Leica, Model G, feature a newly designed viewfinder and rangefinder system, through which the eye-pieces of these units are placed closely together to enable the photographer to change from one to the other almost instantly. This speeds up camera operation considerably. The Leica method retains a separate magnified rangefinder image, making focusing rapid, simple and accurate. Prices on the Model G range from $183 with f:3.5 lens, to $315 with f:1.5.

Manufacturer: E. Leitz, Wetzlar, Germany; Distributor: E. Leitz, Inc., 730 Fifth Avenue, N. Y.

Selectroslide

A convenient and ingenious device for slide projection is the Selectroslide, designed for use with the Leitz Model VIII-S projector. A rotating turret holds 45 2x2 inch slides and will make slide changes automatically or by push-button control. The device is particularly valuable for one-man stereopticon demonstrations and lectures, and obviates any errors in projection sequence of slides.

Manufacturer: Spindler & Saupe, Inc., 84 Third St., San Francisco, Calif.

Two Wabash Bulbs

Newest flash-bulb from Wabash is 30 per cent smaller than the smallest flash-bulb made to date, approximately as tall as a package of chewing gum, and called Superflash No. 6. Total light output exceeds 22,500 lumen seconds, intended for open and shut shots with average films and synchronized speed shots with the new fast films. Also announced is a new Special Press 40,000 bulb, slightly larger than the standard Superflash No. 1. This has a total light output of 40,000 lumen seconds, and is designed especially for press photography, particularly with candid cameras and others with focal plane shutters.

Manufacturer: Wabash Photolamp Corp., 333 Carroll St., Brooklyn, N. Y.; Distributor: Sold direct, dealers.

New Enlarger Projector

The new Enlarger Projector from Hollywood Photo Supply Company offers a number of attractive features as an enlarger and also is a practical projector for showing positive prints, slides, color slides and transparencies. Features include: heat absorbing filter, revolving head, extension arm, new type negative holder, new type projection lamp, extra large baseboard, double plug receptacle, 15-foot cord, double condenser system, iris diaphragm, spiral focusing mount, and a 2-inch anastigmat f:1.5 lens. An adapter is available to use miniature camera lenses. The Enlarger-Projector with interchangeable lens mount, complete less lens, costs $25.
with lenses and accessories proportionately priced.


New Ampro Model U

Ampro has added a new powerful, A.C. operated sound-film projector, with 750 watt lamp to its 16 mm. line. Designated as the Model U, it features an amplifier output of 15 watts undistorted, with 30 watts maximum, together with 12-inch permanent magnet field speaker. It is intended for classrooms, auditoriums, industrial sales and home entertainment where maximum illumination and reproduction are required. Innovations in the Model U include a speaker hiss eliminator, allowing full volume without hiss at low voltage; and an amplifier signal light which indicates when amplifier is on and also designates location of volume and tone controls when rooms are darkened. New model is extremely compact and portable. It sells for $395, with a sound-proof blimp case $29 extra.

Manufacturer: The Ampro Corporation, 2839 North Western Avenue, Chicago, Illinois; Distributor: Direct, dealers.

Victor’s Model 33

Victor has entered the low price 16 mm. sound projector field with a precision made new ‘all-in-one’ Model 33 Animatophone, priced at $295 complete. New model handles sound sufficiently for audiences up to approximately 250-300 people. As priced the new model comes with 500 watt lamp, 2-inch f:1.85 projection lens, and hand rewind. A deluxe model with motor rewind, 750 watt lamp and f:1.6 lens will be on the market soon. A standard feature is an input jack for plugging in a high impedance mike for announcements, or a phonograph turn-table for recordings.

The Model 32 assembles into one compact unit for transporting. For operation, the main unit subdivides into three integral parts. A removable top houses 1600-foot reel arms, a 400-foot take-up...
reel, and the projectors attachment cord.
The special 8-inch speaker with 50-foot connection cable is housed in its own baffled case, which may be instantly detached from the rear of the projector case. After removal of top and speaker, the projector is entirely enclosed in its own case with a convenient control panel located at the rear.

Model 33 Animatephone incorporates a number of the Victor features, including automatic film protection device, the multiple-wall lamp house with super-efficient ventilation, swing-out lens mount, and keyed-in-position sound system.

Manufacturer: Victor Animatephone Corp., Davenport, Iowa; Distributor: Direct, dealers.

Fast Eastman Cut Film

A new Super Panchro-Press Film, more rapid than Panchro-Press, but retaining all the physical characteristics of this popular emulsion, is now available from Eastman. Extremely fine grain, freedom from abrasion, excellent gradation, and a reasonable development time which permits control under unfavorable temperature conditions, are claimed for the new Super film.

Super Panchro-Press will produce a softer negative with normal development than other ultra-speed press films. This is a distinct advantage in flash work, when contrasty lighting is the

rule. When added contrast is desirable, added development of 30 to 40 per cent will give negatives with ample snap and brilliance.

The new Super film retains another valuable trait of Panchro-Press, continued development will build up excellent shadow detail in underexposed negatives. Despite its added speed, grain is for practical purposes as fine as that of Panchro-Press.

Tests with the new emulsion indicate that it will give excellent results when developed under normal press conditions. Where more rapid processing is desirable, D-19 developer is recommended. The fixation rate is identical with that of Panchro-Press. It is made less sensitive to red than other ultra-speed press films, and gives well-balanced color rendering.

Manufacturer: Eastman Kodak Company, Rochester, N. Y.; Distributor: Direct, dealers.

More Superpan Sizes

Agfa's fast Superpan Press cut film now is being supplied in several new sizes, including 6.5x9 centimeters, 2½x3½ inches, 2½x3⅛ inches, 11x14 inches and 12x20 inches. The standard sizes of 9x12 centimeters, 3½x4⅛, 4x5, 5x7 and 8x10 inches, of course, continue to be available.

Manufacturer: Agfa Anasco Corporation, Binghamton, N. Y.; Distributor: Direct, dealers.

New Location Service

Hollywood Screen Service, headed by James R. Palmer, member of Local 659, IATSE, now offers shooting service complete with sound and full camera and lighting equipment for location, projection background, expedition and industrial film making. Arrangements are either by contract or salaries and rentals. Black-and-white and color are available, either on 16 mm. or 35. The organization also offers a special dehumidifying process that insures preservation of film in tropical areas.

Goerz Catalog Out

A new catalog covering Anastigmat lenses for professional and amateur photography, photo-engraving and movie-making, also accessories used by
people in these branches of picture-taking, has just been published by the C. F. Goerz American Optical Company. Among the lenses listed is the famous wide-angle Dagor Double-Anastigmat, which made its debut in the photographic world 46 years ago. Other lenses, all made in their New York factory, include the Super-Dagor, Dogmar, Apochromat-Armat, Gotar and Kino-Hypar.

New Emulsions Tested

Tests are now being made on the major lots of DuPont’s new fast XL Pan, which also has recently been made available to amateurs in rolls for miniature cameras. Several types of emulsions with higher speed ratings but preserving all other qualities of Superior Pan are being tried out. Another new DuPont film being tried out, is as yet un-named special duplicating film for variable area recording prints. It offers high contrast fine grain and tests have shown it several db quieter.

Numbered Film Packs

Individual films of all Agfa film packs now are being marked with consecutive numbers from one to twelve, corresponding to the number on each film tab. This feature provides positive yet simple identification of every film pack negative. All Agfa Superpan Press film packs carry this number.

Similarly marked are all Agfa Super Plenachrome film packs with an expiration date of April, 1939, or later, and all Agfa Superpan film packs with an expiration date of January, 1939, or later.

Unbreakable “Glass”

Lacite, new transparent, non-breakable resin product from DuPont is currently the object of interesting experiments by studio prop departments in making ornamental lighting fixtures and costume jewelry. The new product, just available, is reported to offer unusual possibilities, since it is more transparent than glass and virtually unbreakable.
Universal studio still department chieftain gives views and pointers on capturing stellar personalities for exploitation value portraits.

It is more than 16 years since I began to photograph a seemingly endless array of the most beautiful and talented women in the world for motion picture purposes. This, in addition to the fact that I have been equally busy transposing to the negative their stellar male counterparts in filmdom.

These photographs have been distributed to all parts of the universe, in every form of publication, and still the public demand for them seems to be insatiable. The reason for this, perhaps, lies in the fact that in the mind of every beholder there is an ideal of beauty which can never be found in the busy activities in every day life. Hence we turn to the screen and its luminaries, hoping to discover in their pictorial presentation the elusive qualities which have brought them fame and fortune.

But each time that I focus the camera I find a new problem confronting me, for the portrait photographer is not only required to reproduce the vivid coloring, the sparkling eyes and infinite grace of the majority of these subjects, but also must strive to bring out the spirit and personality that are hidden beneath the lovely mask of flesh.

For months now I have been endeavoring to record the personality that is an integral part of the fresh girlish beauty of Deanna Durbin. Yet at each sitting, she reveals to me unsuspected depths of character and charm, vivid flashes of light and life which one can only hope to capture by means of the camera.

Even greater problems confront one, when the sparkling and vivacious Danielle Darrieux comes into the portrait gallery. Here indeed is an enigma for the photographer, for the great French star can never be found twice in the same mood. Hence, there is a bewildering variety in her portraits, and a consequent insatiable demand on the part of the public for new presentations of her.

In addition to these great headliners of the screen, we are confronted daily by such spectacular and diverse beauties as Gail Patrick, Nan Gray, Dorothea Kent and Barbara Read—each as different as day and night insofar as photographic angles are concerned.

Our difficulty lies in the fact that each and every screen star requires a different...
kind of treatment. The first problem is to dissect their personality and win their confidence. They must have a feeling of repose when they face the camera, must feel certain that you will not depict them against a background which is not in keeping with their characteristics. Real photography bares the "ego" of the subject and you must first determine what this ego really consists of and then endeavor to present it in its most pleasing aspect.

If you succeed in doing this, you win the confidence of your subject, and at each sitting you find it easier to bring out the elusive beauty of mind and spirit that you have been seeking.

For instance, Darrieux is glamorous, and must be presented in that manner; Gail Patrick is of the regal type, while Deanna Durbin is in that transitory stage that reminds one of spring days and April showers. Therefore, pictures of Miss Patrick reveal her repose, intellect and sophistication; those of Darrieux her glamour and sparkling gayety, mixed with her tremendous sense of sardonic humor; while those of Miss Durbin, if you are fortunate, reveal the suppressed fires of budding genius that are likely to explode, from a camera viewpoint, in any direction.

It is all most fascinating, but of one thing I have become thoroughly convinced. That is, that the fads and passing fancies of "freak" photography will never stand the acid test of time. Beautiful, artistic portraiture will live on, for it is the one medium that will always give complete satisfaction to both subject and public. The reason for this is that it is an exact reproduction of life itself and presents its subjects in attitudes and poses that they would normally assume in real life.

Action pictures, so-called, have their place in the world of photography, as do the miniature informalts which are now all the rage, but they do not have the depth of color, the proper background effects which can only be obtained in the portrait gallery.

If I were asked to set down a few rules for a successful portrait sitting I would name these things as the absolute essentials:

First, that all poses must be in keeping with the dramatic background that each subject occupies in the scheme of life;

Second, that the photographer must have a thorough knowledge of the characteristics and mental attitude of the subject;

Third, that the background must be in keeping with the general coloring or "aura" of each individual who faces the camera;

Fourth, that there must be a feeling of mutual confidence and lack of restraint between the photographer and his "victim."

It is all important that the personality of the subject shall be released from its usual confines. We all of us carry a mask to hide our real thoughts. The days when we asked our subjects to "look at the pretty birdie" are long past. Instead, we must exhibit a genuine sympathy and understanding of those who pose for us; learn to understand their needs and desires, their modes and modes and thus capture the "mental flashes" that continually come and go as they face the lens.

Above all, portraits should never be attempted when the sitter is under great nervous stress. Instead, one should wait until the combination of a calm mind in a calm body is attained—then it is possible to bring forth and highlight the major emotions in their most attractive form.

We are presuming, of course, that the most up-to-date equipment is being used, as it is in all modern, major studios. Each day the strides of science bring forth some new refinements in photography. We have better lighting, better films, better lenses, and, we, the technicians, must progress with them or go into the discard.

RAY JONES, Local 659, IATSE.

The Basis of Color Stills

Introductory article of a practical series on the principles and methods of color still photography aiming at good work within reasonable costs.

In the last few years color has made amazing progress. Statistics show that advertising in color has increased sales as high as 700 per cent since the public is becoming more and more color conscious. Motion picture production in natural color is increasing yearly. Mickey Mouse is color-minded entirely. Many experts believe the time will arrive when black and white photography will be replaced by color entirely; just as sound forced the silent picture out.

However, color stills are at present regarded as too intricate; too expensive and not advanced enough to permit being done at reasonable cost. This reminds me of a remark made to me of Carl Laemmle which I first encountered some eleven years ago, and which is quite true. At that time I had just entered Universal Pictures under his supervision. I was impressed by a big sign facing me as I entered through the main gate on which was written in big letters: "IT CAN BE DONE—CARL LAEMMLE, SR.," which is my own whole-hearted opinion. We can do it—we can solve color still problems, through intelligence and cooperation.

Color still processes were discovered years ago. Virtually every material needed to produce color today is on the market. The only thing needed to produce color correctly is the experience and knowledge in the technique of color photography and that, we are not able to buy. Natural color photographers throughout the country and color photographers are popping up everywhere like dandelions on the front lawn. Color cameras are bought—color films, every imaginable piece of equipment, gadget, and incidental which, according to catalogues, one cannot afford to be without—and we think we are ready to shoot color; not suspecting the painful experience ahead—the traps and pitfalls which might spell failure. Color is a little word, but how much sorrow it can cause, simply because we don't follow the rule of nature that "we have to learn how to walk before we can run."

Color photography, even more than monochrome photography, is a complicated process belonging to the graphic art; both having limitations. In color, just as in sound, recording accurate work and knowledge are most essential in order to reproduce successful results. But we can't stop here—in order to be a good technician of his trade every craftsman should at least know the composition of the things he is working with as well as their limitations. Also, a good technician should be so thoroughly familiar with his materials, that should trouble arise, he would be able to solve his own problem. It is an accepted fact that we are not able to get more out of any one thing than it is capable of producing. In other words, "You cannot make a racehorse out of a cow."

What knowledge I have gained in color photography in the past ten years was obtained in various ways; a good part of it by the trial and error method. I also got quite a bit of useful information and leads from the many books written on color which supplied me with connecting links.

This article is written mainly for beginners interested in color, to help them lay the foundation of the important factors involved in producing color correctly and successfully. Detailed discussion of particular phases will come later. The main factors to be familiar with before attempting color work are:

1. Knowledge of the light quality in relation to the spectrum;
More effective portraits from Ray Jones' camera.

2—Knowledge of the light sensitive surface—the emulsion—and its limitations;
3—A decided knowledge of color in regard to color harmony, for there is nothing so disturbing in an otherwise beautifully lighted picture as bad color harmony.

Books on all of these points can be had in the library. Particular volumes will be cited later in this series of articles.

Inasmuch as color depends entirely on the light condition, it is of great importance to the color photographer to understand light. The quality of light is also of great importance when projecting color; the light source should be of such quality as to produce the best results. Any light can be analyzed with the spectroscope, a discovery made by the scientist, Clark Maxwell, who advanced the theory that all color in nature could be matched by proper admixture of the three primary colors selected from the spectrum.

The source of color is light; without it, natural or artificial, there could be no color. Everything we are able to see is visible; either because it is self-luminous,
like the sun; or it reflects light falling upon it, and is non-luminous. The greater the reflecting power the brighter it will appear. Daylight is preferable to any other light, but even here there are only a few hours during which conditions are favorable. The actinic quality is changing constantly, and as light characteristics change, so color values change, and compensation by light filters is necessary.

Incandescent light if of no great value due to the fact that it is too low in intensity to permit sufficient speed in color photography to insure satisfactory results. Speed in exposure is greatly reduced by color taking screens in the emulsion, screen plates, filters and mirrors as in one-shot cameras, and other devices needed for color. Hence a considerable increase in light is necessary or large lens openings and long exposure inevitable. This not only decreases sharpness and depth of the picture but often results in poor quality. I have found the best dependable light for around work to be the high intensity Arc-light or Photoflash; both of them requiring slight filter compensation, while permitting the use of small stop openings and speed.

The camera and the eye are of similar construction. However, the eye with its long range of sensitivity to light and its facility for adapting the iris, sees high and low illuminated areas in full detail; while the photographic light sensitive surface recording the half-tones in their delicate gradation are subject to strict limitation. The range that they cover is very short, and any attempt to extend that range will lead to failure.

Since all color can be matched by the proper admixture of the three primary colors, it is of utmost importance that care should be taken in making color negatives. Consideration should be given to proper lighting, exposure and proper development. Weakness in any of these points will completely nullify all efforts to reproduce color correctly. From the many questions that have been asked me, I judge that the general tendency is to overestimate the speed of the color-camera and also the range of the emulsion. Do not believe the camera is capable of duplicating the eye's feat of recording shadow and highlight detail simultaneously, for under no condition is this so. Contrary lighting, under and over exposure, are dangerous. It is folly to believe that speed can be gained by using dynamic developers and thus to produce satisfactory negatives. Great care should be exercised to keep exposure and developing time consistent to minimum values, in order to arrive at the contrast and shadow detail desired. There can be very little juggling around. However, there is some latitude, and one should try to stay within ten per cent limits.

Excellent color prints can be obtained with a minimum amount of effort from negatives containing full density range, which are free from fog and aberration. I have found borax to be an excellent developer. However, there are many others, varying in composition and developing characteristics. All manufacturers of photographic emulsions will give, on request, information as to the development of their product, what type of developer to use, and the correct developing time in regards to gamma. But this of secondary importance. The important factor is density range. Color can be photographed in any key, as long as one stays within the range of the emulsion and does not try to stretch it beyond its capacities. This contradicts the many statements that color must be photographed with flat lighting.

The essential factors for good color in stills are familiarity with the camera, its speed, the range of the emulsion, the lighting, and correct development by tests.

You will also find that the type of light used will make a great difference. Let us assume that we have produced a set of color separation negatives which leave nothing to be desired in printing quality, cleanliness and balance. Even these will need correction if correct color reproduction is expected. Pure color is needed. The best color pigments obtainable at present are not correct, since pure color mixed with foreign matter, gelatine or other substances, will not transmit or reflect its correct value. This makes it necessary to correct the negatives.

The technique in making the three continuous tone positives differs from the regular monochrome printing. What is needed to know is continuous full-range, half-tone positives. We know that all neutral tones like gray are represented as of equal strength in the color separation negatives. A good way to familiarize oneself with this is by using a regular black and white negative. From this make a normal print and reproduce same by using three continuous half-tone positives which, by employing the three primary colors, should equal the original. This procedure will show you what continuous half-tone positives should look like. It is of importance that you adjust yourself and work in such a range that all steps are under normal conditions. Slight corrections can be made if the negative should be a little too contrasty or too soft, without changing developer or developing time.

Considerable time and effort is involved to make color prints from poor negatives; and for engraving purposes much staging and re-etching is necessary in order to bring up the cost to such an extent that color printing will be prohibitive. Light and expose your negatives correctly and do
Notes on Progress

New Eastman cut film and light metal 8x10 camera tested by Wanger publicity and still experts.

The most provocative article on studio still photography in recent years was the thorough analysis of the situation by John LeRoy Johnston, veteran studio publicist, and now publicity director for Walter Wanger Productions, in our September, 1937, issue, in which Mr. Johnston envisioned a new type candid 8x10 metal camera for studio still work. Since publication of the article, fast new cut films have appeared, the latest being Eastman's Super-safety Pancho Press, and a new camera has been designed by Gordon Head, member of Local 659, IATSE.

Notes on these new developments from Mr. Johnston and the United Artists still department experts are contained in the following communication to the editor, received just on the eve of going to press (the new Eastman film was first used in Hollywood in these experiments.)

Technical details on the new film and the new camera will appear in succeeding issues.

Dear Ed:
The tests which Gordon Head has been making on the set of Walter Wanger's "Algeria" are most interesting and encouraging but far from fair to either Head or his camera.

First of all, the tests were made on a high and narrow Algerian street set where James Wong Howe, in keeping with the spirit of the story, was forced to maintain a heavy shadowy lighting effect and the best still pictures had to be given double the exposure that is normal, whereas Mr. Head was trying his camera at regular candid camera speeds to give it the most severe tests possible. Furthermore, on the three days that Mr. Head was on the set the action was not conducive to his best results.

However, these things I am happy to note and to call to the attention of the craft. Mr. Head's camera affords many advantages we feel candid cameras should have namely:

1. the ability to make an 8x10 negative permitting retouching when necessary, and contact prints of standard size without the necessity and weakening of enlarging;
2. although larger than any other camera, it is built so lightly that it can be held in the hands steadily;
3. it has a reversible back, allowing shifting from panorama to upright pictures more easily accomplished than on the present standard equipment.

Besides, he has built in stereopticon focus on the camera, which is unique and an improvement, a shutter speed of 1/2000, and with certain minor corrections his exposure (shutter) curtain can be made absolutely silent, giving his camera the effectiveness of a speed graflex in a handy "blimp." The experiments made for us clearly indicate that what Head's camera has not yet overcome in optical correction is compensated for in the speed of the new Eastman Super-safety Pancho Press for which Mr. Head and our own Bob Coburn have been the first to introduce in 4x5 and 8x10 sizes in Hollywood. This fast film has been checked by Mr. Coburn, Mr. Don Keyes and Mr. Charles Bullock of the United Artists still room, all of whom attest its great value, its laboratory handling and reproductive quality.

Both Mr. Coburn and Mr. Keyes will use the 4x5 Eastman Pancho Press exclusively in their fast action graphic and graphex work hereafter.

We hope, in the near future, to have more active sequences than those photographed on the Casbah set recently, at which time it will be our pleasure to have Mr. Head make further experiments.

If so-called candid camera pictures can be made large enough to permit contact reproduction in quantity, many of our present publicity and lobby still problems will be solved, and I think all publicity men should encourage such experiments, hopeful that a practical new candid camera for making action stills (without interference with production) during the filming of movie scenes, can be produced for general Hollywood service.

I want to thank you and your magazine for assisting and encouraging such progressive still photography.

Sincerely,
John LeRoy Johnston,
Director of Publicity.
SMPE Session Papers Outstanding

Semi-annual convention of Society of Motion Picture Engineers in Washington features best collection of papers in recent years on technical progress.

Spring convention of the Society of Motion Picture Engineers, April 25-28, at the Wardman Park Hotel, Washington, D. C., revealed the most extensive and interesting array of technical papers in recent years. As is International Photographer's custom, we present herewith abstracts of the papers presented, but due to lack of space, only abstracts presented during the early days of the session appear in this issue. The balance will be published in the June International Photographer.

Report of the Progress Committee; J. G. Frayne, Chairman.

Outstanding event in cinematography during past year was development of high-speed panoramic emulsions by Agfa. These new emulsions will increase the flexibility of the color process and add to its possibilities. Carlson and Dukis outlined their work in progress in the research laboratories of the Eastman Kodak Company. Of interest also is the new sound emulsion developed by Dupont in which periodic variation in sensitivity brought about by present emulsion-drying methods has been eliminated.

In sound-recording field, items of interest are introduction of linear discel volume indicators by United Artists Studio and introduction by RCA of modulated high-frequency method of determining optimal processing conditions.

"Sound Stages and Their Relations to Air-Conditioning"; C. M. Wert and L. L. Lewis, Carrier Corp., Syracuse, N. Y.

Development and growth of modern motion picture sound stage has almost paralleled that of sound pictures. Weather and advancement of lighting technic undoubtedly brought about original need of enclosed stages. Ad- vent of sound recording brought about requirements not originally considered. Modern sound stages have increased not only in quality but in size. Modern sound stage, must have structural strength to withstand the elements, including earthquakes. It must meet requirements of set construction, sound-proofing and occupancy. Sound treatment makes necessary other treatment for satisfactory occupancy. Lighting on sound stage is greatest contributor of heat gain within the stage. Lighting is variable as to amount and duration, must be controlled correctly. Size and number of sets are very variable and create their individual problems. Both number and types of persons present on a sound stage play their parts in the relation between air-conditioning and the sound stage.

Construction that retards flow of heat in either direction through walls necessitates the addition and removal of the heat. Lighting on a sound stage is of such magnitude that its effects must be removed. High-salaried personnel often in costume, demand comfort while working. Management is obviously economically in better position if personnel is comfortable; less time is lost due to make-up retouching and less delay brought about by perspiration dampened clothing.

An air-conditioning system should have the ability to provide heating, cooling, ventilation and cleaning. Heat in the air rising to top of the stages should be removed by an exhaust system. Stages are generally maintained at 75 degrees Fahrenheit and 50 per cent relative humidity, with temperature settings above and below at option of the occupants. Floor distribution of air has advantage of more economical removal of rising heat but has the practical disadvantage of placing set construction and personnel too near source of cooling. Overhead distribution has the advantage of better temperature distribution but in less economical in removal of rising heat from lights.

Sound treatment of an air-condition installation is necessary for continuous operation of system. If system does not operate continuously heat load builds up to point where system can not adequately regain comfortable condition during non-shooting periods. Treatment is accomplished by both isolation and absorption of generated sound, and can be so accurately determined that percentage of the increase in noise level can be given in decibels and in relation to frequency ranges.

"Documentary Film Study—A Supplementary Aid to Public Relations"; A. A. Berg, School of Public Affairs, The American University, Washington, D. C.

Documentary films are proving of incalculable importance as a factor in informing and mobilizing opinion. Marked success of two U. S. documentary films, "The Plow That Broke the Plains" and "The River," both written and directed by Pare Lorentz, has focused new attention upon this type film. The school of Public Affairs of American University conducts an "in-service" training school for government employees where-by registrants obtain instruction in courses and subjects from experts in various Federal departments. Included in curricula are series of courses on public relations. The film as a factor in public relations is an important one. In answer to requests for some information and instruction in this new field, a course in "Documentary Films Today" was instituted.

Film course included eight-week study with screenings, film analyses and discussions conducted by visiting experts in film-making and film use. Subjects covered were: the newsreel as contemporary historian; the "March of Time" as a document; federal, educational, and scientific films; U. S. Government documentary films; documentary aspects of Hollywood films; foreign documentaries; industrial, sales, and domestic propaganda films.

In addition to regular film discussion and study, a number of reports were made on documentary film activities. Among the most important was one on a federal film survey. For the first time, a complete survey of all U. S. government films is being made that will compile in one place the data on motion pictures. A standardized type of procedure was outlined.


Average projectionist does not equip himself with all the latest tools, and average theatre management refuses to stock projection room with anything more than a scant supply of tools of poor quality. After listing tools that are known to be useful in projection room paper points out that were such tools available to projection- ist they would return their original cost in relatively short space of time by enabling proper testing and alignment of equipment in addition to facilitating minor repairs.

"The Determination of Correct Exposure in Photography"; L. A. Jones, Kodak Research Laboratories, Rochester, N. Y.

Many treatments of this subject, some dealing with certain specific phases, and some fairly complete, are to be found in various textbooks and scientific journals in the field of optics and photography. In spite of this, however, there seems to be some uncertainty in the minds of some men as to the correct manner of dealing with the problem. This paper is distinctly of a tutorial character, an endeavor being made to present the problem in a clear and systematic fashion. Much of existing confusion is doubtless due to multiplicity of photometric units found in literature of photometry, and to a certain amount of ambiguity in current definitions relating to these units. Attempt is made
TOP STAR

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EASTMAN SUPER X
PANCHROMATIC NEGATIVE
BIG PICTURES. In a period in which virtually every hit story is seeing its unspoiled remake through a serious shortage of original new story ideas, an especially interesting remake is that of Philip Barry's "Holiday," originally starring Ann Harding for Pathé, and which Columbia now releases with Katherine Hepburn and Cary Grant co-starring, directed by George Cukor. An excellent supporting cast includes Doris Nolan, Lew Ayres, Edward Everett Horton, Henry Kolker, Bianie Barnes, Jean Dixon and Henry Daniell. The story opens at Lake Placid and features both strong emotional drama and amusing comedy in working out the complications of the young lawyer (Cary Grant) engaged to the daughter (Doris Nolan) of a stuffy Social Register family with millions. Black sheep of the family for her unconventional but natural ways is the sister (Katharine Hepburn) who, in a role that is particularly suited to her acting talents, eventually wins Grant when he finally rebels completely against the smug pattern of the Seton family. The well-composed and finely handled production stills on these pages are by Alex Kable, member of Local 659, IATSE. Photography was by Frank Planer, film editing by Otto Meyer and Al Clark, art direction by Stephen Goossen and Lionel Banks, musical direction by Clifford Brown, and Lodgo Cunningham, member of Local 695, IATSE, was sound engineer. The picture was produced by Everett Riskin.

to present a considerably simplified conception of the minimum number of photometric quantities required for dealing with the exposure problem. Relation between image illumination and object brightness is dependent upon several physical characteristics of the image-forming system. Quantitative information relating to specific image-forming systems and a general average image froming system useful for computing relation between object brightness and image illumination are given. Relation of sensitivity of photographic materials to problem is considered in some detail, as well as photometric and contrast characteristics of various types of photographic subjects.

"Latent-Image Theory and Its Application to Low-Intensity Photographic Exposures";


In previous paper by the writer, it was shown that photographic exposure characteristics are in agreement with assumption that a photographic grain must absorb two photons of visible light in order to become developable. In this paper, theory is compared with recent physical research by other authors. It is assumed that a film grain is "sensitized" by the first absorbed photon and fully "exposed" by the second absorbed photon.

Reciprocity-law failure at low-intensity exposures can be explained by the assumption that sensitized state of film grains is unstable and that number of sensitized grains decreases with time in an exponential manner unless fixed by activation. The half-time of this fading for certain emulsions is deduced from Kodak publications on reciprocity-failure characteristics.
Conclusions from this theory are drawn with regard to the contrast improvement for low-intensity photography, such as astronomical work or newscast photography under unsatisfactory lighting conditions; by pre- or post-fogging. Theoretical conclusions are checked with test results.

"Effect of Aeration on Photographic Properties of Developers":

Unseasoned o-n-hydroquinone developers of relatively high alkalinity (pH 10.0 to 10.5) showed a rapid decrease in activity after aeration for 15 hours while o-n-hydroquinone-borax developers of low alkalinity (pH 8.4 to 8.8) showed increased activity (due to the liberation of alkaline resulting from oxidation) which then remained constant for prolonged periods.

In general, alkalinity of developers containing hydroquinone increased on aeration. Those containing only o-n showed little change.

Practical tests with processing machines equipped with air agitation devices have shown that a constant development condition can be maintained with both positive and negative type of developers.

"Solution Agitation by Means of Compressed Air":
C. E. Ives and C. J. Kunz, Eastman Kodak Co., Rochester, N. Y.

In development of motion picture film, developer in emulsion undergoes exhaustion and thereby loses activity. Agitation of developing solution in vicinity of film is required to assure sufficiently rapid and uniform renewal by relatively fresh developer brought from the remainder of bath.

This paper is concerned with methods of bringing about agitation by means of compressed air which is released at one or more points in developer, through which it rises to upper surface creating generally turbulent condition and setting up rapid streaming effects.

Effectiveness of stirring is limited by tendency of induced stream to form a narrow channel in one portion of tank with relatively low velocity in remainder of tank.

Various means have been tried in an effort to direct rapidly moving stream along film surface, and this was accomplished by means of gridwork or conducting pipes extending from top to bottom of rack and parallel to sides of racks. Tests for uniformity of development made by means of uniformly flashed film showed benefit conferred by various improvements in control of agitation. Dimensions and details of construction are given for making up distributing grids.

"Maintenance of a Developer by Continuous Replenishment":
R. M. Evans, Kodak Research Laboratories, Rochester, New York.

By a series of simple assumptions that do not depart appreciably from current practice it is shown that concentration of any ingredient in a developer solution that is continuously replenished during use may readily be calculated. The equations for the equilibria and rates of growth of various substances are derived and application is made to a practical case. Benefits of chemical analyses for developer constituents both for maintenance of quality and for economy are pointed out, and analytical methods published by Lehmann and Tausch are briefly outlined.

"The Effect of pH upon the Washing of Processed Films":
S. E. Sheppard and R. C. Houck, Kodak Research Laboratories, Rochester, N. Y.

Advantage stated to be obtained by adjusting firm baths and wash-water to isoelectric point of gelatin have been claimed. Advantages are said to be shorter washing time, less swelling and retention of water, with consequent improvement in film strength of wet emulsion, and reduced drying time. In this investigation conditions as to pH of solutions, and wash-water, rate of flow of water, residual thiourea, etc., were controlled accurately. Results indicate that with regular acid fixing and hardening bath (F-25) there is no advantage, but rather a disadvantage in washing at isoelectric point (ca pH 4.9) rather at pH 7 to 8, since time required to remove hypo to same degree is increased, nor is less water retained.

In non-hardening acid fixing bath, there was little difference in washing time, but some gain in drying time for isoelectric wash because of reduced water absorption.

"A New Densitometer":
H. Neumann, Klangfilm G. m. b. H., Germany.

Density measurements of variable-width sound records should cover a large range of densities, and measuring area should be as small as possible, to make it easy to find suitable area on normal sound recording.

Densitometer described, intended mainly for use in studios and laboratories but it is accurate it may be used also for scientific research, is capable of measuring densities of 0.01 to 2.5 of areas 2.5 mm. long and 0.03 mm. wide, limited by mechanical slit. Absorption of light by object is determined by means of current set up in blocking layer photoelectric cell which is measured by very sensitive galvanometer giving direct density readings. Calibration of light-source can be checked very simply by separate light path without making necessary removal of object during the check. Special arrangement is provided for visual observation of measuring area.

Density values are determined with parallel light, and from these data values for diffuse light may be easily calculated.

"The Transmission of Motion Pictures Over a Coaxial Cable":
H. E. Ives, Bell Telephone Laboratories, New York, N. Y.

Transmission to television signals over wire lines number of years ago used signals corresponding to images of coarse detail, and required frequency bands accommodated by existing types of circuits. Television images now considered necessary correspond to frequency bands of greatly increased width, and will require special wire networks and transmission means.

Coaxial conductor recently in operation for experimental purposes between New York and Philadelphia can transmit band of frequencies of approximately 1000 kc. While designed primarily for multiple telephone channels, it offered possibility of transmitting a
News Reels

Spot News Half a Mile Down

Movietone crew goes into the earth to cover amazing story of engineering genius in driving the new Aqueduct from Colorado to Southern California.

When millions of dollars and miracles of engineering skill are being expended to bring water across the State of California from the Colorado River to 13 Southern California cities, that is prime material for the newsreels. We covered the Aqueduct work recently because Movietone News Cameraman Al Brick decided that the Mt. San Jacinto tunnel of the project would make a good newsreel yarn, and the experience and the story were worth the trouble.

A small army of determined men are relentlessly pushing this series of canals and pipe lines closer to the Los Angeles area, and one of their toughest assignments has been the Mt. San Jacinto tunnel. In planning for the Aqueduct, which will carry a billion gallons of water per day, the engineers picked a route that was most free from geological hazards. It is 392 miles long, but requires the boring of five tunnels.

Mt. San Jacinto has put up the stiffest resistance against being tamed by man, and when Brick decided to take his camera down into the bowels of the earth for a first-hand film I tried to convince
him that I would be much happier just reading about it; but off we went on the assignment.

Being distinctly not of the hard rock type, my trip to Banning, California, was a mixture of forebodings and hope—hope that somehow it wasn’t a story. My first introduction to Bill Fox—he’s superintendent of photographic records for the aqueduct—and right now I put my vote for him as one of the most versatile photographers in the business. Bill’s enthusiasm is catching and when we started out for the construction camp I rather felt that maybe it wasn’t such a bad job after all.

Our next meeting was with Superintendent of Construction John Austin which practically put me in a “rarin’ to go” mood. Austin is one of those tall, lanky, genial types that you talk to for five minutes and come away saying “What a swell guy.” Indeed, at the end of the day I felt that I could use the plural sense and still not be exaggerating the least bit.

Austin explained that the tunnel was being bored from four different locations on Mt. San Jacinto. Each bore starts with an addit, or entrance tunnel, to bring you down to the level of the main tunnel. At the proper level excavations are made in both directions and eventually the four main tunnels will be joined.

From the very beginning this sleepy old mountain has resented the intrusion. She has retaliated with one of man’s most destructive forces, water. Hundreds of thousands of hidden springs flood the tunnel at a rate varying from 7000 gallons per minute up to 25,000 gallons per minute. Estimated cost of this tunnel has already skyrocketed from eight millions to twenty millions of dollars. Conceive if you can, the infinite study and application that the Aqueduct System has made to employees’ safety which has allowed work on this tunnel to progress over a period of five years with only one fatality.

After a visit to the stock room, we lumber back to the muck cars (our only means of entrance and exit) outfitted in hip boots, heavy raincoats and hard hats. With all our camera equipment safely wrapped and loaded on the car the operator touches an overhead wire with a metal contact and thus relays the go-ahead signal to the control man. We start the speedy descent down to the main level. This is the Lawrence addit and is the longest one of the system. It plunges into the heart of the mountain at a 25-degree angle for a mile-and-one-half. We rush headlong into an inky blackness which is relieved only by a little chain of lights strung along the side wall and I think of the times when as a little boy I used to ride the front car of the subway train and experience the same sort of thrill.

The car we are riding is used to bring
Top, left, Movietone News records meeting of John Austin, superintendent of construction (with hot off), and Thaddeus Merriman, consulting engineer on Aqueduct project; top, right, Al Brick, member of Local 639, IATSE, and the author, Warren McGrath, member of Local 695, IATSE, loaded on muck car for descent into tunnel; lower left, "action" half a mile underground; and lower right, at the "working head" miners battle to stem torrents of water rushing out of the rock face. All pictures are by Bill Fox, Metropolitan Water District staff photographer.

supplies into the tunnel and to take muck and debris out. It also furnishes transportation for the workmen. It resembles the popular conception of a mining camp dump car except that it is built on a special truck designed to keep the car level on the steep incline. A powerful steel cable wound on the largest drum in the world controls the movement of the car; but a safety dog drops to lock the car in position on the tracks should the cable fail.

In an incredibly short time we arrive at the tunnel level a half mile underground and are immediately conscious of the great battery of pumps that work tirelessly to keep the water at a workable level. Engineers in planning for the greatest possible emergency have installed a pumping plant with a capacity of 25,000 gallons per minute. These all-important machines are never left unattended. Should they fail the tunnel would rapidly fill with water and the work of years would in a great measure be ruined.

This is an old story to Bill Fox. While I stand with mouth agape he is busy with his paraphernalia and in a few minutes, presto, a battery of flood lights go into action. These together with our camera equipment are loaded on a flat car and we enter the main tunnel. Instantly we are greeted with a downpour that can only compare with the recent flood storm at its worst. But the nonchalance of the hard rock miners is contagious and soon we are wading around knee deep in crystal clear water as if it was our daily stint. The main tunnel is 16 feet in diameter, large enough to accommodate a locomotive comfortably.

Perhaps you’ve seen these pictures in a recent edition of Movietone News and caught the thrill of this battle of man against nature. If you remember the shot of the timber work suddenly giving away under the pressure of another hidden spring and torrents of water cascading out, let me say that there was nothing framed on this story. When those hard rock miners “dropped everything” and rushed in with emergency shoring it was the real goods. All in all, Al managed to capture the story in six hundred feet. He was hampered by the torrential downpour which ruined a thousand foot roll and caused many buckles. We both felt it was a good day’s work to get the story at all. But, as I said before, what is “can’t be done” on topside becomes “must be done” down under.

Anyway, early in 1940 when Mr. and Mrs. Southern California lift a glass of crystal clear Colorado water to their lips for the first time, let’s remember to toast those hard headed, hard fisted, hard thinking hard rock miners who substituted the word “must” for “can’t.” As for your newsreel reporter—we’ll probably be busy covering a baby contest.

Warren McGrath, 695, IATSE.
Electrometric Titration Method

Technique for determining end-points of reactions described in detail: has wide range of application for accurately determining solution values.

Electrometric titration is the technique whereby end-points of reactions are determined electrometrically; i.e., by means of electrode potentials. The method has a wide range of application, and may be used to accurately determine end-points of neutralization, oxidation-reduction, and many precipitation reactions. An application to which electrometric titration is particularly suited is the titration of colored or opaque solutions in which the usual end-point indicators cannot be used. Likewise, solutions such as hypo may be adjusted to any predetermined pH value by this method.

In an electrometric titration, progress of the reaction is followed by measurement of the electrode potentials. Rapidity and ease with which these potentials can be measured with the Allison pH Meter now makes this method available to all scientific workers.

Procedure is to mount the pH meter in such position that the electrodes are correctly immersed in the solution to be titrated. This will be facilitated by the use of extension electrode leads, whereby electrodes may be mounted directly in the titration beaker, or the pH meter may be mounted directly on the burette support stand.

If the Bio-Model pH Meter is used, add sufficient quinhydrone or Hydronol to the solution to saturate at the end-point. (For example, if the final volume will be approximately 100 ml., add 100 drops (5 ml.) of Hydronol, or 150 mgm. quinhydrone.) If the Industrial Model pH Meter is used, nothing need be added to the solution before titration.

Next measure and record the initial pH of the solution. Add a small amount (for example, 1.0 ml.) of titrant from the burette; stir, allow to come to equilibrium, and again measure and record the pH. Continue adding titrant and measuring the resultant pH after each
As an end-point is approached, indicated by increasing increments of pH, decrease the volume of titrant added; however, this need never be less than 0.2 ml. for each addition. The full curve of Figure 1 shows the course of a typical neutralization reaction. The points indicated on the curve are successive additions of normal acid and the resultant pH values. It will be seen that the titration can proceed by large increments except in the region of an end-point.

The procedure for glass electrode electrometric titrations is the same as that given above; care should be taken that the electrode has reached equilibrium with the solution before the reading is made. Oxidation-reduction (redox) titrations are likewise performed as directed above, with the distinction that the gold electrode is used, and no quinhydrone or Hydronol is added to the solution.

**Determination of End-point**

The end-point of an electrometric titration is characterized by a sharp break in the titration curve, usually called the "point of inflection." This is a point of maximum slope, and may be located with a fair degree of accuracy by inspection. For example, the curve of Figure 1 shows two points of inflection which appear to be near 12.7 and 23.4 ml. of acid, respectively. Great precision in the location of the exact end-point may be attained by plotting increments of pH with relation to volume, or in other words, plotting the slopes of the various portions of the curve. To do so, the increment in pH produced by the addition of a given volume of acid is divided by the volume of acid added. If a change of 0.48 pH unit were produced by the addition of 0.2 ml. of acid, the corresponding slope would be 0.48/0.2 = 2.4.

The slopes for the various portions of the full curve of Figure 1 are plotted as the dotted curve on the figure. Two perfectly defined end-points are shown: end-point "A" at 12.70 ml. of acid, and end-point "B" at 23.40 ml. of acid. Note that end-point "A" was established by extrapolation of the two sides of the cusp, whereas at end-point "B" it so happened that the end-point was exactly reached in one of the readings.

For the mathematically inclined, an interesting method for locating the end-points in electrometric titration is based on the assumption that the titration curve in the region of an end-point may be described by a cubic equation. Fenwick's formula for the end-point by this method is as follows:

\[
V_{ep} = V_s D - kD' D
\]

where \( V_s \) is the second of four equidistant volume readings, and \( D \) and \( D' \) are determined as follows:

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A point of inflection on an electrometric titration curve is an indication that a reaction has been completed. On the curves of Figure 1, point A is the end-point of the reaction converting the tertiary phosphate, \( \text{PO}_4^- \), to secondary phosphate, \( \text{PHO}_3^- \); and the point B is the end-point of the reaction converting secondary phosphate to primary phosphate, \( \text{H_3PO}_4^- \). If the sample had been pure \( \text{Na}_3\text{PO}_4 \), the volume from end-point A to end-point B would be equal to volume A. However, volume A is greater by the amount, \( 2 \times 12.70 \) —23.40 = 2.00 ml. This excess acid was consumed in the neutralization of free alkali present as an impurity (probably as hydroxide crystallized or occluded in the crystal).

Weight of the sample was 4.060 gms.; 1.00 N HCl used as titrant. The material therefore analyzed as follows:

**Trisodium Phosphate:**
\[
(23.40 - 12.70 \times 164.2 \times 100) \quad 4.060 \times 1000
\]
\[
= 43.0\% \text{Na}_3\text{PO}_4, \text{(anhydrous)}
\]

**Free Alkalinity:**
\[
2.00 \times 40 \times 100
\]
\[
= 1.98\% \text{ as NaOH}
\]

**Water of Crystallization:**
\[
35.02\% \text{ H}_{2}\text{O} \text{ (by difference)}
\]

**Molecular Composition:**
\[
\text{Na}_3\text{PO}_4, \text{ 0.187 NaOH, 11.6 H}_{2}\text{O}
\]

D. K. Allison.

**Interpretation of Results**

The following analysis of the results shown graphically on Figure 1 is typical of the interpretation of electrometric titrations. The data from which the figure was constructed was taken during the routine analysis of a sample of trisodium phosphate (dodecahydrate).

Since the constant increment \( k \) is equal to 0.2 the end-point volume is given by:

\[
\text{Ve.p.} = (12.6 \times 0.34) - (0.2 \times -0.18)
\]

\[
= 12.69 \text{ ml.}
\]

which agrees with the result obtained by the method of plotting slopes.

The mathematical method is useful as a check against the more accurate graphic method, and in cases where coordinate paper is not readily available. The end-points of titrations in strong salt solutions, where the point of inflection is somewhat repressed, may be readily established by this method. It is recommended that when this method is used alone the end-point should be located by calculation from two sets of equidistant volume intervals, since the assumption of the theoretical cubic curve is not always found in practice.

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D. K. Allison.
Paths of Progress Still Wide Open

Studios go to great lengths to study and improve on every angle of projection, but work is wasted unless projectionists in field get managerial support.

As time marches on we pause now and then to pat ourselves on the back. We tell ourselves how good we think we are, that the world is getting better and better and that we had quite a hand in making it that way. But about that time we see some photographs like the above and then we stop for a moment's reflection—after all are we so far ahead of yesteryear?

These pictures are almost self-explanatory. One certain thing is quite prominent and that is the fact that we have not as yet eliminated the danger of fire from the projection room. Yet theatre owners, big and small; theatre managers, circuit supervisors, and on down the line still ignore the plea of the projectionist to repair and replace antique, worn-out equipment. Study the pictures closely. The first thing that attracts you is the fact that the ceiling of the projection room has collapsed from heat, acknowledging the lack of a ceiling ventilation fan. There should be in every booth one of sufficient size to draw flames and gas away from the rest of the projection room, thereby centralizing the fire to one spot, drawing it away from the front wall and the auditorium.

Notice if you will the flexible conduit and the asbestos covered wire is still intact, but what of the drop cord hanging down just over the projector, close to the most vulnerable spot, the open upper magazine while threading. Also there is a noticeable lack of fire protection on the front wall, worst of all no fire shutters on the port holes.

There is no excuse today for a projection room like this one. Certainly there was a fine marquis and foyer, nice soft rugs on the floor; everything fixed up fine for John Public to see. BUT look at the very heart of the theatre, the projection room. Studios spend millions of dollars on single productions, and as the following article shows, small fortunes are spent on projection rooms in the studios that can be duplicated by any theatre at a nominal cost.

All sorts of projection equipment is tried out under adverse conditions. Everything is done to duplicate conditions as found in various theatres and when successfully duplicated the studios modernize the same projection room, checking costs so that when the picture is on the road and some condition arises to harm the film or mar the production, the studio already has experimented with that condition and knows at once what the causes are and how to rectify them. Various studios have sent out circulars to the projectionists to check, if they can, the reasons for damaged film, etc., and the answer has been the same 90 per cent of the time. The projectionist has frequently turned in requisitions or has asked for necessary new parts or equipment and the message has been “as long as there is a picture on the screen, NOT”.

All theatres and theatre circuits are not like this, but there are still owners and managers that have the economy bug “as long as the picture is on the screen.” Then when something goes wrong and the picture is NOT on the screen the great cry goes up: “Fire the projectionist.” But if one were to go into detail it would be found that the projectionist has worked on every angle he knows even though the management will not purchase necessary parts to repair and keep up the equipment.

In order to enlighten brother projectionists throughout the United States as to what actually goes on in the projection department of a studio and to what lengths the studios go to assist the theatre projectionist, I have contacted Brother Merle Chamberlin, Chief of Projection at the MGM Studios in Culver City and he in turn introduced me to John Nickalous, head of the MGM laboratory, and they decided that it was not mere words that were needed, but actual photographs of the various operations necessary to put a production on the screen in your theatre.

These fine shots of the projection department at MGM were taken by Eric Carpenter, of MGM's still department, a member of Local 659, IATSE.

Starting with Figure A we find a new Zenith portable set up ready to go, with its Operadix sound system amplifier on a very convenient portable table just ahead of the projectors. This outfit can be completely dismantled in 20 minutes, and packed in two very convenient carriers.

In Figure B we see a close-up of the projector and sound head of the Zenith
portable. One of the greatest assets of this projector is its utter simplicity, everything being combined in one head. Note the usual MGM way of lacquering white all projectors, for cleanliness. We are quite sure that any theatre owner or manager would be well repaid by doing the same for his projectionist.

Figure C is a close-up of one type ERPI dummy used. This dummy is threaded with the sound track only, so you can see where it travels: from the full reel up into the sound head and down again to the left hand reel. The reel on the upper right is for the picture film take up. When the dummy is not in use the extra two spindles are removed and a two thousand foot reel is put on the lower left spindle. Note the arrangement of extra idlers installed by Brother Chamberlin to take care of the dummies. Incidentally, this is a Microphonic sound head from ERPI.

The SOUNDMAN'S BOOK of TABLES

By J. N. A. Hawkins

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Shaft (No. 2) is direct drive to upper hold-back sprocket. This machine is used in the music and dialogue synchronizing room.

Figure E, (Lower Left) Model E lamp using mirror and Suprex Carbons. Also note the older type ERPI dummy in use in this projection room.

Figure G shows the film lubricator, created at MGM by Mr. Nickolaus, head of the laboratory. This machine is rapidly replacing the old type waxing or processing machine. Note that the emulsion does not at any time touch any part of the machine; all rollers are machined out in the center leaving only a slight edge to touch the part of the film where the sprocket holes are located. In this machine is used a very light and high grade of penetrating oil mixed with a very light wax and this in turn is impregnated in the celluloid. The most important factor considered in the design of these machines was the fact that every foot of film as well as each reel must be lubricated equally. It is virtually impossible to get uneven lubrication from the machines.

There are a number of these machines in operation at one time. They are presided over by Brothers Elwood Borniche, Harry R. Sloane and Wesley Sleeper, all members of Local 683, IATSE.

Figure D

Figure F

Figure G
New Screen Passes Stiff Tests

In last month’s issue of INTERNATIONAL PHOTOGRAPHER you were shown a picture of the new sensation­ally interesting Flat Light Screen. In response to R. M. Hinshaw of the Star and Mayfair Theatres in Weiser, Idaho, we wish to state that Lee De Forest, one of the foremost authorities on sound, has tested the screen thoroughly for sound and given it his whole-hearted and enthusiastic endorsement. Incidentally, Mr. Hinshaw, the match shown on the screen, a small match 1 1/4 inches long, was put there for comparison only and I may add that the holes are much more numerous in the center of the screen than on the outside. This serves two purposes: first, to let the sound through at the mouth of the horns; and second, to darken the center of the screen where the so-called “hot spot” or more intense light from the projector arc light would appear. This assists materially in giving an even field of light over the screen. The Flat Light Screen also has passed severe tests by the Electrical Testing Laboratories of New York and by various major studio experts with flying colors. Reports on these tests were received too late for publication in this issue, but detailed data which should interest every projectionist and theatre manager, will be published in the June issue.

Paul R. Cramer, Local 150, I.A.T.S.E.

Academy Report

Details of Research Council’s recommendations on standard theatre projection practice.

Last month INTERNATIONAL PHOTOGRAPHER carried a story released by the Academy Research Council just as we were going to press, about the report of the Committee of Standardization of Theatre Sound Projection Equipment Characteristics and we promised to publish details of the recommendations of the ARC committee in the May issue. The full text of the committee report is published in full herewith, with the exception of the revised Specifications for Standard Electrical Characteristics for Two Way Reproducing Systems in Theatres. This was first released in June, 1937, and was printed in full in the July, 1937, issue of INTERNATIONAL PHOTOGRAPHER.

INTRODUCTION TO THE REPORT.

It has been found that the present two-way speaker systems as currently manufactured, consisting of a true multi-cellular high-frequency horn and a dynamic low-frequency horn, in a substantial air column, give a considerable improvement in reproduced sound quality over that secured in the past. However, certain differences exist between the present systems which make it difficult for the recording studios to accurately determine the average characteristics of theatre reproducing systems. While these differences may not seem to the casual observer to be of great magnitude, it is felt that the existing differences in studio product cannot be materially reduced until such time as the loud-speakers appear more acoustically alike to the trained observer.

The information below has been compiled in an effort to help to produce this result. This report, containing the following general specifications, has been divided for convenience into six parts:

Part 1—The Sound Head and Associated Equipment.
Part 2—Volume Control Equipment.
Part 3—Amplifiers and Filters.
Part 4—Loud-Speakers and Dividing Networks.
Part 5—Servicing Requirements.
Part 6—Studio and Preview Theatre Requirements.

THE SOUND HEAD AND ASSOCIATED EQUIPMENT.

Noise Level: Sound head should be so designed that noise level due to vibration of gear and drive equipment will be sufficiently low that overall system, of which this sound head is a part, will meet the ___35 db./.006 watts hrm level as described in later specification. Combining photocell and optical system on single vibration-proof mounting plate, mounting drive motors in a shock-proof enclosure, use of adequate shielding of photocell transformer and other electrical equipment in sound head and use of static shield to reduce static pickup by film and drum are examples of good design practice to minimize hum and electrical noises in sound head. Sprocket hole noise caused by scattered light which results in 96 cycle modulation has been minimized either by use of mask to block.
out scanning beam between sound track and sprocket holes or by designing optical system which reduces light leakage.

Uniformity of Output Volume: Illumination in a lateral direction across scanning slit shall be such that maximum variation in output of photocell will be less than \( \pm 1.5 \text{ db} \), when measured with track consisting of non-overlapping increments, each of not more than 7 mils width. Regulation equipment shall be available so that when power line voltage changes ten per cent overall gain of system, including exciter lamp, photocell, amplifiers, and horn fields, shall not vary more than 2 db, as measured in terms of acoustical output from speakers.

Weave: Weave in the sound head shall not be greater than \( \pm 2 \text{ mils} \). The Committee has often observed sprocket hole and other noises due to weave in reproduction from both variable area and variable density recordings and a clipping of peaks in case of variable area.

Film Damage: Design of head shall be such as to avoid all possibility of damage to film, in both picture and...
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sound track areas. At no point in travel of film through picture and sound heads should sound track area, either emulsion or celluloid side, come in contact with any part of equip- ment. All idler rollers should turn freely and shoulders on both sides of all rollers and sprockets should be re- leased. Rollers and sprockets in pro- jection head and rollers of fire track should also be relieved in sound track area. Consideration should be given to possibilities of guiding film through fire track to avoid scratching film.

Oil Leakage: In design of sound head, consideration should be given to location of electrical and optical equipment to minimize difficulties due to oil leakage from sound and picture heads. Use of oil-proof wiring throughout sound head has been found to be very desirable.

Push-Pull Cancellation: Design shall include provision for easy method of ob- taining maximum push-pull cancellation. Balance should be extended as much as possible over entire frequency range from 50 to 8,000 cycles, with minimum cancellation of 25 db. below 1,000 c.p.s.

Track Location: Track location and scanning width shall be set according to attached Academy Research Council Drawing, "Proposed Standard Sound Track Dimensions and Position." (See Page 5 that old.)

Starting Speed: Flywheels or an equivalent device shall be used to limit starting acceleration.

Filter: Total filter shall be less than 0.15% of 1%, as measured with ERPI Flutter Measuring Instrument, or less than 0.30% of 1% as measured with the RCA Flutter Measuring Instrument. (Standardization of flutter measure- ment procedure is now under consider- ation by Research Council, upon which a supplementary report will be issued in near future.)

PART II

VOLUME CONTROL EQUIPMENT.

Volume Control Range: Adjustable gain control of at least 50 db in 2 db steps shall be provided, of which at least 16 db is available at changerove position on wall. Wall attenuator is required at changerove position, be- cause of great difference in level be- tween newsreels and "Hi-Range" prints. Additional volume control shall be a dual operated device incorporated in main amplifier to be used to compen- sate for any abnormal conditions which may arise.

Machine Balance: Balancing facilities shall be provided to allow output of each machine to be balanced to within 1 db.

PART III

AMPLIFIERS AND FILTERS.

Gain: Overall gain of system shall be sufficient to provide 20 db in excess of normal requirement.

Frequency Response: Complete electrical system shall be capable of fre- quency response varying not more than ± 1 db in range from 40 to 10,000 c.p.s.

Distortion: At its rated output ampli- fier shall not generate more than 2% total harmonic in frequency range from 50 to 5,000 c.p.s. Amplifier output is average power into specified resistance load when amplifier is excited with sinu- soidal input signal. Harmonic content is defined in terms of a ratio of cur- rents between root mean square sum of harmonic components and funda- mental.


It is anticipated that changes in elec- trical characteristic will be necessary from time to time, and for this rea- son low-pass filter shall be adjustable over wide range. Low-pass filter shall be inserted in position in the circuit such that it is subject to extra- neous pickup and shall be capable of filtering out hiss and high-frequency disturbances generated in early stages of the amplifier.

Hum Level: Under operating condi- tions residual hum due to frequencies below approximately 300 c.p.s. shall not be greater than 35 db/0.006 watts and no extra-frequency noises shall be suf- ficiently below this level so that pho- tomachine, running without film, will have an output noise which is principally hum and is no greater than 35 —db. This specification holds to be met that no hum will be audible in front row seats in theatre auditorium under normal operating conditions.

PART IV

LOUD-SPEAKERS AND DIVIDING NETWORKS.

Acoustic Response: As measured with flat overall electrical characteristic, trend of acoustic response of loud- speaker system when measured by conventional warble frequency method shall not vary by more than ± 3 db from the following characteristics: namely, flat over frequency range from 50 to 2,000 cycles; not decreasing more than 5 db per octave in range from 2,000 to 10,000 cycles; and not decreasing more than 10 db from 50 to 30 cycles.

The loud-speaker system shall be de- signed to adequately carry rated output of another system.

Conventional method of measurement referred to involves the averaging of five (5) or more readings made with microphone close to speakers. In mak- ing measurements, care must be taken to select microphone positions which will not favor response of either high- or low-frequency units. Most suitable condition under which measure- ments can be made are either in large acoustically dead room or out of doors. In either case intensity of extraneous noise must be sufficiently low not to affect measurements.

Electro-Acoustical Efficiency: A mag- netic structure shall be provided which is efficient and distortionless. Appropriate deluxe two-way horn systems, to avoid necessity of increasing power- handling capacity of amplifiers.

Angular Distribution: In certain insta- tions it is necessary to have wide horizontal coverage, and high-frequency horn shall be available which will cover a maximum horizontal angle of 105 de- grees. Horns shall also be available to cover vertical angle of 65 degrees.

Rear Radiation: Past practice indi- cates extreme need for reducing rear radiation from loud-speakers, and it is...
desirable that loud-speakets be manufactured which have minimum of rear radiation.

**Dividing Networks:** Dividing networks shall be designed to have an attenuation of approximately 12 db per octave.

**PART V**

**SERVICING REQUIREMENTS.**

Meters and Circuit Arrangements: Accessible terminals for volume indicator and switch for substitution of re-sistance to loud-speaker load should be provided at output of power amplifier in order that electrical characteristics may be conveniently measured. It is further required that meter or equivalent be made available on various vacuum tubes, as it is difficult to service equipment which does not have adequate metering facilities.

Wear: Design of the sound head should be such that items subject to wear are easily replaceable; for instance, provision should be made for the easy replacement of felt pads on pad roller.

**Maintenance:** All equipment and wiring should be available for inspection and maintenance. For instance, an accessible method for checking photocell transmitter and wiring without disturbing the rotary stabilizer, if used, should be provided.

**Measurement:** Any part of equipment which is subject to measurement should be designed so that such measurement may be conveniently made.

**Physical Position of Equipment:** From servicing standpoint, it is desirable to mount as much of projection equipment as practicable in booth, such as field supply and dividing networks for loud-speakers.

**PART VI**

**STUDIO AND PREVIEW THEATRE REQUIREMENTS.**

In reproducing equipment used in preview theatres and in the studios, certain requirements are essential in addition to those of average theatre. These additional requirements are listed below and are given here in order that manufacturers, when designing and planning new equipment, may have a basis for provision for them. It is essential that studio sound departments review their product in rooms having equipment which is typical of that in theatres, in order that they may evaluate product in various conditions.

**Double Film Attachments:** Sound heads should be designed so that it is not difficult to provide either single phase or interlocked motors and space should be provided for the mounting of double film attachments capable of handling 1000 foot reels.

**Auditorium Volume Control in Link Circuits:** A link circuit of 500 ohms impedance should be provided in the voltage amplifier for auditorium volume control. This facility should be available without raising hum level and for this reason it is essential that link volume control be at position approximately 40 db above photcocell level. It is further specified that power capacity of amplifier systems must be reduced when maximum of 20 db attenuation is used in auditorium control. In order to avoid possibilities of introducing distortion when inserting equipment, it is recommended that equipment be desirable to have constant impedance in both directions throughout frequency range used.

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**The PROJECTIONIST’S BOOK OF TABLES**

By William Comyns

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EASTMAN
SUPER X
NEGATIVE

J. E. BRULATOUR, INC.
KODASCOPE
MODEL G

MODEL G, the newest member of the Eastman family of Kodascopes, provides great projection advantages at a moderate price.

First, "tailor-made" projection. One lens-lamp combination, from its five available lenses and three lamps, will provide just the screen picture size and illumination needed for your screen and "throw."

New Conveniences in Projection

Movable sprocket clamps, a gate-clearing knob, and thread light make threading simple. This light, controlled by four-way switch shown above, provides illumination for threading, rewinding and changing reels.

Tilting is positive with new gear-operated device in its pedestal base. Reversing motor allows reverse projection—and film can be halted for "stills." Rewinding is quick and easy—just pull out rewind lever.

Plus: framing knob... oilless bearings which require no further lubricating...speed control knob... beautiful combination finish...operation on D. C. or A. C., 25 to 60 cycle, 100- to 125-volt lines.

This great Eastman-made projector, complete with 2-inch f.1.6 lens of new formula, and 500-watt lamp, is $123.45. Carrying case, designed to function also as projection stand, $12. At your Ciné-Kodak dealer's.

Ciné-Kodaks, Kodascopes, and Ciné-Kodak Film are all Eastman-made, designed to work together and backed by world-wide Eastman service.

EASTMAN KODAK COMPANY, ROCHESTER, N. Y.
One outstanding feature of Du Pont ciné film products is their ability to record all the variations in tone between the deepest shadow and the brightest high light.

For better pictures in your next production use Du Pont Superior Pan.

Du Pont Film Manufacturing Corporation
INCORPORATED
9 Rockefeller Plaza
New York . . . . N. Y.
Plant . . Parlin, N. J.

SMITH & ALLER, LTD.
6636 Santa Monica Blvd.
Hollywood . . California

BETTER THINGS for BETTER LIVING through CHEMISTRY
60% OF YOUR CUSTOMERS
HAVE SubNormal Vision

MAKE YOUR PICTURES TO PLEASE THE MAJORITY

Patrons with imperfect vision respond to improvements which contribute to ease of vision. This has proved true in respect to the better presentation of pictures made possible by Simplified High Intensity projection. Progressive cinematographers recognize that this majority group in the theater audience shows equally favorable response to the improved clarity and definition obtained by the use of carbon arc lighting in motion picture production.

NATIONAL CARBON COMPANY, INC.

Did you know that hundreds of newspapers have adopted large type since surveys have shown that 39% of all people thirty years old, and 48% of all people of age forty, and 71% of those at fifty, have defective eyesight?

This means that an average audience of adults includes 60%, or more of people with subnormal vision.

It is now proved that people at 60 need twice as much light to see as well as they did at 20.

Motion picture engineers are now recommending screen brightness much higher than the present average. You can get this with Simplified High Intensity projection at so little added cost that one extra admission will cover it.

You also get the snow-white light which makes black and white pictures better and color pictures natural.

Low intensity projection is no longer economic— it is extravagance. It doesn’t save current—it wastes it. It doesn’t satisfy your audience— it brings unfavorable comparison with the more than 5,000 theaters which now have high intensity projection.

Why delay? Cash in on this modern projection now.

Write for booklet of pertinent facts, “The Eternal Triangle in Picture Projection.”

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation
CARBON SALES DIVISION, CLEVELAND, OHIO
General Offices: 35 East 42nd Street, New York, N. Y.
BRANCH SALES OFFICES: NEW YORK, PITTSBURGH, CHICAGO, SAN FRANCISCO
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CAMERA RENTALS SERVICE
Blimps, Dollies, all Accessories
15 ft. Camera Crane

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HOLLYWOOD, CALIFORNIA

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INC.
CAMERAS, BLIMPS-DOLLYS
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Complete Studio Equipment
Everything from a lens to a crane
KRUSE Camera Rentals
HOLLYWOOD
Rapid Pick-up and Delivery
DAY: HILLSIDE 8144 NIGHT: MORNSIDE 13470
HILLSIDE 4464

VARIRAY BLUE SEAL RECORcING
NEW VARIRAY RECORDING CALVANOMETER
- Variable Area
- Noise Reduction Shutter
- Noise Reduction and Lamp Control Panel
- High Quality Optical System
Complete, ready to install, $750.00 net

Blue Seal Sound Devices, Inc.
723 Seventh Ave., New York City
Cable Address: Soundfilm
Vol. X.  Contents for June, 1938  No. 5

ON THE COVER. Bob Coburn, member of Local 659, IATSE, turned out this beautiful close-up on Henry Fonda and Madeleine Carroll, who are starred in Walter Wanger’s “Blockade,” a romantic story interwoven with the background of the current Spanish war, that has provoked much speculation since its preview was held up last month, reportedly over controversial elements in the story.

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Ace Cameraman Praises Eyemo

“Newsreel” Wong Films War in China with Eyemo

NEWSREEL” Wong rates as one of the ace cameramen in the Orient. His thrilling shots, made under fire, have amazed picture audiences the world over. And like other leading cameramen, Wong relies implicitly on his Eyemo.

As Wong states in his letter, the versatile Eyemo surmounts even the difficulties met in filming the battlefield. Because of its ease of handling, the cameraman is able to follow the swift shifting points of action. The Eyemo is instantly convertible to meet any emergency. A quick change of lenses? . . . conversion from 100-foot film capacity to 200- or 400-foot magazines? . . . a tripod mount or a light easy-to-handle hand camera? . . . a change from electric to spring or hand drive? . . . a silent camera or a hookup for sound? . . . slow motion or silent or sound speeds? Whatever the need, there is an Eyemo model or accessory to meet it.

Built with typical Bell & Howell precision, the new Eyemo is more than sufficiently sturdy to withstand the strenuous work that characterizes newsreel production. Such features as three-lens turret, focusing and diaphragm controls visible through the spyglass viewfinder, and accurate speeds make the new Eyemo more flexible than ever before.


MAIL COUPON FOR FULL INFORMATION

BELL & HOWELL COMPANY
1849 Larchmont Avenue, Chicago, Illinois

Please mail me complete information about Eyemo Cameras.

Name:__________________________

Address:________________________

City:_________________________ State:__________
Tradewinds

TWO NEW HANDBOOKS SET

Make-up Artists Handbook by Murdock and Studio Mechanic's Handbook by Haines to be added to *International Photographer*’s regular data services.

*International Photographer* will inaugurate two new services in its popular tables series with the July issue, adding handbooks on make-up and studio backlot equipment to our current series of books on cinematography, sound, laboratory and projection.

The Make-up Artists' Handbook will be edited by Vern Murdock, business representative of the studio make-up artists Local 706, IATSE, with outstanding experts among the make-up artists contributing authoritative sections on various specialties.

The Studio Mechanic's Handbook will be edited by George Haines, member of Local 37, IATSE, in association with Lew C. G. Blix, secretary of Local 37, and an advisory committee of veteran studio workers amongst Local 37's membership.

This, the numerically largest West Coast studio local of the IATSE, includes the grips, gaffers, props, special effects, miniature, nursery, studio projectionists, drapers and other "back lot" crafts.

Both the handbooks will appear in format similar to the current tables familiar to readers of *International Photographer*. They will be the first complete and authoritative compilations by working Hollywood professional experts of the data in their respective fields.

The major studios and still photographers of Local 659, IATSE, have promised full cooperation in providing complete illustrations for the new handbooks and leading manufacturers also will assist in providing information and equipment needed.

The handbooks will eventually be published in book form. The make-up handbook will cover all phases of professional make-up for photography and the "back lot" handbook will for the first time present a codification and description of all the many items that go into motion picture production from "gobos," "flats" and "flags" to "rifles" and "babies."

Due to the pressure of business on their authors, the regular installments of the Cinematographers Book of Tables by Fred Westerberg, the Laboratory Book of Tables by D. K. Allison, and the Projectionist's Book of Tables by William Comyns, are missing from this current issue, but they will resume these valuable features in the July *International Photographer*.

**Photrix Meter**

The new Photrix electric exposure meter is a compact instrument that can be worn fastened to the wrist like a watch. The dial faces at right angles to the light intake, and can be read conveniently from the top when in the wrist-watch position. The Photrix is similar to other electric exposure meters in operation, except that it does away with setting levers or dials. It has no computer dial, this function being taken care of by an arrangement of the scales. Outer surface is of smooth Bakelite and glass with no protruding parts. It is 2 1/2 by 2 inches in front dimensions, slightly larger than the familiar paper match packet, and is 13/16 of an inch thick. The Photrix sells with eversafe case for $16 and a deluxe model in white Bakelite with pigskin zipper case costs $20. The wrist strap costs $1.00.

**Distributor:** Intercontinental Market-

**Greetings To “I.A.” Delegates**

*International Photographer* and the members of the West Coast Studio Locals of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada extend greetings and fraternal good wishes to the delegates to the IATSE Convention, which opens in Cleveland, Ohio, June 5th. It is our sincere hope that under International President George E. Browne's able administration, that this publication can continue to improve and expand its service as a medium between the production and distribution and exhibition branches of the industry in the dissemination of constructive news of technical activities.
**Victor Price Cut**

Victor Animatograph Corporation, of Davenport, Iowa, manufacturers of the well known 16mm Animatophone Sound Projector, has effected material list price reductions on its Models 25AC, 24B and 38. Effective immediately the revisions are:

- Model 25AC, 10-Watt Undistorted Output, with 10-inch Speaker, was $455.00—now $415.00.
- Same with G-12 High Fidelity Speaker was $490.00—now $450.00.
- Model 24B, 15-Watt Undistorted Output, was $595.00—now $520.00.
- Model 38, 30-Watt Undistorted Output, with two 12-inch P. M. Speakers, was $660.00—now $585.00.

The new Model 33 "All-In-One" Animatophone lists at $295.00 complete.

Company executives state that, although material and labor costs have steadily increased, price reductions have been made possible by a constantly growing volume of sound projector business, a large part of which has come from the school market.

**Graflex Publications**

Incorporating twenty outstanding photographs, many of them prize-winners in major contests and exhibitions, as well as photographs of twenty-four of the country's most illustrious photographers, the new Graflex catalog now is being distributed and it can be obtained without charge either by writing direct to the Polmer Graflex Corporation or at Graflex dealers.

Also, a revised and up-to-the-minute edition of Franklin I. Jordan's well-known book, "Photographic Enlarging," published by the same company, is now off the presses and obtainable from representative photographic dealers. The new edition has the same high quality of workmanship, paper stock and binding that featured the initial volume, which sold at $3.50.

**NVE Session**

The National Conference on Visual Education has completed the program for its eighth summer session, to be held at Francis W. Parker School in Chicago, July 20-23. This organization operates with no admission or membership fees and advance information is that an especially interesting program has been laid out for those interested in commercial and educational films, particularly in the sub-standard field.

The program will open with an address of Homer Buckley, a well-known advertising executive; with a reply by Mr. H. A. DeVry, president of the DeVry Corporation, and founder of the National Conference, which is now in its eighth year.

Other speakers and their subjects:
- Fred B. Semb, "German Railroads";
- J. J. Ferguson, of Fireman’s Fund Insurance Co., showing "Remember Jimmy";
- G. R. Browder, General Motors Corp., showing the Oldsmobile film, "Stranger Than Fiction";
- "A School in CCC Barracks" will be presented, also in film and discussion form by George Rilling, Superintendent of Schools, Anna, Ohio; F. L. Warren, of the L. C. Chase & Company, of Chicago, "Story of Mohair.

Dr. I. E. Decr, representative of the Motion Picture Producers’ Association, will talk upon Hollywood’s efforts to improve upon motion pictures and make them more suitable for educational use; and L. A. Hawkins, of International Harvester Company, will present their "Back to the Farm" film.

Educators on the program include: A. P. Heflin, of Lane Technical High School; Stuart Grant, of Pure Oil Company; R. E. Hughes, of the Evanston Township High School; Dr. Francis S. Onderdoff, of Ann Arbor, Michigan; Dr. James Bliss, of Western Reserve University, Cleveland, Ohio; and William E. Morse, County Superintendent of Schools, Malad, Idaho.

There are many other well-known speakers who will appear on the program and who will tell the conference guests interesting and valuable stories of motion pictures as the subject applies to education and to industry.

Since the school has become an important point of distribution of industrial films, the relationship between industry and education, together with the obligations entailed, will be discussed in its many phases.

Other subjects of discussion will be:

The splendid documentary film, "The River," will be shown by A. A. Mercy, U. S. Department of Agriculture, of Washington, D. C., who will give an interesting inside story of this picture and the important innovations it represents in the field of education.

**B & H Sales Chief**

J. Harold Booth has been appointed general sales manager of the Bell & Howell Company, replacing J. G. Llewellyn, who is no longer affiliated with this company. For the past three years, Booth has been assistant sales manager of the company. Prior to this, he was a development engineer in the research laboratories of the same organization, specializing in the design of amplifiers and sound projectors. He has been with the firm for 11 years. Before joining Bell & Howell, Booth was advertising manager of the W. L. Clark Company of New York.

**1938 Reeves Recorder**

A new 1938 model of the Art Reeves Ultra Fidelity Variable Density Recorder, now is available. The new model features all advantages familiar to the Reeves ultra-violet recording for variable density, but also has been redesigned and improved for greater strength and efficiency, and, as illustrated herewith, its outer appearance features streamlined simplicity.

The recording head is the portable type. While suitable for fixed installa-
tion, either in a studio recording room or in a mobile recording truck, the recorder is as portable as a camera.

Adaptability of the 1938 model recorder is heightened by provision for complete interchangeability of driving motors, permitting normal operation from most every desired power supply, including batteries, DC or AC generators, or from alternating current mains of almost any frequency. To allow this, the driving motor is a separate unit, attaching to a standard camera-type motor mount and it is therefore possible to drive this recorder with any standard camera motor suited to the available power supply. Normally battery-powered DC interlock motors for camera and recorder are supplied with each equipment.

The automatic speed control has been retained in the 1938 design. It has, however, been made an integral part of the recorder rather than of the motor if it is desired for any reason to control speed manually, a special switch in the base of the machine throws the automatic control out of the circuit. A standard footage counter and tachometer are regularly supplied. Both of these are carefully calibrated to be accurate with the recorder upon which they are used. These accessories are built into recording head and are easily visible to the recordist.

The new model offers a modern and simple design. Only two sprockets, a dampened, free-running recording drum, and four sets of guiding idling rollers are used. This simplicity has not been achieved by any sacrifice of uniformity of the film’s motion past the recording aperture. The large main sprocket carries the primary loads of feeding the film from and to the magazine; the secondary sprocket insures uniform film-feed from the recording drum. Both these sprockets run on precision-built ball bearings. The recording drum is also supported on precision ball bearings, and has an efficient damper or a special type which is absolutely unaffected by any temperature changes. The mass of this damper is sufficient to assure unflagging uniformity of motion of the recording drum. The surface of this drum is ground to such a high polish that, in a manner not unlike the celebrated Johansson adhesion gauges, the film adheres to this polished polished surface and partly of the uniform motion of the drum.

Gear-trains driving the sprockets are lubricated by a single “one-shot” offer. The ball bearings require no lubrication, as they are of a special design, lifetime-lubricated at the factory.

The camera to which this equipment was designed, and which is regularly supplied therewith, is the new Art Reeves “Ultra Fidelity” variable-density glow-lamp optical system fitted with the Art Reeves “Line-O-Lite” ultra-violet glow-lamp. This unit projects a slit-shaped recording beam on the film. No part of the “Ultra Fidelity” optical system is in direct contact with the surface of the film, clearing it by more than one-sixteenth of an inch. No physical slit or other recording aperture is necessary, for the light-source in the “Line-O-Lite” glow-lamp is in itself a narrow line of light only a few thousandths of an inch wide. This is focused upon the film by a special optical system and results in a fine line of intensely actinic light approximately 0.0065 inch in width.

For those who prefer to record by the variable-area method, a high quality galvanometer recording unit of Reeves manufacture may be fitted to these recorders, at a slight additional cost.

Manufacturer: Art Reeves, 7512 Santa Monica Blvd., Hollywood, Calif. Distributor: Direct.

**Leica—Motor**

Latest addition to the Leitz line is the Leica-Motor, an accessory to be available in the near future which will aid in materializing the desires of many photographers for a camera which is practically automatic and foolproof and enables photographs to be made in rapid succession with ease.

The Rapid Winder, a special baseplate with a trigger, for making pictures in rapid succession, has been available for some time. However, for greater latitude and success in making sequence pictures a camera that will make the successive exposures automatically, entailing practically no camera movement, is necessary. Such requirements are met by the Leica-Motor.

The new accessory is interchangeable with the baseplate of the Leica and when attached to the latter the whole forms a compact unit. A key on the bottom of the Leica-Motor winds a powerful spring which enables up to twelve exposures to be made automatically, releasing of the mechanism being accomplished by pressing a lever conveniently located on the front.

A scale on the Leica-Motor makes it possible to set it beforehand to automatically make the particular number of exposures required. One advantage is that its operation does not cause camera movement, and, in addition, it allows the camera to be held firmly by both hands. This permits use of slow shutter speeds should occasion arise for this practice. Speeds at which the successive exposures can be made are one per second and two per second.


**Rollei Salon at S.F.**

The Third Rollei Salon (first shown at Rockefeller Center, New York City, May 2-8, can be seen on the West Coast at the Photo Art Print Gallery, Monadnock Bldg., San Francisco, Calif., June 1-14. All Rollei enthusiasts and others interested in advanced amateur and professional photography are cordially invited to attend.

**Kodachrome Guide**


The guide also includes a "conversion dial" which provides a complete range of lens-and-shutter combinations. When this dial is set at the lens and shutter speeds indicated by the charts for any subject, it automatically indicates the equivalent lens opening for any other shutter speed from 1 second to 1/1000. Lens openings from F:2.2 to F:1.5 are included.

Complete data is provided for Photo-flood and Photoflash pictures on Type A...
Kodachrome film, and instructions are included for the use of Kodachrome filters and the Kodak Pola-Screen Type 1-A.

Manufacturer: Eastman Kodak Company, Rochester, N. Y. Distributor: Direct, dealers.

Developer Agitation

Agitation is a recognized part of the technique of miniature film development as it enables more uniform results to be obtained than would otherwise be the case. To permit agitation be carried out in an efficient manner the Leitz Reelo Developing Tanks are now supplied with hand agitators consisting of a rod with a knob on one end and a slot in the other which engages with a crossbar in the core of the developing reel, so that the reel is easily revolved independently of the tank itself. The Leitz Reelo Developing Tanks come in three sizes for 35mm film, for vest pocket size film, and for 2 1/4 x 3 1/4 inch size film. They are starily made of bakelite throughout. Prices on these tanks have been reduced considerably, the 35mm film size listing for $6.00 (formerly $7.25), the vest pocket and the 2 1/4 x 3 1/4 inch film sizes listing for $6.30 (formerly $7.50).


Spun-Glass Diffuser

A new Kodaflector Diffuser is announced by the Eastman Kodak Company. The diffuser, a disk of white spun-glass fabric 13 inches in diameter, is mounted on a metal rim. A bracket and U-shaped rod are supplied for attaching to the socket of the Kodaflector. Softer light obtained with the diffuser is useful in informal portraiture, as well as in identification work and clinical photography. Exposure with the diffuser being about three times the exposure without it. Kodaflector Diffusers will retail for $2.25 a pair, and single units will be $1.25.


Developing Machines

While considerable use has been made of 35 mm, motion pictures in commercial, industrial, and educational fields, the many advantages associated with the filming, production, and distribution of 16 mm. films has resulted in a remarkable growth of this branch of the industry. The processing equipment requirements of the many laboratories throughout the United States and foreign countries engaged in this work have presented some unusual features which have resulted in the creation of several new models of the Fried Developing Machines. These new models are designed for moderately small capacity, uniformly high quality output, and to sell at reasonable cost.

Other distinctive features incorporated are: Simplified operation; complete versatility for all processing operations; compact construction with all features self contained; ease of installation; use of small quantities of modern proven design; precision construction and finest quality materials. The Fried machines are entirely automatic and any length of film can be accommodated without cutting.

The combination 35 and 16 mm. models is designed for complete versatility in all processing requirements, and is capable of handling both film sizes—positive and negative, sound and picture. In these machines the ability to make an immediate change from one type of film to another is accomplished without any mechanical alteration or inconvenience to the operator.

Fried machines are completely motor driven and once in operation require very little attention of the operator. The operating units consist of: (1) developing tanks, etc.; (2) motor drive unit and air squeegee pump; (3) controllable air conditioning unit and film dry box.

The developing tanks form a complete processing combination consisting of a large developing tank, a "stop" bath tank, a hypo or "fixing" tank, and separate large wash tanks. While contained in one compact unit, this division of the chemical baths assures correct development with the least possibility of chemical depreciation due to "carry over" contamination. Drive is through the bottom rollers. Individual action of the upper rollers and the compensating elevators between each division of the tank, maintain a constant equalized tension throughout the processing. A variable speed control permits control of developing times for positive and negative films.

Air squeegees direct a controlled blast of air against both sides of the film before it enters the next compartment and also removes surplus water from the film before it enters the dry box. This feature in combination with the dry box film buffers assures negative that will not be spotted, streaked or scratched.

Dry box is equipped with most modern of air conditioning units, embodying a fireproof heating unit, air filter, and controllable speed circulating and exhaust fan. With this unit operator can vary heat and humidity of drying compartment to conform with developing time of film being processed. A conveniently visible and temperature and humidity gauge is placed so that it can be observed through glass door on dry box. Dry box in addition to buffers also contains film compensator which automatically controls constant tension of the film throughout machine. It also provides a safety factor to continuous development of film in case of any stoppage of machine.

When occasionally it is necessary to clean and inspect the submerged developing unit, ability to drain tank either by hand or pump; advantage of the Fried advanced design of overhead counter balanced "hoist" becomes apparent. By means of a slight pull on the cable handles the developing rack is raised clear of the tanks to facilitate any operation necessary. This feature eliminates necessity of exterior construction of "hoist" mechanism by purchaser—complete installation is self contained ready to be assembled and used.

The standard 16 mm. and combination 16 and 35 mm. models are available in 500 and 1200 feet per hour positive capacities. Negative capacity is approximately one-third that of the positive rolls.

GOLF TIME is here with the annual studio tournaments following each other in rapid succession, so we dragged out this shot from past golf yarns of Johnny Mescall, veteran member of Local 659, IATSE, and generally conceded to be one of the industry's top flight golfers, with a number of championships to his credit, including twice winning the International Photographers tournaments. Mescall believes in shooting 16mm shots of the golf swing as one of the best methods for correcting faults.

No Picture Should Be Without Action

Motion pictures, whether fan or feature, must be based on fundamental of telling the story pictorially through camera lens.  

By Herbert Aller.

While we recently "scooped" the trade and general press with our March story about the trend of public favor toward the so-called "horse opera" type of picture, and away from the sophisticated and screwball comedy types of stories, this
These stills by Jack Koffman, member of Local 659, IATSE, from Larry Darmour’s production “Lost in the Andes,” starring Jack Holt, for Columbia release, give an excellent idea of the technical aspects involved in the making of a feature picture.

was not the result of any sly news hunch by this writer, who has never posed as a journalist. Our advance slant on a subject that now is becoming the big trend in current production policy, stemmed from our preoccupation with the affairs and problems of the cameramen in the studios.

Our prime interest in production affairs is influenced by the viewpoint of how the cameraman can contribute most effectively to the finished picture. And there is no question but that there are still possibilities to be opened up in greater realization that the photographer can bring important values to feature production beyond the routine technical qualities of good or outstanding photography.

In conversations with the many members of Local 659 I have been impressed time and again with their emphasis upon the need for action in motion pictures. The cracker-jack professional cameramen, whether production or newsreel, always strive to capture dramatic action on the film. This does not necessarily mean helter skelter running about to no purpose, which many people confuse with dramatic action. It means rather that in the telling of any story, there is a continual up and down surge of activity, with first one force and then another triumphing, and this ends only when one or the other force emerges with final victory. Generally audiences like to take sides and the force that they are rooting for usually is typified by the hero and/or heroine of most stories.

The expert cameraman realizes that it is the camera’s function to always be...
Given the title, the reader gets a mental picture of adventure in a strange land. These forceful scenes are typical of the so-called “action” pictures.

 aware of this struggle, or contest, which is the essential dramatic action, and to always be alert to capture it on film with proper regard for the dramatic laws of emphasis, proportion, balance, etc. It is from this fundamental viewpoint that the theories of the proper time and place for close-ups, medium shots, long shots, etc., have been developed. It is not surprising, then, that the working theories of most expert cameramen, although not expressed in academic language—and frequently merely an instinctive attitude resulting from long experience—should fit so aptly with the expressions of great thinkers and teachers in the dramatic medium throughout the history of literature.

The expert cameraman, therefore, brings to his work a vital, practical understanding of the most important factor in any dramatic offering, be it stage, screen, radio, television or what have you—action! Take away this essential dramatic action and you no longer have drama but mere narrative or a succession of more or less impressive pictorial effects or amusing incidents, each possibly entertaining in itself, but not bound together in the solid framework that makes for truly popular entertainment.

This yard-stick can be applied to every expensive flop production, whether musical, drawing room drama or leisurely epic, and it likewise is the explanation why many a low budget picture has company auditors opening black ink bottles, much to the surprise of the Hollywood geniuses and master minds. This quality is just as evident in the low cost smash hits as it is in the high budget flops.
hits turned out by Bryan Foy's unit at Warners as it is in the more expensive hits that mark the records of the Zanucks, DeMilles, Lloyds, Selznicks and other production leaders.

In passing, it should be pointed out that the amateur cinematography enthusiast can profit greatly in pursuing a deep study along these lines if his amateur productions are to be anything beyond cinematographic snap-shooting.

**Speed Strip Photography**

Series layouts supported by supplementary pictures are becoming increasingly popular with magazines; notes on strip technique.  **By Jack Albin, Local 659, IATSE Screen Guide**

Speed strips of pictures in the magic eye manner have become invaluable to the fan magazines and newspapers to round out picture layouts. In some cases a picture layout may be built around one strip as in the case of the auto crash strip illustrating this story. Supplementing the action strip, pictures were used showing stuntmen, soundmen, wiring for the fire and other preparations for the spectacular scene.

I am now shooting speed strips on magazine assignments with the Robot and the marvelous depth of focus obtained with this camera under adverse conditions is well demonstrated in the crash scenes. The automobile did not land the first time on the deal of the truck but jounced directly under this photographer, who made haste to yell lustily for someone to untie him from the bracings on the side of the bridge when the fire and smoke quickly made the position very uncomfortable. Yet the picture was captured from start to the close-up on the finish.

The greatest difficulties experienced with the Robot when it first was used for speed strips about a year ago was movement of the camera while clicking off the strip, and determining correct exposure. Jarring of the camera was checked by resorting to a hand and wrist strap, and the exposure problem was overcome by trial and error methods using a photometer. Your exposure must be right on the button as the frame of the picture is smaller than 35mm. used in most candid photography and the film must be processed in fine grain soup.

The rotary type shutter of the Robot is unusually accurate. It really is 1/500 of a second that you are shooting, not more or less, as is the case with some cameras. Depth of focus is to be marveled at, as at stop f:5.6 everything is in focus from 10 feet to infinity. The camera's lightness and simplicity in actual operation, also its convenient, fast re-loading, are great assets for getting difficult shots and angles. I would not attempt to use the Robot for ordinary candid shots for a number of reasons, but I believe that for speed strips it has no equal.

One practical hint to photographers making speed shots that will save much disappointing negative is to study and practice timing on strip shots. One must develop an instinctive sense of the timing as in the golf swing. Seldom is any interesting action continuously going on at the same fixed speed. Practice will develop a sense of timing so that when the action is slowing the shutter is clicked less rapidly, and vice versa when it speeds up. Concentration on this will insure the strip having the right punch effect when laid out for publication.

**DuPont XL Pan**

Comparison of new 35mm film with other DuPont miniature emulsions.  **By Harry Champlin**

The new XL Pan film, marketed by DuPont, is characteristically DuPont, having the dependability and uniformity which have been a feature of this company's Superior and Parpan films. In addition to these characteristics, it has a tremendous advantage in speed and a gradation more nearly equal to that given by the human eye.

In order to use this film correctly we should have clearly impressed in our minds the difference between XL Pan and the Superior and Parpan emulsions of the same manufacturer. Parpan is a slow film with a Weston rating to daylight of 16 and to Mazda light of 8. It is fine grained and capable of building considerable contrast with slightly prolonged development. Slow films require less developing time for a given contrast than fast films and, by the same rule, we can say that fast films are generally flat-working unless developing time is considerably prolonged.

Parpan develops in a relatively short time. It should be used in two different ways. First, for scenes showing great contrasts, the film should be overexposed and underdeveloped. For scenes showing little difference in tonal values, it should be underexposed and overdeveloped. In my Formula 15 the correct developing time for ordinary scenes with Parpan is 16 minutes. When it is overexposed for extremely great contrast, it should be developed for 13 minutes. Underexposures to increase contrast should be developed for 22 minutes.

DuPont Superior is a rapid emulsion with a Weston speed ranging from 32 to 64 in summer sunlight, and to 24 in Mazda light. The contrast of this film should be termed normal and superior will give excellent results when used for scenes with normal contrast. There is considerable latitude in this film. If you are out in the desert and want to increase contrast, you can underexpose and overdevelop, but overexposure and underdevelopment should only be practiced within narrow limits because fast films do not build up as much contrast as slow film. Overexposure and underdevelopment, then, might result in flatness and a consequent loss of detail.

The developing time for a normal exposure is 19 1/2 minutes. If the film has been overexposed in order to reduce excessive contrast, the time of development will be 17 1/2 minutes, while if it has been underexposed in order to increase contrast, the time will be 22 1/2 minutes.

DuPont XL Pan is something new in emulsion making, having a Weston speed of 128 to daylight and 72 to Mazda light. This film is softer working than either of the other two and a distinct fault is that it records shadow detail and highlight detail in almost equal intensity. The developing time is considerably longer for the same degree of latitude in the developing times of either of the other two emulsions. This film should not be overexposed. Overexposure of a normal scene should be avoided with any film emulsion because there will be a definite loss in quality in the finished print. Underexposure also is one of the chief faults of amateur photography and a great deal of this will be avoided when XL Pan is used.

One of the most difficult shots in the realm of amateur photography is outdoor portraits of people. If the subject is wearing a hat and the sunlight is directly overhead, much of the face will be in shadow. The detail in the shadows is either not recorded at all or recorded at the expense of the highlight detail. Hence, we have either black shadows or the hat and rest of the face the hat itself, or full detail in the shadow of the hat and blank white for all else. XL Pan will give shadow detail and highlight detail in the same picture with a minimum exposure. This film can be used for photography where there is an abundant contrast outdoors and for stage photography where someone is in the spotlight and all else is in deep shadow.

In addition to these more difficult shots, this film can be used for normal work where a slightly greater depth of focus. The objects in shade will be recorded correctly without burning up the highlights. This film will therefore give you results as you see them with your eyes without any special manipulation of the developer. The developing time for this film is from 22 1/2 to 24 minutes in Formula 15.

Grain size is a subject uppermost in the minds of miniature photographers. Grain structure of any film is materially affected by the developing time. If the developing time is beyond the normal time there will be some increase in the size of the grain structure of the resulting negative. DuPont Parpan is a fine grain film and has the finest grain structure of the three, Du-
Pont Superior has a coarser grain structure than Pan and yet if this film is correctly exposed and developed, it will yield negatives capable of enlarging to 8x10 on glossy paper without any visible grainy effect. When XL Pan is exposed and developed for 22½ minutes, the grain structure will compare favorably with the grain structure of a Superior negative which has been correctly exposed and developed. If XL Pan emulsion is exposed and developed for 24 minutes, there will be a slight increase in the size of the grain structure which will in turn be slightly noticeable in an 8x10 glossy print. All of the Weston speeds and developing times given throughout this article are for use with Formula 15. This formula is as follows:

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<td>Nickel &amp; Ammonium Sulphate</td>
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This developer should be used at 70° F.
Versatility of device in taking up slack on errors wins approval from all departments for the “the studio doctor.”

By Lynn Dunn, Local 659, IATSE
RKO-Radio Studio

The complicated job of putting a motion picture together involves so many factors in which there are possibilities of a slip up that the industry has experts and special devices of all sorts to take up the slack of error. The outstanding “studio doctor” of them all, with a versatile adaptability to solving tough problems is the optical printer. Its main job, of course, is the regular duty of handling duplicate negative work and with the advent of new fine grain films, the scope of the optical printer is even greater, since the use of duplicate negative now is much less objectionable when cut in with original negative.

However, the optical printer earns its rating as “studio doctor” and trouble-shooter through a wide range of both major and minor operations on production scenes which crop up with unforeseen ailments. Nearly all departments in a major studio are benefited by this adaptability of the optical printer. The following illustrations are from actual cases on major productions:

The Camera man’s work is aided by the balancing of certain scenes in fog sequences which need more fog to smooth out the variation in density from scene to scene. It is often quite difficult for the cameraman to maintain a perfect balance in this type of work, and the optical printer is sometimes called on to double expose more fog over the scenes which appear too thin. This is true also of rain, snow, dust, smoke, and even fire scenes. Diffusion can also be added to scenes that need it.

The Sound Department has been known to let a microphone slip down into a scene, in which case the simple job of running through a magnified duplicate negative—moving the frame to eliminate the microphone—quickly makes the scene usable.

The Director calls upon the optical printer to make closer shots from scenes already photographed. Also, longer shots are made by double exposing a painting around a reduced closeup frame, and accurately blending the picture detail from this frame to the painting.

If the Art Department decides to reconstruct part of a set after it has been photographed and dismantled, the scene is run through the printer, blocking out the area of the frame where the new construction is to be put. A painting is then made of the change, and fitted into that section.

The Film Editor is confronted with numerous and varied problems which he turns over to the printer department for solution. The most important of these is perhaps the scene transition, executed by the conventional lap dissolve, wipe off, or trick effect. Also the action of scenes is reversed, as well as the direction of normal action from one side to the other. Dolly shots are made from stationary scenes in order to continue the flow of camera movement through a dissolve to dolly scenes made on the set.

The Scenario Department is thankful that it can fall back on the optical printer for the montage effect. This well-worn transition technique is used for the advancement of an important story point by impressionistic and graphic scenes, successively imposed or superimposed on a short length of film. It undoubtedly is familiar to us all, and when well done, is a highlight in any production.

The Music Department once in a while calls on “the studio doctor” to retime a scene to line up with phrasing in music already recorded. The zooming of titles, and dissolving of scenes behind main titles is often required to be at an exact spot in a musical score.

The Property Department was once known to have left unnoticed a wrong sign on the side of a moving truck.
GET THIS FREE BOOK ABOUT THE CINÉ-KODAK SPECIAL

THE STORY OF THE WORLD'S FINEST 16MM. MOVIE CAMERA

It takes this 38-page illustrated book to describe the unique advantages of the Ciné-Kodak Special. For, among its basic features are an adjustable opening shutter, reflex finder, interchangeable 100- and 200-foot film chambers, frame counter, one- and eight-frame shafts. Its scope includes animation, mask shots, dissolves, fades, multiple exposures, slow motion analysis and time lapse studies. Available are an optical finder, reflex image magnifier, electric motor drive, eight interchangeable lenses, tripod and tripod truck. Ask your Ciné-Kodak dealer for a free copy of "The Story of the World's Finest 16 mm. Movie Camera," or write to

EASTMAN KODAK COMPANY, ROCHESTER, N. Y.
INTERNATIONAL

might claimed, the a say recently the is booth. Due optical process omitted do operation; the new complete vveloped enough er for ing so erated. By even The I normal manipulation that was perfect. A preview shot of the new Mitchell rear projection process unit.

By manipulation on the optical printer the sign was blurred, frame by frame, so that the reading matter was obliterated.

The Film Laboratory comes in for some help with under and over developed negative. A duplicate negative of normal density is easily made, and proper correction in contrast is obtained to a remarkable degree.

Even the Actor can thank the printer for putting some real speed into his fight and chase scenes, by frame-elimination. It is obvious that comedies can often use such work to advantage.

The Paint Department has been saved retakes by the retouching on the printer of improperly painted parts of a set or property. For example, the hands of a large clock were painted so that they did not stand out plain enough to be readable under certain lighting. A little retouched highlighting on the edge of the hands, and the scene was perfect.

I might even cite a case that could be classed under assistance to the Make-Up Department. The censors objected to the extra hairy chest of a man stripped to the waist, and prominently displayed in the scene. "The studio doctor" used its substitute for a razor in this case, and retouched the hair off.

To appease the Censors, the printer has a noble record. A certain September Morn-like long shot seemed too much in evidence for censor standards, so the branch of a tree was doubled across the foreground, leading to the composition, as well as satisfying the censorship board. This really should be classed as an aid to the Landscaping Department!

An instance where the producer was saved some grey hairs and an expensive retake bill, was in the following case: A wrecked plane failed to burst into flames, as pre-arranged, at the time the injured pilot climbed out of the cockpit, clearing the plane. The flames didn't appear till he had crawled clear of the scene, thereby ruining the dramatic tension of the situation. A new prop plane would have had to been built, and the leading man brought back for another day plus the over-

head of retaking the scene. The way was cleared for a delicate major operation, with the scene the scene was dissolved to a split screen around the man, as he cleared the cockpit. In this dissolve, the action of the plane was advanced to the point where it burst into flame, while the pilot's action continued normally.

It is safe to say that the men in charge of optical printing are confronted with every conceivable type of a cinematographic repair job, and sometimes even the impossible is wanted. We usually attempt to do that, but when I recently received the request to do a usable job of taking a woman out of a bedroom set, and putting her behind a microphone in a radio station with a different dress on, I gave up!

Rear Projector

Compact, boothless and steady new background process projector added to the Mitchell line.

Following on the heels of the addition of a sound recording system, introduced in 1936, which was developed in conjunction with the engineering program for their new type cameras, the Mitchell Camera Corporation now is manufacturing a new type projection background machine for process work. This latest addition to the Mitchell line now is being demonstrated at the studios.

As pictured herewith, the new Mitchell projector is neatly and compactly designed, and operates without the need of a booth. Design and construction stem from Mitchell camera experience and the film moving mechanism is similar to the latest type Mitchells.

According to Mitchell executives, first thought in designing the new unit was reduction of noise in operation; and the second was elimination of heat from the film moving mechanism, both of which, it is claimed, have been accomplished to a surprising degree. During tests that preceded the present studio showing, the machine was operated over long periods of time without any mechanical adjustment and for long periods without any appreciable heat reaching the film mechanism.

With rock steady as a "must" for projection background work, every effort has been bent toward turning out a projector that would meet the toughest studio demands in this regard. Its steadiness won approval from studio special effects chieftains at a recent Academy demonstration at the RKO-Radio lot. Due to the limited number of persons legitimately interested in the technical details of process equipment, a complete technical description is omitted from this announcement, but Mitchell representatives will be pleased to demonstrate the new projector to any bona fide inquirer.

While Mitchell has already joined Teague and Newman in production of rear projectors, International Projector Corporation also is experimenting with the possibility of adapting the Geneva type movement to rear projection.
Brings Three
INDISPENSABLES

THREE indispensables of the modern motion picture negative film: speed...fine grain...photographic quality. Eastman Super X brings these essentials to the industry in abundance, with special emphasis on the most vital of them all...photographic quality. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN SUPER X
Panchromatic Negative
Sam Slyfield, chief of sound at Walt Disney's, has dreamed up one of the most useful cueing arrangements for helping out the re-recording mixer that has appeared to date. It is called by the Disney soundman "the mixers' gallows."

As all soundmen know, the final sound negative from which the release print is made, is a composite of from three to fifteen individual sound tracks which are re-recorded in synchronism from individual film phonographs. One of these tracks will have the dialogue on it, another the effects, a third will be the music track and often additional tracks will carry extra effects, added music and dialogue. It is the function of the re-recording, or dubbing mixer to vary the volume level of each individual sound track so that levels on the composite track will have proper dramatic relationships and thus satisfy the producer.

It is entirely possible to have a hundred mixing cues per thousand feet of composite track which places a terrific responsibility on the dubbing mixer if he has to remember which cue goes where, and how much, with perhaps just a few punch marks on the action print which is being projected on a screen in the dubbing stage in synchronism with the sound to cue the mixer.

Some studios mix all the effects into one track, then mix all the dialogue on a second track after which all the music is dubbed onto one music track. This preliminary dubbed then leaves the dubbing mixer with only about three tracks to worry about, each of which is a composite track itself. While this process of splitting the job up into four or more dubbing sessions somewhat relieves the load on the dubbing mixer, it naturally takes longer and obviously costs more than doing the whole job at once. Also it has definite disadvantages from the artistic standpoint in that it is hard to mix effects, for example, without knowing how much the effects are going to be masked by dialogue or background music, etc.

Other studios attack the problem by dubbing in very short sequences of just a few feet at a time. By this method the number of cues to remember is held down to something that the average mixer can duplicate. This system, however, is expensive due to the fact that all the tracks must be rewound and retreaded to a "sync" mark after each short re-record, which again takes up time. It takes nearly as long to rewind and rethread a dummy after a hundred foot sequence as it would for a thousand foot sequence.

The new system developed by Slyfield for use at Disney's is particularly adaptable to their type of cartoons which have many more dubbing cues per reel than the average picture. However, the idea still seems very useful for general use.

Fundamental premise on which the mixers' gallows works is that the entire foot of the picture appears on the musical director's score, whether or not there is a continuous background of music. Thus, the musical director stands at the center of the gallows with the master musical score fixed to reference locating clips on the mixing console. Each dubbing mixer has in front of him a cue book which consists of musical score sheets in blank on which are written, by a system of simple symbols, the mixing cues.

The musical director follows along the score with a metal pointer, which is attached at its upper end to a ball and socket joint on the crosspiece of the gallows frame. His metal pointer is mechanically connected to four movable cylinders in which dim lights and a vertical cross wire are located. The image of the light appears on the cue sheet of each mixer as a small blob of dim light and follows the lines of cues on each page in exact synchronism with the movements of the pointer along the master musical score.

At points on the master musical score where there is no background music the words of the dialogue or a description, by symbols, of the effects, appears so that the musical director can always follow, on the score, the progress of the sequence as it is projected on the screen. Each mixer handles about four tracks as a maximum, and the cues for each track are written in a separate color on the cue sheet.

Cues are erased and rewritten during the progress of each review to suit the ideas of the mixer, musical director and producer, as is usual in such dubbing sessions, but the point is that once a cue is set it remains that way so that everyone can concentrate on the weak points without having to worry about duplicating the good parts of the sequence. Two or three reviews usually serve to set the cues for a whole reel and one take usually is all that is necessary.

Another advantage of the new cueing system is that if it ever becomes necessary to make a new master sound negative it can be dubbed over again from the original tracks by using the original cue sheets and there can be no doubt that the new sound negative will be a very close duplicate of the first dubbed negative.

The Slyfield system of cue symbols is very complete and clearly describes every type of slow or fast, shallow or deep fade and eliminates most of the mental strain from the mixer. This allows him to concentrate on getting the ideal dramatic contrasts and artistic nuances into the sound as it will appear on the release print. The mechanical construction of the mixers' gallows is rather difficult to describe in detail but the lights all "track" perfectly with the pointer and the use of ball bearings eliminates practically all friction from the system.
News Mikes Hear But Not Seen

Soundmen’s efforts have solved problem of getting the mike out of the way of cameramen with the “mike spider box.”

By Warren McGrath, Local 695, IATSE

Fox-Movietone News

Ever since the newsreels took unto themselves their step-child, sound, the poor mechanical ear that we have pleased to dub “microphone” has been a bone of contention. It might be likened to the highly fictionized robot—that mysterious assembly of gadgets that does the bidding of a master. Unfortunately (or maybe fortunately) the robot is unable to distinguish intelligently which parts of the job to do and which to avoid. And so too is the lowly microphone cursed. Inherently it has the faculty of picking up extraneous noise with the same fidelity as desired sound.

It has been the lot of the small army of motion picture soundmen to figuratively take their robot by its duraluminum ear and force it to obey the strict requirements essential for the illusion of audible realism on the screen. The perhaps overzealous performance of this has been the cause of much weeping and gnashing of teeth by their co-workers, the cameramen.

With a view to improving the general results of sound newsreel coverage, on the basis of both sight and sound, newsreel sound technicians have devised and constructed apparatus which recently has gone a long way towards solving the constant problem of camera angle vs. microphone location.

In the limited budgets of most newsreel producing companies, there is little place for costs incurred by field experimentation in the interest of sound. It is to the great credit of the soundmen that they willingly shouldered the cost of many improvements in order that sound equipment might be used to best advantage in the field. Due in no small measure to this fact, newsreel field recording has kept pace with the demand for better and still better quality.

For purpose of comparison let us take a quick look at the technique employed in a newsreel interview, vintage of 1930. At times there were as many as four sound cameras with attendant sound apparatus shooting the same scene. Camera men, accustomed to artistic composition, were confronted with a picture of the rear side of four ugly looking microphones surmounted by the head and shoulders of the subject. Small wonder that wordy battles ensued between cameraman and soundman. Yet each was trying to do his part of the job in a manner guaranteeing the best possible results from their separate viewpoints. In time, however, the soundman and cameraman learned to grant concessions to each other. Microphones were placed to one side and lenses and angles were chosen which would frame out the mikes, but the result was neither fish nor fowl. In the majority of cases it was neither a good pick-up nor the best to be desired photographically.

This, of course, was an impossible situation and its solution seemed to be in a device which would enable all newsreels to operate from a common microphone. To M. G. McCarroll, soundman for Paramount News, goes the lion’s share of credit for working out the extremely flexible system now in use by the newsreel producing companies operating in Southern California. McCarroll, a member of Local 695, IATSE, is a graduate of Massachusetts Institute of Technology. In the methodical manner characteristic of good design engineers, McCarroll laid down a list of minimum re-

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The SOUNDMAN’S BOOK of TABLES

By J. N. A. Hawkins

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requirements to which he determined to hold. Among these were: fidelity over a range covered by all possible newsreel recordings; ability to deliver to each recording amplifier a signal at workable level correctly matched for impedance; and the necessity of absolute freedom from intercoupling effect resulting from the various input circuits into which it had to work. Added to these main requirements was a list of secondary importance imposing enough to cause crack engineers to reach for a slide rule and a ream of paper.

The first microphone distribution system was in itself a highly satisfactory device. It was greeted with enthusiasm by the men in the field and promptly christened "The Mike Spider Box." Subsequent improvements resulted in the present ten pound affair, entirely self-contained and capable of working one dynamic microphone or a maximum of two crystal microphones into as many as five recording amplifiers. Today the Mike Spider Box is deemed as important on jobs where all newsreels are working as the microphone itself.

Of course, there still was the problem of that one microphone. A problem which was mostly solved by the sound development laboratories. Soon the small, rugged, dynamic type microphones replaced the cumbersome boxes housing condenser units and associated amplifiers. Next black lacquered pedestal stands replaced the all too noticeable wooden tripods, but the problem of placing the microphone close enough to overcome background noise seemed still to be with us.

McCarroll and this writer cooperated in developing the next improvement—a portable microphone boom. With this boom microphones can be placed within eighteen inches of the speaker's mouth on head closeups and still be outside of the frame line. It can be assembled in about one minute and collapses to a compact bundle about four feet long and ten inches in diameter. Its weight is a mere seven pounds and when opened to its full size, reaches seven feet in the air with a 52-inch arm. It is designed to safely handle the conventional 618 type dynamic or an eight ball mike unattended.

At times, newsreel soundmen are confronted with a recording which must be done in an atmosphere of great extraneous noise. Proper suppression of unwanted noise calls for a microphone to

Compare the nondescript array of microphones in two top pictures in this layout (used in 1930) with the neat equipment and setups on opposite page. Improvement is due to development of "mike spider box," shown in bottom picture on this page. It allows five or more newsreel soundmen to record from one mike. M. C. McCarroll of Paramount News, who developed the "spider box," is the gentlemen in the pictures.
Pictures at top show M. G. McCarroll, of Paramount News, with the collapsible microphone boom now used for many shots by West Coast newsreel men. The light, portable boom was developed by McCarroll and Warren McGrath, of Movietone News, author of the accompanying story. McCarroll poses in shot at lower left with the neat new microphone stand which has replaced the cumbersome and unsightly gadgets of early sound days. At lower right is illustrated the lapel mike, which is used for interviews when there is an unusual amount of extraneous sound that would be picked up by the ordinary type of microphone.

be located within a few inches of the source of sound. This requirement was a matter of ounces and its size about that of two air mail stamps placed side by side, the lapel mike fitted nicely into our scheme of an inconspicuous "close talking" pick-up. In use, the very light connecting cord is draped around the speaker's neck, usually inside of the coat collar, and is allowed to hang down behind the back. The tiny mike, to all
appearances a lapel ornament, is all that is revealed to the camera. It is capable of delivering clear, crisp dialogue sound and can be successfully operated when extraneous noise precludes the use of most other type microphones.

There is one type of newsreel interview which still defies solution. Due to the fact that newsreel cameras are not silenced sufficiently and that the ponderous blimps employed by the studios are impracticable for newsreel use, the indoor pick-up is still the soundman's headache. One camera running is bad enough but when you have three or four motor driven cameras and a hand operated machine all operating at once, the recordable din is comparable to that inside of an old fashioned coffee grinder. At least two newsreel companies have equipped their cameras with a light weight blimp especially designed to be compact and incorporate the features of a rain cover and sunshade. They have proved of great service in the field. However, reverberation is such a fickle thing that one noisy camera can ruin the take for all, and their good work is nullified by the others. The apparent solution here is the use of blimps of this type on all newsreel cameras where camera noise is at a recordable level.

Probably the simplest thing that a newsreel soundman does is the actual recording of sound. His real work is the complete understanding of the overall problem presented by each newsreel story and his adaption of recording to them. Most newsreel soundmen have proven that they can be measured by the same standards by which newsreel cameramen are judged and not found lacking in any respect. No small part of the soundman's worth has been his resourcefulness in matching seemingly impossible conditions with creative ingenuity. The sound laboratory's equipment must still be adapted to the rigid requirements of field recording before proving its worth and in this the newsreel soundman seems to have done good work. After all, newsreel sound has typed itself from the very beginning as that which is recorded successfully not because of conditions— but in spite of them.

**Gab Eliminator**

Announcement was made last month of the development of a "dialogue eliminator" at the Warners' lot by Major Nathan Levinson, head of the sound department, and his aide, W. A. Mueller. The studio has applied for patents on the device, which permits the saving of much time and expense in re-dubbing for the foreign market. The machine now is being used at the studio for this purpose. As it re-dupes, it automatically skips parts of film in which there is dialogue, but records music and sound effects. More detailed information will be published in July INTERNATIONAL PHOTOGRAPHER.
Continuation of SMPE Papers

More abstracts of the latest information on technical progress and future prospects from the Society's spring convention.

Because of considerable interest by many readers of International Photographic, who file their copies as a record of technical news, we are devoting this month's news section to the continuation of the papers presented at the Society of Motion Picture Engineers' Spring Convention at Washington in April. This is one of the most interesting array of papers presented before the SMPE in some time. Because of special interest in the first report of the SMPE's survey of theatre conditions, the full text of the report, which will be available for the July issue of International Photographic, will be published in full.

“A Continuous Optical-Reduction Sound-to-Print Process”
M. G. Townsley, Bell & Howell Co., Chicago, III.

Optical-reduction printing from 35 mm. negative to 16 mm. positive has come into wide use. Now printer has been developed for making optical-reduction prints, which departs from conventional design in that film rolls are horizontal, making possible oil-damped filters and fluid lubrication without friction-producing oil-seals. Printer operates in either direction and stops automatically at end of negative. A three-phase, 220-volt synchronous motor drives main worm shaft from which all working parts are driven at printing speed of 60 feet of 35 mm. film per minute. Uniform film motion is achieved by variable filtered and independently filtered drive to each film drum.

Self-contained optical unit produces on 16 mm. film an image of 35 mm. track moving in synchronism with 16 mm. film, with longitudinal and transverse magnifications of 0.48 and 0.84, respectively. Provision is made for printing masking lines at edge of track. A 10 volt 1/2-ampere d-c. lamp is operated from pair of 6-volt storage batteries and full-wave charger. Lamp current is controlled by rheostat and ammeter.

“An Automatic Camera Timer for Time-Lapse Cinematography”
H. Roger, Rolab Photo-Service Laboratories, Sandy Hook, Conn.

Ever since invention of motion picture, time-lapse cinematography has been used extensively to speed up slow actions. More or less complicated devices have been constructed, mostly by cameraman himself, to take single exposures at various time intervals. In modern cinematography, especially in industrial and scientific field, time-lapse photography has found great many uses in recording slow processes. Camera timer described in this paper operates not only camera but also light, in synchronism with the camera shutter. Timer is result of more than twenty years of practical experience in this field.

“New Piezoelectric Devices of Interest to the Motion Picture Industry”
A. L. Williams, The Brush Development Co., Cleveland, Ohio.

Devices discussed are: (a) phonograph pick-up with uniform response for frequencies without feed-back; (b) recording and playback of high-fidelity weight using light-sensor diode. Devices have been developed for好感 and the present model offers a recording system where the response of the pickup will record over the same range; (c) high-fidelity head-phones reproducing to over 10,000 cps, with high sensitivity and high impedance; (d) unidirectional microphone (changeable at will) to bidirectional or non-directional; (e) lamps using ribbon pressure gradient and sound cell pressure unit.

“Characteristics of Supreme Panchromatic Negative”
A. W. Cook, Agfa-Ansco Corporation, Binghamton, N. Y.

New panchromatic negative film is compared with earlier types of supersensitive material. It has a light-sensitivity twice as great as that of Superpan. This, it is claimed, permits a 50 per cent reduction in set lighting, or use of smaller lens aperture for gaining greater depth of field with diminished illumination. Relative color-sensitivity is substantially unaltered. Film is doubly coated, with two emulsion layers superposed upon gray antihalation layer between emulsion and support. Despite increased sensitivity, Supreme negative has equally good keeping qualities, finer grain, and lower developing fog than Superpan. Development characteristics are similar and no alteration of laboratory procedure normally employed for typical supersensitive materials is suggested. Although long scale film allows great latitude in development, extremes of light shade beyond limits imposed by earlier supersensitive materials can be recorded faithfully, as indicated by long straight section of characteristic curve, very short toe, and shoulder falling in region of densities far beyond those encountered in practice. Advantages are reflected in quality of negatives taken under adverse lighting conditions.

“A Roller Developing Rack with Stationary Drive”
C. E. Ives, Kodak Research Laboratories, Rochester, N. Y.

In a previous paper a rack was described that provided for continuous motion of 200-foot length of motion picture film during processing but could be used with rack-and-tank equipment. Purpose of this roller rack was to give type of treatment in processing essentially similar to that given by continuous machine while retaining features of batch equipment that are helpful in experimental processing.

Rack previously described included built-in driving motor and reduction gear, an arrangement that was most feasible for a single unit. With more extensive use it became desirable to have multiple units operated from stationary drives at tanks and at loading and unloading stations.

New design has been worked out in which weight of rack was reduced greatly by use of stationary drives. Further reduction in weight was attained by substitution of tucking spring for weight supporting beam associated with movable lower shaft in earlier model. This shaft was mounted upon frame by lever arms in such a way that one leverage of shaft itself to maintain it parallel to upper shaft while allowing necessary vertical movement.

“Automatic Camera”
H. Griffin, International Projector Corp., New York, N. Y.

This new projector is provided with synchronized front and rear shutters operating in same frame, providing considerably greater screen illumination; an automatic fire-shutter safety trip for fire prevention; a Bijur one-shot oiling system to provide positive lubrication under pressure; together with ball bearings having sealed lubrication for extremely long service; heavier film-gate construction, entire unit being readily removable for cleaning and having adjustable tension devices and locking positively both in open and closed position; readily removable film-trap having edge-guiding means and provision for easily cleaning and replacing worn film runners; new ring-type fire-shutter governor; easier threading facilities; new automatically positioned threading lamp; illuminated pearl gray enamelled interior; and other distinctive improvements.

“Film Cement Pen”
R. J. Fisher, Rochester, N. Y.

Purpose of this device is to make application of film cement in splicing film easier. Material allows core to make many splices, as in film exchanges, studios, and laboratories.
“Motion Picture Projection from Metallic Sound”;
W. R. Carter, Taylor-Sloane Corp., New York, N. Y.

Brief history is given of various processes for putting photographic images on lantern slides and evolution from flat surfaces to flexible metal ribbons is discussed. Subject of metal films is traced under following headings: Physical and mechanical properties of metal film; the development of a metal strip suitable for projection; physical, chemical, and mechanical properties necessary for the photographic emulsions and photographic process; the effect of metal strips upon the emulsion; the elimination of strain and the heat of the projection machine upon the metal film; relative wear of quality of metal film as compared with cellulose; the effect of coated sides of the metal strip and the development of printing machines to print thereon; making original master negatives on standard photographic equipment; dubbing positive prints from the master negative; optical system best adapted for getting the highest possible reproduction from the polished surface of the metal film; comparison of light transmission from celluloid and metal films; effect of heat upon the image on the metal film.

Can a metal film be joined rapidly if it comes apart? A comparison of shrinkage between metal film and celluloid is given. Evidence is presented that the permanence of metal film? Will it be possible to develop color on metal film and will the use of prisms make it possible to use a color projector? What changes will the operator have to make in technical and general practice? Why will the sound be more accurate from a reflected image? Will it be possible to use the sound in projection of sound-tracks in various languages on the metal film? With the elimination of fire hazard, shrinkage, and the introduction of less weight and positive permanence, what are the chief defects to be expected in metal film, and what is proposed to overcome these defects?

“The Theory of Color Reproduction”;
A. C. Hardy, Massachusetts Institute of Technology, Cambridge, Mass.

All methods of color photography are outgrowths of suggestion made in 1855 by Clerk Maxwell, illustrious British physicist. Method he suggested would now be classed as an additive process, since final reproduction was effected by projecting three lantern-slides in register on same screen; one lantern being supplied with red filter, one with green, and the third with blue filter. Maxwell suggested further that these lantern-slides be prepared from three negatives, each negative being exposed through appropriate filter, but was not interested in projecting corresponding lantern-slide. Extension of Maxwell’s reasoning to subtractive processes leads to conclusions used in printing. Authentic use of positive images should each be complementary in color to corresponding taking filter.

Maxwell’s intimation that his process was theoretically incapable of perfect reproduction, basic features of Maxwell’s reasoning have been incorporated into commonly accepted theory of color reproduction. Recent progress in science of colorimetry has made it possible to investigate relation that should obtain between the characteristics of taking filters and colors of the reproduced image. Much investigation shows that taking filters required for perfect reproduction have characteristics that are very different from those in common use.

This paper is concerned with establishment of conditions that lead to faithful reproduction by any three-color process. Examples of application of optimal fundamental conditions are given for both additive and subtractive processes.

“Screen-Film Negative—Positive Process”;
T. M. Taber, Dufaycolor, Inc., New York, N. Y.

Progress in two directions has greatly simplified the making of prints from screen-film negatives. Study of emulsion characteristics and of mechanics of development with silver bromide solutions has led to avoidance of color dilution in copying one screen material from another. Sodium thiosulfate in a metal developer has been shown to localize development in the lower strata of the film, so that silver image is formed in close contact with resica, largely eliminating the boundaries of differently colored units; crystalline structure of silver salts and grain-size frequency also assist in pre- venting color dilution. Curves of development and dilution as the result of 45-degree oriented reseaux is explained, and way in which this has been counteracted by suitable choice of negative material. Positive material. Production of a vapor-lamp emitting line spectra of mercury and cadmium without appreciable spectral background, combined with line-mapped line-source, has provided triple monochromatic light-source, spectral lines of which coincide with peaks of response transmission. With resultant elimination of color due to overlap, such as has always previously been present with color filters of narrow-cut type. Dufaycolor contact process with automatic control of both hue and printing light is described. Techniques of printing and development with standard equipment are described with lantern-slides and production of 35 mm. cinema prints (which are at present circulating in English theatres).

“Problems Involved in Full-Color Reproduction of Growing Chick Embryo”;
E. S. Phillips, New York State College of Agriculture, Cornell University, Ithaca, N. Y.

Attempts to record on 16 mm. color-screen film physiological changes that take place in the period immediately prior to hatching of hen’s egg presents problems varying with each day’s growth. Because author was working with living subjects and the expected rate of growth and number of stages in period of time would not permit establishment of normal embryological development and even life itself, it was necessary to add post-hatching stages.

Development of embryo is shown in three different ways, i.e., (1) transmitted light, with shell entire; (2) removal of shell of the shell, and subsequent photography by reflected light; and (3) removal of entire shell, and placing the embryo in a watch crystal, thus showing all parts of their relative size.

In all three methods, temperature, humidity, and light control constitute the major problems.

“A Method for Determining the Scanning Loss in Sound Optical Systems”;

Usual methods of evaluating frequency characteristics of recording and reproduction devices have been satisfactory for determination of required correction for overall losses. However, losses due to aperture and other factors have been known with sufficient precision to permit an inferior limit to be assigned to film loss only.

The method described was chosen in connection with high-fidelity development, and consists in comparing direct measurements made on images formed by contact printing of geometrically shaped test-object on film with measurements of frequency records made using recording optical system. While results obtained can not be applied generally, described is to show image of filament of 0.001 inch wide when used with exciting lamp having coil diameter of 0.055 inch. Such is then superimposed on the curvature image of filament of lamp. Curved image is then re-imaged by highly corrected objective lens of numerical aperture 0.2. The objective lens has inherent curvature of field, and image is compensated for by curvature of line-image formed by toric lens so that final image is flat. Toric lens also acts as condenser to throw image of filament into objective lens. Careful tests of samples show that final image is flat, straight, and of uniform width and intensity.

“Sound Recording by Color Modulation (Van Leer System)”;
A. L. W. Williams, Brush Development Co., Cleveland, Ohio.

Method of recording sound is described in which record of variation in sensitivity of photographic film to light of different wavelengths. On standard film there is portion of sensitivity—wavelength curve in which sensitivity changes linearly over wide range with small change in wavelength. On color film there is portion of sensitivity—wavelength curve in which sensitivity changes linearly over wide range with small change in wavelength. Optical system and apparatus arranged, designed to vary color of recording light by means of band and capable of wide-range recording. By this method small deflection of recording galvanometer is required, enabling simple crystal oscilloscope to be used for purpose. Chromatic aberration is almost eliminated. Large errors in exposure or development may be corrected to such extent that minimum distortion occurs.

Report of the Standards Committee;
E. R. Carver, Chairman.

Tentative report that has received initial and final approval by Standards Committee have been published. Tentative report for Journal of the Society. Uncompleted items at present under consideration are:

1. Drawings for standard cores for
When accurate high-contrast emulsion is required to record the standard sound track, which would be used in ordinary way to make release prints, Improvement in release print ground-noise of 8 to 12 decibels is obtained by method, and volume range is increased by 8 to 10 decibels. New method also means for increasing density contrast of final release print track when original is recorded on panchromatic film.

"Design and Operation of Theatre Loud-Speaker Systems

J. H. Miller, Lansing Manufacturing Co., Los Angeles Calif.

Although really satisfactory loud speakers have been commercially available for only a short time, all essential elements of good loud speakers have been at hand for many years. Reasons for late appearance of suitable units must be sought in economic rather than technical field.

Loud speaker with its horn and other adjuncts is considered analogous to antenna and plate circuits of radio transmitter. It is expected to work essentially only in acoustics and in radio transmission do we have to be so wavelength-conscious, since only in these cases can the product be made small enough to fit from very small to very large, compared with apparatus dimensions. This wide range at once deues use of types of simplifying assumptions that are so convenient for other fields, and introduces several sets of mutually contradictory requirements for apparatus. To date, apparently no one has succeeded in fulfilling all the requirements of one single piece of apparatus, so that it becomes necessary to use multi-channel systems with appropriate frequency-dividing networks.

One solution to requirements just outlined is discussed in detail from engineering point of view. Comparatively meager published design data are reviewed, and compared with light of author's experience with units described. Some information is given regarding possible modification of performance in existing apparatus in units. Experiences in application of units in field are discussed and suggestions are given to users.

"Push-Pull Recording with the Light-Valve"


Push-pull recording on film is accomplished by means of double light-valve system on cylindrical glass. Design is introduced by recording medium which are represented by second-order harmonics balance out in reproducing as do also frequency distribution portion of noise-reduction system. As result, push-pull recording not only eliminates certain defects of conventional recording but permits applications of techniques that allow further extension of volume range and improvement in naturalness in final product.

"New Uses for Instructive Motion Pictures

H. Roger, Robal Photo-Science Laboratories, Sandy Hook, Conn.

Problems are described that were encountered during production of several motion pictures with sound for New York State Department of Health. Films represent type that has found new uses in instructing physicians and nurses, as well as general public, in treatment of pneumonia patients. They represent part of a nation-wide campaign program against spread of pneumonia.

"Making an Industrial Film"

J. A. Norling, Losques & Norling Studios, Los Angeles Calif.

Industrial films can be classified as advertising films, which are made for purpose of putting sales message across to prospective customers—training films, devised to train salesmen for work not planned for public use; educational films, which may contain some sales-promotional material, advertising films, which are usually short films released in theatres. Of many industrial pictures made in last few years, by far most important are those classified as possible promotional and sales-training.

Problems that arise in production are discussed. Increasing demand for color has set up many new problems for producer of industrial motion pictures and slide-films. Growing appreciation of high production quality among industrial clients has also increased difficulties. These matters are touched upon in main portion of this paper is devoted to one typical film—a detailed case history of making, from original scenario to ultimate use of film in reaching market.

"An Industrial Visual Instruction Laboratory


History, methods of operation, equipment, and types of work are described of section of General Electric Co. that produces industrial pictures, used by the Apparatus and Supply Division of the company.

"A Higher-Excitement Condensing System for Motion Picture Projectors

F. E. Carlson, General Electric Co., Cleveland, Ohio.

In motion picture projection optical systems for tungsten lamps, condenser design is such that source is imaged well ahead of picture aperture. This position is dictated by consideration of uniform brightness of picture. It is not optimal position from standpoint of utilization of light, for it entails losses at aperture. At best position for efficiency, degree of brightness uniformity is unacceptable because of non-uniform brightness of source. This paper describes method for reducing these losses without sacrificing picture quality.

"A Water-Cooled Quartz Mercury Lamp

E. H. Noel and E. F. Farbman, General Electric Co., Cleveland, Ohio.

Structure of the water-cooled quartz mercury lamp, its various radiation, brightness, and source size limitations are first described, followed by discussion of power-supply equipment, both a-c. and d-c. Applications of lamp are as follows:

1. Motion picture projection, both with single lamps and with several sources.

2. Motion picture photography, both black-and-white and color. This part of the paper tells also of application to very high-speed motion picture photography. For black-and-white photography lamp is quite satisfactory. For color work relatively limited red radiation may call for external methods, either in use of fluorescent reflec-
tors or highly red-sensitive emulsion, to make up for this deficiency.

(3) Film printing. Because of relatively high output in the blue and ultraviolet regions, lamp may prove very satisfactory source, especially where advantage is taken of ultraviolet radiation.

Following additional applications of secondary interest motion picture industry, are also discussed: photo-erasing, photoengraving, and searchlights.

"Theory Vs. Practice":

F. H. Richardson, Quigley Publishing Co., New York, N. Y.

Attention is directed to the discredit thrown upon the splendid work accomplished by scientific men in designing apparatus employed in projection, and upon the praiseworthy accomplishment by constructors engineers in carrying those designs forward into completed equipments. Apparatus can not be made to function efficiently in theatres while men are in charge who lack practical and theoretical knowledge. The public, for the most part, is unable to form intelligent opinion as to where the fault for poor functioning lies, and almost invariably will credit it to imperfect equipment. Suggestions are offered looking toward placing theatre projection equipment in the hands of thoroughly capable men, to ensure that the equipment may be made to produce results of which it is capable and to last a maximum length of time in service without excessively high operating expense.

"A New Technique for Testing Photographic Lenses":


Different makes of lenses have different properties and characteristics which may render a lens ideal for one purpose and totally undesirable for another. Lenses of a given make and series often vary in quality among themselves. To obtain best type of lens for specific purpose it is necessary to subject various lenses obtainable to tests that will reveal characteristics in such a way that they can be reduced to numerical quantities for comparison. Once type of lens for specific purpose has been chosen, it is of great importance to be able to select best of that type from group submitted by manufacturer.

Equipment and technique used in tests that make such discrimination possible are described. A few general hints and precautions are given that will aid in determining characteristics most desirable for various purposes. Special emphasis is placed upon tests for lenses intended for use with standard 35 mm. equipment. It is simple matter to apply methods and principles to other classes of lenses.

"Some Unusual Adaptation of 16 mm. Equipment for Special Purposes":

J. L. Boon, Development Department, Eastman Kodak Company, Rochester, N. Y.

A casual observer, looking over existing standard amateur photographic equipment, would probably be of opinion that there is little need of altering a camera to do a special job. However, closer observation of various problems that photography serves to reveal that standards of practice have been chosen merely to suit needs of a common majority of users, and minority
VERSATILE CAMERA CAR is this latest device, now offered for studio rentals by Jack O'Hare, veteran expert in camera cars and electric looices. The new car, as clearly illustrated, provides for over 50 possible setups, including from 6 inches above the ground to 16 feet. It carries five tripod heads for Mitchell and Bell & Howell cameras. The car is mounted on a Lincoln chassis and has been specially designed to carry the cameras and crew at speeds as fast as 60 miles per hour with safety and insure steady photography. It also is equipped with movable reflector stands and other unique features. Irving Klein, member of Local 659, IATSE, is the assistant busy in foreground.

are almost forgotten. Further observations show that alteration to standard camera to make it fit a specific purpose usually precludes its usefulness for many of purposes for which it was originally designed, also its utility for other special purposes.

 Attempt has been made in this paper to make known some of the unusual adaptations of 16 mm. motion picture equipment, each to fulfill a definite purpose, and to show that industry is becoming more conscious of utility of such photographic equipment as tool in solving some of its problems.

"A New 16 Mm. Projector";
H. C. Wellman, Camera Works, Eastman Kodak Company, Rochester, N. Y.

New projector is housed completely in aluminum die-castings, and to provide quietness of operation, pull-down gears are individually adjusted in assembly by means of eccentric sleeve. To facilitate threading, location of pull-down claw is designated by threading knob, position of which can be detected by touch and sight. Throwing single lever engages rewind mechanism and at same time releases lower reel.

A threadlight is built into projector, so positioned as to be most effective for threading gate and sprockets. Single control switch, a new and unique feature, has four positions; first is off position; second turns on threadlight so that machine may be easily threaded in darkened room; third turns motor (threadlight) remains on so that operator can momentarily see that loops are properly formed and that projector is functioning properly; fourth turns on projection lamp and turns off threadlight.

"A Criticism of the Proposed Standard for 16 Mm. Sound-Film";
J. A. Maurer and W. H. Offenhauser, Jr., The Berndt-Maurer Corp., New York, N. Y.

It has been proposed that standard dimensions of 16 mm. sound prints be changed, principally by widening sound record and scanned areas. Question is reviewed from standpoint of cumulative effects of film shrinkages and mechanical inaccuracies in steps leading to final sound print and in projection of that print, following method described by R. P. May in April, 1932, SMPJE Journal.

A film having sound records of various widths was demonstrated to support contention that increased width of sound-track is not needed, and that if any change from present standard is to be made, it should be in direction of narrower track to provide wider margin outside sound-track and wider safety area between sound-track and picture.

"The Shrinkage of Acetate-Base Motion Picture Films";

A simple direct-reading film-shrinkage gauge has been constructed which will shrinkage readings may be made in a few seconds. Accuracy of instrument is such that maximum variation in series of readings made upon particular film will not be more than 0.02 per cent of predetermined length measured. Readings have been taken systematically with this instrument over period of five months to determine shrinkage behavior of acetate-base films under various conditions of storage and use.

Results indicate that safety-film base made by each of three American manufacturers has characteristic value of shrinkage that is ordinarily reached within few days after processing. Subsequent shrinkage is slow but continuous over long period of time. Ultimate value of shrinkage is of order of 1.25 per cent except in case of films that have been projected many times on projectors using high-wattage lamps. Bearing of this shrinkage information upon equipment design is discussed briefly.

"A New Framing Device for 35 Mm. Projectors";

This device embodies unique application of silent chain drive to motion picture mechanism, so that up or down movement of film effected by framer is accomplished without disturbing synchronism between shutter and intermittent. Also, since framing is done by overhanging arm built directly onto intermittent, intermittent moves only rotationally, and remains always so close to aperture that there is no room for buckling of film.
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The rotary stabilizer sound head of the Simplex sound system is illustrated at top. Note sturdy and compact construction. Simplex system will take care of modern type push-pull and the stereophonic sound of the future. The new Simplex sound is manufactured under license from both ERPI and RCA, by International Projector Corporation in conjunction with their new Model E-7 Simplex projector. The Simplex system offers one deluxe design for theatres of any size. Only variables are number of power amplifiers operating in parallel to provide proper power output and the type and number of loudspeakers to provide adequate distribution and power handling. Below are illustrated a typical horn setup (left) and the main amplifier cabinet of modern design.
NEW DEVELOPMENTS IN FIELD

The Weaver accessories; Flat Light Screen tests; the Academy report on film scratch precautions; Notes and Comment.

By Paul R. Cramer, Local 150, IATSE.

It is a real pleasure to talk about an old-timer among the projectionists who has made good in more trades than one. We refer to Brother Fred Weaver, member of Local 150, IATSE, who with Art Schroeder and Harold Greiner, is on the projection staff of the world-famous Grauman's Chinese Theatre in Hollywood (operated by Fox West Coast).

Brother Weaver promises to have the lowdown on the new Model E-7 Simplex projector, recently installed at the Chinese, ready for the next issue of INTERNATIONAL PHOTOGRAPHER, but our current discussion is confined to a group of projection room devices he has perfected that are of great value in promoting efficiency and economy in projection practice.

The illustration at top right on this page shows the Weaver Douser, with which so many of us are familiar. This piece of equipment is the result of experience and ingenuity. The original model was, naturally, rather crude compared with the present one, but during the period of trial and error, it has been perfected considerably.

This particular model of the Weaver Douser was made especially for the Model E-7 Simplex, and is a little heavier throughout than the previous models. It comes equipped with the bracket, screws, bolts and everything necessary for ready installation.

The next illustration (top left) shows the new carbon savers for Suprex carbons.

All pictures on this page are fully described in the accompanying story.
and although the ones in the picture are for a Peerless type lamp, Brother Weaver assures me that he has on hand carbon savers for practically any lamp made at the present time. Here is a word to those brothers that do have these Jiffy Jaw carbon savers now: "The tightening screw of the positive saver should not be tightened so that the carbon cannot be inserted or removed by merely pushing in the carbon butt under a reasonable pressure. As the carbon heats after striking the arc, it expands, therefore tightening in the holder. If tightened too tight with the screw the expansion will warp the saver out of shape. The Negative saver can be tightened as much as desired because the negative carbon must be held rigid at all times."

Finally, at the bottom of Page 29, is pictured one of the foot change-over switches developed by Brother Weaver. This particular piece of equipment is not used very much on the Pacific Coast, but I. A. members cast of Denver seem to like them very much; at least so the sales chart shows. We would like some word from the eastern brothers as to the ability of this equipment to withstand hard use, for this department of International Photographer desires to boost only the equipment that can be of permanent use to all projectionists and we welcome practical information along such lines.

Brother Weaver invites all projectionists visiting Los Angeles to drop in at his plant and see for themselves just how the above articles are made and for those who cannot come but desire further information, he would be more than pleased to have you drop him a line at 1639 East 102nd St., Los Angeles, Calif.

Screen Test Report

Much interest was evoked by our recent publication of stories about the new Flat Light Screen. The new type screen has received a great deal of unofficial approval in informal studio tests, as well as passing rigid tests by Dr. Lee De Forest, Jr., and the Electrical Testing Laboratories of 80th Street and East End Avenue, New York City. The DeForest tests were reported in the May issue and we present herewith the text of the ETL report, which is signed by C. E. How and William T. Little, the latter chief engineer of the laboratory's photometric department.

Data requested: Brightness characteristics and reflection factor of one sample of motion picture projector screen.

Authorization: Personal application of Mr. John Gentile.


Test: To determine the brightness characteristics of the screen a beam of light was thrown normally upon the screen and its brightness was observed at angles varying from 1 degree to 80 degrees to the normal.

Measurements of reflection factor were made. Illuminating the sample by diffused light of equal intensity from all directions. The color temperature of the light source was approximately 2100 degrees K. The sample was viewed at an angle of 12 degrees to the normal.

Result of Test: The reflection factor of the sample is shown in Table No. 1. The per cent brightness in terms of a perfect diffuser is shown on the attached graph Plate 30429, and in Table No. 2.

<table>
<thead>
<tr>
<th>Angle</th>
<th>Brightness in terms of a Perfect Diffuser having a reflection factor of 100%</th>
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<tbody>
<tr>
<td>1 degree</td>
<td>114</td>
</tr>
<tr>
<td>5 degrees</td>
<td>100</td>
</tr>
<tr>
<td>10 degrees</td>
<td>96.6</td>
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<tr>
<td>15 degrees</td>
<td>96</td>
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<tr>
<td>20 degrees</td>
<td>86</td>
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<td>30 degrees</td>
<td>83.5</td>
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<td>40 degrees</td>
<td>83</td>
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<td>50 degrees</td>
<td>77.5</td>
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<tr>
<td>60 degrees</td>
<td>73.5</td>
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<tr>
<td>70 degrees</td>
<td>71</td>
</tr>
<tr>
<td>80 degrees</td>
<td>59</td>
</tr>
</tbody>
</table>

Story of Production

Watch for the first publication anywhere of the complete technical story of what happens to a piece of film from the time the manufacturer delivers it to a studio until it is turned over to the projectionist in release print form. This series will appear soon in International Photographer. A number of studio technical experts are cooperating with us in preparing this material and we expect to present a large batch of exclusive technical news pictures and practical working charts of production activity. We hope to have this material lined up in time to start it as a series in the July issue.

MPPC Opens Plant This Month

Motion Pictures Process Corporation, new projection background and special effects organization, expects to open its new Hollywood headquarters the middle of this month. Original opening was set for May, but was put back due to delays in construction and installation at its new plant on McCadden Place. MPPC holds a long term exclusive distribution and exploitation deal on the Neumatz rear projectors and also offer full production facilities for process work at its new headquarters. Motion picture and still photography effects in black-and-white or color will be available, along with a complete library of backgrounds. Roy Davidson, well-known in the studios in the process field, is technician in charge. It had been intended to publish a complete layout of the new headquarters in this issue of International Photographer, but it was held up due to completion of the new quarters, which will appear in the July issue.
Streamlined Booth

Continuing the thought of projection room cleanliness, we present this month a picture of the Variety Theatre in Medford, Oregon, featuring Motograph projector heads and bases and Brenchert lamps. Note the strict simplicity of the equipment. There are no wires nor unnecessary junk lying around. By junk I mean pans on the floor to catch surplus oil, exposed wire, cans for carbons and other things too numerous to mention that only the projectionist on the job would understand the reason for.

Checking Up

I walked into this one the other day, on the 20th Century-Fox lot. Brother Harry Mahler of Locals No. 150 and 37, IATSE, stopped me and wanted to know how come I recently quoted the line voltage and amperage and not that which would be registered at the ARC. (Int. Photog., March, 1938.) Of course my only answer could be that the only meters showing at the MGM studio on the demonstration described were line meters, but when the question was put to Brother Merle Chamberlin of MGM the information was forthcoming at once. The arc voltage was 60 and actual current was 62 amperes. We were unable to check the resistance, since the studio was changing the portable equipment around and the grids used on this screen test have now been moved elsewhere, but Brother Chamberlin is going to make a similar test this month, and we'll have all the information in the next issue.

Reducing Print Scratches

From the Academy Research Council comes a report of May 7th date, covering modifications in projection equipment aimed to reduce print scratches. Because this should interest every projectionist, the full text of the report follows:

The following information summarizes modifications made in projection and other equipment to prevent rotating parts from scratching prints, and has been furnished by Major Nathan Levinson, Director of Sound Recording for Warner Brothers - First National Studios, for the information of the engineering departments of the producing companies participating in the Research Council’s cooperative technical program, and the engineering departments of the associated companies affiliated with these producing companies.

A. Projector Picture Heads

1—Intermittent and upper and lower sprockets relieved to the tooth base on the inside of each sprocket.
2—All pad rollers and idler rollers are relieved where required. Those which have double flanges have had the inside flanges turned down flush with the center diameter of the roller.

3—in all instances, sprockets and rollers are relieved on each inside edge to permit of their being reversed to secure longer life after tooth and flange wear.

4—a flanged guide roller is installed above and to the left of the fire-trap in the upper magazine. The film passes under this roller as it leaves the reel and is guided through the fire-trap rollers to prevent those rollers from scratching the film due to excessive weave caused by bent reels, spindles, etc.

5—the lower small roller in the fire-trap of the takeup magazine has been replaced by a flanged guide roller to prevent the film weaving through this fire-trap because of bent takeup reels, spindles, etc. To allow threading through the fire-trap with this roller installed, the fire-trap casting is cut away on the front side so as to greatly widen the present threading slot.

B. RCA Preview Attachments
1—all guide rollers are relieved.

C. RCA Sound Heads
1—Constant-speed and hold-back sprockets are relieved.
2—all pad rollers are relieved.

D. RCA Dummy Heads
1—see RCA Sound Heads.

E. RCA Film Phonographs
1—thirty-two tooth sprockets relieved.
2—all pad rollers and idler rollers relieved in the phonograph and in the double magazine.

F. Moviolas
1—sound head.
(a) pull down and sound sprockets relieved.
(b) pad rollers and idler rollers relieved.
(c) felt shoes in sound gate should be of the latest type which bear only outside the sound track area.
(d) sound sprocket shoe must not be so worn that its two mounting screws or inside surface bears on the film.
2—picture machine.
(a) not modified except in film laboratory where composite film is run in moviolas. All sprockets and rollers are relieved.

G. Eastman Visible Numbering Machines
1—drive sprocket relieved.
2—all pad rollers and idler rollers relieved.

H. Footage Counters
1—drive sprockets relieved.
2—all pad rollers relieved.
20th Century-Fox Studios have altered all equipment by exactly similar methods to those used by Warner Brothers in every case, except that, instead of placing a roller in the lower magazine fire-trap, a flange roller has been placed just outside the fire-trap which acts as a guide for the film and leaves the fire-trap as originally constructed.
Lighting-Sets

DuPont's Lucite

New resin product, light, tough and transparent, attracts much interest for studio use.

A water-clear plastic, strong as glass, flexible and non-shattering, Lucite, new resin product from DuPont, is attracting considerable interest for use in studio props and offers many possibilities for its application in the motion picture industry. Chemically known as methyl methacrylate polymer, Lucite is half as heavy as common glass, is clearer than optical glass, and is strong enough to resist a tension of 4 to 5 1/2 tons a square inch.

Though softer than glass it is hard enough to be used for many purposes. It is thermo-plastic and can be sawed, cut, drilled and polished, also molded to any desired form; and a liquid intermediate variety can be poured into molds and hardened. Unlike glass, Lucite transmits a large proportion of the sun's ultra-violet rays. It is not affected by sunlight.

Transparency of Lucite, amazing new DuPont resin plastic, is illustrated in top view of girl photographed through a 2 1/2-inch thickness. Top right shows adaptability to designs for studio props and below a view of the Michigan highway between Detroit and Lansing where new material is used for reflectors along roadside. Lucite can be fabricated into tints and shades by combining dyes and pigments, and also to varying degrees of transparency.
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HERRON OPTICAL CO.
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MOLE-RICHARDSON, INC.
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UNION CARBIDE & CARBON CORP.
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STUDIO EQUIPMENT CO.
11235 Lillian Way, Holly’d. (Granite 6444)
FRED HOFNER
5319 Santa Monica Blvd., Holly’d. (GL. 0243)
PATENT ATTORNEYS

ROBERT W. FULWIDER
3235 Whitley Blvd., L. A. (O'Regan 1265)

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PATENTS

Last month the following patents of interest to readers of International Photographic were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and trade mark counsel.

No. 2,115,153—OPTICAL SYSTEM. Merrill W. Wilde, New York, N. J., assignor, by mesne assignments, to Motion Picture Corp. of N. Y., a corporation of N. Y. Original application March 1, 1930, Serial No. 452,325. Divided and this application Aug. 20, 1934, Serial No. 740,588. 4 Claims. (Cl. 88-1)

No. 2,115,319—PHOTOGRAPHIC PLATE. Ralph Bryant Moon, New Kensington, Pa., assignor to Eastman Kodak Co., Rochester, N. Y. Original application April 28, 1934, Serial No. 659,851. 8 Claims. (Cl. 95-8)


No. 2,115,738—FILM FEEDING MECHANISM. William C. Morrissey, Brooklyn, N. Y. Original application May 3, 1935, Serial No. 674,127. Divided and this application March 28, 1934, Serial No. 717,785. 6 Claims. (Cl. 271-2.3)


No. 2,116,826—PROCESS OF MAKING COMPO- SITE PICTURES. William Vermon Draper and Frank William Young, Palmis, Calif., assignors to one-third to Charles L. Stokes, Los Angeles, Calif. Application July 2, 1934, Serial No. 733,470. 10 Claims. (Cl. 88-16)

A process which comprises producing an image on part of the emulsion and fogging the balance thereof, developing, fixing, and resensitizing the emulsion, re-exposing the image already formed and then printing a different image on the rest of the film and developing and fixing.

No. 2,112,226—TRIPACK. Walter Dewey Baldeisen, Raritan Township, Middlesex County, and John Roe Weber, South River, N. J., assignors to Du Pont Film Manufacturing Corp., New York, N. Y., a corporation of Delaware. Application Oct. 24, 1934, Serial No. 107,484. 2 Claims. (Cl. 64-0)

A tripack negative for color photography comprising a yellow dyed blue sensitive film, a red dyed green sensitive film, and a red sensitive film with a greenish blue anti-halation layer.

No. 2,112,891—FILM MOTION FILTER. Harold B. Hasbrouck, P. O. Merchantville, N. J., assignor to United Research Corporation, Burbank, California, a corporation of Delaware. Application March 28, 1934, Serial No. 713,532. 13 Claims. (Cl. 271-2.3)

A stabilizer for film advancing means comprising a sliding friction damper located in a loop of said film offering substantially constant counterforce over a certain range of velocities.


A manually settable automatic mechanism for controlling the effective operation of a rotary film driving means.

No. 2,113,184—METHOD OF RECORDING AND REPRODUCING SOUND ON FILM. George Scott, Covington, Ky. Application Nov. 25, 1934, Serial No. 754,505. 5 Claims. (Cl. 179-100.3)

Reproducing apparatus having an optical wedge adjacent to the film and means for moving the wedge in accordance with lateral movements of film.


A film for color photography having in its color recording layer diazonium compound, a coloring component capable of reacting with said diazonium compound to form a colored image when moistened and a powdered substance to absorb moisture from the atmosphere.

No. 2,113,256—FILM DRIVING MECHANISM. Armand L. Jeannin, Garden City, N. Y., assignor to Garden City Film Corp., Garden City, N. Y., 1/2 of one-half interest in the patent to Armand L. Jeannin, of Garden City, N. Y. Application Jan. 8, 1934, Serial No. 59,752. 5 Claims. (Cl. 88-16)
“THE BEST LAID PLANS OF MICE AND MEN”—so goes an old adage and never was it better proved than during the recent lunar eclipse. Dr. Dinsmore Alter, Director of the Observatory, and Leon Hall, Observatory Technician, of the Griffith Park Observatory, extended their full cooperation to Al Brick, Moviètone News cameraman, to photograph the eclipse. If you read the newspapers you know the answer. It was Friday the 13th and old man fog, just to support the popular superstition, rolled in with the well-known pea soup variety and spoiled everything. However, it was a good try and an interesting experiment which would have given newscast audiences a front row seat at the eclipse. The long tube at the upper right received the image from ceilstat mirrors and projected it onto an aluminized mirror from which it was to be photographed in stop motion. The picture, by Warren McGrath, Moviètone soundman, and a member of Local 695, IATSE, gives an interesting view of the photographic set-up for such work.

A film driven fly-wheel and a freely rotatable fly-wheel and two film driving mechanisms, one of which cuts out above a certain fly-wheel speed.


4 Claims. (Cl. 95-88)

A fine-grain photographic developer comprising a developing agent and a strong acid salt of ethylenechamaine.


The process of producing a colored photographic record on a sensitive element having a plurality of superposed, differently sensitized silver halide layers, which comprises simultaneously forming latent images in the layers, the images being different color sensation records of a subject, simultaneously developing the latent images to metallic silver images, bleaching the images to remove the silver, exposing the sensitive element to light, re-developing the images in a color-forming developer, selectively bleaching at least the outer layer and re-developing said last-mentioned layer in a second color-forming developer.

The process of producing a sound track on a sensitive element having a plurality of superposed, differently sensitized, silver halide layers which comprises forming a latent image of the sound track on the sound track portion of the film, developing said latent image to metallic silver and dye images in a color-forming developer, coating the sound track portion of the film with a material impervious to subsequent treatment baths, and processing the film to produce color component images in the remaining portions of the film.


A color-forming photographic developer comprising an aromatic amino developing compound and a coupler compound have the formula

\[ \text{CH} = \text{C} - \text{CH} = \text{C} - \text{R} \]

where R is a group selected from the group consisting of alkyl and aryl groups.

No. 2,113,400—RECORDING AND REPRODUCING APPARATUS. Glenn L. Dimmick, Hadfield, N. J., assignor, by mesne assignments, to Radio Corp. of America, New York, N. Y., a corporation of Delaware. Application Oct. 31, 1934, Serial No. 750,766. 6 Claims. (Cl. 179-100.3)

A recording apparatus provided with means for moving a portion of the lens system in correspondence with variations in the film movement.


In France June 19, 1934. 4 Claims. (Cl. 88-24)

A printer of gobbled films including a plurality of narrow light sources and a movable screen having a narrow window and means for moving said screen hexomatically with said sources of light.

No. 2,113,703—PROJECTION SCREEN. Rafael Mendosa, Mexico, D. F., Mexico. Application April 21, 1936, Serial No. 75,631.

In Mexico August 21, 1934. 3 Claims. (Cl. 88-24)

A projection screen having a curved mirror behind it to reflect a virtual image back on the screen to give pseudo-stereoscopic effect.

No. 2,114,187—PHOTOGRAPHIC STRIP. Albert S. Howell, Chicago, Ill., assignor to The Bell & Howell Co., Chicago, Ill., a corporation of Illinois. Application Nov. 28, 1934, Serial No. 755,196. 2 Claims. (Cl. 95-9)

A photographic film strip having the main longitudinal portion thereof flat and provided with a longitudinally corrugated portion of relatively short longitudinal extent disposed in the region of one end thereof and having the corresponding end thereof flat.
SIMPLEX E-7 MECHANISM

NEWEST AND FINEST

of the long line of SIMPLEX PRODUCTS

which have given us leadership in this field

since the pioneer days of the motion picture

industry.

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The quality of Superior Pan is dependable. In back of every roll is the skill and experience accumulated from making this film during the last six years.

For consistently good negatives, rely on Du Pont Superior Pan.
These shots of the Watson automatic focuser device using a reflected light beam illustrate the speed of Agfa’s new Supreme. They were made with the Nettax shown on next page with medium yellow filter in late afternoon interior. Ordinary desk lamp was only extra illumination, shot at f:2.8 at 1/50 second.

Watson’s Candid Focuser

An outstanding addition to speed graphic photography, according to Los Angeles photographers who have used it, is an automatic reflected light beam focuser developed by Coy Watson, Jr., of the photographic staff of the Los Angeles Herald-Express, afternoon newspaper. It proved so practical that Jack Campbell, managing editor, and Frank Bentley, head of the paper’s photographic department, have had all staff press cameras equipped with the device. Other newspapermen also have requested the attachments to the extent that Watson now is considering turning them out in larger quantities.

As illustrated on this page, the focuser can be built into the camera and in no way interferes with normal operation. Whenever photographic light present is not so brightly glaring as to kill out the reflected light of the focuser device, it insures absolutely accurate focusing and framing merely by racking the lens, and permits speed graphic photography to equal so-called candid photography with the advantages of the larger negative.

Watson’s focuser is based on the principle of light being reflected from a mirror on a 45-degree angle. In other words, an indirect light beam is used for focusing the camera and simultaneously framing the image correctly. Light for the focuser originates from a small flashlight bulb, which is mounted at the top of the camera box. The beam used is the reflected image of the actual burning wire in the bulb. This light from the glowing wire moves across the back of the camera and strikes a small mirror, which is at a 45-degree angle. The reflector mirror throws the light out towards the front of the camera and parallel to the lens in the same direction the picture is to be taken. Fastened to the front-board, and exactly even with the photographic lens is an auxiliary lens. This is used to control the light beam, which passes through the lens and is thrown out into space. In actual practice a small dot of light, about the size of a half-dollar, is seen by the photographer on the object to be photographed. Through the center of this dot of light the “S” shape of the glowing wire of the single bulb filament is plainly visible.

When the lens-board is racked forward until the "S" comes into sharp focus, the picture automatically is correctly focused and framed, because the distance from the wire in the bulb to the mirror and thence to the auxiliary lens is mathematically identical with the distance from the photographic lens to the ground glass. Accurate and speedy focusing with this method is possible within a range of from three feet to approximately 25 feet, the longer distance depending upon light conditions.

A distinctive feature is that the accessory device in no way interferes with routine operation of the camera. Once it is properly attached, there is nothing to adjust or unscrew in opening or closing the camera.

The batteries used are small and compact and are easily and conveniently replaced in a holder under the camera. The device uses two batteries, the standard one-cell pen flashlight type, No. 915, Size AA. These are widely available. Experience in newspaper use is that the batteries last for about two weeks.

Watson’s invention already is in use to the extent of about two dozen units, and plans for additional production to make it available on a wider scale at a reasonable cost now are in the discussion stage. Anyone interested may communicate with the inventor in care of this publication or the Herald-Express, Los Angeles.

Watson is a nephew of George Watson, Los Angeles chief for Acme-NEA Service, whose interesting historical collection on wire picture transmission was the subject of a story in the December, 1937, INTERNATIONAL PHOTOGRAPHER.

Zeiss’ Nettax

While not as widely exploited as the Contax, one of the most interesting miniature cameras in the Zeiss line is the Nettax, which uses standard 35 mm. motion picture film and sells for $120 to $165, depending on type of lens used as standard equipment. The camera incorporates many of the Contax features. It has a metal focal plane shutter. Lenses are easily interchangeable.

As illustrated on Page 2 in a virtually self-explanatory layout of pictures, photographed exclusively for INTERNATIONAL PHOTOGRAPHER by Paul Allen, it will be noted that the demountable lens has a built-in superimposed image-type range-finder. Also the range-finder and view-finder eye-pieces are placed close together for convenient and rapid operation.

The back is completely removable and loading can be accomplished either with Contax metal magazines or most of the standard spools supplied by the film manufacturers. Shoes on top of the camera are designed to accommodate extra finders, the Contameter and other accessories. The automatic film transport prevents double exposure. There is an automatic picture counter. Speeds are set by lifting the winding knob and setting it at indicated marks.

The Nettax is cased in a rigid metal housing, covered with black grain leather, with all exposed metal parts chromium plated.

Photorecord Filing System

For years, business offices, industrial firms, libraries, historical associations, museums and similar institutions have been troubled with the problem of how to preserve in economical, space-saving form, their records, correspondence, valuable papers, manuscripts, books and the like. In microphotography several years ago was found the answer to the problem. Now Photorecord, a new Folmer Graflex Corporation machine, places this service within the reach of anyone.
These pictures of the Zeiss Nettax (Page 1, Column 1) were photographed exclusively for International Photographer by Paul Allen, who also photographed the Hyp-O-meter shown on Page 5. The Nettax pictures are virtually self-explanatory. Shown with the camera are Zeiss sunshade filter holder and the standard Contax spool with its bakelite case. Note close position of view-finder and range-finder eye pieces. Next month, dope on the new single lens reflex camera models.
ON THE COVER. A striking silhouette shot by Durward "Bud" Graybill (659, IATSE) whose hobby of silhouette photography, illustrated by a two-page layout, is described by Herbert Aller, starting on Page 11.

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Protizing—Solow
Grip Equipment—Haines
New Course in Color Photography
Cinematographer’s Book of Tables—Westerberg
Motion Pictures Process Corp. Opens

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Left, the new Photorecord filing system from Folmer-Graflex Co., which copies flat surfaces up to newspaper size on 35 mm. film. (Page 1, Column 3) and Right, the new Bell & Howell 8 mm. Titler, shown in operation with a Filmo 8. (Page 4, Column 2.)

desiring it, due to its low cost and economical operation.

The new instrument, illustrated on Page 6, enables as many as 800 newspaper pages or 1600 smaller pages to be recorded on one 100-ft. roll of 35 mm. film four inches in diameter and two inches thick. The reduction in storage space is as much as 95 per cent and the acetate film used will last as long as record paper of the highest quality.

Duplication is made easy with the Photorecord. Once the desired material is recorded on film, it is a comparatively simple matter to make positive film copies of the original negative or enlarged prints of any size.

The Photorecord is a compact, completely portable camera apparatus weighing only 42 pounds when packed. In it is combined everything necessary to photograph anything occupying a relatively flat plane up to and including a full newspaper page.

Actual operation of the unit is effected by a foot pedal which enables the hands to be left free to handle the subject being photographed. Each time the pedal is pressed down, the film is positioned, the lights are turned on from half to full photoflood intensity and the shutter is actuated. Speeds of from 500 to 1000 exposures per hour may be made. A counter is an integral part of the machine.

Complete portability of the equipment makes it ideal for use in various locations. The outfit when packed in its carrying case weighs only 42 pounds, and may be carried as easily as a suitcase. Thus the operator can take the camera wherever he goes and obtain exact photographic copies of the material he desires.

Filmo 8mm. Titler

Owners of Bell & Howell Filmo 8 mm. cameras now can obtain a new titler designed especially for Filmo 8's.

The new B&H device, shown on Page 6, consists of a base and camera stand cast of aluminum in one piece, and an illumination arm which fastens securely to the camera support and bears two Mazda lamps. At the upper end of the camera stand is a special, highly-corrected copying lens in the Filmo snap-on-mount, to which camera is fastened in the usual way after the regular photographic lens has been removed. The titler lens is accurate pre-focused on the title card holder on the base, directly beneath the camera.

The holder takes title cards 3 1/4 inches by 2 9/16 inches. This size was selected as best for reproducing typewritten titles so that they appear entirely legible on the screen.

The illumination arm fits firmly in its socket on the camera stand, and the two lamps and reflectors are permanently fixed in the exact position which eliminates glare from surface of the title card. It is even possible to use a glossy finished photograph as a background, without recording highlights in the title. Two sets of lamps are furnished, providing correct illumination for films of various emulsion speeds.

Since the newer Filmo 8's are all equipped with the single exposure device, the titler can also be described as a most efficient miniature animation stand. Animated maps, drawings, cartoons, etc., are all easily made. It can be used in a horizontal position, with the camera resting on its own base, and since the titler lens has depth of field of more than one inch, objects of considerable depth may be photographed in sharp focus.

The Hyp-O-meter

Claimed to eliminate all guess-work in washing of prints and film negative in the still photography lab, the Hyp-O-meter, manufactured by Haynes Products Co., of 136 Liberty Street, New York City, is attracting considerable interest amongst professional lab workers. The makers contend that when properly used it will allow washing to be finished in the shortest possible time without risking incomplete washing.

As illustrated on Page 3, the Hyp-O-meter is a handy and compact instrument. It can be set upright on the table or hung on the wall by means of a small eye. A flexible cable is provided, to one end of which the contact electrode is connected, while at the other end are two pin-jack terminals. In operation these pins are inserted in the bottom of the meter.

The adjustable knob below the meter is for battery compensation. It needs only occasional adjustment after it is once set. Two small 3-volt flashlight batteries are used, which are easily and conveniently replaced. In ordinary use they last more than a year.

Before using the instrument for hypo tests, the tap water used must be tested; and this establishes a reference point of zero. The Hyp-O-meter actually measures the relative resistance of any fluid in which the electrodes are submerged. Hence, a reading obtained in one water will vary from that of another depending upon the fluid's chemical composition.

In testing for presence of hypo, a few prints are allowed to drip into a small graduate glass or tube, such as an MQ developer or test tube. The electrode is inserted to the black insulated
Top strip shows the Hyp-O-meter, which insures speedy washing of prints and negatives without risking incomplete washing. (Page 4, Column 3). Center left, Patrick Nardell’s new device for immediate shift from long-shots to close-ups shown built on an Akeley. (Page 5, Column 2). Center right, the new Leica rapid winder attachment, which was described in last month’s Tradewinds. Bottom strip, the new Leica continuous projector for slides in display advertising. (Page 7, Column 1).

Rapid Change Device

A new device for facilitating close-up and long-shot rapid changes in motion picture photography is announced by Patrick Nardell of New York City. While this device has not yet been seen on the West Coast, the inventor claims it permits the use of long and short focus lenses with virtually immediate selectivity for change, allowing slow or fast dissolves and various angles of slow and fast wipes from long-shot to close-up or vice versa.

As illustrated on Page 5, Nardell’s device is adapted to an Akeley silent camera, with separate finder lens of corresponding focal length, adjusted to move in unison with the dissolve mechanism, and providing a finder image of the exact photographic field.

The illustration shows an Akeley with two-inch and six-inch lens and corresponding finder lens. Any lens of different focal length can be mounted with aligned corresponding finder lens. The inventor claims his device is par-
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inter upon a particular part where action has
loved. The model illustrated was built and installed
by the National Cine Laboratory of New York
City.

Continuous Projector
For visual advertising a new Leitz Automatic
Continuous Projector now is available. It permits
up to twelve slides to be shown over and over
again, in consecutive order, for intervals ranging
from 10 second to a minute. Either standard
front-projection or rear-projection on a trans-
cient screen may be employed.
The projector, shown on Page 5, accommodates
one popular 2x2 inch square glass slides, either
black and white or color. In the case of
the latter the slides consist of 1x1½ inch color
transparencies, such as are made with the Leica
camera, mounted between two two-inch square
ass plates.

Essential feature of the Leitz Projector is a
rolling circular disc with 12 2x2 inch slots,
nearly spaced around its outer edge, which hold
6 slides. An AC-DC motor mounted on the
backboard of the continuous projector causes the
disc to revolve at set intervals, which are gov-
erned by adjustment of the thermostat.

Basically, the new setup consists of two sepa-
rate units—a Leitz VIII-S projector and the Con-
tinuous Projector Attachment. The projector is
merely placed on the latter and the disc of the
Continuous Projector Attachment revolves in such
manner that the slides automatically come into
correct position for projection.

The New Filmo

Incorporating a number of new features Bell
Howell's new Filmo 141, a 16 mm. magazine-
loading amateur camera of unique design, was
introduced first of this month. Features not
usually found in cameras of this type, but incor-
porated in the new Filmo, include a radically
new "projected area” viewing window, four camera
speeds, and a single frame exposure device opening
up the field of animation work.

Operation of the Filmo 141 is exceptionally
simple. Slip the ready-loaded film magazine into
the camera, close the door, and you are ready
to shoot black-and-white or color film. The ad-
vanced amateur can make use of the various
speeds, single frame exposures, interchangeable
lenses, critical focusers, etc., for the most versa-
tiile effect he has learned to achieve.

Most radical departure from previous design is
the "projected area” viewing window, a positive type
of viewer which, it is claimed, brings to the
amateur movie maker for the first time the same
ease and accuracy in determining his field that
the Hollywood cameraman has long used on pro-
fessional cameras.

The new Filmo takes Eastman film magazines,
each of which is provided with its own indi-
vidual footage indicator, the dial being plainly
visible through a window in the camera. The
magazine is slipped into the camera through a
small door at the rear, and as an added safe-
guard, the mechanism will not work until the
door is properly closed. As the magazine
is withdrawn, its aperture is covered automatically,
preventing fogged film. The position of the
camera door at the rear permits magazines to be
changed, and a soon-to-be-announced critical
focuser to be used, without removing the camera
from a tripod.

A color-corrected one-inch f/2.7 Cooke lens is
standard equipment; and since the camera has the
same lens mount as the Filmo 70, all lenses used
on the latter are interchangeable with the 141.

The mechanism is controlled by a governor
which maintains a constant rate of film move-
ment, thus insuring even exposure throughout the
entire film run. Shutter is of the rotary type,
giving uniform exposure over entire frame area,
and its open segment of 133 degrees gives an
exposure of 1/13 second at 16 frames per sec-
ond.

The new Filmo will be available in two models,
differing only in operating speeds. The 141-A
will have speeds of 8, 16, 24 and 32 frames per
second, while the 141-B operates at 16, 32, 48
and 64 f.p.s.

Wright Joins B & H

Bell & Howell Company, last month announced
the appointment of A. E. Wright as manager of
sales promotion and publicity. Wright has been
active in Chicago advertising agency and radio
circles the past 19 years. Agencies he has served
as contact and copy executive include Lord &
Thomas, Erwin Wasey & Co., Henri, Hurst &
McDonald, Potts-Turnbull Co. and Reinke, Ellis,
Younggreen & Finn. Following a year with the
Columbia Broadcasting System as inter-zone sales
representative prior to the establishment of their
Detroit office, Mr. Wright served two years as
Radio Director for Freitag Advertising Agency,
directing all programs of the Pure Oil Company.

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In sunlight, G-E MAZDA lamps are handy. Many cameramen use them for softening shadows or making shots when the sun is wrong for the camera angle required.

Now G-E MAZDA lamps are available with a brighter, whiter light, which not only rivals sunlight, but blends with it. This feature is helpful in black-and-white, essential in color work.

Add to this that they go into action fast; are especially handy for lighting cramped quarters; and permit faster, more efficient shooting schedules, and you will quickly see why they are so widely used.

There is a type and size to meet any need from general set lighting to special effects and process work. Are you benefiting fully from this versatility? General Electric Company, Nela Park, Cleveland, Ohio.
Hollywood Upturn

Studio production reaches new highs; excise tax off influences price reductions in many lines.

Important developments during the past month were a marked upturn in Hollywood studio work, with many crafts of the International Alliance in the studios working at full strength; and elimination of the manufacturer's excise tax July 1st, which brought a number of price changes, particularly in camera and similar fields, and promises to bring further revisions in wholesale and retail prices. Announcements of price cuts on standard items already are being made and many changes in models also are expected.

With the major studios pushing rush productions into preparation and shooting to reach new peaks of activity, Hollywood took on a tone of optimism in contrast to the slump jitters of early spring months. The motion picture industry expected to share in the benefits of the sensational stock market upturn and other evidences of a national trend away from recession.

Hints of many new progressive steps, particularly in improved sound recording and reproduction methods, color photography and in the 16 mm. field were getting past the gossip stage. In next month's issue we expect to present late news on such developments. Bell & Howell's announcement of their new camera-loading Filmo 16 appears in this month's Tradewinds.

Of particular interest in this month's issue is D. K. Allinson's first publication of important new trends in Laboratory control methods, which appears among the Technical Articles, while the Society of Motion Picture Engineers' report of theatre standards in the same section should interest all industry technicians.

Contest Extended

The Kalart Company has extended their second Synchro-Sunlight photography contest until November 1st. First prize is $100; second prize, $50; third, $25; and there are 15 additional prizes of $5 each. A folder containing details of the contest may be obtained from dealers or by writing the Kalart Company at their New York headquarters or Hollywood branch.

Protize Process

New treatment assures protection of green prints. By Sydney P. Solow, Consolidated Film Industries.

The projection of "green" prints has always been one of the vexing problems of the motion picture industry. During the first few runnings of a picture, the gelatine emulsion is extremely susceptible to abrasions and scratches and has a tendency to accumulate dirt and other foreign particles. In the case of exhibition prints, the "greenness" of the film disappears after a few runnings; and, if the film has safely survived its initial handling period, no further trouble may be anticipated.

Dubbing prints, process keys, and other film tools of the studio, however, present a different problem. These prints have no aging period or first-run showing; they are used only a few times or perhaps even only once; and, if there is to be no compromise with the quality of the finished product, they should be free from any defect. Dubbing prints should remain clean and abrasion-free after repeated rehearsals and many handlings lest undesirable frying and cracking noises be introduced; process keys should remain free from scratches, abrasions, and cinch marks through all the takes in which they are employed.

What the motion picture technician needs, obviously, to insure these conditions is a method of treating the film so that the emulsion is transformed from a delicate, easily-mutilated material into one that is mechanically rugged and resistant to injury. Any protective process offered to the industry should fulfill the following specifications:

1. It should be inexpensive.
2. It should be capable of easy and quick application.
3. It should be without effect upon the photographic image.
NEWSREEL HIGHLIGHT. Last month the news-reel boys had a flash at the newest and biggest airship from U. S. factories. Top, America's Leviathan of the air, 32 tons of aeroplane on the wing, the new Douglas DC4, a million-and-one-half dollars investment in sub-stratosphere commercial aviation of the future. Center, the new air monster on her maiden flight from Clover Field, Santa Monica, she soars over Los Angeles; Lower left, Al Brick (659, IATSE) of Movietone-News shooting a close-up of one of the 1400 H.P. motors; and Lower left, the news-reel boys making shots at Clover Field before the take-off. Hearst News of the Day cameraman Roy Klauer with soundman Carl Bjerre at left, and just in the picture at right is Al Brick with his Pacific Coast supervisor, Jack Darrock at his left. Top pictures courtesy Douglas Aircraft Corp., and bottom strip by Warren McGrath, Fox Movietone soundman, and member of Local 695, IATSE.

4. It should not cause the film to become brittle.
5. It should not interfere with normal film technique, viz.; splicing, projection, etc.
6. It should reduce the tendency of the emulsion to accumulate and retain dirt and other foreign particles.
7. It should be effective in preventing scratches, abrasions, and chin marks.

The Protize process, recently announced to the industry by Consolidated Film Industries, Inc., is the result of three years of experimentation devoted to the development of a protective treatment that would meet the above-mentioned requirements. The process consists of the application to the emulsion, by means of a cloth covered roller, of a fluid which effectively toughens and lubricates the film. The gelatine layer of the film thus treated cannot be scratched by ordinary means. Moreover, the original moisture content of the gelatine is retained even when the film is subjected to prolonged heating; thus there is conferred upon the emulsion a pliability that is permanent. Owing to the lubricating effect of the process, edge-waxing of prints is unnecessary if they are intended for use in an ordinary type of projection machine.

MPPC Opens

Delayed a few weeks by the usual complications of getting a new building straightened away for operation, Motion Pictures Process Corporation, new rear projection and special effects organization, was slated to be "ready for business" early this month in a brand new plant at McCadden Place near Santa Monica Boulevard in Hollywood.

Featuring a modernized and stream-lined Newmatz rear projector, which MPPC also will market as international distributor under a ten-year contract, the new plant has ultra-modern facilities for special effects work. Maximum set space in the 60x150 foot plant is 60x70 feet, and there is a complete array of new Flat Light screens. Largest screen is 16x20 feet, which is next to MGM's huge 20x35 foot screen installed for "Test Pilot."

Convenience and efficiency feature the new Newmatz projector setup, which will be presented at the MPPC opening early this month. Features include: remote control focusing of image on the screen by the camera operator; a handy speaker system between the camera and projector operators; and of outstanding interest, a stream-lined blimp on the projector, replacing the huge "ice-boxes" now in general use on other types of projectors. This eliminates 75 per cent of the weight. The outside dimensions of the Newmatz are 4 feet long by 5 feet wide by 6 feet high against the average of 8x8x8 feet of the "ice-boxes."

Heads are interchangeable on the same base and the lamphouse for the motion picture projector and still stereopticon are the same.

The new structure has a fireproof film vault for an extensive library of still and motion picture background plates, modern dressing rooms, and every technical feature necessary for modern special effects photography in either black-and-white or color, including latest type Bardwell & McIntyre and Molt-Richardson lighting.

The new organization has John Gentile, long with the Motion Pictures Producers & Distributors, as general manager, and Roy L. Davidson, well-known in Hollywood, as chief technician. A pictorial layout of the new plant and the new Newmatz projector will appear in next month's INTERNATIONAL PHOTOGRAPHER.
Photographic Eye Catchers

Durward Graybill, member of Local 659, IATSE, tells why his favorite camera effect is silhouette photography and gives tips on how to get good shots.

By Herbert Aller

One of the most striking types of effective pictorial art is the silhouette effect in still photography and frequently our studio still men, members of Local 659, IATSE, make use of this to dramatize stars and scenes from certain productions for whom this photographic approach is suitable. Recently I rounded up a collection of such work from the camera of Durward "Bud" Graybill, one of our "IA" members, who has been doing interesting and effective still photography at Metro-Goldwyn-Mayer, and makes a hobby of silhouette scenes.

The accompanying layout from Graybill's collection illustrates clearly his mastery of this medium. It can be readily noted that Graybill's effects are not only of beautiful composition, lighting and mood, but that they are particularly distinguished in a pictorial handling that clearly indicates that the photographer knew what he was going to get in the finished print. None of his prints indicate that they were dependent primarily upon trickery with the negative to obtain the silhouette effects. In none of them are the silhouetted figures 100 per cent black. Each has a touch of light to give roundness. They are true pictures rather than scissors and ink products.

I asked the creator of these intriguing shots to express a few highlights on silhouette photography for the benefit of readers to whom this type of photographic effect appeals.

"Silhouettes happen to be my favorite type of photography because they usually are more stimulating to the imagination," Graybill says. "They are subtle and have to be studied a trifle longer than a high key picture before the mind and the eye assimilate the composition, subject matter and the general effect the photographer has been striving to capture. This is a valuable asset in publicity photography providing the general effect is striking enough to catch the eye, which usually is the case with a good silhouette study. Naturally this type of shot will get more attention than one that is more easily read on the run.

"A silhouette is nothing more than a normal picture with the main exception that the front light is not present. The chief source of light (exteriors) is the sun which is always in back of the subject and usually rather low in the sky. The subject can many times be used to keep the sun out of the lens of the camera, simply by putting the subject in line between the camera and the sun.

"The majority of silhouettes should be clean cut. The photographer should have the entire subject posed in such a manner that it is entirely surrounded by white or very light background.

"A normal exposure for exterior silhouettes in good sunlight would be 30th of a second at f:22 for still life; 200th of a second at f:11 for action shots.

"A normal exposure for interior silhouettes using two 500 watt flood lights
on a light backing and using no front light is 1/15 of second at f:11.

"Many pictures lend themselves to shades and shadows. That is why silhouettes when properly done can leave a lasting impression upon onlookers."
Grip Equipment

Introducing the preliminary groundwork for Studio Mechanic's Handbook; devices used to block off light for shadow effects in photography.

By George M. Haines, Local 37, IATSE

Equipment used on studio backdrops is so extensive and varied that one scarcely knows where to begin in cataloging the many items. Also, while this series is intended to be published eventually as the first complete and authentic handbook for the backlot-studio mechanics, the obvious eventual arrangement of the material in alphabetic order under proper headings is not as easily handled for practical publication purposes as might be the case if this series were to be presented with all the material already in hand.

One big feature of this series is that its success depends upon the cooperation of a host of veteran "IA" members in supplying information and authoritative facts. Gathering of this material requires considerable detail work and while we already have a huge collection of information and have blocked out general groupings, it already has been discovered that the task of compiling this material can not be approached with rigidly pre-conceived plans for its format or its monthly presentation in International Photographer. The practical problems of gathering pictures and information have a large bearing on such a project and our present plan is to work as close to the eventual format as possible within practical limitations.

We are counting greatly on the cooperation of able "IA" members, studio executives, the manufacturers of equipment and materials, and the stillmen members of Local 659 in teaming together to make this a valuable reference work in this field. One eventual aim is to gather together into one carefully organized volume all factual information on every piece of equipment used in and around motion picture sets; in other words, anything connected with the work within the jurisdiction of Local 37 of the "IA". This information will include photographs and diagrams, where needed, factual and statistical information, slang descriptions used at various studios, minimum specifications, etc.

Obviously no other organization but the "IA" and its technical journal, International Photographer, could hope to accomplish such a task without a staggering expenditure. We hope to do the job efficiently with the cooperation and advice of those mentioned. We sincerely believe that the final result will be a practical and serviceable reference work upon a complex and variegated subject of motion picture production that hitherto has not been much discussed in technical and trade journals.

We also sincerely hope that this collating and pooling of practical information will prove of value to the 8,000 members of Local 37, who daily make important if unsung contributions to motion picture entertainment.

The initial group of items illustrated on this page is grip equipment and deals with the production of shadow effects, with the exception of Nos. 1, 3, 10, which are handling accessories on the set. These various items are used by the grips in assisting the photographers, the gaffers and the camera crew to achieve effective and natural lighting arrangements. After the set lighting arrangement for a particular shot has been worked out by the camera and electrical crew, it then frequently falls upon the grips to undo some of this work with various pieces of equipment used to block or soften the light.

However, the undoing always is in the interest of a more artistic finished picture, for in professional motion picture production, often with straight uncorrected light, no matter how excellent the equipment and skillful the arrangement, the result is not perfectly satisfactory. This is particularly the case in those subtle little touches of light and shade that distinguish Hollywood photography.

A host of varied devices and gadgets are used for the blocking off of light. They range in design and materials from sheer gauze that produces but a slight diffusion to devices for completely blocking off the light at one particular part of a set. Their creation is, of course, to the credit of that "Mother Necessity," whose off-spring are inventions. Never before in commercial manufacture had there been need for such odd combinations of materials; and consequently most of these gadgets were devised by ingenious technical workers to fit some particular problem, then gradually improved on and developed until they became a part of the production routine.

The picturesque slangy terminology used to describe studio set devices in general is indicative of the hybrid and off-hand manner of their creation and development. They are the product of the laboratory of practical picture making. Unimpressive as they may look when stood up stiffly in a group on exhibition as is the accompanying illustration, these gadgets are extremely valuable to the Hollywood production routine. If their use were suddenly forbidden, it is safe to say that the degree of craftsmanship of American photography would slide back ten years in quality.

The initial set of 14 items illustrated on this page are described with a few words in the caption. They will be discussed individually in greater detail in succeeding issues.

The two sets of little blocks, Nos. 9 and 10 at the bottom of the picture, are very handy on any set. The furniture block (No. 9) is used to elevate objects on the set to correct per-
ONLY one raw-film factor matters much to the motion picture public. But that factor, photographic quality, is the most important of all. . . . Reason enough why Eastman Super X has become the cameraman's stand-by... the world's most widely used motion picture negative medium. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)
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Handbook Delayed

New series by Murdock on art of make-up due in early issue with many illustrations.

Last month InternationalPhotographer announced two new handbooks to join its Books of Table series. Initial article of the Studio Mechanics Handbook, edited by George Haines, member of Local 37, IATSE, with the cooperation of Lew C. G. Blix, secretary of Local 37, and a group of veteran members of the IA's big studio mechanics local, appears on Page 14, but the inaugural article of the companion series, the Make-up Artists Handbook, edited by Vern Murdock, business representative of Local 706, IATSE, has been held up, due to the editor's attendance at the annual convention of the IATSE & MPMO at Cleveland last month.

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Projection Notes

Latest information on Simplex E-7 and preview model projector. By Paul R. Cramer, Local 150, IATSE.

In answer to a question by one of the brother members of Local 150, IATSE: "Has anyone discovered a way to successfully stop the cooling fan on an E-7 Simplex from drawing the gasses out of the lamphouse in the booth?" the timely question draws a welcome "yes." It is a pleasure to not only explain the solution but also to pass on a boost for Herbert Griffin and his International Projector organization for hitting upon something that may revolutionize the projection booth as far as sound-proofing and lamp heat regulation are concerned.

The method of stopping the draft is simple, as are all really great things—they usually are so simple we wonder why someone didn't think of them years ago—but in this case, the solution awaited the discovery in another field of the ingredients and methods of making the article that the International Projector organization has adapted to solve this problem. Our description of the article will have to be quite meagre, inasmuch as there are only two sets out, one at the Chinese in Hollywood, the other at the Alexander in Glendale, California. Brother Fred
Above, close-up of the new attachment for Simplex Model E-7 (described in accompanying story) which may revolutionize projection practice in sound-proofing and lamp heat regulation; and at right, a "preview" shot of the new Simplex preview model, now in operation at the Alexander, Glendale, California.

Weaver (Local 150, IATSE) of the Chinese assures me that the system works excellently. It still is being experimented with.

Method used is a stereoptican slide idea, incorporated into the projector design just to the rear of the rear shutter (as illustrated in the accompanying picture) in place of the usual cone that fits into the mouth of the lamphouse. There is a gadget that is shaped similar to a regular slide holder, and into this slide holder is slipped or placed a piece of optically flat, clear, heat-resisting material capable of holding and dissipating terrific heat (much more than ever will come out of a projection lamp). This piece of optically flat, clear, heat-resisting material stops all draft from the rear shutter fan, as well as stopping the mouth of the projection lamphouse, thereby giving the projectionist better control of the projection lamphouse itself.

Brother Weaver assures me that it is virtually impossible to tell when the glass is in or out. There is a slight waver as the edge of the glass passes the light beam, during its insertion, but otherwise there is no telling, as far as the audience is concerned, whether the glass is in or out.

1913 to E-7

Last month we promised some dope from Brother Weaver about the new E-7 Simplex, recently installed at the Chinese. The accompanying pictures show the new Chinese setup, which is under the care of Brothers Weaver, Schroeder, Luppy, Babcock and Greiner, all of Local 150, IATSE.

In Number 1 you will see the copper water pipes (in circle). This water pipe formerly supplied the cooling jacket around the old aperture plates with cold water; but thanks to the new cooling system of the E-7 Simplex these pipes will no longer be necessary, thereby taking away another worry of the projectionist.

Number 2 shows a close-up of the E-7 projector head and the RCA push-pull sound head. I know that it will be unnecessary to suggest that you note the extreme cleanliness, sturdiness and simplicity of this projector head, from the general utility lamp at the top of the head to the one shot oil system at the bottom, the top loop fire trap that really works, the adjusting screw that gives you control over the tension shoes, the extra length of the tension shoes, and the oil well on the bearing of the intermittent sprocket. Last but not least note the new type doser and bracket that Bro. Weaver has made especially for this new Simplex E-7.

After a close study of the accompanying photographs, one cannot help but praise the handwork of the International Projector people for turning out such a truly remarkable piece of workmanship. Not only is the projector visually far advanced, but there are unseen advancements that make it truly a great piece of equipment, such as having all the sprockets and rollers and in fact all parts of this projector that touch the film in any way have been machined away so that all that touches the film is from the center of the sprocket holes outward, thereby preventing all of the old-time damage to film from scratches. This, I should say, was quite a jump on the Academy Research Council's damaged film report.

Just to digress a moment, compare this latest thing in the art of projection with the projectors in Number 3. The center shot, taken at the American Theatre at Fifth and Broadway, Los Angeles, in 1913, and top picture of the Powers projector at the College Theatre at Fifth and Hill, also 1913. The projector used at the American Theatre was an Edengraph and the projectionist was Brother Harold Sailor of Local 37 and 150, IATSE. Note the size of the booth at the American, and the big marble slab that the projector was set upon, also the open light at the aperture, and naturally the accompanying strain on the projectionist's eyes as well as the fire hazard. Even as late as 1913 the use of an electric motor to run the projector was against the law. As I remember, these photographs were taken by the light of the arc of the projection lamp of the second machine we used on Saturday and Sunday, a sewing machine type Motograph.

In the top picture of Number 3 on the shelf in the rear of the Powers projector you will see the powerful open work wire wound rheostat
in use at that time and the ultra heavy wall switches that were used. Note the position of these wall switches, where we had to reach over the hot lamp house to cut the juice so we could trim the carbons.

In the bottom photograph we see the corner of Fifth and Hill Streets in 1913, with the gas lights in the lobby of the then luxurious College Theatre, and the old Occidental Hotel across the street and the New Hotel Clark that was being built next to it. Incidentally, the snappy roadster with the turtle back was one used for film delivery in the Tally circuit.

Swinging from this “ultra modern” era of 1913, let us make a dash over to the Alexander Theatre, Glendale, Calif., where Fox-West Coast is installing a complete outfit of the new Simplex Sound System. In fact everything in the booth is new but the lamps.

This installation took place June 22, 1938, and is the first Simplex installation for Fox-West Coast, as well as the largest installation the Simplex people have undertaken of the more than 100 sets they have installed to date. It will not be possible to get an accurate account of the performance of this equipment until next issue. But inasmuch as there were several reels of various productions of different studios run off for test purposes, we can say that the equipment was not found wanting, but the final analysis will be after the studios have run two or three previews on this new system.

Now let us get to part of this equipment that is of utmost interest to the projectionist, namely, the projector head, and the changes made necessary by having a preview attachment added, as pictured on Page 3. We have printed a picture of the projector head of the E-7 at the Chinese in Hollywood, for comparison purposes in the layout on Page .... Please note the radical change of the position of the oil reservoir of the head installed at the Alexander and the flywheel, out in front of the motor instead of between the motor and the head, also the compact carrier for the new piece of heat-resisting material to stop the draft at the mouth of the lamp house.

Personally, I think the new location of the oil reservoir is much better than the old location. It takes the oil out of the bottom of the projector and puts it on top and to the side of the projector head where it can be taken care of much better. Should it become necessary to put a preview attachment on your equipment, there are no last minute changes to be made in the head, so we all can enjoy the advantages of different types of preview attachments.

Brother Frank Hildbert of Hildbert, Platt, Urlik, Bradley and Tartt, all good members of the projection crew at the Alexander, and of Local 150, IATSE, tells me that the new preview attachment is a honey. As you can see by the photograph it is a permanent installation and is easy to handle. The big door of the lower magazine has a hinge in it and when the attachment is in use the whole door opens but when standard or composite prints are used the front half of the door closes and the back half or the portion over the large reel is used. This is a big advantage.

While talking to R. H. McCullough, supervisor of projection of Fox-West Coast, he explained that the work being done at the Alexander in Glendale is part of the routine employed by the circuit to keep pace with the constant improvements in sound and projection as they are tried and approved by the technicians in the studios.

Picture Number 4 is a good view of the first Western installation of the Simplex sound system, at the San Carlos, Phoenix, Arizona. We had this picture made before we obtained the exclusive shots of the Alexander, Glendale, just before going to press.

(The installation of the Powers projector in the College Theatre at Fifth and Hill Streets, March 12, 1912, was done by John Fillbert, then located in his store at the corner of Sixth and Main Streets, in the Severance Building.)
Analytical Methods in Lab

Scientifically accurate methods for analysis of developing solution for rational replenishment system with its resultant economies and improved efficiency.

By D. K. Allison

Recent papers by Messrs. Hanson and Evans of Eastman Kodak Co., and others, have indicated the need for analytical methods whereby the concentrations of the various components of the developing solution may be estimated, in order that rational replenishment and its resultant economies may be effected. The accompanying method of developer analysis will assist the laboratory chemist to maintain the operating characteristics of the developer substantially uniform at all times. (See Page 22.)

Numerous tests have shown that the factors pH, Eh, and RH, coupled with a consideration of the sulfite and bromide concentrations present, are of primary importance; the concentrations of carbonate, borax, or other alkali are important only in their relationship to pH and buffer index.

Because of the wide range of concentrations, and the various manufactures of developer constituents encountered in the various film laboratories, it is suggested that the chemist carefully compound a fresh developer by his formula, analyze it according to the following methods, and thereby determine the factors for conversion to his particular constituents. For example, in a developer known to contain 75 gms. per liter of sodium sulfite, heptahydrate, of a certain manufacture, there is found by analysis to be 39 gms. anhydrous sodium sulfite; future determinations of sulfite in this developer would use the factor 75.39 × 1.26 = 2.42, in place of the factor 1.26 given in the table.

The author wishes to thank Mr. A. M. Gundelfinger and the research staff of Cinemacolor Films for their cooperation and assistance in the testing of these methods, and for the determination of bromide in old developing solutions.

The Basis of Color Photography

"Light and Lights Sensitive Surfaces" is second article in series on color fundamentals; lays ground-work for understanding of color balance.

By Charles Hoffman, Local 583, IATSE

When we see colored objects, be it a piece of fabric or any other kind of object, we know that no matter how brilliant the color appears, we shall not be able to see its color in dim light; such as moon or star light. We realize, therefore, that color is not a property of the object alone, but that it depends upon the presence of light.

The reason the objects appear in color is because they possess the property of absorbing some of the color rays of light falling upon them and reflecting others. Color is the result of absorption, transmission, and reflection of light. To understand this, we must examine the theory generally held, and now very well substantiated, as to how the eye perceives color. Vision to color—you may say—has nothing to do with color-photography and knowledge thereof is not essential to successful practice. Yet it will frequently be found of great assistance if a clear understanding of the underlying principles is possessed.

Some facts are so familiar that we sel-

see things every instant that we are awake and that we are almost helpless in the dark, yet how many of us have even a rudimentary knowledge of how and why the different light sources play such an important part to the craftsmen throughout the industrial world; the artists and color-photographer? Each of them requires the type of light which is most suited to the type of work he is doing. The appearance of a piece of fabric in a color photograph is looked at from a much different viewpoint than the appearance of the same fabric is regarded, say, by an inspector at the factory.

The barber's view of our face is quite different from that which we present to our hostess.

Similarity of human vision and the camera has been known or surmised for a great length of time. Vision is, in actual fact, a complete photographic process combining all the elements of color-photography and television; in fact, it is identically the same up to the point where the light strikes the light sensitive surface. It is commonplace to say that vision to color and color-photography is dependent on the proper light, and the truth to state that the true value of color by vision or photography is no better than the light condition. We know that we see better under certain conditions of light than others, but the fact that bright light is better than dim is about the extent of common knowledge on the subject.

In recent years the question of providing the workman with suitable light for his use has received increasing attention. A system of measurements of light in its various ap-

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applications, and instruments for making the measurement, has been fully worked out, as have devices for directing light so as to utilize the rays of the various light sources in the most economical manner and that is eminently practical.

The photographic film of the eye called the retina corresponds to the gelatin of the photographic emulsion. Through it are distributed a great number of microscopically small nerve cells containing chemical substances that are acted upon by light, and which perform the same function as the particles of silver salts in the photo emulsion. The cells are of two kinds, called respectively rods and cones, due to their general shapes. The retina comprises two different photographic emulsions. The cones are adapted to taking pictures, where sharpness of detail and full color representation is required, as in color-photography, and resembling a screen-plate. They are relatively "slow," requiring a fairly high intensity of illumination to produce a visible picture. The rods are extremely rapid but incapable of producing sharp definition or of showing color. The rods resemble the color blind emulsion, but supply the visual picture when the light is dim. In the retina just off the optical axis is a little depression in which there are only cones. This is called the fovea. Covering this is a thin transparent tissue of yellow color which acts as a filter against the ultra-violet rays, the same as the yellow filter is used in conjunction with a panchromatic film.

The fovea is especially adapted to producing the color picture in which the utmost sharpness of definition and discrimination of small objects is required. All of the field within our visual range which we see distinctly at any one instance is a part of the image that falls upon this little dent. This area is very small, and fairly well represented by this capital letter (O), on the page before you. You can readily verify this by fixing your focus on this letter and observing the sharpness of the adjacent letters. If the eye takes a very small picture, how is it that we still can see half-way around us? The explanation is that the eye really is a motion picture camera capable of taking many pictures per second (a field of investigation still being explored by scientists).

Light falling upon the retina does not instantly cease when the image is removed.

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The LABORATORY BOOK of TABLES

By D. K. Allison

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ANALYSIS OF DEVELOPING SOLUTION

<table>
<thead>
<tr>
<th>SODIUM SULPHITE</th>
<th>POTASSIUM BROMIDE (Rapid Method)</th>
<th>pH</th>
<th>Eh</th>
<th>SODIUM CARBONATE (electrometric)</th>
<th>POTASSIUM BROMIDE (determination in old developer)</th>
<th>HYDROQUINONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipette 5.00 ml. sample with vigorous stirring, into 100.0 ml. 0.10 N iodine solution, to which 25.0 ml. 10% H:SO₄ have been added. Titrate excess iodine immediately with 0.10 N Na₂S:O₃ to straw color. Add 10 drops Solution G, and continue titration to disappearance of blue coloration.</td>
<td>Take 50.0 ml. sample, make acid to litmus with 50% H₂SO₄, then add 5 ml. excess. With stirring add 25.0 ml. 0.10 NAgNO₃. Add 5 ml. Solution J, titrate with 0.10 N NaKSCN to first pink color.</td>
<td>Measure the pH of 100 ml. sample, using the Allison pH Meter or the Allison Electrometer with the glass electrode.</td>
<td>To a 50.0 ml. sample add 1.0 ml. Solution N. Measure reducing potential EMF at 20° C, using Allison pH Meter or the Allison Electrometer with gold electrode. Convert to Eh, by the following equation: Eh = 250 + EMFobs</td>
<td>Titrate a 50.0 ml. sample with 0.10 N HCl to first point of inflection, using the Allison pH Meter or the Allison Electrometer with glass electrode (see directions for Electrometric Titration, Int. Phot., May, 1938.)</td>
<td>Add 5 ml. 50% H₂SO₄ and 20 gms. KC1, stirring to 50.0 ml. sample, stir with heating until effervescence ceases. Cool, place in separate funnel and extract six times with successive 50 ml. portions of ether. Combine extracts and evaporate to dryness in weighed dish on water bath. Cool in desiccator; weigh.</td>
<td></td>
</tr>
<tr>
<td>gms. Na₂SO₃/liter.</td>
<td>25.0—vol. KSCN</td>
<td>0.238</td>
<td>gms. KBr/liter.</td>
<td>gms. Na₂CO₃/L.</td>
<td>Weight residue</td>
<td></td>
</tr>
<tr>
<td>100—vol. Na₂S:O₃</td>
<td>×</td>
<td>=</td>
<td>rH</td>
<td>=</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>×</td>
<td>=</td>
<td>gms. Na₂CO₃/L.</td>
<td>=</td>
<td>gms. hydroquinone/L.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BUFFER INDEX

Using Allison pH Meter or Allison Electrometer with glass electrode, by method of electrometric titration, determine amount of 0.10 N HCl to produce 1.0 pH unit change in 100.0 ml. sample developer. Volume CHI=Buffer Index

DIRECTIONS FOR THE PREPARATION OF SPECIAL SOLUTIONS AND REAGENTS FOR THE ANALYSIS OF DEVELOPER

Solution G—6 gms. soluble starch, trinitrated and made to 1 liter with boiling water; 10 gms ZnSO₄ added.
Solution H—8N HNO₃.
Solution J—Cold saturated ferric ammonium sulphate, to which enough nitric acid has been added to cause disappearance of brown coloration.
Solution N—50 gms. KFe (CN)₆ per liter.
Phenolphthalein Solution—5 gms. phenolphthalein dissolved in 100 ml. ethanol, made to 200 ml. with distilled water. 0.10 N I: Dilute 250.0 ml. 0.25 N I: solution to 1000 ml. 0.10 Na₂S:O₃: 24.83 gms. Na₂S:O₃: 0.1 SH:O per liter. 0.10 N AgNO₃: 16.99 gms. AgNO₃ per liter. 0.10 N HCl 10.0 ml. conc. HCl per liter; standardize against Na₂CO₃. 0.10 N KSCN 10.0 gms. KSCN per liter; standardize against AgNO₃.

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but gradually fades out—the action corresponding to the moving picture, and depending upon the physiological effect known as persistence of vision.

We have seen that the eye consists of two "films" both changing their sensitivity in opposite directions, according to the amount of light falling upon them. In darkness the rod-film becomes very sensitive, while the cone-film becomes entirely insensitive. As the light intensity increases the rod-film becomes less sensitive, while the cone-film begins to acquire sensitivity; the two processes move accordingly. At very low intensities, both films take the picture. This change, technically called adaptation, takes place very slowly from light to darkness, but very rapid from darkness to light.

In color photography, as in vision, the final test of all lighting schemes is, HOW WELL CAN YOU SEE? An equally important question is, DO THE THINGS YOU WANT TO SEE APPEAR AS YOU WANT THEM TO APPEAR? How do you want an object or scene to appear depends upon circumstances: The light is the source of color; color is dependent on the presence of light. For practical purposes, as in color-photography, we have to deal with "white light."

"White light" is light containing all of the wave lengths found in the average sunlight, and of the same relative intensity. The natural color of an object is the color as seen by white light. Light of a different wave length composition than white produces a different color sensation when reflected from a given surface. Thus, colors that match by day-light may or may not match by electric light.

At high intensities of light, all colors tend to become white, and at very low intensities, black. This means that at high intensities or glare, the light sensitive surface of the eye or photographic camera is generally or locally over-exposed and is not able to record the color; and in the latter case it is under-exposed and can "see" little but black.

The difference of light intensities between bright sunshine and star-light is of the order of two billion to one. The variation of light recorded by the eye, due to its facility of adaptation, is of the order of hundred to one, while the photographic-emulsion can not record a light variation of over ten to one and upwards. (XX)

Since all color can be matched by the proper admixture of the primary colors, the proper quantity of each color must be recorded in the three color separation negatives of photography. The scene or object must be so lighted and exposed as to be within the range of the photographic emulsion; and it must be properly developed so that the negatives present the full range of tone values. From this it can be seen that over or under exposure only leads to failure, and also it is plain that a color-photograph is no better than the image which produces it.

It is equally obvious that the character of the picture can be marred, even to the extent of complete ruination, by the quality of the light, photographic-film, and the manner in which it is exposed and developed. Lighting as an applied science has been developed along physical and mechanical lines, giving practically no attention to what happens after the light reaches the light sensitive surface. The fact to be emphasized is that the color-separation negatives are only the beginning in the process of the technique of color-photography, and, as is the fact in vision, the actual process of seeing begins after the light ceases to exist.

The technique of color-photography covers a very large area, and there is no practical book yet written on this subject. The few now in existence contain comparatively little information and rarely touch those problems in color which the practical worker wishes to solve. I recall one book in particular, a very large and expensive one, upon which I spent a great deal of time and learned little in connection with color, but was very well informed about "law."

There are, it is true, some excellent scientific works written on light color and so on down the line, supplying the connecting links that must be known in the technique of color-photography. What should be known, or better still how much should be known, depends upon the individual and in what capacity he is engaged in color-photography. It does not require a genius to be a color-technician. On the contrary, it requires only a thorough knowledge of color. A superior aptitude for color-photography will, of course, always produce a superior color-technician because the latitude in color-photography is so large that the craftsman with the best knowledge will naturally do better than the one not so well informed. It also takes a great deal of practice and experience, and one should not feel discouraged when something goes wrong; but set to work to find the cause of the trouble. Don’t be afraid to start over again. Experience makes masters.

Before going into the discussion of the process of making the three continuous tone positives that are the basis of color reproduction for the graphic arts, it should be emphasized here that certain fundamentals of color, and particularly the principles and theories of color mixing, must be always kept in mind. The thorough knowledge of color is a stimulating thing to the color printer, the engraver, the lithographer and other graphic arts workers. Generally, the best color photography today is intended for graphic arts reproduction. And all the eager rush to get color prints is wasted effort if we do not consider color from the standpoint of proper mixing of colors to achieve the final effect.

Balance is a quality that is easier to sense than to explain. Entering into every branch of artistic production it is one of the most important principles of art and embraces many elements, all more or less elusive. Applied to color, it refers to a certain equipoise attained by relating the quantities of different hues, tones, and intensities to each other in a manner which produces a pleasing unity. It is therefore concerned more with the quantities than with the quality of colors.

A color-scheme, though perfect as regards the selection of hues, may be unsatisfactory because the quantities of the colors are not properly proportioned. A color scheme would be unbalanced if, for instance, the reds, or warm colors, so predominate as to produce a scorched appearance; or, if the blues and cold colors were so much in evidence as to produce a sense of chill. These two examples will serve to illustrate crudely what is implied in the term balance.

We know that any color can be produced by the proper admixture of the three primary colors. With this knowledge the color still printer should be able to correctly read and interpret the color densities of the three continuous tone positives. The color quantities being represented in the positive in gray tones, the operator should be able to visualize the resulting color, balance, and correct the print plates without going through the entire process. With experience and care he should be able to make the corrections so that the final result would be, if not a perfect at least an acceptable, color print. This would mean reduced cost by saving time, material and labor in the handling of exposed emulsions between the photographer and the engraver.

Bearing in mind the fact that light, as far as human vision is concerned, naturally divides into RED—GREEN—VIOLET, and that the photographic-film of the eye undoubtedly is arranged to correspond or harmonize therewith (no other logical explanation will account for the various color phenomena) we can definitely deduce that the true colors, the source of all other colors are, red, green and blue. These colors may be roughly represented by a scarlet red, emerald green, and a good ultramarine blue.

There are three methods of mixing colors; two perfect methods and one imperfect. There are also two sets of colors capable of producing all other colors by combining or mixing. These methods of mixing color are the additive method—the subtractive.


<table>
<thead>
<tr>
<th>RED</th>
<th>GREEN</th>
<th>VIOLET</th>
<th>TABLE I</th>
</tr>
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<tbody>
<tr>
<td>is one element of white light.</td>
<td>is one element of white light.</td>
<td>is one element of white light.</td>
<td></td>
</tr>
</tbody>
</table>

| YELLOW | MAGENTA | CYAN-BLUE |
|        |         |          |
| Contains two elements of white light—RED AND GREEN | Contains two elements of white light—RED AND VIOLET | Contains two elements of white light—VIOLET AND GREEN |

ADDITIVE:

SUBTRACTIVE:

TABLE I

JULY, 1938—23
method and the third, where the colors are placed next to each other as in screen plates. This last method we call imperfect because it will neither produce black or white but is necessary to supply both independently. The black is supplied by interposing the photographic positive, and the white can only be produced by the use of an excessive amount of light. With the additive method it is necessary to supply the black independent of the colors, while in the subtractive process the opposite is the case, and white is supplied independently. With the subtractive process, the three color processes in which we are interested, the white is of course supplied by the paper on which the combination of color is printed. For this process we use the MINUS colors, YELLOW—MAGENTA—CYAN-BLUE. The great difference between the MINUS colors and the PLUS colors as used in the additive method is: the MINUS colors in each instance contain two elements of white light, while the PLUS colors contain only one, as outlined in Table 1.

Therefore, when we print yellow on a sheet of white paper we are absorbing but one ray of white light; namely, the violet, and we are reflecting the two rays of red and green to the eye, and so on. Another difference between the minus and plus colors is that the plus color have the property of absorbing two elements of white light. The difference in purity of color between the two compounds superposed subtractively must be in favor of the minus primary colors. And for the same reason this makes for purity of color in the minus set when superposed subtractively; it also causes a weakening, or dilution, of color when these colors are superposed additively. Each minus color being composed of two elemental rays of light when they are combined additively, an excess of white light is introduced into the mixture. This, of course, is not the case with the plus colors.

An explanation of why this is so will occur to the reader when it is remembered that in the Kromoskop a composite or color picture is formed by the three rays of light, while on the three-color print, with the usual method of observation by reflected light, we have at all times but one volume of illumination. In other words, if a good three-color print be made transparent, or by lifting the three-color tissue off the paper and viewed as a transparency, it would be found to be very weak in color. The blacks will appear gray and the color will be diluted with white. We do not obtain a saturated or full power color. From this it can be seen that each individual color tissue is very light and delicate in tone in regards to density, when we have to consider that the trio in combination make the final picture. Each can only be one-third of the normal strength when producing black, and must contain all the full tonal range to produce all the HUES, TINTS, SHADES when superimposed.

(Next article in this series will deal with the three continuous tone positives.)

**SMPE Theatre Survey Report**

First word from Projection Practice Committee on study of theatre technical conditions to set up modern industry standards.

First results of the survey of theatre design by the Projection Practice Committee of the Society of Motion Picture Engineers were presented recently at the spring convention in Washington. The report is published herewith in full. The committee is seeking to eventually set up standards that will supply the exhibition branch of the industry with a complete yardstick for new theatre design and modernization of existing theatres. The end of putting a more satisfactory entertainment on the screen with the greatest efficiency in theatre operation.

Members of the Committee are:


Summary.—For some months the Projection Practice Committee has been conducting a survey of motion picture theatres for the purpose of determining existing conditions under which motion pictures are presented. Following report summarizes data obtained from survey and presents them in form of charts showing ratios of viewing distance to screen width, seating length to seating width, and seating width to screen width. Other charts show distance from floor.
to bottom of screen, angle of projection, screen width, and arc current.

The survey covers approximately 600 theatres, and is shown to be fairly representative of entire industry by reason of fact that index figures calculated from the survey for only 400 theatres did not change when the number of theatres increased to 600.

Data presented are to form the basis of an analysis leading to determination of criteria for proper motion picture theatre design.

For convenience in conducting studies on the many projects engaging attention of Projection Practice Committee, several sub-committees have been formed which have been working very vigorously on their respective problems throughout the year. However, in view of pressing need for reliable information on theatre structures, that part of the work was pressed forward with all speed so as to be able to report on it at this time.

Another important job that Committee is doing resulted from request by National Fire Protection Association to study "Regulations for Nitrocellulose Motion Picture Film," with view of presenting to the NFPA any recommendations for changes that the Committee might deem advisable. Accordingly, Sub-Committee on Fire Hazards has completely revised all the NFPA regulations referring to projection rooms, and the material was presented to NFPA Committee on Hazardous Chemicals and Explosives at meeting held at Atlantic City the latter part of May. The latter Committee will probably take several months to consider the recommendations, after which time it is expected that proposed regulations may be presented to the Society, probably as a joint report of the SMPE Projection Practice Committee and the NFPA Committee on Hazardous Chemicals and Explosives, and eventually published in the Journal. We hope to present final report at the next Convention.

**Report on Theatre Survey**

Motion picture theatre structures should be designed according to standards that will insure satisfactory reception, by the audience, of the screen performance. Need for such standards has been emphasized by the survey made by this Committee of approximately 600 theatres. Charts similar to that shown in Fig. 1 were distributed by the Committee among a number of large companies of the industry whose engineers assisted in obtaining the dimensions requested on the chart. Accompanying the charts were letters describing the purpose of the survey. Instead of mailing charts directly to managers of theatres, it was felt that results would be more uniformly determined if measurements were made and charts filled out by men experienced in such work. Accordingly, held men and the management of RCA Manufacturing Co., International Projector Corp., Electrical Research Products, Inc., National Carbon Co., Inc., Forest Electrical Co., Bausch & Lomb Optical Co., and National Theatre Supply Co. are all to be thanked for their co-operation. In addition, a number of charts were distributed to the delegates to the Convention of the MPTOA at Miami last March.

Although survey includes only about four per cent of total number of theatres in operation in the United States, care was taken so that these 600 theatres would represent a fair cross-section of all theatres of the country. Theaters in every state and theatres of capacities varying from 200 to 4000 seats were included. Averages computed from the survey at a point when 400 theatres were covered showed some index values as when number of theatres surveyed reached 600 (as shown on chart). Accompanying the charts were letters representing of general theatre conditions.

Information obtained from survey reveals fact that basic theatre forms, relative screen sizes, and viewing conditions vary to a very wide extent. Variations in design, as shown in graphs, spread over an extent of at least three times what might be regarded as tolerable. Only 16 per cent of all theatres surveyed proved to have satisfactory conditions for all basic considerations of proper motion picture presentation. Considering only theatres erected after 1930, percentage was 27.

A set of standard requirements for theatre construction could easily have limited these variations and thereby have benefited motion picture presentation greatly. As it is, however, there appears to have been considerable neglect, disregard, or ignorance of motion picture viewing principles in design of motion picture theatres. This is evidenced by fact that smooth broken curves, drawn through jagged graphs for purpose of roughly representing average tendencies, are amazingly similar in general shape to well known probability curve. Inference follows, therefore, that the fulfillment of satisfactory viewing conditions in theatres, up to the present, has been primarily a matter of chance and not of intention. Perhaps this disregard of proper motion picture design principles may be attributed to fact that motion picture theatre design has evolved from stage-theatre form, which is unfortunate since basic form required for stage theatre is quite different from that required for motion picture theatre.

Since the motion picture has become sole, or, at least, most important means of entertainment in almost all theatres where motion pictures are exhibited, it is important that recommended practices for motion picture theatre design be formulated. Such recommended practices could be followed as guides not only in designing new theatres but in remodeling and re-equipping existing theatres. They would indicate ideal conditions desirable in new structures and variations from ideal that would be tolerable, if
indicating best possible use of poorly proportioned as well as more correctly proportioned plots. This is necessary because street plans and excessive land costs produce many variations in ground plan shapes.

Laws governing theatre construction in many countries are designed to correct these defects. For example, the projection laws for cinema rooms will control the size of the screen, the distance of the screen from the seating area, and the brightness of the screen. In general, the projection laws are intended to control the size of the image in order to ensure that the audience can see the screen clearly. The projection laws also regulate the brightness of the screen in order to ensure that the audience can see the screen clearly in different lighting conditions.

Future recommendations should show disadvantages encountered when capacities of over 1500 seats are contemplated. A point to be noted in survey is that characteristics of theatres having capacities greater than 2000 seats do not fall within the 50-per cent group, indicating that an important percentage of seats in these large theatres are more or less subject to undesirable viewing conditions, and that best results in establishing standards of design will be attained if the seating capacities are assumed to be 1500 or less. This maximum applies to usual rectangular ground plan. Somewhat greater capacities may be possible in a trapezium-shaped ground plan.

Although screen-image size is related to maximum viewing distance, screen-image sizes in theatres surveyed indicate tendency towards sizes too small for given viewing distances. This may be due to general desire to avoid sufficient magnification to reveal film graininess and thereby assist in rendering seats closer to the screen undesirable. Fig. 8 shows that average screen-image is 18.5 feet wide, 50 per cent of the theatres surveyed having screen-images ranging from 16 to 21 feet wide.

Using average screen width of 18.5 feet (Fig. 8) and assuming this width represents maximum desirable magnification of 35-mm. film, approximately 800 seats can be arranged in a single tier.

### TABLE 1

<table>
<thead>
<tr>
<th>Theatres Survey. Characteristics of Theatres</th>
<th>Lower</th>
<th>50%</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio max. viewing dist. to screen width</td>
<td>2.60</td>
<td>4.65</td>
<td>6.00</td>
</tr>
<tr>
<td>Ratio seating length to seating width</td>
<td>0.92</td>
<td>1.52</td>
<td>2.55</td>
</tr>
<tr>
<td>Ratio rear seating width to screen width</td>
<td>1.00</td>
<td>2.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Screen width</td>
<td>10'</td>
<td>16'</td>
<td>18'</td>
</tr>
<tr>
<td>Distance from floor to bottom of screen</td>
<td>5'4&quot;</td>
<td>5'9&quot;</td>
<td>8'2&quot;</td>
</tr>
<tr>
<td>Projection angle</td>
<td>0°</td>
<td>5°</td>
<td>15°</td>
</tr>
<tr>
<td>Amperes (arc) per sq. ft. of screen surface</td>
<td>0.06</td>
<td>0.16</td>
<td>0.24</td>
</tr>
</tbody>
</table>
both 800- and 1100-seat instances, these capacities would be increased respectively to approximately 1200 and 1700 seats. These figures indicate reason for assuming that 1500 seats may be advisable maximum capacity.

While data shown in graphs do not determine, but rather study, ideal theatre proportions and dimensions, they do, however, reveal conditions that may be regarded as at least tolerable. For example, conditions in theatres proportions and dimensions of which fall within 50 per cent group marked on charts may, for immediate practical purposes, be regarded as tolerable. Fig. 9 depicts these characteristics graphically. Figures shown should not be interpreted as representing attempt on part of Committee, as yet, to fix maximum or minimum conditions; further analysis is required.

Considered from standpoint of visual aspects only, ground plan of a motion picture theatre is controlled, first, by ability of audience to see details of picture. This ability is determined by:

(a) Illumination of screen;
(b) Brightness contrast of the projected image;
(c) How much image detail is to be discernible to spectator (art of cinematography is here the guiding factor);
(d) Width of film, which controls maximum screen-image size.

Second, ground plan is controlled by area within which viewing angles afford an acceptably undistorted appearance of two-dimensional screen-image. (Tuttle, C.: "Distortion in the Projection and Viewing of Motion Pictures," J. Soc. Mot. Eng., XXI (Sept., 1933), No. 3, p. 198.) Still another consideration in determining ground plan is that of choosing between a single tier of seats and a multilevel seating plan. Desire to obtain maximum number of seats on valuable ground area has usually been important reason for adopting upper-level seating schemes. Yet most plausible reason for multilevel seating is that excessive viewing distances can be avoided and minimum screen-image sizes can be used. Multilevel seating scheme would tend toward more squarely proportioned and smaller ground plan; whereas single-tier seating plan tends toward elongated rectangular plan, and, naturally, larger ground area.

Ideal motion picture theatre form, considered from purely technical and artistic standpoint, may develop into form that may not in some instances fulfill all rigid requirements set forth for the commercial motion picture theatre; yet it is obligation of Society to indicate what would be the most desirable form of theatre, and all those who are concerned with design of theatres may adhere as closely to these recommendations as may be practically possible, in any case being sure to stay within limits set forth as tolerable.

Following principles determine characteristics of ideal motion picture presentation:

1. Minimum seating capacity, permitting minimum screen-image sizes.
2. Control of screen-image size, to avoid over-magnifying film graininess.
3. Minimum viewing distances, to enable greater cinematographic use of screen without further magnification.
4. Maximum seating capacity possible while still adhering to requirements of (2) and (3) above.
5. Maximum number of seats within an area from which screen-image will not appear objectionally distorted.
6. Floors or steps properly graded, to afford unobstructed view of screen-image from every seat.
7. Maximum screen brightness, using minimum of electric power.

It is intention of Committee to give further detailed study to problems of picture detail, screen brightness, cinematography, magnification ratio, image distortion, and obstruction of screen-image. By considering factors revealed by survey and other studies it will be possible to formulate definite recommendations for standards for motion picture theatre design.

Report of Sub-Committee on Projector and Screen Illumination

For a long time Projection Practice Committee, through its sub-committees, has been working on the problem of discovering meters that could be used in the theatres for measuring light from projector incident upon and reflected from screen. Such meters should be simple to operate and relatively low in cost, in order to be within means of all theatres. Meters have been available in past by means of which such measurements may be made, but in all cases meters were very high-priced and required for their operation men specifically trained in art of handling meters.

Some progress has been made, however, in that meter is now available by means of which incident light may be measured, but no report can be given at this time as further studies are being conducted with meter with regard to its use in connection with screens of various types and under various circumstances. Very little progress can be reported, however, with regard to measuring the reflected light, so that for present no means are available for determining reflection coefficient of screen other than by using specially measured and graded samples of paper such as accompanied the report of the Projection Practice Committee in the June, 1933, issue of the Journal.

Committee plans to continue its work on screen illumination during coming months, and hopes to render a more definite report at a later time.

![Figure 9](image_url) Characteristics of Theaters Falling within the 50% Group.
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Motion Picture Camera Sup. Co. 723 Seventh Avenue, N. Y. (Bryant 7-272)

Morgan Camera Shop 6305 Sunset Blvd, Hollywood

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Eastman Kodak Co. Rochester, N. Y.

Karant Company 58 Warren St. New York

Devry Corporation 667 N. Robertson Blvd, West Hollywood, 6-1051

Thalhammer Company 121 S. Fremont Ave, Los Angeles

Sun Ray Photo Company 538 Centre Street, N. Y.

MovieSound Company Jamaica, 1st, N. Y. New York

Commercial Camera Co. 1023 No. La Brea Ave, Hollywood (HE. 8119)

Fried Camera Company 6144 Santa Monica Blvd, Hollywood

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Rotthenburg Color Photography Co. 4961 Sunset Blvd, Hollywood

DuPont Film Mfg. Corp. 4750 Madison Ave, Cincinnati, O.

Eastman Kodak Company Rochester, N. Y.

Agfa-Ansco Corp. 6732 Santa Monica Blvd, Hollywood

Hollywood Ray Film Co. P. O. Box 3036, Hollywood

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Landers & Trissell, Inc. 6133 Sunset Blvd, Hollywood

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ALLISON, D. K. 9308 Santa Monica Blvd, Beverly Hills, (O. Daly 6277)

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DK. Kleening J. Price 6311 Hollywood Blvd. (HE. 0637)

Underwood Elliott Fisher Co. 1517 No. Vine St, Hollywood (EL. 6240)

Sardis Restaurant 6233 Hollywood Blvd (H. 2131)

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Herron Optical Co. 7600 Jefferson Ave, Los Angeles (PR. 3822)

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Hardwell & McAllister 7636 Santa Monica Blvd, Hollywood (Hollywood 6235)

General Electric Company Nela Park, Cleveland, Ohio

Mole-Richardson, Inc. 245 N. St, Hollywood (Hollywood 5838)

National Carbon Company Carbon Sales Div, Cleveland, Ohio

Union Carbide & Carbon Corp. Cleveland, Ohio

Manufacturing Machine Shops

Cinema Arts-Crafts 514 N. Fairhills, Hollywood (HE. 1894)

Duplex Camera Equipment 4572 Santa Monica Blvd, Hollywood (MO. 14717)

Art Reeves 7512 Santa Monica Blvd, Hollywood

Studio Equipment Corp. 2125, Lincolny Way, Hollywood, (Granite 6844)

Fred Hohnet 5519 Santa Monica Blvd, Hollywood, (GI. 0245)

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Motion Picture Process Corp. 1137 No. McCadden Pl, Hollywood (Tenn. Phone Hillside 8179)

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Flat Light Screen Co. 6233 Santa Monica Blvd, Hollywood (Hollywood 4109)

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Blue Seal Sound Devices 723 7th Ave, N. Y.

Canady Sound Appliance Co. 19570 S. Western Ave, Culver City, Ohio

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FIRST among this 16 mm. Ciné-Kodak's many features is its 3-second loading—with films that come pre-threaded in light-tight metal magazines which slip into the camera.

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THREE SPEEDS—16, 32 and 64 frames per second. Smooth-running motor supplies power enough for extended scenes—and automatically cuts off when rewinding is needed.

FOCUSING FINDER—shown above, right—slides into the camera and shows exact field covered by any lens, and a magnified section of field for critical focusing. $20.

COMPARTMENT CARRYING CASE—shown above—holds camera, extra magazines, lenses and filters, $27.50.

AND FOR PROJECTION—Kodascope Model G—Eastman's new projector with 2-inch f.1.6 lens and 500-watt lamp for showing 16 mm. movies at their best. $123.45.

Ciné-Kodaks, Kodascopes, and Ciné-Kodak Film are all Eastman-made, designed to work together and backed by dependable, world-wide Eastman service.
Of course, photographic quality is most important. But the prompt delivery of fresh film and the rendering of cooperative technical assistance in its use are also worthwhile considerations.

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40mm Telyt Lens

With telephotography becoming more and more popular today with professionals, newsman, and advanced amateurs making considerable use of long focus lenses to make close-up photographs of things happening at a distance, the Leica camera now enters the ranks of these super-sport cameras with a new Telyt 400 mm. lens. This lens has an aperture of F:5 and is focused by means of a mirror reflex housing which gives ground glass focusing up until the moment of exposure.

The new lens has a focal length 16 times greater than the short side of the 1x1½-inch Leica negative. If one wanted to have a similar lens on a 5x7-inch camera, it would be necessary to have a lens with a focal length of 80 inches, or 6 feet, 8 inches, so big that it would require transportation by truck.

The 400 mm. Telyt lens, when mounted on the Leica camera with mirror reflex housing, measures 12½ inches from the back of the camera to the front of the lens (when focused at infinity), and the entire outfit weighs 7 pounds.

For maximum ease of operation, the new 400 mm. lens may be mounted on the Leica Gun (Int. Photoc., Tradewinds, March, 1938), combining rapid winder action with complete freedom of action for it need merely be mounted on a tripod with a ball jointed head. Thus, it may instantly be swung into any position desired without loss of time in tightening the tripod screw every time it is moved—for, since the butt of the gun rests against the shoulder, it may be held steadily on the subject.

Zephyr and Perfex

Two new candid cameras competing in the "under $30" field are the Zephyr, manufactured by Photographic Industries of America, New York City, and the Perfex, manufactured by Candid Camera Corp. of America, Chicago. The latter sells at $25 with f:3.5 lens and the former at $22.50 with f:3.5 lens, and at $29.50 with f:2.9 lens.

Both cameras feature focal plane shutters with speeds to 1/500. The Perfex features a built-in exposure meter as well as a built-in range-finder. Carrying cases and other accessories are part of the two new lines.

A New "Baby Keg"

Simplicity and lightness are the keywords of a new 500-watt unit introduced by Bardwell & McAlister, Inc., Hollywood lighting equipment manufacturers. Following the general lines of their well-known Keg-Lite, this "Baby Keg" weighs only 28 pounds complete with double riser stand. For break-down, the head only weighs 16 pounds, the stand 12 pounds. This lamp, light, yet of sturdy construction, is another valuable contribution to the small spot field for studio and professional use.

The popular B&M quick-focusing device has been further simplified. A lever arm, protruding from both front and rear, is moved from side to side for focusing spot to flood. So simple is this mechanism that a high lamp can be focused by merely exerting a pressure against the protruding lever.

The lamp can be furnished with either pre-focus or medium bipost sockets. Both types of socket are porcelain base, insuring against deterioration from heat.

A short focus six-inch diameter Fresnel lens combined with a pre-focused high reflecting mirror gives great efficiency in light output.

The standard Keg-Lite lines and ventilation incorporated in this lamp make for longer globe life as well as coolness of operation.

16mm Supreme

To users of 16 mm. film with the negative-positive process Agfa's fast Academy Award winning Superpan Supreme is now available in 100-ft. lengths in 16 mm. negative form. Superpan Supreme may be used with one full lens stop less exposure than that necessary for 16 mm. F. G. Superpan which it replaces, or for ordinary supersensitive type films. Although speed is great, grain size is extremely small and grada-
tion is more brilliant than Superpan formerly supplied. Protection against halation is provided, and a coating over the emulsion protects it from abrasion marks.

**Kalart's Multiflash Unit**

Photographers shooting stills in color will be interested in the new Series 110-V Kalart Multiflash Unit, which will flash as many as 20 bulbs in synchronism with the shutter at all shutter speeds, when used with the Micromatic Speed Flash units. Lamps may be placed at a distance from the camera and arranged to obtain a variety of lighting effects. The unit consists of a specially designed electrical relay which will operate from either the 4½-volt or 9-volt battery case, standard with the Micromatic Speed Flash. This relay will close the 110-volt circuit to the flash bulbs which are connected in series by means of a specially designed and wired series connectors.

The complete equipment for this type of flash work, which is invaluable in making color shots particularly, consists of the Multiflash relay set-up, which plumbs into the Kalart battery by means of a six foot extension cord; and attached to the relay is a neon test light. As illustrated on Page 2, the complicated setup can be handled simply by the photographer or his assistant, once its arrangement is mastered. The neon test light assures a full flash from all bulbs when the release is tripped.

The operation of the Multiflash is such that when the Synchronizer switch is closed, the battery from the Synchronizer outfit will operate the relay switch, which in turn passes house current through the flash bulbs. Only one flash bulb may be used in connection with each series tap and when the entire circuit is properly plugged into the house current, then only does the neon bulb glow.

Kalart is marketing the Multiflash relay unit at $22.50 with one series tap and the neon test light; and additional taps cost $2 each.

**Eastman Super Kodak**

Automatic adjustment according to the light conditions to give a perfect exposure of the scene before it, at snapshot shutter speeds from 1/25 to 1/200 second, is the feature of Eastman's new Super Kodak Six-20, through coupling a photovoltaic cell with the lens diaphragm. When the picture is taken the Super Kodak lens automatically stops down to exact aperture required for perfect exposure at the selected shutter speed.

The sensational new camera incorporates a range finder of radically new design, mechanically coupled to the focusing mount of the lens and combined with the direct eye-level view finder in a single eyepiece. Double exposures are automatically prevented by a device which precludes re-tripping of the shutter until the film-winding lever is operated. An automatic visual warning signal indicates when film should be wound to the next frame. Winding of film automatically re-sets shutter, for the next exposure. The shutter carries slow speeds of 1/10, 1/5, 1/2 and 1 second, as well as snapshot speeds from 1/25 to 1/200 second. A built-in self-timer device offers a delayed action interval of approximately 12 seconds. A galvanometer dial on the lens housing permits selective readings of light and shadow areas in a scene, as with a photo-cell exposure meter and with effects the lens diaphragm may be adjusted by hand.

The Super Kodak's body, back, and rangefinder housing are die-cast of special aluminum alloy for maximum strength plus lightness. Beaded borders, finished in polished chromium, contrast with the larger satin-finished metal areas. The body covering is fine-quality black morocco-grain leather, and lugs for hand or neck straps are provided.

Slight pressure on the bed release allows the user to draw the camera front forward until it locks in picture-taking position. Front extension struts of new design support the lens and shutter assembly with girder-like rigidity.

When the camera is held for a vertical picture, the range-finder is at the top. Just below it is a multiple collective lens, with the sensitive photo-cell behind it. This is so calculated that it covers the exact field of the camera lens—an important feature, since it causes the photo-cell to react only to the light conditions in the picture scene.

At the moment the shutter is released, the photo-cell actuates the galvanometer in the lens housing, and the diaphragm adjusts to the correct aperture at the chosen shutter speed to produce a technically correct negative.

The shutter speed scale is seen through a window on top of the hood which projects over the bellows and lens. Adjustment is made by turning a knurled knob at the left of this hood. When the shutter is tripped, a red warning dot appears in this window to indicate that film should be wound.

Despite all these operating conveniences and technical safeguards, the new camera is approximately the same size as a conventional Six-20 Kodak. It takes eight pictures, 2¼x3½ inches, on a roll of Six-20 film, and its lens is a newly calculated Kodak Anastigmat Special F:3.5, closing down to f:22.

Retail price of the Super Kodak Six-20 is $225. It will be in the hands of dealers some time this month.

**B & H Expands Exakta Sales**

Bell & Howell Company last month expanded its sales representation on the Exakta line of still cameras manufactured by Ihagee Kamera-werk, Dresden. Starting more than a year ago with exclusive sales rights in eleven western states (California, Oregon, Washington, Nevada, Idaho, Utah, Arizona, New Mexico, Colorado, Wyoming and Montana) the new expansion extended the B & H sales representation of Exakta cameras to five additional states (North Dakota, South Dakota, Nebraska, Kansas and Oklahoma).

Bell & Howell has been experimenting for some time in the supplemental use of "stills" with motion pictures for both personal and educational purposes.

The Exakta line of cameras are practical for those wishing to take black-and-white or natural color stills mainly for projection purposes, with the Kine 24x36 mm. Exakta, using multi-exposure 35 mm. recommended. The V.P. 3x6.5 cm. Exakta is recommended to those desiring mainly to obtain stills for printed enlargement.

The new plate-back model Exakta now distributed by Bell & Howell in the west and by Photo Marketing Corporation of New York in the east, is fully illustrated on Page 4 of this issue.

**Willo Contact Printer**

A new WILLO CONTACT PRINTER, all-metal and selling at $8, now is available from Willoughby's, New York camera supply house. Among its features are: two sources of printing light; takes two 40- or 60-watt lamps; red pilot lamps always on for composition of negative; automatic on and off switches; thorough ventilation; four masking blades one inch wide, which swing upward, permitting movement of film without scratching; convenient hold-down; heavy felt on platens; positive contacts between paper and negative; prints up to 5x7; takes paper up to 9x12; etched scale shows size of print and margin.

**Protective Paper Box**

An INGENIOUS enlarging paper box, which will not permit thoughtless unintended exposure in the dark-room is now available from E. Leitz, Inc. It has a spring actuated lid that snaps shut and protects the contents of the box against light as soon as the hand is removed. The box holds several sizes of paper. It saves paper, time and trouble by eliminating fumbling about for enlarging paper in the dark-room.

**Contax 180 mm Lens**

From SEISS comes a new Sonnar f:2.8, 180 mm. lens with reflex Flectoscope and chest support for use with the Contax. The lens unit sells for $400 and the chest support costs an additional $16. Primarily intended for high speed sports photography or nature studies of birds.
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On The Cover: Nan Grey, Universal starlet, photographed by Irving Lippman, stillman member of Local 659, IATSE, while on loanout to Columbia. Miss Grey is the daughter of Eddie Miller International Representative of the IATSE & MPMO, with headquarters at Houston, Texas.

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Win one of these big cash prizes with a flash picture out-of-doors . . . First prize $100, second prize $50, third prize $25, and 15 prizes of $5 each.

On the lot still picture men have loads of equipment available for special lighting effects which is the envy of the freelance commercial photographer.

Those special lighting tricks, however, can now be effected by the Kalart new Synchro-Sunlight technique.

See the Kalart Micromatic Speed Flash, list price $15.50, at all good camera stores and ask for free literature on Synchro-Sunlight Photography, details of our contest and entry blanks. Contest closes November 1st. All Kalart equipment made in U.S.A.

See dealer or write: Dept. 7-S. 915 Broadway, N. Y.; Room 619 Taft Bldg., Hollywood, Calif.
Another self-explanatory preview layout by Paul Allen—the new plate back model Exakta.
B & L Slide Viewer

A New Film Slide Viewer, finished in either brown, green, or black, has just been completed by the Bausch & Lomb Co., for the users of miniature cameras. The unit is sturdy constructed with an excellent optical and illuminating system. The ground glass diffusing screen is approximately two inches square, permitting showing of all popular miniature sizes, in black-and-white, or colored positives. The three-inch precision lens produces a crisp enlarged image of the film and creates an illusion of depth. The Film Slide Viewer operates on 110-volt A.C. or D.C. and uses a standard 15-watt Mazda bulb. The housing is well ventilated and the bulb is small to avoid harming slides or film.

Fried Continuous Printer

A New Model DB of the Fried 16mm Continuous Printer is now available. It is a 16mm bench model machine incorporating the necessary features of precision construction; accurate control and efficient operation. It is designed to print sound track as well as picture. A small shifting lever permits the opening of either sound or picture aperture for printing. Operating speed is 40 ft. per minute.

Extreme care has been taken to avoid frictional contact between film and the mechanism. The plating of aperture, pressure, and stripper plates with hard chrome finish provides an ideal smooth wear-resistant surface protecting the film from injury. In operation this printer is semi-automatic with respect to printing light control. In order to compensate for the different densities of consecutive scenes the negative film is notched in the margin at the proper point for an effective change of light. As the scene passes the printing aperture, the notched film establishes an electrical contact which in turn actuates an electro-mechanical shutter. This affords an instantaneous change in the volume of printing light. The necessary changes are predeter-
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Two views of new Duplex optical printer.

Fried continuous printer.

mixed by the operator. The setting of the shutter is always one step ahead of the actual operation. The manufacturers claim that the Fried Shutter Control is distinctly superior to any method of light change which varies the resistance in the printing light circuit, asserting that the latter method is slow in action and materially changes the actinic value of the light.

Duplex Printer Model

Latest model Duplex optical reduction printer model features the new camera-style movement with pilot pins and pressure pad, which release for registration and contact. The new optical printers from the Hollywood firm are available in either the single or double model. The double model consists of two machines mounted on one base and pedestal. The hand-dissolving shutter, which may be locked in any desired position, is extra equipment, as it is also the new type unlimited scene, fully automatic light change. The light change operates in the same manner as in the new Duplex Standard Automatic Printing Machine.

Double pulleys for the V-belt drives allow a rapid change in speed and unless otherwise ordered the speeds of the new reduction printers are 30 and 60 feet per minute.

The reduction printer can make 16 mm. prints from either a 35 mm. or 16 mm. negative, and it can also make dupe negatives from either a 35 mm. or 16 mm. print. When the lamp-house is in the position on the 16 mm. end of the machine 35 mm. prints may be made from a 16 mm. negative and 35 mm. dupe negatives may be made from a 16 mm. print. A double machine is necessary for printing color film in production work.

The camera type movements may be operated at camera speeds thus assuring real production. Emulsion speed and Lamp wattage being normal the film will be printed at 60 feet per minute on each side. A double machine therefore normally prints 120 feet of positive film each minute.

The constant glow of the lamp is not changed...
as in past years by resistances, but by placing different diaphragm openings in between the light source and the negative film. These diaphragm openings are punched in a piece of exposed and developed film which automatically travels to the next opening whenever a change in scenes occurs.

Complete operation of the machine from threading up to taking off of the printed reel is simple. Time is also saved due to the machine's portability (it is mounted on rubber tired, ball-bearing casters) and its readiness to operate. It is delivered ready to plug into the current supply for operation.

The usual current is 115 volts D.C. for the lamp circuit and 115 volts 60 cycles for the motor circuit. However, if the voltage and current supply is different the electrical equipment on the printing machines will be altered to suit.
When you take along the Bell & Howell Eyemo, you are prepared to get any shot. Always the “right arm” of those cameramen who never know what the next shot may demand, recent improvements have made the Eyemo even more versatile. Its features include:

**NO STOPPING TO WIND MOTOR:** Hand crank on every model in addition to powerful spring motor—complete loading of film can be shot without interruption for winding. Especially important where electricity is unavailable for motor, which is optional.

**INTERCHANGEABLE MOTORS:** Precision machining of motor mounts makes any Eyemo motor fit any Eyemo camera. You can purchase motor at any time, and use one motor on several cameras. Choice of universal, 12-volt, or synchronous motors.

**S. M. P. E. STANDARD SOUND** aperture plate and matching-drum type variable viewfinder on every Eyemo except the lowest-priced model... permits sound to be added to film made with Eyemo, using standard recording and printing equipment.

**PRECISE SPEED, QUICKER PICKUP:** insured by improved, vibrationless, high-speed type governor, sealed away in steel from dust and moisture.

**CHOICE OF TURRET HEADS:** Compact or offset types, each mounting three lenses. The offset type (illustrated) allows a wider choice of lenses and the incorporation of a prismatic focusing magnifier aligned level with the photographic aperture.

Other features contributing to the standing of Eyemo at the top of its field are described fully in literature which will be mailed for your asking.
The Story of Kalart

Ten years ago unknown but today a leading manufacturer in the photographic field, supplying accurate and virtually fool-proof range-finders and speed flash synchronizers. By Herbert C. McKay

(Under the heading Close-ups, each month INTERNATIONAL PHOTOGRAPHER will in the future present illustrated stories of the companies and organizations contributing to the progress of photography and the allied fields of the motion picture industry. Close-ups are intended to bring the manufacturers and technicians who use their product into a closer understanding of each other's organizations and problems.—Ed.)

The story of Kalart is that of a dream come true within a decade, and it began when Morris Schwartz, Kalart's president, then a press photographer on the New York Times set up night after night working on a device that would fire a flash-bulb and simultaneously trip the shutter of his press camera.

Ten years ago photography was an accepted fact; today it is an integral part of the life of the nation. Then the photographer was one who tried often and often failed, but today the cameraboldly claims, "What can be seen can be photographed." Perhaps the true spirit of modern photography is best reflected by the fact that a decade ago anyone seen on the street carrying a camera was instantly spotted as a tourist; while today the miniature camera is almost an expected part of the sports costume. Ten years ago one of the leading miniatures had just been announced and was being received with hearty guffaws.

Ten years is not such a long time, yet in such a period photographic history has been made. Panchromatic film was a mystery, not even the "high ortho" emulsions of today had been developed. Motion pictures struggled with ortho stock and the amateur patiently tried to get results with the "T" type lamp or the sputtering carbon arc.

It is true that the f:2 Ernosta lens had been announced, and a 1.5 for cine work had been reported; nevertheless the 3.5 was the speed lens of the day. Speed was sought in other directions by using lenses of fused quartz to take advantage of the ultra-violet.

The lowliest amateur or the most proficient professional of today would be at a total loss if asked to work under the conditions of ten years ago. At that time beginners were solemnly warned about the dangers of flash powder; how it must be kept dry; precautions which must be taken to prevent disastrous explosions; warnings against using flash in a closed room because of the fumes and "snow" which resulted.

In those days, if you couldn't estimate distances you were doomed to limit your work to a tripod and focusing screen or use a reflecting camera which was bulky.

Left: section of crowded storage room for range-finder dies; Center: power press stamping out range-finder parts; Upper Left: assembling range-finders; Lower Left: the synchronizer department shipping room.
In fact the camera in vogue then was one or another of the reflecting type.

Today the complete outfit; camera with synchronized range finder, synchronized flash equipment and perfectly safe flash bulbs can be carried in a small shoulder strap case or in a couple of pockets. Today the photographer, amateur or professional, is independent of conditions; day or night, winter or summer, rain or shine, indoors or out—it's all the same, he goes ahead and makes his shots. More than that his percentage of bull's eyes is far higher than it was a decade ago.

The fact that photography is today almost universally practiced is a direct result of its having been perfected to a degree which makes success almost automatic. To this the mechanical perfection of cameras, the introduction of faster lenses and more sensitive emulsions have contributed greatly. However, more than anything else, the amateur, the news cameraman and the professional have acquired greater confidence in their ability to produce through the elimination of guesswork regarding focusing and exposure.

First came the flash bulb, providing safe illumination at high intensity and short duration, totally independent of fixed sources of current supply. Truly efficient and portable photographic light had been attained. Next came the coupling of the lens mount with an accurately adjusted range finder, and the necessity for using the ground glass had been dispensed with.

With these two great advances photography was greatly simplified and rendered more accurate. The only thing remaining was the problem of using a flash of practically instantaneous period with a shutter exposure short enough to stop motion. The answer lay in an old, old idea. More than fifty years ago magnesium "blow lamps" had been connected with a crude shutter by means of pneumatic pressure through rubber tubes; but now electricity replaced the air hose, uniform flash bulbs replaced the magnesium lamps and the speed flash was born.

Bulb manufacturers cooperated to the fullest extent, working to produce bulbs with uniform firing characteristics, and with such success that a bulb which fails to ignite within specified time limits sufficiently accurate to work with an exposure of 1/500 or even less is a rarity.

Devices for firing the bulb and operating the shutter in synchronization appeared upon the market by the dozen, but either they were not accurate or they worked positive damage upon the shutter. One by one they died out. Today the Kalart Speed Flash remains as the original normal operation synchronizing device; normal because it operates by exactly replacing the shutter release for which the shutter was designed.

Carefully tested upon specially designed electronic control meters which instantly indicate errors of a slight fraction to a thousandth of a second, Kalart synchronizers are now faithfully serving thousands of enthusiastic owners; professionals, amateurs, travelers, newspaper cameramen, photographers in every branch of the work. Even in such highly specialized fields as clinical photography and photomicrography the Kalart Speed Flash is making possible photographic work never before within the ability of man.

Coincidentally with the development of
the Speed Flash, Kalart attacked the problem of equipping cameras of the conventional type with a synchronized range-finder. While the miniatures are wonderful in their record of accomplishment, there are several grave faults. Serious photographers cling to the larger camera, even in the amateur field. The 2 1/4 x 3 1/4 and the 3 1/4 x 4 1/4 continued to sell by the thousand while the 4 x 5 newspaper camera remained standard.

The problem lay in the fact that these cameras were equipped with every conceivable type of lens; lenses with focal length far, far from that with which they were labeled. However, after endless research and experiment the present day Kalart range-finder was developed; a range-finder built with the utmost precision. Even the first surface reflectors are made of flawless optical glass ground and polished with the careful precision used in grinding the finest lenses.

The Kalart range-finder may be accurately adjusted to any lens regardless of its true focal length; adjusted so accurately that at any distance from infinity down to its near limit, the accuracy of focus is greater than can be achieved by the keenest eye, because in visual focusing the grain of the focusing screen is always a source of error.

The one fault of the non-integral synchronized range-finder has been its limitation to lenses not exceeding 18 cm. focal length. Recently the Kalart Pantagraphic Transmission has been perfected which permits the interchange of short focus and telephoto lenses upon the same camera, using the same range-finder. For example, the interchange between 15 cm. and 30 cm. lenses upon a 4 x 5 Speed Graphic has been made easy without disturbing the accuracy of the range-finder.

These developments have extended the application of the range-finder to cameras as large as 5 x 7 and for lenses up to 30 cm. focal length.

The contributions made by Kalart to modern photography are far from the least which have been made. Dead sharp negatives, fully exposed regardless of time, place or speed of the subject has been made easy by the use of Kalartized cameras.

Today the Kalart offices, sales, service and assembly departments now occupy the entire 20th floor of the Broadway Building, 915 Broadway, New York City. The machine shop is in the downtown section of Manhattan. Recently a West Coast branch was opened in the Taft Building in Hollywood, where the International Photographer's editorial office is located. This office gives factory service to Western dealers and studio photographers.

Kalart's president is a modest and retiring type, and it is at his request that we do not publish a picture of the man responsible for the devices used by so many press photographers and studio stillmen. Our illustrations are devoted to the Kalart plant and the people who make Kalart devices.
16mm Reaches Technical Majority

After years of predictions and hopes, sub-standard films now reaching status paralleling 35 mm. professional standards through improvements and refinements by manufacturers.

After five years of predictions and hopes, the sub-standard 16 mm. motion picture now is ready to assume important proportions alongside its professional parent, the standard 35 mm. product that today leads the entertainment world. Informed trade figures state that sensational news will be made in the sub-standard field within the next year and that within another decade, the narrower film may seriously rival the larger as a commercial vehicle.

Factors entering into this new phase involve both technical problems and financial and distribution angles. Up to the present time, experts of the manufacturing companies frankly admit, when talking off the record," that cameras, projectors, sound, film, lenses and other important technical items of production have been far below professional 35 mm. standards. Likewise, there was neither sufficient interest by enough commercial organizations to spend money for sub-standard productions, nor adequate distribution and exhibition facilities. This entire situation was complicated by the adding of sound to film, which set back the sub-standard field considerably during the past decade.

Today sub-standard equipment can be rated fairly as being on at least a semi-professional basis and there is an intense if not overly-publicized race by all the important manufacturers to put it on a 100 per cent par with 35 mm. equipment. This applies all down the line from cameras and projectors and screens to the film, lenses, developing and printing equipment, sound systems, reproduction systems and of special importance, color.

The editors of INTERNATIONAL PHOTOGRAPHER are in possession of confidential information that assures that these are no random predictions. With regard to color, sensational plans are in the engineering stage and major advertisers are waiting eagerly with contracts for a contemplated setup to deliver economically quantity color prints on sub-standard stock. The current wave of revisions of models in the sub-standard field is merely the forerunner of sweeping improvements and refinements, which will utilize to the full the results of millions of dollars in research for 35 mm. feature production problems.

That there is a definite boom ahead in commercial production in sub-standard product has been widely heralded in the trade press of both the motion picture and the advertising industries. This rests on a technical framework of recognition by the emulsion manufacturers that there is plenty of cash on the line for sub-standard commercial work. Consequently new lines of perfected and improved film are being made available and for the first time it now is possible to shoot first-class work of standard professional calibre direct on 16 mm. and to get satisfactory processing for consistently satisfactory quality in release prints.

Is There an Educational Film Market?

Move now under way to clear up the chaotic conditions in this field and bring producers and film users closer together through practical program.

By Annette Glick Barnes

Assistant Supervisor, Visual Education Service, Los Angeles City Schools

Soil may be very rich, but if it is never stirred it may be as unproductive as barren wastes of rock. So with the school market for educational films—the market is clearly there, it is a good and growing one, but up to the present it has remained a potential market alone, promising but unorganized.

The tragedies in the past in which major producers of professional films have turned to the school market for a vehicle for their artistic and sincere expression have been many. These fine producers failed to realize in advance, though there were clear signs and warnings, that they could not merely confine their efforts to production, but that they must concern themselves equally with the problems and labor of actual distribution.

The producer of educational films up to the present, unless he wished to sell his product direct to one of the retail or sales distribution companies, has been forced to do his own selling. When once his film was completed and the last fade-out had gone through the optical printer, his troubles were just beginning.

In the motion picture industry the producer, the distributor and exhibitor all are highly organized; whereas in the school field there has been up to the present a simple but regrettably inefficient three-in-one arrangement, whereby the producer also must distribute and even do some exhibition if he was to make his produce known.

Formerly the lone educational film producer has had to cool his heels in the anteroom of every visual aids department in the country, screen his offering before a thousand evaluation committees, interview ten thousand curriculum authorities, wander from bureau to bureau, desk to desk, in the attempt to ferret out in the maze the final person who actually had the authority to place the stamp of approval upon the film and really buy it!

By the time he had wandered down the labyrinthine ways of the typical Board of Education office and polished many apples upon his well-worn sleeve, his actual production costs faded into insignificance in comparison to the mounting cost of shoe leather!

A development of unprecedented significance in the educational film field which will undoubtedly change all this is the recent announcement of the American Council on
Education that its influence and financial weight will be brought to bear upon the effort to bring together producer and consumer of school films together. The details remain for members of the new organization to work out cooperatively, but the fact that there will be such an organization of the school-church-club market for worthwhile films is now fixed, by which visual education departments and other buyers of the best instructional films will be informed of sources through periodic lists, and producers on their side will be made familiar with the buyers of educational films and of their needs, standards, and requirements.

Such a list of available films, it is true, has already been made available through the indispensable and pioneer catalogue list published by H. W. Wilson Company (950 University Avenue, New York City), publishers of Readers' Guide to Periodical Literature, The Motion Picture Review Digest, and other cumulative lists to current publications.

The Educational Film Catalogue is, in fact, the sine qua non of all film listings in the school-church film field. Not only is there a complete listing of all available films which have an educational application, but the lists are cumulative, and the end of the year in an annual which is on the desk of every director or social worker who attempts to keep abreast of the sources of his recreational and instructional film supply.

Though the Educational Film Catalogue lists all known film sources, no attempt has as yet been made to include valid evaluations, that is, ratings of the educational value of the film in certain grade and age levels. Accordingly, the producer who sees a list of twenty or so subjects listed under the title, "Markets and Marketing," need not conclude that there is no room for his own production, due to probable oversupply. The truth may be that of the twenty or so subjects listed, only one may be found suitable for the specific unit of study or social or age level wanted by the educational library.

So far the Educational Film Catalogue lists the title, source, and form of the film, including a short synopsis and opinions of users of value, where these are available, but a scale of measurement of value for the specific purpose for which the film is designed still remains to be evolved in the science of educational measurement.

A number of visual aids specialists are working upon various rating scales and a combination of these, and some day an actual scale of measurement of the value of films for specific social and chronological age levels and for units of instruction will be forthcoming. No doubt the standardizing of the various evaluation systems used throughout the country will be one of the early and important jobs attempted by the new cooperative organized by the American Council on Education so that educational films will not only be listed and made available to members of the cooperative, but ratings will be given in terms of the objectives for the use of the film, much as summaries of opinions of critics and individual groups are given in the Motion Picture Review Digest of theatrical films.

The purposes of the cooperative educational film library association as stated in its first mimeographed report to participants in the preliminary organization plans indicate that it will:

1. Serve as a center of information on film production, film sources, and film evaluations;
2. Purchase prints cooperatively for member and non-member programs of the association, thus effecting a reduced price to member organizations and stabilizing the market for educational films;
3. Compile and print in loose-leaf form a basic catalog to be supplied to each member organization;
4. Ascertain from member organizations their needs for types of film materials and various subjects and make this information available to producers.

The association is to be one of limited liability, non-profit in character, but where members are free to buy elsewhere on the basis of open bids. The association will not doubt negotiate with the producer for a price on a number of prints to be determined by a preparatory canvassing of the needs of the member organizations.

The report of the American Council on Education lists eight or more sources of improved educational pictures are awaiting only the assurance of adequate distribution before releasing their offerings. These sources are listed as follows:

1. Commission on Human Relations of the Progressive Education Association, headed by Dr. Alice V. Kelber.

This significant project includes the cutting and editing for classroom use of standard theatrical classics like "The Story of Louis Pasteur," "Fury," "The Black Legion," important for their social points of view. Approximately 30 feature theatrical films have been edited. Release of the films has been hitherto prevented through the lack of a wide enough non-commercial distribution system to carry the costs.

2. Special Educational Film Companies—Eastman Kodak Company, Bell & Howell, ERPI Picture Consultants, Inc., Bray Pictures Corporation, etc.

It is now expected that the partial limited distribution of the products of these well-established veteran, and standard film companies will be amply recouped upon the organization of an adequate distribution system.

3. Theatrical Shorts.

This is the project wherein, through a grant of $50,000 from the Motion Picture Producers and Distributors of America, Inc., thorough reviewing panels of educators waded through a list of 2,000 films from some 10,000 short subjects produced over a number of years, and of these selected about 900 suitable and desirable for educational release. The recommended subjects include the best of the travelogs, the Walt Disney productions, and such other subjects as "The Perfect Triumvir," from the Motion Picture Producers and Distributors of America, Inc., "The Servant of the People," "Give Me Liberty," and probably "The Song of a Nation."

4. Foreign Films.

These include the abundant foreign sources, particularly as regards foreign language instruction, and films which lead to international understanding of foreign cultural aims and contributions.

5. University Productions.

These are general educational films produced for the specific needs of a particular university, which in addition have general educational value.

6. Independent Producers.

This is one of the richest and most abundant sources. The amateur sometimes comes as close to actual school needs as the well-established professional, where the latter narrows himself down to techniques and mechanical accomplishments rather than educational needs and applications.


Illustrations are the splendid products of Pare Lorentz of the Farm Security Administration, "The Plow That Broke the Plains," and the memorable "The River," which have set a new standard for film accomplishment in this country.

8. Industrial Sources.

Excellent commercially sponsored films are available in good numbers and are entirely free from objectionable advertising which enables "Ford's World Without End," "Lett's Metal," "Steel," produced by the Ford Motor Company, and U. S. Steel Company's Technicolor series. A second classic which should be added is "Master Hands," produced by Jam Handy for Chevrolet.

While industrial concerns often maintain their own distribution systems, there is no existing organization which sorts industrial distribution into the good and the bad, says the report. "Free distribution of industrial materials is a center of considerable agitation in educational circles, and many educational film distribution libraries are eliminating industrial films completely. Such drastic action involves the destruction of good films as well as saves it from bad ones."


This ninth classification, it is believed, should be added to the list, due to the scarcity of such well-made amateur and professional films recording the work that film has become a part of the teacher-training institutions and boards of education.

It is clear that the potential producer of educational films should keep his ear close to the ground for developments as the work of organization proceeds with this significant effort.

The professional, semi-professional, and amateur all will have a channel through which the buyer of educational film products can be reached. The producer will have someone to whom to go who is closest in touch with school needs throughout the country. He will be advised (if he wants advice) as to his scripts, his techniques, and his treatment. And he will be encouraged, through actual distribution of his films, even though slow at first, that semi-professional-amateur though he may be, he can often strike the school needs through imagination, a fresh point of view, creative approach, and an intimate knowledge of educational films and objectives as well as, or better than, the professional with all his perfection of appointment and his millions.
Grip Equipment

Another batch of gadgets for the Studio Mechanics Handbook.

By G. M. Haines, Local 37, IATSE.

In getting the Studio Mechanic's Handbook under way, we now have in hand individual pictures of more than 40 items of grip equipment used in the studios every day. Last month we presented a layout of grip equipment used to block off light and this month we present another layout of equipment used by the grips to assist the juicers in their work of lighting the sets. As intended for final publication, each of these items will be pictured individually with complete descriptive data, but it has been thought advisable to also publish in International Photographer layouts of connected series of items, so that we may secure the cooperation of all IATSE members in compiling as much accurate data as possible on each individual item.

We sincerely hope that all members of the "IA," whether in Local 37 or in other studio locals, will accept the invitation to make suggestions or criticisms of our coverage of these series. We welcome every suggestion that will make this Handbook as complete as possible. Particular information sought includes: correct technical name; slang names used at various studios; size and other minimum specifications; brief descriptions clearly defining the use of each item in studio production.

We also wish to extend sincere appreciation to the stillmen members of Local 659, IATSE, at 20th Century-Fox, for their excellent and able cooperation in supplying our illustrations. The current layout was photographed by Frank Powolny and last month's layout should be credited to Gene Kornman.

The items pictured this month are:
1. Overhead Celo Diffuser for strip lamp.
2. Overhead silk diffuser for strip lamp.
3. Diffusing strip.
4. Spill ring.
5. Five K-lamp diffuser.
6. Trombone hanger, for baby spot lamp.

Studio Contacts Aid Lamp Design

Practical testing under actual production conditions along with exact photo-technical research facilities responsible for excellent performance of modern motion picture lighting units.

Behind any unit of motion picture studio lighting equipment is a background of modern engineering and intelligent cooperation. None of these units "simply happened" to be built; each is the result of a specific need on the set, made possible by a combination of pure scientific research, practical photo-technical necessity, and production engineering to give motion picture craftsmen a better tool with which to work.

Only in Hollywood, where a majority of
the world's film production is centered, could this precise combination be achieved with the speed and economy that exists in this case. Only in Hollywood could designing and production engineers be in such close daily contact with the ultimate, practical users of their products.

Among the leaders in this activity is the Mole-Richardson Company, which has been active for more than 11 years. The firm's engineers are in close contact with the research laboratories of General Electric, keeping abreast of all new developments in Mazda light globes, and with the laboratories of the National Carbon Company, where improvement in arc carbons is constantly going on. On the other hand, the Hollywood firm's same engineers are in
close daily contact with the cameramen and electricians of all the Hollywood studios, and are in intimate touch with the ever-changing requirements of studio lighting.

These contacts with manufacturers and users mark the starting point of most lamp designs. In some instances new lamps have been evolved to make more efficient use of some new globe or carbon. In many more instances, new lamps have been evolved as a result of some specific demand by Hollywood's technicians. A familiar example of the latter is the development of the present Mole-Richardson arc equipment, to meet specific requirements of the Technicolor three-color process.

Once such a need has been made known, the first actual step is a consultation among
the firm's engineers to survey existing light-sources, to learn what may be available to aid them in their project. If it is found that no existing globe, carbon or other device will serve the purpose, the firm's contact with the makers of such products brings their experts into consultation, often with the result that the desired product is not only evolved for the purpose, but finds application as well in other fields of lighting.

An excellent instance in this is the development of modern high-powered incandescent globes. The globes originally used were designed for airport floodlighting, and as such were planned to be burned in one position, and as a rule in permanently mounted fixtures. Studio use proved that these globes required re-designing, because continued use caused the filament to sag and ultimately burn out, with an unnecessarily short burning life. When this fact was known, a simple modification of globe design provided a means of automatically taking up this sag, resulting in a better, longer-lived globe.

If the new design being evolved is a Mazda type, the next step is painstaking experiment on the optical bench. This device permits the engineers to "mock up" any imaginable combination of globe, reflector and lens, studying performance under all focal adjustments with microscopic precision.

For similar research into the problems of arc design and performance, the manufacturer's staff created a special arc-testing unit. This is a special, flexible arc mechanism which permits the burning of any type of trim in any position, with the carbons at any angle to each other from 90° to 180°, and, of course, fed with any amount of current desired. Only four of these machines exist: one is in daily use in the Mole-Richardson laboratory in Hollywood, and three in the various eastern laboratories of the National Carbon Company. Like the Optical Bench, this device permits testing of arc mechanisms under precisely governed conditions, with or without any desired combination of lenses and mirrors.

In either of these testing set-ups, careful records are made of current consump-
tion and light output. The latter is measured, not only in terms of actual lumen Projection, but in terms of light distribution at all focal settings. Such tests played an important part in the development of the Morinck lenses used on the now familiar Solarspot lamps. The design of these lenses was the result of collaboration with another eastern firm, also a specialist in its line, but never previously active in any phase of motion pictures. This is the Corning Glass Company, makers of heat-resisting glass and lenses. During this research, before a single Solarspot was made, several dozen different designs for lenses were evolved, and over a dozen types were actually made and tested before the present design was termed efficient enough to offer a real advantage for studio lighting. When laboratory research is completed, an experimental lamp is built and given further tests. In any type of lamp, the distribution of light is of paramount importance, and a special device and method for testing this have been evolved. A special pedestal has been made, in which the lamp to be tested is mounted so that its horizontal revolution in degrees is indicated on an accurately engraved scale. The lamp is set up at a predetermined position at one end of the testing room. At the other end, a photoelectric cell measures the light. Thus, with the lamp focused for any desired beam-spread, the distribution of light can be accurately measured by rotating the lamp on its base, and plotting the photometer's readings graphically. The curves thus obtained show at a glance the performance of the lamp. Some show vividly why cinematographers used to have to fight a showed center in the beams of many old-tyle mirror spotlamps, for there was often a variation of over 500 per cent in intensity between the edges and the center of the flooded beam. Equally they reveal the reason for the popularity of the more modern Fresnel-lensed "Solarspots," which give a smooth, even light at any beam spread.

In testing arc lighting units, steadiness of burning is of utmost importance. This is tested by means of a special General Electric recording photoelectric meter. The photoelectric eye is coupled to a stylus under which a band of ruled paper moves. Variations in the intensity of the light, too small to be perceived by the eye (though often visible to the camera) are recorded as fluctuations in the line drawn by the recorder. The newest type arcs are coming increasingly closer to being able to duplicate the straight, unwavering record of the inkie.

Experimental lamp models are next given practical tests, under actual working conditions. Here Hollywood lamp manufacturers enjoy another asset in their proximity to the studios. Instead of having to ship equipment to Hollywood from a distant factory, with inevitable delay and expense, units may quickly be loaned or rented to a number of studios within the space of a few days, to be used by a variety of crews, under varying conditions. This is a practical preview system which no laboratory test can ever equal.

Once these laboratory and practical tests have been completed, and any indicated modifications made in the design, the lamp goes again to the drafting boards, and the final production design is made. Here the inevitable faults of any experimental working model are eliminated, and the practical details necessary for efficient manufacture are incorporated.

When at last the lamp goes into manufacture, quantity production is possible on a scale really surprising when one considers the fundamental intricacy of some modern lamps. With the exception of such specialized units as lenses, mirrors and motors, virtually all the components of modern M-R lamps are produced in Mole-Richardson's own factory. With this centralization, economies of volume production are possible, often to an extent seldom previously possible in so relatively limited a field.

Standardization of parts for several types of lamps, wherever possible, permits efficient use of such standard equipment as one of the new Warner-Swasey No. 4 Universal flat turret lathes. With less careful design such methods of production would be wasteful for the machine would have to be set up to produce parts for perhaps only twenty or thirty units at a time; but with the methods used, related parts for batches of several types of units—sometimes several hundred at a single run—can be made at once with obvious economies. Standardization is passed on to the consumer in lower first costs and in simplified and more economical repairs in the rare instances when repairs to lamps are necessary.

Modern methods of research and manufacture could be applied almost anywhere; but only in Hollywood could they be coupled with the quick and intimate contact with the practical executives and IATSE members who must handle the finished product. This contact reacts greatly to their advantage, for it first gives them an opportunity to express desires and needs directly to the men who design the equipment, next to test designs under practical working conditions before the final design has been irrevocably determined, and finally to secure improved equipment, or equipment planned especially to meet their specific problems weeks or months sooner than would be possible if the makers of that equipment were not the neighbors and coworkers of those who use it.

Sound Book A Hit

Success predicted by J. N. A. Hawkins (695, IATSE) in his exclusive pre-publication review of the Academy's new book, "Motion Picture Sound Engineering," in the January, 1938, issue of International Photographer, has been more than realized. The immediate sell-out of this book, which is based on the volume thus far is a timely contribution to motion picture technical literature, covering many new and important developments of recent years, not to be found in any other published tome.

While additional copies are being rushed to supply heavy demand, the new volume last month also received another note of approval in its adoption by the Los Angeles County Board of Education as an official text book for use in the city high schools. Several hundred copies are already in use at the Frank Wiggins Trade School and it has been approved for purchase by the Los Angeles City and County libraries.

International Photographer also can add assurance of the book's phenomenal success, as we have turned over to the Academy Research Council orders that have been received from thousands of subscribers in far corners of the globe. Facsimiles of this magazine are gladly available to any readers who desire us to arrange purchase of the Academy publication for them.
THIS new book is planned to do a definite job—to show how easy it is to derive the utmost enjoyment from amateur movies. It picks up the story where instruction manuals leave off. But it stops far short of the complexities of advanced cinematography. Between the two falls the wide expanse of enjoyable and trouble-free movie making and showing.

This is the field covered in lively fashion by How to Make Good Movies.

For every movie maker—and for every non-movie maker considering the possibilities of amateur cinematography.

Published by
EASTMAN KODAK COMPANY
ROCHESTER, N. Y.

TELLS ABOUT...

Camera Angles Lenses
Close-ups Lighting
Clouds Panoraming
Color Film Photofloods
Composition Plays
Continuity Portrait
Customs Attachments
Duplicates Posing
Double Projection
Exposure Reverse Action
Editing Scenarios
Enlargements Scene Length
Exposure Scenics
Exposure Showing Movies
Fades Silhouettes
Film Slow Motion
Film Libraries Splicing Film
Filters Stunts
Finishing Tempos
Focusing Trick Shots
Foreign Travels Film
Indoor Movies Libraries

At your dealer's late in August

More than 200 pages crammed full of helpful ideas on the taking and showing of trouble-free home movies.

Price $2
L & T Adds Kruse Equipment

Landers & Trissell, Inc., studio rentals organization, has taken over the complete equipment that Henry Kruse had in the Hollywood rental field for the past year, including Mitchell cameras, dollies, etc. Entire equipment now is being rebuilt at the Landers & Trissell headquarters on Sunset Boulevard, and soon will be available in addition to their already extensive lineup of rental cameras, cranes, dollies and other accessories available to the independent producer.

New Shop

Rudy Geras, well-known in Hollywood camera supply circles, opened the Hollywood Photo Supply Company last month with headquarters at 1683 North Cahuenga Boulevard. The new store is equipped with dark rooms and projection rooms and will cater to both professionals and amateurs. Associated with Geras is Hal Harms.

Newmatz Projector

Studio projectionist previews efficient new process projector.

By R. L. Monson, Local 37, IATSE

As simple and practical a piece of process projection equipment as we have seen yet is the new model Newmatz rear projector, just on the market. The new model is very versatile and can be converted at a moment's notice from a motion picture projector to a stereoptican or slide projector. This is particularly valuable in view of the trend toward using slides as well as motion picture scenes for process effects.

The unit as a whole is light, weighing about 1000 pounds. This amount of weight is sufficient to hold the machine in place, and it produces a "rock steady" picture despite its light weight and compactness, pro-

HURRELL TO WARNERS. George Hurrell, ace Hollywood portrait photographer of Local 659, IATSE, last month signed a contract with Warners at one of the highest weekly stipends ever paid a studio still photographer. Press of business has kept our contributing editor from turning out a few promised articles on his portrait methods, so well illustrated in the two accompanying shots, but we expect to be able to publish Hurrell contributions in an early issue.
Joan Bennett photographed by Hurrell.
Tallulah Bankhead photographed by Harrell.
RELIABLE

IT WAS not by chance that Eastman Super X became the world's most widely used motion picture negative. Super X simply proved over and over that it yielded the world's finest photographic quality. The industry takes no chance in continuing to use this famous, reliable film.


EASTMAN SUPER X
PANCHROMATIC NEGATIVE
HAL PORTER
Cameraman
AVAILABLE

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- Expert on Optical Printer.
- Operative.
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[...]

MPPC Busy

Modern new process plant operating full blast with latest equipment and process facilities.

After several months' delay in getting their new building completed, Motion Pictures Process Corporation, new Hollywood rear projection service organization, is now operating full blast with a complete IATSE staff under chief technician Roy Davidson. MPPC is using the new streamlined Newmuth rear projector, described above, and illustrated on opposite page.

Excellent demonstration of the convertibility of the Newmuth projector to stereopticon use is the top strip on opposite page, showing first, two models in front of the blank screen, and then the composite of the two models with a rear projected Leica transparency. Excellent balance and detail in this rear projection enlargement show the value of this process for commercial art purposes.

Bottom strip in the accompanying layout shows the actual setup in the modern new MPPC plant for a motion picture process scene. At the camera are Roy Davidson and Harry Zeck, chief cinematographer; while standing at left are Ralph Miller, grip, and Bill Johnson, gaffer. Projector can be seen at rear.

Tops of the new process outfit shown in the side-walk conference are: John Gentile, general manager; Mario Castegnaro, vice-president, Davidson and Zeck.
Pictures in this page layout covering the new Motion Pictures Process rear projection plant in Hollywood are completely described in the accompanying story on opposite page.
New Series in Lab Tables Starts

Introducing a new tack in scientific lab methods series with explanation of why much material presented to date seems overly technical to some readers.

By D. K. Allison

It has long been a source of repeated wonderment to chemists of other industries that the operations of photographic chemistry have remained shrouded in virtual mystery. Despite the tremendous advances in the field of emulsion speed and color sensitivity, the subsequent chemical reactions whereby the latent photographic image is transformed into the visible silver image, and the fixing, washing and coloring operations have until quite recently remained substantially as obscure as in the early days of photography. Formulas for development, fixation and coloring baths were empirically assembled in such proportions that they would yield approximately the desired results, but without any rational regard for chemical or physical efficiency.

When this writer accepted the invitation of Herbert Aller and Ed Gibbons to become a contributing editor of International Photographer, it was with the understanding that all constructive efforts would be made to present in the pages of the Photographer an eventual complete coverage of the modern developments in this field along scientific lines. This has been attempted in individual articles and in the current Laboratory Book of Tables.

Our current program has brought considerable criticism that the information presented is too technical and that much of the material requires at least a college education to be readily understood. It should be understood, however, that the present material must be presented in essentially the form it now is appearing. It is intended for the practical chemists engaged in laboratory processing work and is, in fact, the product of the experience of the writer and other Hollywood experts in practical work on actual production processing.

Not all of the material in the Laboratory Book of Tables, and accompanying articles, is to be presented in such completely scientific form. With the able cooperation of Tom Bryan, secretary of Local 683, IATSE, and a veteran in practical laboratory practice, we intend to translate this material into understandable terms for the average laboratory worker, and also to present a system whereby the untaught but competent craftsmen may be able to develop an understanding of the chemical symbols and other scientific terms used by practical chemists in modern industry today.

However, it is essential in exploring this field for the first time with a consistent program in an industry trade journal to start with the material that would lay the groundwork for the chemical experts. It is our hope that the eventual results of this program will be authoritative, exact and also practical.

Returning to the subject of laboratory practice, first work in the direction of rational formulation was performed in the Howard Hughes Multicolor organization in the early 30's. Mr. Gundelfinger contributed his noteworthy paper on the chemical relationships in metol-hydroquinone developers and derived the expression for a developing formula showing maximum chemical efficiency for a given characteristics. However, efficient maintenance of such developers, operating at critical optimum concentrations, is of course predicated on the ability to determine accurately the respective rates of depletion of the various developer constituents, in order that rational replenishment may be used to insure the desired gamma and efficiency, with only secondary recourse to sensitometry. For example, if the required gamma and density call for 15 grams hydroquinone per liter, and analysis shows 11.3 grams per liter present, corrective replenishment would require 3.7 grams of hydroquinone to be added per liter.

Furthermore, the Hughes Laboratory was processing colored motion pictures by a purely chemical process, and efficient operation was possible only through the most rigorous chemical control of the color solution. The author was at that time in charge of research and plant control of these laboratories, and in this capacity developed analytical methods which have constituted the previous series of the Laboratory Book of Tables. These methods, in somewhat simpler form, were used throughout the operation of the Hughes Multicolor Laboratory, and are today a decisive factor in the operation of the Cinecolor and Consolidated

The LABORATORY BOOK of TABLES

By D. K. Allison

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L.M.F. VALUES FOR HYDROGEN ELECTRODE AND SATURATED CALOMEL HALF-CELL IN MILLIVOLTS, AT 25° C.

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TEMPERATURE CORRECTIONS FOR OTHER THAN 25° C.

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In-run corrections for systems other than the above may vary, and must therefore be determined on an individual basis.
color processes. From our experience in these laboratories it appears probable that all successful color operations will depend on these or similar methods of analytical control for the maintenance of uniform color quality.

In black-and-white photography, the realization that the methods of physical and analytical chemistry have a very practical application in the developing and fixing operations has finally been expressed by Messrs. Hanson, Evans, and Crabtree of Eastman Kodak Company.

The "Laboratory Book of Tables" which have appeared serially in INTERNATIONAL PHOTOGRAPHER will be published under one cover in expanded form in the near future. The new series of tables now starting will present useful information of electrode pH potentials, conversion tables for metric and avoirdupois systems, temperature conversion tables, chemical calculations, and similar data.

The first installment of the new series presents the conversion data for converting the E. M. F. of the hydrogen electrode-saturated potassium chloride mercury chloride system, into the corresponding pH values. The hydrogen electrode is arbitrarily adopted as the international standard to which all pH and electrode potential determinations are referred. By definition, a hydrogen electrode, in equilibrium with hydrogen gas at one atmosphere pressure, and immersed in a solution containing 1.008 grams (one equivalent) of hydrogen-ions, exhibits zero E. M. F. It is against this arbitrary standard that all other electrode and cell systems are calibrated.

To use the tables proceed as follows:
In a sample instance: reading of the potentiometer, 790 millivolts; temperature of solution, 21° C. From the table, 790 millivolts corresponds to pH 9.20 (units in left hand column, tenths reading across). Nearest pH unit is 9, therefore the temperature correction is +0.08 and pH value of the solution is therefore pH 9.28.

Screen Quality
Anonymous contributor takes lab critical jargon for a humorous ride.

A contributor who desires to remain anonymous dropped the following satirical comment—which, incidentally, is an excellent start toward a glossary of studio laboratory slang—on our desk last month. The editors of INTERNATIONAL PHOTOGRAPHER do not presume to know whether a standard nomenclature might properly replace the picturesque, if rather general, phrases cited by Mr. "A"; but we did think his comments interesting enough to publish. We're wondering whether they are interesting enough to stir up any further discussion on the subject.

"That 'elusives omething' called screen..."
Color Labs

Dunningcolor offers new process and plans lab; Cinecolor building new Burbank plant.

In the laboratory field last month two announcements on color processing were of outstanding interest. After much quiet research and organization the Dunningcolor three-color process was announced as commercially available, while Cinecolor finally disclosed completion of plans for their long contemplated new laboratory, to be located in Burbank.

Dunningcolor will be offered to producing companies under a royalty licensing plan, with Carroll Dunning stating that among other economies his proposition offers a probably base cost of 19 cents per screen foot, plus putting rush prints on the same basis as release prints.

Reese Heads New Service

H. L. "Pop" Reese, who has been with Wholesale Supply Company in the chemical field for the past 15 years, has joined the Tibbetts-Westerfield Paint Company as studio division manager of their new Hollywood branch at 1211 North Western Avenue in Hollywood. The firm, which has been catering to studio needs for paint and allied lines, will feature a full line of Baker & Adamson reagent chemicals, paints, enamels, varnishes, lacquers, thinners and shellacs, everything in the line of chemicals and paints used in studio work.

Kalart's English Agents

SCHERING Co. of London has been appointed sole agents in England for the Kalart line and the association got under way last month with an initial order of 200 Micromatic Speed Flashes.
Last month the following patents of interest to readers of International Photographer were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and trademark counsel.

Spring operated means for synchronizing the flashing of a flash lamp and operating the camera shutter.

No. 2,117,694—Shutter Mechanism for Moving Picture Cameras. Helmut Becker, Wetzlar, Germany, assigner to Ernst Leitz, G. m. b. H., Wetzlar, Germany. Application May 29, 1936, Serial No. 82,451. In Germany June 3, 1935. 8 Claims. (Cl. 88-16)
Apparatus for producing overlapping exposures comprising a coupling device for automatically and sequentially connecting the shutter with the film advancing means.

An apparatus for printing, reproducing colored prints by employing a plurality of colored light beams and automatically varying the color and intensity of said lights during printing.

In apparatus for feeding motion picture film, a mechanism comprising a device adapted to be connected to drive a film engaging means, an instrumentality engaging said device to intermittently operate the same, said instrumentality having an adjustable element for adjustment to move said device through a predetermined distance and at a predetermined frequency for all adjustments while varying the speed of movement of said device.

A sprocket assembly comprising a plurality of sprockets, hubs, and collars so arranged that the films are supported on the shoulder and collar.
members while engaged by the sprocket teeth. No. 2,118,089—Antistatic Photographic Film. Alfred D. Slack and Albert A. Young, Rochester, N. Y., assignors by mesne assignments to Eastman Kodak Co., Jersey City, N. J., a corporation of New Jersey. Application Sept. 20, 1933, Serial No. 41,417. 10 Claims. (Cl. 95-9)

A photographic element comprising a support carrying an emulsion layer and an antistatic layer containing a higher fatty alcohol sulfate containing no carboxylic acid salt group.


A projector for additively projecting two color value images at the same time to produce a colored picture on the screen.

No. 2,118,519—Color Film. Franz Noack, Berlin, Germany. Application March 19, 1936, Serial No. 69,615. In Germany Nov. 16, 1933. 7 Claims. (Cl. 88-16-4)

A film strip having slits between the frames to increase its elasticity and thereby facilitate accurately registering it with another film.


A method of printing colored pictures which employs a diffraction grating and lights of different colors.

The Green Lake Theatre, Seattle, Washington, features Moviograph projectors and bases, with Model K Western Electric 211 sound head with Microphone amplification and speakers. Moviograph Model K bases and mechanism with barrel type rear shutter, Breaker Enameled Suprex lamps.

By Paul R. Cramer, 150, IATSE.

New Series Schedule

After months of research, correspondence and checking with research engineers and studio department heads and technicians, INTERNATIONAL PHOTOGRAPHER now is ready to print the series of articles we have planned covering schematic drawings, photographs and technical information of a practical nature for the practical projectionist on all the new wrinkles that are cropping up in the general program of trying to bring theatre practice in line with the many advances now being made at the studios.

In the past, projectionists have obtained most of their information and technical data from handbooks printed months ahead of the time of purchase. Sensational technical advances have made much of this material (except for basic reference matter) quite obsolete, because the modernization of sound systems has moved so fast. New angles are being discovered daily and are coming from the drafting table into actual use with startling speed.

In order to keep up with this trend and give the manufacturing and studio experts an opportunity to play ball with the projectionists in the field INTERNATIONAL PHOTOGRAPHER has arranged to bring this information to its readers month by month.

Backbone of this service will be a discussion of the three larger sound systems, with the excellent cooperation of their sound engineers. Studio department heads and their technical aides will contribute to the program and we also soon expect to have back with us the West Coast IATSE gang's friend and technical "prof." William Comyns, with his Projectionist's Tables and other information. Comyns now is recovering at his home from a major operation performed last month.

Thanks to the cooperation of Messrs. George Urey and W. W. Wolfe of RCA's Hollywood office (heads of the service and engineering departments, respectively) who have assigned such well-known experts as C. N. Batsel, W. S. Thompson and Watson Jones to collaborate on these articles we are getting under way with a discussion of the RCA system. Later we will bring in information on the ERP1 system and the simplex sound setup.

These articles will begin in the September issue and will run for one year, treating a different division of the sound system each month, with quarterly reviews of previous chapters, covering modifications of all equipment as they may appear.

Additionally, IATSE members are welcome to write in to this department for any special information on any subject under discussion. All correspondence will be treated as strictly confidential, unless you desire us to print your name, should the correspondence be deemed interesting enough for publication. Those desiring to be answered personally through the mail should send stamped, self-addressed envelope.

A tentative schedule of subjects to be covered and the issues in which they will appear follows:

**September Issue**

Optical system in sound head in general:
- (a) Exciter lamp, its care and functions.
- (b) Sound aperture.
- (c) Sound aperture position.
- (d) Sound aperture size.

**October Issue**

Sound track dimension and film motion:
- (a) Position of track.
- (b) Width of track.
- (c) Weave of film.
- (d) Flutter.

**November Issue**

Discussion of PEC and associated circuits:
- (a) Review of Articles 1 and 2 with modifications.
- (b) Photoelectric cell characteristics and duties.
- (c) Photoelectric cell circuits.

**December Issue**

General discussion of amplifiers and power supply:
- (a) Power supply.
- (b) Type of amplifiers.

**January Issue**

Amplifier requirements:
- (a) Gain.
- (b) Capacity.
- (c) Tubes.

**February Issue**

General acoustical considerations:
- (a) Speakey sound.
- (b) Noise level in auditoriums.
- (c) Acoustics.
- (d) Reproducing levels.

**March Issue**

General review of all articles with recent modifications:
- (a) Push-pull, its meaning and application.
- (b) Bi-lateral sound track.
- (c) Uni-lateral sound track.

As we progress with the above articles there will be at least two practical demon-
stations in Hollywood, at one of the studios or at the RCA laboratory in Hollywood, where all IATSE projectionists may come and see the newer type equipment disassembled. At that time there also will be present engineers to describe latest things in sound, some that are in use and some that will be put into use in the near future.

Seattle's Green Lake

The accompanying photograph of the projection room of the Green Lake Theatre in Seattle indicates that the boys in the fair state of Washington are in luck to have a place like that to do their evening chores in; and how they like their Motoscopes up there! This is the second streamlined booth from up North. Keep them coming boys, we like them.

Glenn Slipper, at B. F. Shearer Company in Los Angeles, gave me the dope on this set which I will pass on to the rest of you brothers. The heads in this photo are Model "K" bases and mechanisms, with the improved barrel type rear shutter that Motoscopes are noted for, and it certainly keeps the aperture cool. Brother Ralph MacDonald at the Pantages in Hollywood opened the film gate of one for me the other afternoon, and it was possible to put your fingers on the film track without burning them, especially just after you have run a full 20-minute reel with a Suprex type lamp. Don't try this on your older type projectors. Blisters are bad for the fingers.

The booth seems to be completely equipped with Brenkert Enac lamps even to the spotlight. Not only are these lamps able to dish out the service but they seem to last forever, with practically no trouble. It might be a good thing if some of you brothers who read these lines would drop in and see Glenn some time and let him show you all about these lamps.

The sound system at the Green Lake is the new Western Electric 211 sound head with Mirrophonic amplifier and speakers. Notice the neat arrangement of the amplifiers on the far wall.

Simplex Sound Tests

Just before going to press, we checked with Brother Frank Hibbert of the Alexander Theatre in Glendale, and learned that the technicians are still experimenting with the new Simplex sound equipment so we will have to wait until next month before the full story is forthcoming. But at that we can rest assured that when the International Projector Company gets through with the Alexander equipment it will be a credit to the new field that they have entered.

The CINEMATOGRAPHER'S BOOK of TABLES

By Fred Westerberg

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### CAMERASPEED—SHUTTER COMPENSATION

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### SHUTTER OPENING—EQUIVALENT F-VALUE

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Bell & Howell Co.  
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(WYoming 3344)

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Hollywood, Taft Bldg.

Devry Corporation  
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Thalhammer Company  
121 S. Fremont Ave., Los Angeles.

Mitchell Camera Corp.  
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(AXIOM 1651)

Sun Ray Photo Company  
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Movisound Company  
Jamaica, L. I., New York.

Commercial Camera Co.  
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(HE 8110)

Fried Camera Company  
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(Hollywood 5838)

National Carbon Company  
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Union Carbide & Carbon Corp.  
Cleveland, Ohio.

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New Eastman Films

Three new films, intended to more closely adapt the qualities of professional 35 mm film that have made miniature photography possible to amateur needs were put on the market last month by Eastman Kodak Company. The new films offer speeds ranging from equal to four times that of present Panatomic, with finer grain and an emulsion more efficient equally with daylight and artificial light.

The original development of miniature and candid photography during the past ten years has been made possible by the technical advances in emulsions, lenses and processing, to meet demands of the motion picture industry. The film used has generally been motion picture 35 mm stock. Eastman experts have been working toward a type of emulsion more tailor-made to amateur needs, where negatives frequently must be developed to a higher contrast than those used in professional motion pictures. The result is the introduction of these three new Eastman films for miniature cameras using 35 mm or No. 828 films.

Important characteristics in any film are not only high speed and fine grain, but exposure latitude and good quality—the ability of the film to translate faithfully the scale of light and tone values existing in the subject into monochromatic values in the print—and uniformity of the product so that consistently good results may be expected. Eastman experts feel that their new line meets these standards.

The new films are:

Kodak Plus-X Panatomic film, which has about twice the speed of Kodak Panatomic and about 50 per cent faster in sunlight and artificial light than Kodak 35 mm Super Sensitive Panatomic film. It is also somewhat finer grained than regular Kodak Panatomic. This film is recommended for general use in miniature cameras.

Panatomic-X, a film of ultra fine-grain for enlargements of great magnification. This film possesses even finer grain than the fine grain that has made the original Kodak Panatomic film so popular with users of miniature cameras.

Panatomic-X has the same speed as Panatomic. The fineness of grain, however, is equal to that which was formerly obtained only by the use of special fine grain developers, which reduced effective speed of the film. Graininess is so low that, with the new film, enlargements can be made of a size which will exhaust the sharpness of images before graininess is visible.

Kodak Super-XX Panatomic film is the fastest Kodak film ever supplied the miniature camera user. It has about four times the speed of Kodak Panatomic and more than twice the speed of Kodak Super-X Panatomic in sunlight and artificial light, with grain kept at a minimum.

Maximum emulsion speed is obtained by developing fully in the Kodak developer D-76. With Kodak Super-XX, camera enthusiasts can now get clear detail shots of floor shows, boxing and wrestling bouts in sport arenas, and the high spots in basketball and other floodlighted indoor spots.

Each of these three new Kodak 35 mm and No. 828 films has great exposure latitude, freedom from halation, and a balanced sensitivity to light of all colors. In order to reduce the effects of halation to negligible proportions, the films are coated on a support which is of a bluish-gray color. Although the developed negatives retain this color, there is no necessity for increasing normal printing exposure times.

The new films are fully panchromatic. They have a very high sensitivity to red light, and in addition, they have been especially sensitized for the green. They do not, therefore, give overcorrection to red objects, such as cheeks and lips, which is characteristic of films which have their main sensitivity in the red.

Exposure latitude is another important factor in film. In order to be able to get prints of good quality, it is imperative that negatives should not exceed the whole range of tones likely to be encountered in outdoor and indoor subjects. The three new Kodak films are especially prepared with this in mind. The films are coated to insure proper recording of shadows and middle tones and to give gradation in the dense highlights when exposure is full.

Even if exposure exceeds the normal level by a wide margin, negatives of good printing quality will result. It is possible to overexpose these new Kodak films to the extent of one hundred times the minimum exposure necessary to provide a reasonably good print. Of course, such overexposure should always be avoided if the finest grain is required.

M-R Introduces Duarc

The Duarc, a radically new twin-arc broadside, is announced this month by Mole-Richardson. Features of the new lamp include a completely new, self-controlled automatic carbon feed giv-
ing a burning period of over two hours without rettrimming; silent, flickerless operation; new heat-proof Pyrex diffusing system; and interchangeable operation as a floor or overhead unit.

The new unit replaces the firm's previous Six Arcs and Scoops, which were the first units developed for three-color Technicolor and at the time considered revolutionary advances over previously known broadside arcs. Though they were efficient light-sources, their burning period was unduly short for efficient production, being from 40 minutes without rettrimming—a distinct incotvenience where large numbers of these lamps were used, as on Technicolor sets, for overhead lighting.

The new Duarc was developed primarily to overcome this fault. A radically new method of feeding the carbons had to be devised an in the Duarc, each of the arcs is fed individually by a separate automatic feed mechanism while the arcs themselves are in series. Each feeding mechanism is driven by a special low-speed electric motor which requires only 60 revolutions to feed a complete trim of carbon. Each motor is governed directly by the voltage drop of the arc it feeds. In this way the carbons are fed at a rate directly controlled by the rate at which they are consumed, in effect, a self-metered feed.

This feed is remarkably efficient. Not only is the burning period without rettrimming extended in excess of two hours, but the carbons are burned down to stubs but two or three inches in length.

The practical value of this new feed is that the batteries of Duarcs, whether used in floor or overhead service, if reasonable care is exercised to turn the lamps off during non-productive periods, can be burned from morning to noon on a single trim, or even in some cases operate without rettrimming for a full day's shooting.

The same mechanism serves as an automatic striker, adapting the Duarc to remote-control operation, either singly or in groups. When the main switch is thrown, the arcs are automatically struck and self-adjusted to the most favorable arc-gap. Thereafter they burn automatically until current is cut off or the entire trim consumed.

The automatic feed further serves to virtually eliminate flicker. Ultra-sensitive photoelectric recording meters chart the burning of a Duarc as an almost perfectly straight line. Fluctuations in light intensity are not visible to the eye or to the camera.

Motors and carbon-feeding mechanisms are placed well away from the arc itself, and thoroughly insulated acoustically and thermally. Ample ventilation is provided, so that the rear of the lamp, through which access is gained to the mechanism, need seldom be opened on the set.

The reflecting system is of familiar type, consisting of a curved shell of polished metal, with suitable apertures through which the carbons protrude. Unlike previous twin-arc units, in which the ends of freshly inserted carbons sometimes projected outside of the reflector housing, the carbons of the Duarc are wholly within the lamp's housing. Similarly, the ballast resistance, which in previous floor-type broadside was a separate unit mounted on the lamp pedestal, is in the Duarc contained within the lamp housing, making the unit completely self-contained.

An important development is the introduction

Top, front and rear views of the new Mole-Richardson Duarc (Page 1, Column 3); Center, the new Ampico sound on film projec-
tor (Page 5, Column 1); Bottom, the new model Coinometer (Page 5, Column 3).
International
PHOTOGRAPHER
A JOURNAL OF MOTION PICTURE ARTS and CRAFTS

Editor, Ed Gibbons; Managing Editor, Herbert Aller; Art Editor, John Corydon Hill; Business Manager, Helen Boyle.

Vol. X. Contents for September, 1938 No. 8

On The Cover: As sensational an action shot as one could want, is this photographically and pictorially impressive scene, a dashing western climax. Note the hero’s white horse and heavy’s black horse, so typical of western formula. The still is by M. B. Paul, 659, IATSE, for Columbia’s “Song of the Plains.”

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International Photographer, as the monthly official publication of International Photographers, Local 659, of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, not only represents the entire personnel of photographers engaged in professional production of motion pictures in the United States and Canada, but also serves technicians in the studios and theatres, who are members of the International Alliance, as well as executives and creative artists of the production community and executives and engineers of the manufacturing organizations serving the motion picture industry. International Photographer assumes no responsibility for the return of unsolicited manuscripts or material.

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of heat-resistant Pyrex in place of glass for the
diffusing window used in front of all modern
arc. Due to the well-known heat-resisting quali-
ties of Pyrex, the diffuser can now be made as a
solid sheet of glass, rather than as a series of
loosely mounted strips. This, together with the
efficient ventilation provided, makes it possible
to mount the diffuser close to the lamp. A new
type of diffuser mount has been designed for this
purpose. It consists of a rigid aluminum frame
which slides over the front of the lamp window
fashion, fitting tightly in place but quickly remov-
able when necessary.

No claim is made by the manufacturers for in-
creased intensity of light from the Duarc as com-
pared to their previous Side Arc types. Camera-
men and electricians who have used the lamps in
practice, however, report that they consistently
obtain more usable light with a Duarc eight feet
away from the subject than they do with previous
broadside at half the distance.

The new Duarc can be burned in virtually
any position, and can be used interchangeably
either as a floor lighting unit or as an over-
head “scoop.” For overhead use, special over-
head hangers, fitted with safety chain locking de-

Fried Step Printers

Fried Registration Step Printers are available
in two models. The Standard model is designed
to meet such critical printing requirements as are
not to be satisfied with a continuous printer. It
permits the making of lavenders and dupe nega-
tives without sacrificing the quality of steadi-
ness, registration and definition of the original
negative. It is unequaled for the making of key
prints for background protection and similar
process work. The Si-Pack model has been de-
signed to meet and fully satisfy the problems
and requirements associated with the printing of
two negatives against a single double coated posi-
tive film. It may also be used in the same man-
er as the standard model for black and white
work.

Extremely critical registration and contact are
attained through many exclusive features of de-
sign and precision construction. The film move-
ment has pilot pin registration and releasing
pressure plate.

Both the Standard or Bi-Pack model can be
furnished with either of two types of Fried
shutter light changes, the semi-automatic or fully
automatic type. The Bi-Pack model utilizes two
light changes for the critical balancing of light
values from each negative. The Standard model
has similar constructional features to the Bi-Pack
model, with the exception that it requires only
one light change. The Fried shutter method of
little control provides perfect and instantaneous
light change without effecting or altering the
value of actinic value of the printing light, and
most effectively meets the requirements of color
and black and white printing.

B & H Candid Case

A New Bell & Howell Filmo 8 Candid Carrying
Case is cleverly designed with a hinged “drop
cover” which allows the camera to go into instant
action without removal from the case. Windows
are provided in the snug-fitting inner case to
make every camera operating part instantly ac-
cessible. Windows on right side of inner case
expose the footage dial, speed control dial and winding key. A window in the rear matches eye position of the spy-glass viewfinder. The left side window reveals exposure calculator. With drop cover down in front, the viewfinder, lens and starting button are completely in the clear for action and use.

Both inner case and drop cover are made throughout of double-thickness, full-grain cowhide. The color is known as Bombay, a rich dark brown. The all-linen thread stitching in goldrod color creates a classy, decorative trimming. Fastener and buckle attachments are nickel-plated.

Illustration on Page 5 shows the three phases of action: 1. Ready starting position, case closed. 2. Hinged cover quickly unsnapped and swung down, making camera ready for action. 3. Action—Camera remaining in case.

Retail price of the case as described above, complete with adjustable shoulder strap and swivel attachment is $6.

**Ampro Projector**

A NEW AMPRO-ARC sound-on-film projector, claimed to have five times the brilliance of the ordinary 750-watt projector is announced by the Chicago 16 mm manufacturing firm. Complete equipment consists of the following major components, designed to operate on 50-60 cycle current, varying from 100 to 125 volts.

**Kodaslide Metal Binding**

A NEW KODASLIDE Metal Binding, unusually convenient and rapid for Kodachrome slide mounting, is now supplied in eight-inch strips. The binding is U-shaped, nickel-finished brass, ready-notched. No tools are required. The strip is simply folded around the edge of the Kodaslide cover glasses, and the ends lock together to form a neat joint. If desired, the metal binding can be unlocked and a new transparency inserted in the slide, the same binder strip being re-used. Cartons of one dozen strips of Kodaslide Metal Binding will retail at $1, and cartons of fifty, $3.75.

**New Bee Bee Model**

BURLEIGH BROOKS, INC., 127 West 42nd Street, New York City, announce a new convertible Bee Bee Negative Viewer which has a special frame for viewing Dufalcolor and Kodachrome color slides up to two inches square in addition to the regular track for viewing 35 mm. films. By using auxiliary tracks, either 8 mm. or 16 mm. film can also be inspected. A windowed magnifying lens is mounted in an adjustable metal tube which may be removed and used as a low power microscope.

**Leica Self-Timer**

A NEW VISIBLE-ACTION. Self-Timing Device for the Leica camera is now available. The spring mechanism that trips the shutter takes from 12 to 15 seconds to unwind.

It is possible to always determine the time that remains before the shutter will be automatically released by observing the relative position of a white, circular dot on the face of the slowly rotating winding disc of the self-timer. The Leica Self-Timing Device is compact and simple to adjust. It weighs a little more than an ounce. Should the timing mechanism be out of adjustment for any reason, the fault can be easily corrected by taking a quarter-turn of an adjustment screw which is situated in the neck of the instrument. The device swings freely on its axis for convenience in winding.

**Rapid Change Maker**

ONE OF THE MOST efficient coin-changing devices, the Coinometer, manufactured by the Universal Stamping Company of Chicago, now is priced at $95. A rapid and fool-proof coin-changing device, the Coinometer is intended for use in theatres, cafes, banks, amusement parks, ticket offices, etc.

**Cesco Trays**

A NEW LINE of photographic developing trays and hypo fixing baths of Enduro stainless steel has been announced by the Columbian Enameling & Stamping Co. of Terre Haute, Ind. The trays, equipped with a formed pouring lip, will accommodate the three generally used sizes of paper and plates, 8x10, 11x14 and 16x20. The No. 170 hypo fixing baths are made to accommodate all paper and plates up to 11x14 inches in size. Both developing trays and fixing baths are drawn, seamless shapes made to government specifications. They are fabricated from special Enduro SMo stainless steel (No. 316 analysis), which has been found most acceptable for all types of photographic developing work.

**Bessa Prices Cut**

WILLoughby's complete stock of Voigtlander Bessa roll-film cameras are being put on sale at considerably reduced prices because the factory is discontinuing this model camera, in view of the tendency toward the miniature type. They
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**New Canaday Recorder**

The latest type Canaday DeLuxe 16 mm Recorder now is available. It features ball-bearing recording drum and highly improved rotary equalizer to insure the constant speed so essential for 16 mm. work. As illustrated in accompanying close-up shot, the new Canaday recorder is equipped with recording lamp holder, fitted with genuine quartz slit that does not crack with emulsion or dirt. The new model also is furnished with a high quality galvanometer of rugged construction and high sensitivity.

As with the well-known 35 mm. model of the Canaday line, the 16 mm. machine can be furnished with a specially built, ball-bearing, constant speed battery driven motor for operation on 12 volts, or with synchronous motors for any specified power supply. The new model already has seen considerable service in the field in recent months with highly satisfactory results, according to its users.

Another new item in the Canaday line that is creating unusual interest is the Noise Reductor Unit. Owners of glow lamp equipment are bringing their amplifiers up to date by doing away with "B" batteries and "power packs" for glow lamp supply and installing this new unit which provides noise reduction and at the same time supplies up to 600 volts polarizing voltage to the glow lamp.

The new Canaday model is furnished complete with removable 400 foot magazine, synchronous motor for any specified power supply, the improved recording lamp holder with genuine quartz slit mounted in protective shoe, footage counter and friction take-up. The 16 mm. recorder can be wide. Finish is black crackle and chrome. The glow lamp type (Model MLR) sells for $595 f.o.b. Cleveland, and the galvanometer type (Model MGR) for $995.

Dimensions of the new model are: 15½ inches long; 18½ inches high with magazine; 7 inches wide. Finish is black and chrome. The glow lamp type (Model MLR) sells for $595, f.o.b. Cleveland, and the galvanometer type (Model MGR) for $995.
Arguscreen Kit

From Argus comes a new low-priced combination screen kit, labelled the Arguscreen Kit. It features a CP Argus 100-watt portable projector with slide box of 100 capacity and an adjustable 16-by-32-inch screen. Complete kit with a strong case sells for $30. Entire outfit weighs 11½ pounds.

Reeves Reductions

New lower prices now are in effect on Art Reeves Ultra-Fidelity Optical unit and Lin-O-Lite glow lamp. The unit now is priced at $150 and the glow lamp at $20. The Reeves organization is expanding their sound department considerably due to increased orders from all over the world and is prepared to cooperate with technical advice and information on any type of sound, laboratory and allied equipment for production conditions in any part of the world.

SMPE's Fall Session

Arrangements have been completed for the annual convention of the Society of Motion Picture Engineers. It will be held in Detroit, October 1 to November 3, and the Statler Hotel will be SMPE headquarters. The program of papers and presentations is being prepared by J. E. Rabbee, editorial vice-president, and G. E. Mathews, chairman of the papers committee. Carl Brenkert, of Detroit, is chairman of the local arrangements and reception committee. Mrs. F. Strickler will be the convention hostess.

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CINEMATOGRAPHY

Movie Campaign

Industry cooperates in $600,000 drive to stimulate interest; outstanding stills sought.

For the first time in the history of the motion picture industry a gigantic cooperative drive of all factors of production, distribution and exhibition is under way to exploit motion pictures to the ticket paying public as an outstanding entertainment "buy." The campaign is tied in with the current release of many outstanding pictures, and centers around a $250,000 prize money movie quiz contest. Including the prize money a budget of over $600,000 has been laid out for advertising and exploitation.

The campaign is a recognition of the need for the motion picture industry to follow the lead of other industries in cooperating to "sell" the industry and its product generally to the general public. Not only is it expected to bring increased box-office receipts at the nation's theatres, but it also is calculated to build a cumulative good will that cannot be estimated in dollars and cents.

The part that members of Local 659, IATSE, are playing in this cooperative drive, is in producing interesting and news-worthy still pictures, and in the special trailers being turned out during the campaign. One of the first stills of the drive is published herewith and in an early issue we plan to present a layout of the outstanding illustrative contributions of the cameramen to the exploitation program. Suggestions from members and publicity departments of outstanding photographic work that should be reproduced in such a layout will be appreciated by the editors of INTERNATIONAL PHOTOGRAPHER.

It also is suggested that any studio workers having any constructive suggestion to make toward ideas and exploitation slants that will contribute toward the greater success of the motion picture industry's cooperative drive to boost public interest in motion pictures, submit them through the channels of their studio publicity departments, where they will receive the fullest cooperation. The studio publicity men are always on the alert for any ideas or news-worthy suggestions that can be used in the campaign or in exploiting their individual studio productions.

Books of Tables

Due to lack of space in the current issue it has been necessary to omit the Laboratory Book of Tables, Soundman's Book of Tables and the Studio Mechanic's Handbook. Also a number of technical articles have been held for later publication.
Newsreeling a 70 Mile Swim

The cameraman's inside story of the courageous attempt by Paul Chotteau to swim from Santa Barbara Island to Venice. By Frank M. Blackwell, 659, IATSE, as told to Warren McGrath, 695, IATSE.

Anxious red-rimmed eyes peer hopefully over the bow of our sixty-five foot sloop "Zarack." We have been 17 hours making a crossing of 31 miles from Venice, California, to Santa Barbara Island—a crossing that should have slipped by easily in ten hours. All of us know that the last seven hours have been spent in blindly seeking the mile long wisps of land in a murky fog that has persisted all night. We kid each other about being lost—and yet it's an eerie feeling knowing you are helpless out there 'til the fog lifts or something less pleasant happens. But we are anxious for another reason; we are bringing Paul Chotteau to Santa Barbara Island for the start of his epochal swim to the mainland.

Our human seal as we affectionately dub him, first saw the light of day 40 years ago under the very shadow of the Eiffel Tower and for the past nine years has been a naturalized nephew of Uncle Sam. Since taking up his residence at Venice, the pseudeo calm of the tricky waters of the Pacific between the Channel Islands and the mainland has flouted a constant challenge. Six times during a single year ending in July 1936 did Chotteau accept that challenge in attempting to swim the treacherous 44 miles between Santa Catalina Island and Malibu Beach. After five failures, an exhausted but supremely confident Chotteau flung himself from the boiling surf at Malibu with that accomplishment securely tucked to his name and 3½ hours of grueling punishment to erase from his body.

Last December Chotteau began a rigorous program to condition himself. His lonely swims in the chill Pacific waters were marvels of endurance, yet each day he would say "Non—it's not yet time"—and return home to the consolation of his violin. Monotonous months of this passed until on Saturday, July 16th, Chotteau announced himself ready. During his training period he had consumed 36 gallons of cod liver and halibut oil. His weight had increased from 204 pounds to 235 pounds.

I feel quite lucky to have been chosen official photographer for the swim. With any kind of a break it ought to be a swell news story. Here we are, straining our eyes for something that looks like terra firma in
the kind of a pea soup fog that clings. Harvey Walters, our swim manager, is first to sight land and we cautiously poke our way to the rocky cove that marks the starting point. We all pile into a small dory to take us sh oreward and after speedy preparations consisting mostly of a generous body greasing, Chotteau enters the water at exactly 12:45 p.m. I use the Akeley for some swell shots on the island and manage to grind on him until he had swum quite a distance out, before going back to the "Zarack" for the scenes en route.

Now we are alongside of Chotteau watching the long powerful strokes from the comparative safety of the dory. The fog has lifted somewhat, which eases the strain of watching for the dreaded sharks. Chotteau rests occasionally by drawing his knees up and actually sitting in the water while floating. This is good stuff for the reels; with his white water goggles, Chotteau resembles a giant frog in the water. I'm getting a swell 4" closeup of this when Harvey Walters' sharp cry is heard from the bow. He has sighted our first whale. It's only a pup though and after splashing around once or twice is seen no more. I've missed a good shot. Right then I drop everything and load the trusty Eyemo; if any more whales show up, they're going to be on film.

Chotteau is calling for food. Walters prepares the "formula," which has as its principle ingredients, dextrin, maltose and milk,
and hands it to him in a paper container from the side of the dory. More methodical swimming, almost noiseless. We are looking at each other now with constrained glances for the extremely slow speed causes the boat to wallow in the high seas. One or two are unashamedly seasick—but I'm lucky, so far. Another shout, and now Chotteau is splashing furiously. Two sleek gray bodies with upright fins veer suddenly from the course straight at Chotteau and, turning over, scrape their barnacle laden bellies on the keel of the "Zarack." Our consuming dread, the sharks, have sighted their prey and from now on it's every man on the alert.

The encounters with whales, blackfish and sharks became quite commonplace after that. I grind plenty of footage on them. One small shot was of a whale actually resting his head on the stern of the dory and blowing his breath at us. Had we smell equipment to record odors that piece of film would surely have been deleted. Whales in general are afflicted with halitosis but this one was Public Offender Number 1. Once a shark bolder than the rest lunges straight at Chotteau. He splashes furiously and the shark darts away. We relax for a minute but Chotteau starts yelling—now he's splashing and kicking furiously but still the fin keeps coming. Walters makes lunges with the boat hook—but Chotteau gives a great cry and beats the water about him. The shark has finally been frightened away but not before it has scraped its body along Chotteau's legs—and not before our human seal has seriously strained the ligaments in his right arm by his frantic thrashing.

We are a gloomy crew now. Our champion is swimming with one arm. The other drags uselessly. It's dramatic stuff for the reel; but we all are feeling each pain laden stroke he takes. He can't last much longer it seems and we are only little more than half way. It's dark nighttime and the water at this point is bitterly cold. Rests are more frequent now and the strokes get slower and slower. Phil Daubenspeck, life guard at Venice stands ready for instant action on the deck of the "Zarack." The night drags on.

A murky dawn arrives on Monday. Our admiration for Paul Chotteau is of the greatest. Here, I resolve, is the man who can take it. The cold gray light of the fog filtered sun reveals a face gray with the pain of suffering. The same light reveals many green faces alongside of me on the "Zarack." Phil Daubenspeck plunges in from time to time and swims with Chotteau to keep him company. Foot by foot we drag ourselves over the Pacific. My eyes feel like two burnt holes in a blanket. We check constantly with our navigator but the "Zarack" seems to hold a true course. Where the deuce are we anyway? Six o'clock, seven, eight, nine pass. The strokes seem barely enough to keep him afloat. We are frantically berating our navigator. Something MUST be wrong.

I'm grinding away just for "coverage" when I hear a splash alongside of me. I look up, still grinding, everybody is excited. I look through my finder again but I can't see Chotteau. Unconscious, our champ had SUNK. Phil Daubenspeck has to dive in and rescue him many feet below the surface. We haul him aboard slightly revived but all in. Our swim was ended in failure but it's been one of the most glorious battles man ever waged against the elements.

Dr. George Clark, our attending physician, is busy now with his stethoscope on the inert form of Chotteau. He is conscious now and protesting with increasing vigor the efforts we made to "rescue" him when he sank. In that busy half hour the fog lifts and our eyes focusing shoreward perceive, barely five miles away, the row of trim cottages marking Malibu Beach. We are miles from our destination but the "Zarack" had held a true course during the entire trip. The swift current had moved us 48 miles parallel to the coast and had forced our human seal to swim 70 miles instead of the 51 miles originally planned, 44 hours and 56 minutes for a 70 mile swim through shark infested, treacherous and at times, bitterly cold waters of the Pacific—not bad!

Chotteau was resting comfortably in the Santa Monica hospital when I saw him next. Back to his normal weight of 205 pounds he looked fit enough to try it all over. His blue eyes twinkled when I asked him if he would try again.

"Young man," he said, "I will not say." Here he paused while he grasped my hand.

"But I'll tell you something," he continued, "it can be done."

And I have just that much confidence in Paul Chotteau that I will have an additional camera on the beach at Venice to make him emerging from the surf at the completion of his next attempt.

**IN MEMORIAM**

King D. Gray 1886-1938 659, IATSE & MPMO
Clarence Hewitt 1901-1938 659, IATSE & MPMO
Robert V. Doran 1890-1938 659, IATSE & MPMO
Robert Morton 1900-1938 659, IATSE & MPMO
NEW BOOKS

Two new books of interest from Eastman Kodak were available last month. "Photography by Polarized Lights," priced at 50 cents, discusses various types of Polascreens, their effects, plus data on exposure time, filters, accessories and negative materials to be used with this type of photography.

"How to Make Movies," a very complete, authoritative and well-illustrated volume, sells for $2. It is written in simple, understandable style, covers thoroughly the angles of 8 and 16 mm cinematography and while it passes up considerable technical and background information otherwise available, is a valuable handbook for the average amateur cinematographer.

Another handbook of interest to both amateur and professional still photographers is "Prices to Charge for Photographs," by H. Rossiter Snyder. It is published by Fomo Publishing Company at 50 cents, and is one of a series of booklets from this house.

One particular phase of amateur cinematography, "Featuring the Family," is dealt with thoroughly and interestingly in a 36-page booklet issued last month by the Amateur Cinema League. The author is James W. Moore.

Agency Film Department

Another development in the progress of commercial motion picture production was announced last month by Stanley Resor, president of J. Walter Thompson Company, international advertising agency, that the company have created a new department to present commercial motion pictures for its clients. The new department is headed by Fred Fidler, with headquarters in New York, and the possibility of a branch office being opened in Hollywood later.

The J. Walter Thompson Company already has made a number of commercial motion pictures, one in Technicolor. While here, Resor revealed that of the 14,000 sound equipped theatres in the United States, about 7,000 are accepting commercial films, and that more than $15,000,000 today is invested in commercial film production.

Effects Spectacles Due

Roach leads in plans for "Lost World" type of picture using latest process methods.

Hal Roach appears to be jumping the gun in a new cycle of spectacular stories of the type of "Lost World" and "King Kong" that appears on the screen horizon. Producers are deciding to take advantage of the many sensational strides made in the technical fields of rear projection, miniature and special effects in recent years. While RKO-Radio and Columbia are reported working quietly on plans for such pictures, Roach already has announced production of what is described as "a screen saga of primitive humanity," to be titled "When Man Began."

Six months of quiet preparation were spent by the studio's process department, headed by able Roy Seawright and Frank Young (Int. Photog., Dec. 1937) in developing methods for successfully reproducing the animal and reptile life of prehistoric days before the production was announced. Roach plans to line up a cast of "names" from the sports world for featured roles.

Koffman's Mystery Effect Stills

Unorthodox lighting is the secret of obtaining menace and horror photographic effects to illustrate dramatic highlights of films of mystery and adventure.

By Herbert Aller

Closely allied to the silhouette type of picture, which was so ably illustrated in the collection of photographs by Durward Graybill, member of Local 659, IATSE, in the July, 1938, INTERNATIONAL PHOTOGRAPHER, is the mystery and macabre effect type of shot. Both types depend upon unorthodox lighting. Whereas the silhouette depends almost entirely on back-lighting, obscured by the figure or object to be silhouetted, sinister effects are obtained by meagre cross-lighting and low-lighting.

Production of stills for the independent and major "B" pictures calls for such effects more frequently than in any other pictorial exploitation, because these pictures
Mystery and horror effect shots by Jack Koffman.
E, described in story on Page 13 by Herbert Aller.
frequently feature adventure and mystery story angles. An expert member of Local 659, IATSE, in this field of menace and horror is Jack Koffman, whose work is illustrated in the layout on Pages 16-17 of this issue of INTERNATIONAL PHOTOGRAPHER.

Most of Koffman's pictures shown here-with were made for Larry Darmour's productions, which are released by Columbia. Koffman tells me that he rarely uses more than one light for such effects. They are placed low, or to one side or the other of the actors, almost always at some slant. Koffman points out that this type of shot requires more than ordinary cooperation from the players, and says that the pictures illustrated are excellent illustration of the willingness of most players to "play ball" with the stillman. Since this type of stills must generally be obtained in moments when the actors are in character—and must be sandwiched into spare moments during rapid production schedules—Koffman usually works in an improvised gallery near the actual set where shooting is under way.

Eyes and hands are most important in getting effective shots of this type. The photographer should always have some general scheme in mind, but must use judgment in fitting in with the actor's ability to catch a mood of mystery or fear. Consequently ground glass focusing is essential and Koffman prefers to use an 8x10 Ansco camera. All the pictures illustrated were made on Agfa Superpan Press.

Koffman agrees with George Hurrell and others who have expressed themselves in the past in INTERNATIONAL PHOTOGRAPHER, that too much technical mumbo jumbo interferes with good pictorial work. He doesn't use a light meter, and prefers to judge his effects by the accumulated experience of trial and error, rather than a welter of mechanical computation. He, therefore, prefers a few favorite stops and shutter speeds and is quite conservative in this regard.

Another major point he emphasizes is that while props are valuable, particularly when placed between the light and actors such as in the accompanying jail and stair effects, great caution must be used in avoiding any extraneous detail, that might detract from the general mood.

Kalart Service

A free advisory bureau on all problems of flash and newspaper photography has been set up by the Kalart Company, manufacturers of the well-known synchronizer and range-finder. Experienced members of the Kalart staff will cooperate in solving any bugs in connection with this type of photography. The Kalart Company also wishes to call attention of all studio still-men members of Local 659 to the fact that they have rapid repair service available from their Hollywood headquarters in the Taft Building.
As Standard as the
AMERICAN MOVIE

MONTH-AFTER-MONTH check-ups invariably show that the bulk of motion picture productions are filmed on Eastman Super X. Prime reason is consistently superlative photographic quality. Like the American motion picture itself, Super X is the world's standard of excellence. Eastman Kodak Co., Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN SUPER X
PANCHROMATIC NEGATIVE
"Can't Take It With You"

"You Can't Take It With You," Frank Capra's latest Columbia production, is a picture that should be prescribed as essential mental treatment for the currently widespread manifestations of human ego in its warped and distorted forms. Dictators, warmongers, political and business worshippers of power and bombast should be forced to sit through the picture time and again until its human, sane, thoroughly entertaining story had cleansed them of their crackpot illusions.

Yet the picture is in no sense a preaching. That is its most telling value. It is thoroughly and showmamly 100 per cent entertainment. Grandpa Vanderhof and his re-educations of Banker Kirby to a saner viewpoint on life teaches a lesson and sells the viewpoint of common sense philosophy far more effectively than any of the tub-thumping, dogmatic self-appointed panacea experts of the day just because it is down-to-earth entertainment.

Frank Capra, with his direction, the entire cast with fine performances, Robert Riskin with a worthy cinematic treatment of the George Kaufman-Moss Hart Broadway hit, all share in giving the picture values that are timely and memorable.

The contributors to the motion picture version have succeeded in introducing qualities and values far superior to the play version, according to all who have been in a position to make a comparison. New characters, new scenes and newer and stronger dramatic situations have been introduced in most effective camera story-telling technique that take the story far deeper into the realms of human character and emotion than did the proscenium-limited stage play.

In any listing of "Big Pictures," Columbia's version of "You Can't Take It With You" must be given high ranking. What faults it may have of extraneous matter and misplaced emphasis as evidenced in its preview were minor as measured against its sterling qualities. Pre-release editing will undoubtedly correct these trivial slips.

The picture is of the sort that through every moment gives the feeling that every participant in its production thoroughly enjoyed the job. It should have a heartening effect on every sincere worker in the motion picture industry who believes that new horizons of constructive contributions still are wide open.

Because Director Capra has succeeded particularly well in perfectly balancing an array of excellent character portrayals such as has seldom been approached in motion picture history, our pictorial layout on "You Can't Take It With You," this month fea-
pictures in addition to highlight scenes of the film, still studies of the important cast members. These are part of the excellent collection of still pictures assembled for the film by Whitey Schafer, member of Local 659, IATSE, and his staff in the Columbia still department.

Illustrated on these pages are highlight scenes from the production. At left top is the memorable scene where Grandpa Vanderhof (Lionel Barrymore) pauses before the family dinner to address his impressively human substitute for the conventional grace. Center is a sequence climax scene where G-men arrive to arrest the entire clans of Sycamores and Kirbys through a hilarious mistake. At lower left is the highlight scene of the court-room sequence, when Alice Sycamore (Jean Arthur) "tells off" Tony Kirby (James Stewart) because of his parent's snobbish and intolerant attitude, which is contrasted strongly against Grandpa Vanderhof's friendly, though unconventional viewpoint.

At top right is the scene between Kirby, Sr. (Edward Arnold) and his son in which the son expresses his smoldering resentment against the stuffiness of his bank job and his father's campaign to corner the muntions market, when the boy asks his father whether he has "overlooked the sling-shot monopoly?" Center right, Kirby has accomplished his dream of power, but in the midst of his triumph has lost his son. Lower right, Kirby leaves the expectant business big shots to go to Grandpa Vanderhof for help in the problem that is too much for him; and in perfect character, Grandpa Vanderhof solves the entire situation merely by getting Kirby to play a mouth organ duet.

The story is essentially one of the contrasts and conflicts between a family of wealth and social position, snobbish and power-mad, against Grandpa Vanderhof's uninhibited and irrepresible brood, whose motto is "live and let live and do what you really want to." The dramatic developments center around the love affair of the boy and girl, but the real story and the acting triumphs of the picture belong to Barrymore and Arnold as the heads of the respective families. Both give magnificent portrayals, and Capra has logically placed the story's climax in the hands of the two able character actors with dramatically telling results.

On Page 20 are the principal players, topped by Director Capra and Cameraman Joseph Walker, whose photographic job is first rate. In the left strip are Miss Arthur and Stewart; Donald Meek as Mr. Poppins, "who makes things," and Halliwell Hobbes as Mr. DePinna, the ice-man, who stayed to engage in the delightful pastime of creating bigger and better fireworks effects with Mr. Sycamore. Top strip shows Barrymore and Arnold in their famed duet; Samuel S. Hinds as Mr. Sycamore and Spring Byington as
Mrs. Sycamore, who writes plays because "somebody delivered a typewriter by mistake one day." Center strip shows Eddie Anderson as the enthusiastically pro-WPA husband of Lillian Yarbro, the family cook; H. B. Warner, as the financier, who is ruined by Kirby's monopoly scheme; and Ed Carmichael as Dub Taylor, the ex-Alabama football player, who plays the xylophone and prints Communistic literature, so he can practice setting type. Bottom strip: Charles Lane as treasury department man who shares a hilarious income tax scene with Barrymore; Mischa Auer as the genially misanthropic Russian dancing teacher; and Ann Miller as Dub's wife, who divides her time between making candy and ruining the terpsichorean art.

Not shown are Harry Davenport, who contributes an outstanding performance as the police court judge, and able supporting players Mary Forbes, Ann Doran, Clarence Wilson, Joseph Swickard, Jimmy Burke and Bodil Rosing, who all handle minor roles effectively.

**Kruse Joins Cinecolor**

In line with their present expansion policy, Cinecolor Inc., has appointed J. Henry Kruse sales manager in charge of their studio division, effective September 1st. Howard C. Brown, Cinecolor vice president, takes over the firm's industrial department.

Kruse is a charter member of Local 659. A cameraman since 1920, Kruse during the past two years has had his own camera rental business, and has produced a number of industrial films and a series of screen tests.
Air-Conditioned Sound

Paramount sound department sold on benefits of rigid temperature control of recording conditions after thorough experiments; another instance of delicate values in new type sound methods.

Air-conditioning, valuable on stages, in laboratories and theatres, now makes a contribution to sound recording. At Paramount, Loren L. Ryder and his sound department have gone thoroughly into the benefits of air-conditioning in recording and are thoroughly sold on it.

"We have discovered through experimentation that musical tones travel differently in different types of atmosphere," Ryder says. "In the sound-scaled recording rooms, the temperature and humidity of the air have been shown to have marked effect on the quality of the music played in these rooms. Tremendous strides that sound equipment has taken in recent months make these seemingly minute variation extremely important. The new recording equipment is so sensitive that the slightest blur in reception is noticeable on the sound track. To handle this problem we now are making our own weather. Research has shown that the 50-piece Paramount recording orchestra is at its best in a special mixture of air containing 55 per cent constant relative humidity."

This constant is maintained by washing and cooling the air for the recording room, heating it to the proper temperature by a 24-hour gas furnace, and pouring it into the sound-proof, air-tight room where the orchestra plays.

Air-conditioned music is particularly important for the brass instruments, though it makes a difference in the tonal quality of music from the strings and reeds, and even the percussion instruments. The density of the wind in the trumpets, trombones and saxophones has a definite effect on the product.

"During our recording of music for 'The Texans' we had a good demonstration of the importance of our air-conditioning," Ryder said. "A campfire singing scene in this picture required the presence of Joan Bennett and Randolph Scott on the scoring stage. Neither was familiar with our new recording technique. When we went to lunch, Randy lingered for a moment, left the door open. As a result, the air was changed. We failed to check the humidity on our return, and recorded a scene.

"The playback was so lacking in the brilliance of the other playbacks on this score that we thought something had gone wrong with the equipment. But the trouble was soon traced to the unconditioned air."

ERPI in 16mm

Major electric's entry into sub-standard field seen as another important progress step.

One of the most significant developments in the march of progress in the sub-standard field was last month's entry of Electrical Research Products, Inc., into the 16 mm sound recording field. With RCA and ERPI both now admittedly recognizing the importance and the sales possibilities of the sub-standard field, another vital link has been forged in the chain of progress that now is putting 16 mm on a technical part with 35 mm.

ERPI exploitation claims that their new machine will permit sound technicians to record 16 mm negative with the same facility and quality as is presently possible in the studios with 35 mm stock.

This step along with the work of other companies such as DeVry, Ampro, Canady, Art Reeves in the sound field, and the active though not yet widely publicized work of the emulsion manufacturers in the sub-standard field field, assures that within the near future, the commercial, semi-professional and even professional product will be able to use 16 mm to its fullest advantage.

The fact that scores of auditoriums, halls and other meeting places usually smaller than the average motion picture theater are using motion pictures for many purposes, in addition to the fact that motion picture theatre construction of the future will tend toward the smaller and more intimate type of house, opens up wide possibilities for sub-standard production and exhibition. The latter trend is clearly indicated in the theatre survey report of the Society of Motion Picture Engineers, published in full in International Photographer's July, 1938, issue.

Informed trade circles are wondering whether ERPI plans the same sort of exploitation drive to sell modern sound in sub-standard field as accompanied the first rush of sound to major motion picture production a decade ago. The new recorder is seen as only the first move in a complete equipment line for sub-standard production and exhibition.

There are few manufacturing organiza-
New Eastman Exposure Ratings

Electric exposure meter data on Eastman's new line of miniature camera films, designed especially for amateur needs and on the market this month.

Electric exposure meter ratings for the new Eastman candid films, described in this month's Tradewinds section, were released last month by the Eastman Company. They are:

For Weston Meters:

<table>
<thead>
<tr>
<th>Film Type</th>
<th>Daylight</th>
<th>Tungsten</th>
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<tbody>
<tr>
<td>Super XX</td>
<td>80</td>
<td>128*</td>
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<tr>
<td>Plus X</td>
<td>40</td>
<td>61*</td>
</tr>
<tr>
<td>Panatomic X</td>
<td>24</td>
<td>40*</td>
</tr>
</tbody>
</table>

For General Electric Meters:

<table>
<thead>
<tr>
<th>Film Type</th>
<th>Daylight</th>
<th>Tungsten</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super XX</td>
<td>128</td>
<td>80</td>
</tr>
<tr>
<td>Plus X</td>
<td>64</td>
<td>40</td>
</tr>
<tr>
<td>Panatomic X</td>
<td>40</td>
<td>24</td>
</tr>
</tbody>
</table>

*The use of these numbers will give somewhat less dense negatives, preferred by many workers. Ratings for the General Electric Meter may be increased proportionately.

The values in the left-hand columns do not represent the least exposure which will give the best possible prints. They include a safety factor to take care of variations in the use of the exposure meters and in

New Weston Speed Chart

Embracing not only the several new ultra-fast films, but also first recognition of varying standards of development and gamma in different types of film usage, a completely new table of emulsion speed values has been published by the Weston Electrical Instrument Corporation. The new chart is available free through all photographic dealers.

The new chart lists the various plates and films in ten groups, according to usage. Groups include Rolls and Packs; Miniature Camera Films; Press; Portrait; Commercial; Process; Graphic; Aero Film; 35mm. M.P. Film; and 8mm. and 16mm. M.P. Film. Emulsions used in more than one type of service accordingly get multiple listing, often with greatly varied speed values.

Ratings in Roll and Pack category are based on standard commercial procedure—5 minutes in DK50 developer. Miniature camera values are based on development to a gamma of .8 in the fine-grain developer recommended by manufacturer. Press ratings base on gamma of 1.2. Portrait ratings are based on a gamma of .9, while commercial ratings use a gamma of 1.0. Process rating is based on gamma of 3.0, while Graphic ratings call for a gamma of 7.0 and reading using the “O” position on Model 650 calculator and reading from white card. Aero film ratings use gamma of 1.2.
The CINEMATOGRAPHER’S BOOK of TABLES
By Fred Westerberg
Copyright 1938, All rights reserved

CHECKING VELOCITY

<table>
<thead>
<tr>
<th>VELOCITY</th>
<th>DISTANCE TRAVELED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 Feet</td>
</tr>
<tr>
<td>Miles Per Hour</td>
<td>Feet Per Second</td>
</tr>
<tr>
<td>1.00</td>
<td>1.467</td>
</tr>
<tr>
<td>2.00</td>
<td>2.933</td>
</tr>
<tr>
<td>4.00</td>
<td>8.800</td>
</tr>
<tr>
<td>6.00</td>
<td>10.267</td>
</tr>
<tr>
<td>8.00</td>
<td>11.733</td>
</tr>
<tr>
<td>10.00</td>
<td>14.667</td>
</tr>
</tbody>
</table>

For higher velocities move decimal points to right in first two columns, to left in the other four columns.

GEAR-BOX CRANKING SPEEDS

<table>
<thead>
<tr>
<th>Camera Speed in Pictures Per Second</th>
<th>Relative Camera Speed</th>
<th>GEAR-BOX RATIO USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>192</td>
<td>8X</td>
<td>1-3</td>
</tr>
<tr>
<td>144</td>
<td>6X</td>
<td>1-4</td>
</tr>
<tr>
<td>96</td>
<td>4X</td>
<td>1-6</td>
</tr>
<tr>
<td>72</td>
<td>3X</td>
<td>1-8</td>
</tr>
<tr>
<td>48</td>
<td>2X</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>1 1/2</td>
<td></td>
</tr>
</tbody>
</table>

Based on Normal Camera Speed of 24 Pictures per Second.

PARAMOUNT STUDIO IDEA for effective presentation of first feature film built around basketball, starring Hank Luisetti. Stanford All-American, may influence change in ball design. Luisetti is shown here with bleached white ball, similar to type used for night football games, which is more easily followed by spectators. Jack Koffman, 659, IATSE, made the shot.

MODEL CHINA CLIPPER, built by Paramount prop experts, posed with Louise Campbell and Fred McMurray of “Men with Wings” cast. Picture by H. A. McAlpin, 659, IATSE.

C. B. Dr. MILLE gets technical advice of Frank Calvin, son of president of Southern Pacific and Union Pacific railroads for new epic of pioneer railroading. Picture by Don English, 659, IATSE.

DEVELOPER FORMULAS

<table>
<thead>
<tr>
<th>Formula</th>
<th>Metal or Carbonate</th>
<th>Sulfite</th>
<th>Hydro-chloride</th>
<th>Sodium Carbonate (Anhydrous)</th>
<th>Beryll</th>
<th>Per Cent</th>
<th>Grams Per Liter of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastman D 76*</td>
<td>2</td>
<td>100</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Dupont ND 2</td>
<td>2.5</td>
<td>75</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Agfa 17°</td>
<td>1.5</td>
<td>80</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>.5</td>
</tr>
<tr>
<td>Agfa 12</td>
<td>8</td>
<td>125</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>Agfa 15</td>
<td>8</td>
<td>125</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td>1.5</td>
</tr>
</tbody>
</table>

FINE GRAIN NEGATIVE DEVELOPERS

<table>
<thead>
<tr>
<th>M.Q DEVELOPERS FOR QUICK HAND TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastman DK 50*</td>
</tr>
<tr>
<td>Eastman D 72°</td>
</tr>
<tr>
<td>Agfa 40</td>
</tr>
<tr>
<td>Agfa 64</td>
</tr>
<tr>
<td>Agfa 103°</td>
</tr>
</tbody>
</table>

*Available in prepared packages.

Anhydrous Sodium Carbonate contains about 2% water, monohydrated about 15% water. Therefore when using the monohydrated form increase the quantity about 15%.

The above formulas are adjusted to the dilution recommended by the manufacturers.
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the handling of the photographic materials. On the average the exposure called for by these numbers is more than twice that actually required for the best possible prints, but decreasing the exposure by that amount is not recommended unless the operator is thoroughly familiar with the characteristics of his exposure meter and of ordinary darkroom practice. The numbers with asterisks represent a safe decrease in exposure under these conditions.

Under adverse lighting conditions passable prints can generally be obtained from negatives given one-eighth the recommended exposure. On the average, however, excellent prints will not be obtained for negative exposures made at a meter rating of more than twice that indicated, which for Sper XX and the Weston Meter would be 160. To make sure that every negative receives enough exposure to yield the best possible print, a Weston rating of 80 is recommended.

Of course there must necessarily be a good deal of latitude to any recommendations to take care of individual differences both in equipment and in its use. There are both meter and shutter variations to be considered as well as the use of the meter. The type of developer and the extent of development are also factors. It is highly recommended, therefore, that the advanced amateur conduct a few experiments based on the above suggestions in order to determine the practice most suitable to his own needs.

W. B. Port and Water Sets

The old "Kismet" street at the Warners Burbank lot, which stood for years as a setting for scenes with Near East and Mediterranean locations is being replaced by a new set of the Mediterranean port of Casablanca. The new permanent set will be used first in Warners' Technicolor remake of "The Desert Song."

Warners also are making surveys for a new permanent "water set" on their studio ranch. It will have a 150,000,000 gallon capacity, with a river, canal, waterfall and pumping system.

Staub Directs Autry

Ralph Staub, veteran director, who entered the megaphone ranks after years of experience as a cameraman member of Local 659, IATSE, currently is directing Gene Autry's latest musical western, "Prairie Moon," for Republic. This is Staub's ninth feature for the company.

New Publicity Chairman

Julius Haber, in charge of publicity for RCA Manufacturing Company, last month was appointed chairman of the publicity committee of the Society of Motion Picture Engineers.
Theatre Sound Optical Systems

Types and principles of sound optical systems for projection equipment described with notes on operations and proper methods of upkeep.

By C. N. Batsel, RCA

Therefore, in this article and the ones to follow, we will attempt to trace the development of improvements in use by giving a brief description of the salient features of the parts under discussion as their development progressed. The equipment with which we are dealing is equipment with which we are all familiar, and we will therefore, in this article and the ones to follow deal with it in the order in which we are accustomed to think of it; that is, the projection room equipment, which consists of the soundtrack reproduction attachment and associated amplifier equipment, and the stage equipment, which consists of the speakers and associated networks. It is essential for good sound projection that the projection room equipment do two things: first, scan or take the sound from the track, and second, amplify it and send it to the speakers, which in turn must distribute it throughout the auditorium with sufficient volume for all to hear it with comfort.

First requisite of a good reproducer is its ability to scan or convert the sound track image into an electrical current so that it may be transmitted and amplified. This is done by means of a photocell and an optical system. The function of the photocell is, as we know, to convert the small and rapid fluctuations of light into electric current as will be described later, and the function of the optical system is to supply the light in sufficient quantities and in such a shaped spot or ray that the passage of the sound track between the light and photocell will cause it to blink or vary its intensity in proportion to the variation of the recorded sound wave on the film.

Variations in the sound waves on the track are sometimes very fine lines. In order that such a fine line be capable of blocking off the light as it passes, the light beam must be as narrow as the finest recorded sound wave. It must also be as long as the sound track is wide, and last it must be evenly illuminated across its entire length. It is readily seen that if the light is weak at any point across the reproducing beam, the change in the light that strikes the photocell will not be constant all across the sound track.

Earlier sound reproducers obtained this narrow beam of light by cutting a very fine slit in the sound film gate. A piece of quartz was inserted in the slit to prevent it from filling with dust and blocking off the light. By strongly illuminating the slit from the rear of the gate sufficient light would shine through the narrow opening to scan the sound track as it was pulled through. This means of obtaining a narrow light beam did not prove very satisfactory as it was hard to keep the quartz securely anchored and the slits were subject to dust troubles in spite of the precaution of inserting the quartz. It also was very inefficient;
The one illustrated in Figure 1 employs a lamp containing a small round filament that is imaged by the lens System 'A' on to the stop or limiting slit "B" which is in turn imaged on to the film by lens "C". This is called an imaged filament type, as the filament image at "B" is re-imaged to the film. The slit "B" being slightly narrower in vertical width than the filament image presents a straight bright line with smooth edges when imaged on the film. This type of system has only been used in certain type reproducers that employ sound gates and the length of the slit across the sound track is usually restricted to the proper length by a vertical slit that is cut in the gate immediately back of the position occupied by the sound track. This system is fairly efficient but is subject to troubles due to sagging lamp filaments and it also is very critical to vertical lamp adjustment.

Figure 2 illustrates what is known as the imaged slit system, and represents the type of optical system now generally used by reproducer manufacturers. It employs a lamp containing a coiled filament that is imaged by the condenser or collector lens "A" at a point within the smaller lens "C". "B" is an evenly illuminated mechanical slit of the proper dimensions for scanning the sound track according to present SMPTE standards.

This type of optical system is very efficient, and while it is subject to some extent to lamp adjustment it is not as critical as other systems. While in general use the optical system is so placed that the slit is imaged directly on to the sound track, the system employs itself readily to what is known as the inverted system in which the film instead of having the slit imaged at the take-off point is merely brightly illuminated, and the objective lens and slit are between the film and the photocell, as shown in Figure 3: The objective lens 'C' in this case acts as a projection lens by throwing an enlarged image of the sound track on the slit "B", whose dimensions are calculated so that, considering the magnification factor between the sound track image at "B" and the sound track, it will be completely covered by this image of the smallest sound wave, thus fulfilling that condition in the same way as the other types. The light passing through the slit falls on the photocell and acts the same as the other systems. This type of optics has never been generally used in soundheads but is used in 8mm types of film projectors.

The general trend in exciter lamp constructions is toward the bayonet base, heavy coil filament type. A lamp of this type is in general very rugged in filament construction and is ideally suited to the imaged slit type optics in which for the sake of light efficiency it is desirable to leave the entire filament imaged into the objective lens as shown in Figure 2. There are several styles of

The main features of these heads. The imaged slit optical systems used on these heads are assembled and sealed into a small compact oil and dust-proof tube or barrel. The slit is of the proper dimensions to form an image on the film which is eighty-five thousandths of an inch in length and one and one-fourth thousandths of an inch in width. The slit is imaged at the factory and is located so that it is in perfect horizontal alignment. The lamp employed is a heavy coiled filament type of 10 volt, 3 amp, rating, and is constructed especially for this use and has a bayonet base and pre-located filament. Lateral adjustment is provided for the lamp by means of the screw in the socket base. Additional lateral adjustment can be had if necessary to bring the filament nearer the optical center by rotating the lamp 180°.

Vertical adjustment can be and should be made until, when viewing the light through a thin white paper held directly in front and close to the objective lens, an exact spot of light appears to be in the center of the lens.

In reproducing a sound track (as we all know) the slit should be evenly illuminated and, as before stated, it should cover the entire width of the sound track. With an optical system of this type even illumination of the reproducing slit is assured when the evenly illuminated spot of light appears to be centered in the objective lens as seen on the paper as described in the previous paragraph. External adjustment of the slit is in reality not a slit adjustment but is accomplished by an adjustment of the combination pressure and guide roller (shown in Figure 5 as "Lateral Guide Roller") which holds the film in contact with the rotating gate. This roller can be moved in and out the proper amount to place the slit image in the exact position as prescribed by the Standardizations Committee of the SMPTE.

It is also necessary, in order to reproduce the higher frequencies, that the optical system be in focus so as to insures a narrow, sharply defined image of the slit in the film. Authorized factory engineers are regularly supplied with the latest tools and track location films which bear the approval of both the Society of Motion Picture Engineers and the Academy of Motion Picture Arts and Sciences. These films are designed so that the service engineer can quickly and efficiently determine the location of the slit image and film position. Following such a diagnosis, corrections and adjustments can be quickly made.

Inasmuch as the function of the optical system is to transmit light and form a good sharp image of the slit it becomes quite obvious that the lens surfaces must be kept clear of oil and dust. A
DUARC SOLVES ARC PROBLEM!

AUTOMATIC ARC HURLS DEFI AT FLICKER!

A direct attack on flicker in broadside arcs was made today by Duarc, sensational new Mole-Richardson Twin-arc broadside. According to statements from informed sources, flicker menace was laid to inadequate feeding of arc carbons in conventional broadsides, causing carbon-anemia. Duarc pledged flickerless lighting aided by self-metered carbon feed.

Three Scotch Gaffers reported overcome on Hollywood sets by enthusiasm for Duarc's economical treatment of carbons. "Hoot mon!" stated one, "Duarc's automatic feed can't starve the arc or feed too fast—and it burns both carbons down to three-inch stubs!"

At a late hour today sensitive photometers and capitious color-cameras, assigned to detection of flicker in Duarc, were reported ready to abandon search as Duarc continued its dramatic defiance of flicker.

First Pictures of Record Breaking New Duarc

Exclusive photos of record-breaking Duarc show radically new design and appearance of the sensational endurance champion. Fully automatic control and streamlined construction make the record-smasher as neat and controllable as a house-lamp. Rigid one-piece Pyrex diffuser eliminates ultra-violet and gives wide flood of powerful light. Interchangeable mountings assign Duarc to double duty as either floor or overhead lighting unit.

NEW TWIN MAKES 2-HR. NON-STOP RECORD!

Shattering the previous twin-arc endurance record of 30 minutes without retimming, new Mole-Richardson Duarc today made a non-stop record of 2 hours, 10 min., 22 2/5 sec., without retimming or other attention. Record was made under official timing and since repeated on several studio sets.

Sponsors of new champion point out practical value of this record is that it will permit Duarcos used as broadsides or overhead scoops on color sets to work full shooting day without delaying production for retimming. With care in resting Duarcos between takes, a single trim should last a full working day. Fast-working troupes, exercising similar care, can trim Duarcos at start of day, and rettrim only at noonday lunch-hour.

For Further Details See:

MOLE-RICHARDSON CO.

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film of oil or dust on the surface of the lens will scatter some of the light rays as they pass through and prevent them coming to sharp focus. This is particularly true of the objective lens that forms the image of the slit on the film, and this lens should be inspected quite often so as to ascertain that oil and dust have not collected on its surface. Lens tissue only should be used in cleaning the lenses.

In general it is felt that the adoption of the inherently sealed imaged slit optical system having only two lens surfaces exposed to the air, with provisions for ease of focusing and track location adjustment that are provided—along with incorporation of the rotary stabilizer which will be described in the next article—have provided a soundhead reproducer which far exceeds equipment heretofore offered to the trade by RCA.
CABLES AND TELEPHONES

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Scheibe, George II.

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**For Sale or Rent**—Mitchell and Bell & Howell silenced cameras, complete, with cases, for $100. Mitchell and Bell & Howell cameras, complete, for $200. Mitchell and Bell & Howell cameras, complete, for $300. Mitchell and Bell & Howell cameras, complete, for $400. Mitchell and Bell & Howell cameras, complete, for $500. Mitchell and Bell & Howell cameras, complete, for $600. Mitchell and Bell & Howell cameras, complete, for $700. Mitchell and Bell & Howell cameras, complete, for $800. Mitchell and Bell & Howell cameras, complete, for $900. Mitchell and Bell & Howell cameras, complete, for $1,000.

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If there is such a thing as a "matched set" in the home movie field, the 16 mm. camera and projector you see above are it. Both are designed to provide every popular operating refinement at an extremely reasonable price, and to couple these taking and projection conveniences with the utmost simplicity of operation.

MAGAZINE CINE-KODAK is probably the easiest camera in the world to operate. Yet it is also one of the most versatile. You load it in three swift motions—slip open the cover, slip in a film magazine, latch the cover. And you can change magazines—black-and-white to Kodachrome, and back again—without wasting a single film frame, even when the magazines are but partly exposed. Three speeds—normal, intermediate, slow motion. Its famous Kodak Anastigmat f.1.9 lens is interchangeable with seven accessory lenses, ranging from a fast, focusing, wide-angle lens to a 6-inch telephoto. One full-vision, eye-level finder system serves them all.

KODASCOPE, MODEL G, is simply in a class by itself. You buy it with any of fifteen lens-lamp combinations, one of which will provide exactly the screen illumination you need for your shows. Controls are centralized—one four-way switch just about runs the machine. Threading is extremely simple, and a pilot lamp makes it still simpler. Bearings are self-lubricating. Focusing, framing, tilting are positive, fingertip operations. "Stills," reverse projection, high speed motor rewind—the "G" has them all.

Magazine Cine-Kodak is priced at but $117.50, with f.1.9 lens; Kodascope G is priced from $113.35, including lens and lamp. See this outstanding equipment at Cine-Kodak dealers—or write Rochester for free literature.
To be truly versatile, a negative film must have speed, fine grain, and wide latitude.

Actual experience establishes that Du Pont Superior Pan effectively combines these qualities. They make this film the natural choice for good pictures.
Zeiss Tenax and Movikon

Zeiss announces this month a new miniature camera, the Tenax, for all-round photography, but also capable of taking successive pictures at high speed, and also a fine precision 8mm. motion picture camera, the Movikon 8.

The Tenax uses standard 35mm. film in daylight-loading spools or cartridges, making 50 negatives 24x24mm. on a single loading. The standard lens is a Sonnar f/2-4cm., and others are available. All lenses couple with a built-in range finder combined with view finder in one large opening, and focus with a lever under the lens mount.

It has a built-in self-timer and Compur-Rapid shutter with a top speed of 1/400 second, with the shutter release on top. A short-throw lever under the second finger of the right hand advances the film and cocks the shutter with a single movement. Negatives are 1x1 inch, but since the focal length is 4 cm., the image size as compared to a 5 cm. lens on a negative size of 24x36mm. is substantially the same proportion.

The Movikon 8, finished in chrome plate and grey leather, uses either single-8 or double-8 film in standard 24-foot rolls, runs at 8, 16, or 64 frames per second, carries about 11 feet of film on a winding. Interchangeable lenses are in bayonet mounts with the Sonnar f/2-1 cm. as standard. Because of its tremendous depth of focus the 1 cm. lens is in a fixed mount. The Tessar f/2.7-2 cm. may be focussed by scale from 18 inches to infinity. The built-in view finder contains indicators showing how many feet of film the motor will pass before running down and whether or not there is still film in the gate, and also may be used as an angle finder. It has a sliding mask to show the field of the 2 cm. lens. Additional controls permit single exposures for animations, self-timer, and cable release fitting. There is a conventional dial showing the film footage and another spring-tension indicator, both on the outside of the camera. The film gate is readily removable for cleaning and loading is extremely simple.

Zeiss also announces the Bernotar Orientor for the Contax, which enables you to observe the polarizing effect through a coupled viewer as the Bernotar is rotated before the lens. The Orientor attaches to the outside bayonet mount of the Contax and is controlled by a convenient knurled wheel synchronously operating the viewing and taking polarizers. With it the photographer knows that precisely what he sees is what he takes.

At left, the new Photrix device for handy and certain fastening of photometer to camera. (Page 1, Column 3). At right, the new Tenax camera, Zeiss contribution to miniature sequence photography. (Page 1, Column 1).

Photrix Adapter

The Photrix Adapter which has been developed for the special purpose of fastening the Photrix Exposure Meter to the camera is now available.

The Photrix Adapter fits any camera which is provided with the usual view finder bracket. On other cameras, such brackets can easily be installed in any convenient place. To fasten the exposure meter to the camera, slide the meter into the Adapter and slide the foot of the latter into the bracket. The meter will then be held securely in place, yet it can be detached any moment.

The Photrix Meter is especially suited for operation as part of the camera on account of its high sensitivity and its very compact design. It is ready for use at all times and has no discs or levers which need to be set so that it does not interfere in any way with operation of the camera. The Photrix Adapter is distributed by Intercontinental Marketing Corp., New York City.

New Ikonta B.

A new model medium priced Ikonta B, a miniature camera taking pictures 21/4x21/4 in size, and now available, ranges in price from $39.00 to $66.00. Improved models of existing Zeiss cameras are also ready—such as the new Super Ikontas with shutter release on the body, a tell-tale signal to prevent accidental double exposures, a slot for an accessory brilliant finder, and the Ikontes III, an advanced model of the Ikontes II, which retains the unique condenser-type ground glass with
its brilliant, evenly-illuminated image and built-in magnifier, and adds a wheel focusing control, anti-double-exposure lock, a shutter release on the camera body, and visibility of the diaphragm and shutter settings from above.

**Photoflash Calculators**

**Two Calculators**, the one for determining exposure time in enlarging, the other for picture taking, have recently been added to the Photoflash line exclusively.

The enlargement calculator is designed to find the required enlarging time after the light emerging from the lens of the enlarger has been measured with the Photoflash Photometer or any other light measuring device which is capable of determining correct exposure time.

The calculator in combination with the Photometer represents the first device on the American market which allows determination of the required enlarging time by means of a photograph, without the aid of visual comparison.

Once the emission speed of the paper is known, the calculator takes care of the density of the negative as well as of the magnification. The picture taken has to be magnified by means of the Photoflash Electronic Timer. The variations in exposure time required for flat or contrasty negatives are taken into consideration by means of scales engraved into the celluloid pointer.

The exposure calculator is to be used to turn any light measuring device into an exposure meter for photography. It is meant in particular for those light meters of high sensitivity which the photographer must resort to where pocket-type exposure meters fail to indicate. In order to allow evaluation of low light readings as obtainable with the Photoflash Photometer, the light scale of the calculator goes down to 1/40 of a foot-candle so that exposure readings in a city street at night are now entirely possible. In addition, the calculator will be found valuable in those instances where the exposure time is critical as in color photography. The scales of the calculator are drawn mathematically correct in the style of a slide rule and without sacrificing the appearance of convenience.

The Photoflash Calculators are executed in etched aluminum with long scales and clear figures, the turntable disc measuring 3 inches in diameter and the handle 2 1/4 inches wide. It is, indeed, as sturdy as well as as two packs of cigarettes and much narrower.

The new camera has all advanced features which have made Speed Graphic cameras the standard for versatility and efficiency and several new ones not at present found in other members of the Speed Graphic line. One of these is a built-in focal plane shutter flash synchronization built in, and the other is a faster speed for picture taking.

Another new feature is the provision of dual focusing knobs to make focusing easy and natural for either right-handed or left-handed users. Helical ratchet and pinion have been included in its design to afford smoothness in focusing without backlash. Another new feature is its all-metal bed—supplying greater rigidity and increased protection of camera mechanism and lens when the unit is closed for carrying.

The miniature Speed Graphic's removable lens is a 2 1/4 x 3 1/4 inch. The camera can be had equipped and sold complete with lenses so that the amateur photographer has nothing more to buy.

Though comparatively young in the enlarging field, the Sun Ray Photo Company has many years of photographic equipment manufacturing experience. They also make a complete line of popular priced tripods, lamps, studio lights, spotlights and enlarging cases, both for the amateur and the professional.

**New Kalart Speed Flash**

**ONE OF THE SENSATIONS of the recent Photographers' Convention in Chicago was the first viewing of the new Kalart Wireless Press Flash.**

Page 5. Here are some of the revolutionary features:

- A built-in mechanical synchronizer, no outside wires, automatic flash synchronization, finger tip release from camera bed, weights only one pound, adjustable reflector for various bulb sizes, quick change socket with a special lamp ejector, multiple lamp connector, remote lighting feature, two position safety release of bulb, and battery case in one unit.

As a pioneer in the synchronized photoflash field, Kalart has again stepped out to create a product capable of winning acceptance. The new Kalart Range Finder which met with such instant acceptance.

During the Chicago Convention a special contest was held by the Kalart Company and all the photographers asked to submit their comments and criticisms. The results were surprising, there was practically a 100 per cent acceptance and praise for the new photoflash outfit. Some of the comments were: ‘The ejector for hot bulbs is a feature every one used to flash bulbs will appreciate’, "Increased speed of operation and dependability are assured by having only one compart-" "Swell, because it is always synchronized and quick to attach."

A special prize of $50 was offered for the best comment, with Willard D. Morgan selected as sole judge for making the final selection. This prize went to Willard C. Martin, 6814 Wabash Avenue, Terre Haute, Indiana, for the following comment: "The Kalart Wireless Press Speed Flash answers all the objections I have ever had to speed flash equipment and provides for every contingency I can imagine from a practical photographer's angle. It is as fool-proof and businesslike as the other modern materials and equipment with which it is used. It's out just became an integral working part of the camera."

**Argus "C" Accessories**

ARGUS has recently added to its list of 35 low-priced accessories a Macro Attachment, a Copy Lens and a Portrait Attachment for use with their Model "C" Speed Camera. The attachment for Macro-Photography opens up an entirely new field of photography to Argus Model "C" owners the interesting field of close-up photography. It makes it easy to take detailed photographs of small objects such as flowers, plants, seeds, insects, jewelry, watches, stamps, miniature art objects, etc. This attachment also makes possible pictures of bullets, finger-prints, handwriting and type-writing specimens, useful in police and Department Work. The Macro Attachment opens up a new field of photography of very small objects full-size or slightly reduced on black-and-white or full color.
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News of New Products

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Classified Directory

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$100 for One Picture
Big Kalart $250 Contest
There are 18 cash prizes for Synchro-Sunlight pictures in this contest which closes Nov. 1. Ask your dealer for entry blank and folde on this technique which gives Hollywood studio effects with a pocket light source, the Kalart Micromatic Speed Flash, $13.50.
Kalart Synchronized Range Finder gives the flexibility of a "minnie" to plate and film pack cameras. It keeps moving objects in focus and costs only $20.50 installed, for most cameras. See your local dealer or write to your nearest Kalart office.
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F:2.7 and F:3 are LENSES made in focal lengths from 15mm. to 100 mm. that can be fitted in suitable focusing mounts to Amateur and Professional MOVIE CAMERAS
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The production of CINEMATIC ACCESSORIES such as Effect and Trick Devices, Vigneters, etc. has been our specialty for years.

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Copyright, 1938, by Local 659, International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada.
35 mm double-frame negative, and then enlarging several diameters during printing, so the final print shows the object greatly magnified.

Macro photography is made extremely simple by the new Argus attachment. It may be performed easily by the ordinary amateur on the table top at home. The lens barrel is simply unscrewed from the camera body and the Macro extension tube is screwed in its place. The copying-stand collar is then slipped on, and before mounting the legs, the camera lens is screwed to the extension tube. The stage is then slipped onto the legs; a screw in the stand collar is tightened to prevent turning of the camera; and the operator is ready to shoot. By use of two different lengths of extension tubes, separately or in combination, objects may be photographed 1/4, 1/2 or 3/4 size on the film.

The new Portrait Attachment, when used with the Model "C" camera's Gintar lens, focuses from 30 inches down to 20 3/4 inches and covers an area from 18 1/4 inches x 28 1/2 inches down to 8 1/4 inches x 13 3/4 inches.

The new Copy Lens, when used with the Model "C" camera's Gintar lens, focuses from 22 1/2 inches down to 13 3/4 inches and covers an area from 10 inches x 15 inches down to 6 inches x 9 3/4 inches.

Promising projection of larger pictures, the new lamp broadens the use of 16mm projectors. For, it now enables this type of movie equipment to show before larger audiences than has hitherto been possible.

Because of the whiter light the new source also permits more faithful reproduction of colored pictures. Screen illumination is maintained at so high a percentage of initial value that there is no need for inclusion of anti-blackening collector grids in the lamp's internal construction. Construction is such as to secure a high degree of concentration of tungsten deposit at the top of the bulb.

The filament is notably compact, being no larger than the filament of the present 750-watt Mazda projection lamp. The new 1000-watt lamp is designed to burn base down.

New f:1.5 Ektol

Supplementing but in no way supplanting the Taylor-Hobson 1" f:1.5 lens recommended and
Top Left, the new Kalart Wireless Press Speed Flash, attached to a Speed Graphic. (Page 2, Column 3). Top Right, the new Miniature Speed Graphic with new special Kalart synchronizer. (Page 2, Column 1). These items made big hits at recent Photographers convention in Chicago. Lower Left, the new Kodachrome Adapter for Kodak Recmar. (Page 2, Column 2). Lower Right, General Electric's new 1000-watt projection lamp, which is considered an important contribution to 16 mm projection. (Page 4, Column 2).

Micro-Card Records

Micro-Card duplication of records, particularly of library, organization card files, etc., in convenient and compact form is made available cheaply through a new method developed at the regularly furnished with their 16mm equipment, Bell & Howell now offers a somewhat lower-priced 1" f:1.5 lens as optional equipment or for replacement purposes. It is stated that while the new lens is lower in cost, it is of a quality far beyond expectation at the price, since it is fully color corrected and accurately calibrated for photographing subjects as close to the camera as one and one-half feet. It is for use on all Bell & Howell 16mm cameras, and includes adapter when ordered for the Filmo model 121. The list price is $70.00.
Academy of Motion Picture Arts and Sciences for their own library and records and now made available, along with the special Micro-Card camera.

The camera, devised and perfected by Paul Allen, former member of Local 659, now engaged in photographic research, is illustrated on Page 4. The Academy service includes use of the camera, which is virtually automatic and can be operated by regular clerical help. The actual cards, 15/8 by 23/4 inches, are printed in Los Angeles through special photolithographic equipment. Standard rate is one cent per card. Cards 8x13a0 into a regular file tray and four trays fit into a standard 3x5 card file drawer. Text is legible without need of enlarging glass or reading machine.

Details of the Micro-Card may be obtained from the Academy, 1201 Taft Building, Hollywood.

Hagberg Conversion Scale

A NEW CONVERSION scale device has been invented and perfected by Gene Ouen Hagberg, veteran member of Local 659, IATSE. After much hard work and tedious computation, Hagberg now has the device perfected to the point where negotiations are under way for its marketing. He also is working on a new device for visual analysis of light and a densimeter that may be carried about on the person. News on these additional gadgets will appear in early issues of INTERNATIONAL PHOTOGRAPHER.

The new device consists of three superimposed disks of a light metal or celluloid composition bound together at the axis. The central disc is scaled on one face with degrees of shutter opening and exposure time in fractions of a second. The range of exposure fractions extend from .3456 at 3 degrees to .96 at 180 degrees. This range covers any possible shade or degree of negative density that the cinematographer may desire which is within reach by reason of his camera's widest shutter.

In the original (cardboard working model), the device was scaled to cover any possible shutter opening from 5 degrees to 340 degrees but in order to create an instrument adapted to the cameras now in use here, the present model was constructed on a 180 degree basis. This side of the central disc is the scale devoted to Exposure Time and to facilitate the determination of this factor, a disc slightly smaller in circumference than the center one is placed upon it. This disc has a sector removed through which the figures comprising the exposure times may be seen. Along one side to the small disc are figures representing the film speed in frames per second ranging from 12 pictures per second to 48 pictures per second. The two discs operating together allow exact control of exposure regardless of camera speed, shutter opening, or necessity of maintaining exposure during rapid speed changes.

In operation the cinematographer may rapidly and without error attributable to custom or guesswork compute his exposure time. If a greater or a lesser degree of exposure is requisite this may also be accurately controlled by merely shifting the sector disc to that fraction of exposure which is deemed to be ideal for the purpose and then reading off the film speed and the necessary shutter opening. For a more complete coverage of this problem the sector disc may be scaled from one frame per second to one hundred frames per second. All depends of course upon the usages to which the device will be applied.

FILTER FACTORS, TRANSMISSIONS AND FILTERS

The reverse side of the central disc is cut into 18 sections, each of which constitutes a distinct division of the "F" system from f:1.5, to f:32.0. There are few lenses in present use that have a wider opening than f:1.5 or smaller than f:32.0, hence this range is adaptable to all problems dependent upon the lens stop factors for solution.

On the outer circumference of this central disc are numerals from 1 to 18, which are intended to be a subtraction scale.

In the case of the reverse side of this disc, a smaller one is placed upon it. This small disc has three separate scales which are again divided into 18 sections. On the outer circumference are the filters in common use on production, these ranging from the Acro 1 to the 72. There are 18 Filters in this group. A line divides the Filters from the next scale which constitutes the total light transmission of each of the Filters. On the inner circumference is a scale of so-called Stop Factors. Used together, these three scales will be found an answer to any problem involving the compensation of lens stops for filter factors. In operation the cinematographer places the figures of Filter opposite the "F" stop. He then subtracts the stop factor from the scale found on the scale on the outer circumference of the central disc, which gives him the exposure with the filter.

Here combined in one device are ready answers to most problems likely to confront the cinematographer during his daily work. As a companion piece to the electronic photometer it is valuable because foot candle power readings are more easily translated into exposure factors.

LABORATORY

The Duplex production printer is claimed to be an ideal color printing machine, as it is designed so that color negatives will be accurately superimposed on the positive by perfect registration and contact. The printing light is also designed for color as the full actinic value remains in correct proportion to the density of the light. This feature, which is brought about.
by the new unlimited scene fully automatic light change, insures clear color prints.
The printer is the first of this design to combine all the desirable features heretofore used. It incorporates the new camera-style movements with pilot pins and pressure pad with release for registration and contact.

The new printers are available in either the single or double model. The double model is necessary for printing color film. Double pulleys for the silent, non-slip, V-belt drives allow a rapid change in speed for the machines.

The intermittent film feeding mechanism is a precision built camera type movement, constructed for continuous high speed operation. Pilot pins and pressure pad with release insure absolutely rock-steady prints at high speeds, while the sound track is printed on a continuous sprocket conveyor located above the gate. The film gate contains the pressure pad, which eliminates wear or possible scratching from the automatic release. The image being visible through the gate while the picture is being printed is an additional advantage in making the machine as fool-proof as possible.

Speeds of the new type printers are 30 and 60 feet per minute for color printing and 60 and 120 feet per minute for black-and-white. The new printers are delivered ready to operate by plugging in the electric current supply. Air-conditioned lamp houses, smooth friction take-ups of 1,000 foot rolls, and the features listed above contribute to instant rapid operation. Threading is easy and convenient. The equipment carries the usual Duplex 100 per cent one year guarantee.

Although the new light change is entirely automatic, it may be operated by hand if desired. It changes the amount of printing light on the frame line and uses about one inch of opaque film for each scene. The punched opaque film may be filed away with the negative for future reference without inconvenience.

Art Reeves Ultra-fidelity Recorder now available.

Ultra-Fidelity Recorder

The new model Art Reeves recorder is perhaps the first to offer advantages of ultra-violet light recording to the independent field, and in addition it is believed to be the first commercially available unit in which "black light" has been used for variable-density recording.

The new recorder is of the portable type. Primarily intended for a fixed installation, either as a studio unit or in a sound truck, the equipment is sufficiently compact to be carried on location as a portable recording unit.

Its adaptability is heightened by provision for complete interchangeability of driving motors, permitting normal operation from almost any desired power supply, including batteries, DC or AC generators, or from alternating current mains of almost any frequency.

To gain this flexibility, driving motor is a separable unit, attaching to a conventional, camera-type motor mount. It is therefore possible to drive the recorder with any standard camera motor suited to the current supply available. Normally, battery-powered direct current interlock motors for recorder and camera are supplied with the equipment.

Simple Design. As will be seen from the illustration on this page, the design of the new recorder has been related to a point of high simplicity. The film is threaded past the main sprocket, over appropriate idling rollers to the recording drum, past the take-up sprocket and the main sprocket, and into the magazine.

All of the sprockets and idling rollers run on ball bearings; the recording drum runs free and is connected to an efficient damper, of a type not affected by temperature changes. The gear trains driving the sprockets are lubricated by a single oiler; the ball bearings require no lubrication, as they are of a special self-lubricating type.

Both manual and automatic speed control are supplied. The latter is built into the recorder, rather than into the motor, and the wiring arrangement is such that it operates with any type motor. If it is desired for any reason to control the speed manually, the automatic speed control is rendered inoperative by throwing a switch in the base of the machine.

A standard foot-age counter and tachometer are regularly supplied, built into the recording head on the right-hand end, where both are easily visible to the soundman.

Facilities for Two Mikes. The amplifier is substantially the same type already familiar in Reeves recorders. It is contained in a compact carrying case suitable for either fixed or portable use. Facilities are provided for the use of two microphones, which may be of either the latest dynamic types, or of the condenser type, including the Reeves "baby bomb" design. Metal tubes are used throughout, making this amplifier completely non-microphonic.

The ultra-violet recording unit employed is the new Reeves "Line-O-Lite" glow lamp. This is a recent Reeves development, designed for installation in any standard glow-lamp recorder.

Its peak radiation is in virtually the same band of the ultra-violet spectrum as is the peak sensitivity of the newest recording emulsions. The construction of the unit is such that no physical aperture is used in this installation to produce the slit-shaped recording beam. The light source of this tube is in itself a narrow line of light, simplifying the optical projection which forms the recording beam on the film.

The light source of this tube is in itself a narrow line of light, simplifying the optical projection which forms the recording beam on the film.

The frequency response of the system is practically flat to 10,000 cycles, with a gradual taper thereafter. The amplifier has a gain of over 125 db.

Bringing the advantages of ultra-violet recording to the independent field, in Art Reeves opinion, is only a logical step in the continued advancement of this field. "When I entered the business of manufacturing sound equipment," he points out, "independently manufactured sound equipment was stigmatized as 'bootleg' and was generally regarded as inferior.

"Today the situation is different. To remain in business the independent sound or laboratory equipment manufacturer must have business and engineering policies no less stable and progressive than any major firm. What is more, he must offer truly modern equipment. That my firm, one of the first in the field, has survived and grown has, I am sure, been due to the fact that our products were in every case engineered up to the most modern standards, not built down to a price.

"In the present instance, we have been able to produce an ultra-violet sound recorder for this market while ultra-violet recording is yet the outstanding development in major-studio sound. To do this, our facilities have been expanded and centralized until every component of our recorder is built in our own factory. For those who wish variable-area, the recorder can be equipped with Art Reeves high-fidelity galvanometer.

"Glow-lamps, motors, transformers and many other parts are built completely in this plant, with the result that here, as in any other unit the manufacture of which is thus centralized, the entire equipment can be engineered as a unit, rather than as an assembly of separately planned items."

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Gevaert Revives 35mm Raw Stock

Pioneer Belgian firm enters raw stock technical progress competition with new emulsions as answer to demands of U. S. distributor George Converse and technical aide, Jack Guerin.

After five years of laying low with regard to 35mm professional production, the Gevaert organization, world's first manufacturers of motion picture film, has completed plans to re-enter this field with a bang. Their initial line-up will feature a new fast fine-grain film, with special correction for red and accurate sensitivity to other colors, a new positive and a new duplicating film.

Marketing plans are now being lined up by George Converse, who is the distributor for the United States, with headquarters in Hollywood. Converse has been working closely with Jack Guerin, who left the International Cinema lab early this year to join the organization, and has recently returned from a five months visit at the Gevaert plant at Antwerp, Belgium.

The American executives have convinced the Belgian chiefs that there is need for radical revisions in emulsion making to meet the demands of Hollywood technicians, if the organization is to take any strong position in 35mm raw stock distribution. The new products, soon to be marketed, are the first steps in streamlining the Gevaert product. Complete facilities for close technical cooperation with the studio experts along the lines now being carried on by Eastman, DuPont and Agfa, also are set.

Converse and Guerin expect to have the new type emulsions available within the next month, although the recent war scare has interfered with their original plans considerably. General reaction of Hollywood technicians to the new Gevaert plans is that their re-entry into the raw stock field will bring additional healthy competitive spirit to the rivalry of the raw stock organizations in trying to top each other with sensational technical advances.

Technicolor Expands

Technicolor is expanding its Hollywood facilities at the Cole Avenue plant, with construction getting under way last month. The new setup, it is expected, will double the capacity of the color organization to around 80,000,000 feet a year, to meet demand for the successful three-color process by major producers. The expansion, it is reported, also allows for adaptation to feature production of radical new single film color methods on which Technicolor is working with Eastman Kodak, if and when the research experts and the practical production experts get together on a decision that this process is ready for feature picture use on 35mm stock. Eventually the offices and camera department, now at the Seward Street plant, will be moved to the new spot. The latter plant will be used for experimental and research work and emergency assignments.
"Wings" Great Safety Record

Only one accident in spectacular Technicolor aviation epic at Paramount and none injured; highlights and data on camera work of super safety air job.

By Will Cline, Local 659, IATSE

"Men With Wings," Paramount's Technicolor epic of the air, is being hailed and exploited from every angle by the studio's alert ballyhoo artists, but to the men who were behind the cameras and the rudders under adverse conditions the big thing about this picture is its amazing safety record. There was only one accident during the shooting of air sequences and no one was hurt in that one.

On this page is a shot of an upturned plane in a field. The plane was flown by Dick Rinaldi and he had to make a forced landing when he ran out of gas returning from a jaunt into the ether. The plane turned over in the plowed field, but Dick escaped without a scratch.

This record is amazing to anybody famil-
now comes through with another coker in color. Wellman was with the Lafayette Escadrille in the World War and his knowledge of both the aviation and photographic problems involved made the work much easier.

And, of course, prime credit must go to those expert steel-nerved men who flew the planes. I am particularly familiar with the work of Frank Clarke, Paul Mantz and Tex Rankin, to whose skill and ability I trusted my life in many a camera ship during the picture.

It is interesting that we made hay while the sun didn’t shine in getting some remarkable combat scenes with cloud effects for this film. While Southern California suffered under its worst flood in mid-winter, we got our best stuff during that February flood week. All told, we put in about four months (weather permitting) almost constantly in the air, but we got our best stuff during February and March.

The accompanying illustrations on page 11 show various angles on how we mounted the big color cameras for the air scenes. The new type mounts now in use are light and sturdy, and their swivel design allows photographing straight up or down and a lateral movement in a circle of 180 degrees.

We shot most of our air scenes from 2,000 to 15,000 feet above sea level, and it was plenty cold. The high altitude work demands lots of warm clothes. After donning leather jacket, flying suit, overshoes, fleece-lined gloves and the 20-lb. parachute that is an absolute “must” under present regulations, one feels as though working in a straightjacket and it’s no cinch to handle that camera standing up in a 180-mile-per-hour “breeze.”

The big difference between black-and-white and color in air work is the startling contrast in ability to follow and distinguish individual planes. The audience will see the color and flash of the spectacular markings against beautiful cloud banks and the blue sky. Don’t fail to watch for some of the formations in which the nery aviators sailed “blind” through cloud banks.

Another spectacular sequence, the start of which is illustrated on page 10, is where Frank Clarke takes off a huge transport plane and the camera ship maneuvers to follow him from his roll down the incline and around up into the air in a sweeping curve.

This was my third crack at shooting color air scenes, the others being Selznick-International’s “Nothing Sacred” and Warner’s “God’s Country and the Woman.” It was a relief to get back on the ground for the comparative ease of a regulation Techni-

This array of scenes from Paramount’s off-stage shots on “Men with Wings” shows how the big Technicolor cameras were mounted on the camera ships for the photographing of the industry’s first spectacular air epic in color.
color production, "Hearts of the North," at Warners.

In conclusion, it was a real pleasure to work with such cooperative stars as Fred McMurray, Louise Campbell, Ray Milland, Andy Devine and Porter Hall; with Duke Greene and his able Local 659 aids who shot the ground production sequences; and with Technicolor technicians Paul Hill, John Hamilton and Andrew Callahan.

Finally, let's not forget those painstaking mechanics, who watched so carefully over the planes, Tod Oviat and Jim Barton. Their super-caution and unceasing minute examinations of the "crates" were greatly responsible for the production's great safety record and undoubtedly saved the lives of all concerned more than once.

SMPE's Fall Meet

Fall convention of engineering body at Detroit, starting Oct. 31; industrials feature.

DETROIT, Mich., will be the scene of the 23rd Fall, 1938, convention of the Society of Motion Picture Engineers, October 31st to November 2nd, at the Hotel Statler. Meeting in this city for the first time, the engineers of the motion picture industry will view first-hand some of the great progress that has been made in industrial motion pictures.

A comprehensive program of interesting papers and technical presentations is being arranged by J. I. Crabtree, Editorial Vice-President, and Glenn Matthews, Chairman of the Papers Committee. Karl Bremkert, of Detroit, is Chairman of the Local Arrangements Committee.

John Strickler and A. J. Bradford, of Detroit, are asking W. C. Kunzmann, Convention Vice-President, in arranging details of the convention and the banquet to be held on the evening of November 1st. Mrs. J. F. Strickler will act as hostess to the ladies, assisted by her Ladies Reception Committee.

Notable features of the banquet, to be held at the Hotel Statler on November 1st, will be the annual presentations of the Progress Medal and the Journal Award respectively. The Progress Medal is awarded annually by the board of governors of the Society, in recognition of any invention, research or development which, in their opinion, has resulted in a significant advance in motion picture technology. The Journal Award is similarly made by the board of governors to the author or authors of the most outstanding paper originally published in the Journal of the Society during the preceding calendar year. Names of the awardees will be announced at the banquet November 1st.

Hollywood has been selected as the site of the Spring, 1939, Convention, and New York for the 1919 Fall Convention.

New Agfa Setup

The contract of C. King Charney with C. King Charney, Incorporated, distributors of Agfa Motion Picture Films, the expiration date of which was October 15, 1938, has been amicably terminated, it was announced last month. The name of C. King Charney, Incorporated, will be changed to Agfa Raw Film Corporation, and the company will continue its business at its present quarters in Hollywood at 6424 Santa Monica Boulevard.

PHOTOGRAPHY

Studio Clubs Set Joint Program

Series of quarterly exhibitions gets under way with opening bang: International Photographer and IATSE members cooperating in constructive general program.

The International Camera Club, a joint endeavor of film studio camera clubs, got under way successfully last month with its first quarterly exhibition at the Beethoven Society Salon, 4950 Franklin Avenue in Hollywood. The job of bringing together the members of the various clubs in a constructive general program is receiving the cooperation of many veteran IATSE members, particularly in Local 659. Ted Krise is chairman of the joint setup and George M. Haines, members of Local 37, IATSE, and author of the Studio Mechanics' Handbook, which has been appearing in International Photographer, is secretary.

Through the cooperation of the editors of International Photographer important manufacturers of equipment such as Bell & Howell, Mitchell, Agfa, Eastman and Zeiss were represented with interesting exhibits of cameras, films and accessories. Plans now are under way for an outstanding and much larger exhibition shortly before the Christmas holidays.

Sponsors of the Inter-Studio organization are officers of the following clubs: Columbia: Paul Murphy, president; Howard Edgar, secretary; Walt Disney: William Gararity, president; Janet Martin, secretary; Douglas Aircraft: Elmer Wheaton, representative; Paramount: Douglas Rudd, chairman; Virginia Printzlau, secretary; 20th-Fox: Ralph Townsend, president; George M. Haines, secretary; United Artists: Harry Sundby, president; John Wentworth, secretary; Warners: Ted Krise, President; J. L. Edwards, secretary.

More than 500 people attended the initial meeting and as at least 100 were turned away. Plans for the next meeting will determine first on securing larger facilities. In addition to the exhibition of prints, the following program was thoroughly enjoyed: Piano recital by Betty Jane Look; lecture with slides by Ray Clafin, Eastman Kodak; demonstration of fast light shutter by Elmer Wheaton; two Technicolor shorts. The Story of Steel" and Walt Disney's "Donald Duck." All studio clubs mentioned were represented in the exhibition, plus professional prints from 20th-Fox. Among the members of Local 659, IATSE, represented in the latter group, were Gene Korrman, Frank Powolny, Cliff Maupin, Anthony Ugrin, Milt Gold and Jack Woods.

SMPE Nominees

Nomination for officers of the Society of Motion Picture Engineers for 1939 have been mailed to the voting membership of the Society. The nominees are:

President, E. A. Williford (National Carbon); Executive Vice-President, Major Nathan Levinson (Warner Bros.); Financial Vice-President, A. S. Dickinson (Motion Picture Producers and Distributors of America); Editorial Vice-President, J. I. Crabtree (Eastman Kodak); Convention Vice-President, W. C. Kunzmann (National Carbon); Secretary, J. Frank, Jr. (National Theatre Supply); Treasurer, L. W. Davee (ERPI).

Governors: M. C. Batsel (RCA); G. Friedle, Jr. (International Projector Corp.); A. N. Goldsmith (Consulting Engineer, New York, N. Y.); Homer G. Tasker (Paramount Pictures Corporation).

Two of the nominees for Governors are to be elected. President, Editorial and Convention Vice-Presidents and Governors hold office for two years; Executive Vice-President, Secretary, and Treasurer for one year. The Financial Vice-President is being elected to fill a vacancy of one year.

Officers whose terms expire December 31, 1938, are as follows: S. K. Wolf, President; Homer G. Tasker, Past-President; K. F. Morgan, Executive Vice-President; E. A. Williford, Financial Vice-President; J. I. Crabtree, Editorial Vice-President; W. C. Kunzmann, Convention Vice-President; J. Frank, Jr., Secretary; L. W. Davee, Treasurer; M. C. Batsel, Governor; A. N. Goldsmith, Governor.
Easture Service in Hawaii

De luxe attention to photographic needs of travellers pays big dividends to Billy Herman and Bill Sullivan, veteran member of Local 659.

By Ira Hoke, Local 659, IATSE.

Now that the winter season is approaching, when even the beaches of the Southern California coast will be drenched by only the hardest of bathers, our thoughts turn naturally toward our own most lovely chain of eternal summertime islands in the Pacific, Hawaii.

Always we should consider Hawaii as much an integral part of our country as any state in the Union; for while a territory, this series of islands extending for 1,500 miles diagonally across the Pacific is as truly American historically, and as modern as any part of the mainland.

Among this vast archipelago, comprising scores of islands, five stand out in a group known the world over as Hawaii. Reading down your map from northwest to southeast they are: Kauai, Oahu, Molokai, Maui and Hawaii. On Oahu, next to the most northerly island, is built that most beautiful and commercially important city of the Pacific, Honolulu.

This capital city of the islands lies on its lovely harbor, flanked on the east by Diamond Head and on the west by the Pearl Harbor naval base. Towering behind, not unlike the hills of California's Hollywood, the Koolau Mountains rear green majestic pinnacles.

As the holy men of the ancients dreamed of that fabulous Arabian city, Mecca, so photographers from over the world today dream of the glories of Hawaii. And this is rightly a comparison, for probably nowhere else in the world in an area so comparatively small can one find a diversity of seascapes, mountain fastnesses, cloud-capped pinnacles, beautiful valleys and unscalable precipices.

Unlike those holy men of long ago who dreamed of Mecca, but seldom beheld the wonderful city, thousands of photographers from every land yearly visit Hawaii, and when they at last reluctantly leave, their dreams are fulfilled and their negative boxes overflowing. So let us begin our story as the photographer, amateur or otherwise, will see the "Islands" this winter vacation season.

First comes the entrancing steamer voyage over the most romantic ocean in the world. Occasionally fortunate passengers glimpse the China Clipper winging its way westward. On calm days that most graceful of all bird fliers, the black albatross, parallels the ship's course for hours on motionless huge wings. Then one dawn the island Molokai rises from the ocean off the port bow and shortly after Makapu Point, easternmost headland of Oahu, breaks through the mist almost dead ahead. Then Diamond Head, like a great emerald in the early sunlight, looms to starboard as the steamer loses headway just outside Honolulu harbor.

Debarkation is always a gala affair accompanied by enchanting native music of the Royal Hawaiian band and the wholesale greeting of friends and strangers alike with leis of freshly strung flowers. As passengers hurry down the great ramp toward the taxi stands each is courteously presented with a yellow cellophane-covered card on one side of which one reads "Compliments of the Eastman Kodak Stores," while on the reverse side is printed a comprehensive exposure table for Honolulu. This is the photographer's first introduction to that live wire Kodak man of the South Seas, F. B. Herman, known affectionately by all camera fans as "Fritz."

As manager of the Honolulu Eastman Kodak Stores, Fritz Herman has become an institution embodying "service" to all who make photographs throughout the South Pacific. Every visitor to his stores is made
RKO's "GUNGA DIN"

COMBINING action with beautiful photography these highlights from the still set on RKO-Radio's "Gunga Din" are excellent examples of the work of Alex Kahle, veteran member of Local 659. Graphic and virtually self-explanatory, they show off-stage and action scenes from the location trip to Lone Pine, California, at the foot of Mt. Whitney, where most of the exteriors were shot. Stillman Kahle and Camera-man Joe August, Charles Burke, second, and Charles Stau-mer, assistant, worked under such handicaps as temperatures up to 115 degrees and high winds that more than once endangered the lives of camera crew and technicians atop a 40-foot parallel.
By Alex Kahle

And here is the stillman with jitterbug elephant and trusty camera.
NEW CHAMPION SILENT

Duarc, the industry's new endurance champion (above), remained silent today despite searching quiz by star reporters Mike R. O'Phone and R. E. Corder. Pairs at last retired baffled, admitting they were unable to evoke a sound from the brilliant new champion.

DUARC TO NEW YORK

With Hollywood studios clamoring for services of champion Duars, New York's filmmakers have joined the demand parade. As a result, a squad of Duars, this week enthralled for Manhattan, where they will reinforce Charles Rosier's 11th Avenue and 84th Street base. The studio's branches are in New York, Hollywood, Philadelphia, and Chicago, where the company has affiliations with dealers in those cities. The new edition of Duars, the latest in a long line of improved models, boasts a unique feature that is sure to catch the eye of any photographer. The new Duarc is the most popular camera in the world, and it has been widely praised for its reliability and ease of use. The company has been in operation for over 50 years, and its products are known for their durability and quality. The Duarc is a trusted name in the photography industry, and its reputation is built on a commitment to excellence. It is no wonder that Hollywood filmmakers are clamoring for its services.

DUARC IS PRODUCT OF MOLE-RICHARDSON

Duarc, the sensational new twin-arc endurance champion, is the latest in a series of product improvements from MOLE-RICHARDSON COMPANY, 941 North Sycamore Avenue, Hollywood, California. These products are designed to meet the highest standards of quality and reliability, and they are backed by a team of experienced engineers and technicians. The company's commitment to innovation and excellence is evident in every product it produces. Duarc's new twin-arc endurance champion is a testament to its dedication to quality and performance. The company's reputation is built on a commitment to providing customers with the best possible products, and Duarc's new twin-arc endurance champion is no exception. It is sure to meet the needs of even the most demanding photographers.

DUARC UP FOR "WIZARD"

Several MGM technicians are said to favor Duarc for the role of "Wizard of Oz." One recently pointed out that though Duarc made no claim to increased brightness, it obtained better results with it at 8 feet than with previous twins at 1 feet. "If that's not wizardly," he says, "I'd like to know what is?"

OLD MARKS TOTTER BEFORE NEW CHAMP

Continuing its record-breaking upswing, Duarc, M.R.'s new endurance champion, this week proved its mettle on a major-motion picture set. Working on actual production, Duarc operated a full working day on a single strip of camera, with no attention or adjustment other than switching off between takes. In more than thirty years that movies have been filmed under arcs, no twin had approached this record.

Previous twin-arc endurance mark, established several years ago by previous M.R. twin, had stood at 10-minute operation between retakes. Early last month Duarc shattered this record with a sensational run of 2 hours, 10 minutes, 22 4/5 seconds under official timing.

Insiders point to this record as key to speeding up color film production. Ranking high among delays of color production, they say, is time spent retouching batteries of floor and overhead twin-arc. Latter especially are seen in inaccessible, Duarc, able to operate without trimming for half a day or a day speed. Production noticeably.

To Fritz Herman it offered an opportunity of service. On Sunday, February 20th last, through special arrangement with the railway company, Herman inaugurated the first "Camera Train" in the South Seas. The holiday excursion, with stops at all the scenic views and plenty of time for a picnic lunch, was advertised in the local papers and from estimates of ticket sales five special cars were arranged for. On Saturday afternoon preceding the trip, ticket sales warranted several additional cars, but on Sunday morning realities exceeded all expectations when it was found that fifteen passenger cars were necessary to accommodate the throng of photographers packed along the station platform, eager to bag picture scenes along a route so inaccessible.

At the Waikiki store, Manager William Sullivan, well-known in Hollywood as a Local 659 member, has coached novices in camera technique with remarkable results. Last summer he had on display in the Kodak windows one of the most remarkable series of surfboard stills ever made; they were snapped by a native student of Sullivan's.

Many years of professional movie work in Hollywood stand Sullivan in a unique position. The surfboard kingdom of the world lies directly across the street from Kodak at Waikiki, and on favorable days he leaves shop for an hour or so and shoots several hundred feet of Kodachrome 16mm. close-ups of native surfers. These cuts with their definite professional touch may be purchased at a nominal price and cut into any island visitor's memory reel.

Nowhere in all the world does one en-
KING OF FILMS


EASTMAN SUPER X
PANCHROMATIC NEGATIVE
counter the gorgeous sunset colors found at certain seasons in Hawaii. Of course all the photographic minded folk cannot pick these unusual sunset seasons for their vacation, yet no more fitting close to a 16mm. reel of the South Seas can be imagined. Sullivan long ago realized this shortcoming and began a collection of scenes under ideal conditions available only to a resident cameraman. Cuts of any length are now obtainable at the Waikiki store and few of the 16mm. fans who call there leave for the mainland without a generous footage of his masterful coco-framed sunsets in Kodachrome to top off their reels of island vacation pictures.

Everyone who journeys to Hawaii expects to encounter hula dancers at every turn, but in reality they are almost as rare as movie stars on Hollywood Boulevard. For the amateur photographer to catch snaps or movies of real hula girls was until recently almost impossible. Once again Fritz Herman came to the rescue, and made arrangements for a weekly open air performance especially for photographers, with ideal light and background conditions. This features a troupe of authentic and famous native hula girls in ancient tribal dances. The shows take place on the beautiful lawns of Waikiki natatorium park, on the very ground and with the same wonderful background of coco palms and blue Pacific that once formed the setting for tribal festivities of the early Hawaiians.

**Big Negative Strips**

Fred Parrish, Local 659, gets sequence action effects without sacrifice of photographic quality.

ACTION TO Fred Parrish, veteran stillman member of Local 659, means just that, and Parrish, a former ace news photographer, has a record of getting action in his stills. The news-worthy shots illustrated herewith are typical of Parrish's work, which was particularly outstanding from an exploitation standpoint in his space-getting stills of William Wellman, Carole Lombard and Fredric March for Selznick International's "Nothing Sacred," earlier this year.

Parrish was one of the pioneers of the "magic eye" type of shot for sports and other news coverage assignments in the newspaper field, but he believes that for motion picture exploitation much better photographic effects can be obtained by careful planning, while the cameras with larger negatives than the customary 35 mm of most sequence photography.

Two top pictures on Page 20 are typical examples. They were shot with two 8x10

Two sensational action stills by Fred Parrish, Local 659, IATSE, made for Republic's "Dick Tracy" adventure picture. Top shot of a projection background sequence has whiz-bang action with neat matching of players and projected background.
A Camera is No Better Than the Movies it Makes

The designers of Ciné-Kodak Special have built into one compact machine every refinement necessary to the making of 16 mm. movies—"professional" in scope, strictly "amateur" in ease of attainment. Fades, dissolves, double and multiple exposures, spring motor drive or hand cranking, animation, mask shots, interchangeable lenses for a double-lens turret, ground-glass focusing, interchangeable 100- or 200-foot film chambers, automatic footage indicators, individual film foot meter, single frame counter—these are some of its many unusual features.

Yet, despite the unparalleled versatility of the "Special," so many and so varied are the tasks to which it is put that its users—advanced amateurs, physicists, engineers, doctors, biologists, visual educators, athletic instructors—have frequently requested special apparatus to enable them to go even further in their work. Most of these devices obviously could not be properly added to the basic model. So they have been designed and offered as accessories: a lens extension tube outfit for almost microscopic magnification; three different electric motors for automatic or remote control exposures; an electric release control outfit, battery operated, for growth studies and other time-lapse filming—to mention but a few in this limited space. And other devices will be made when, and if, necessary.

If this sounds like the camera you need to lift your film efforts to the plane where they belong, ask your dealer about Ciné-Kodak Special, or write Rochester for the full story—"THE STORY OF THE WORLD'S FINEST 16 MM. MOVIE CAMERA."

EASTMAN KODAK COMPANY, ROCHESTER, N.Y.
More action by Fred Parrish, this time from Republic's "Army Girl," which won much favorable critical comment as smartly produced action picture. The two top scenes, though apparently from a sequence strip were made with 8 x 10 cameras. Parrish used two of them clicking one slightly after the other to get sequence effects with sharp detail on the large negative.

cameras, one right after the other. Parrish believes another way to get sequence effects is to take advantage of rehearsals and takes. Advance study of the script by the stillman will enable the alert photographer to plan a series of shots that will have excellent photographic quality for reproduction and still get over the sequence idea, no greatly in vogue.
The Art of Make-up Article Two

Second in series of practical and informative articles on modern motion picture studio make-up technique. By Vernon M. Murdoch, Business Representative, Make-up Artists Local 706, IATSE.

(With this article on the application of make-up foundations, we resume our series on the art of make-up as practiced under professional motion picture conditions. The author, Vernon M. Murdoch, is the business representative of Make-up Artists Local 706, IATSE, and a veteran and distinguished practitioner of the craft, whose lectures on the subject at Los Angeles arts schools are very highly regarded. Arrangements are now being made by the author and the editors of International Photographer to secure a complete layout of practical illustrations for this series, with the kind cooperation of studio publicity directors and stillmen members of Local 659, IATSE.—Ed.)

In picking up from the March issue, when we discussed make-up generally, the basic principle of all make-up and the predication of a good or bad make-up is entirely dependent upon the base used, the method of application and the manner of application. This cannot be too strongly emphasized. In preparing a wood surface you are about to paint you must first prepare the surface to receive that paint. If you do not, then you have a messy, uneven job of painting. The same applies to the application of a make-up foundation, for if you do not evenly cover the surface with the same consistency of material, the same diameter of material equally distributed over the entire face, your make-up will be incomplete, irregular, and in all probability will photograph as dirty looking.

There are many and various make-up base materials in use in the industry today, but all have approximately the same consistency. Therefore, the manner of handling these bases is approximately the same. First, if you are working on the face only, and desire to blend the make-up out at the neck-line, use from about one-half to three-fourths inch of base, or, about as much as would cover the thumb nail, and apply in the center of the palm of the left hand. Now take the middle finger of the right hand and with a circular motion work this base up to the consistency of a thin oil. This will be facilitated by the temperature of the palm of the hand.

Next, place the remaining fingers of the right hand into this material now in the palm of the left and apply it to the face of the subject by touching the face in such a manner as to distribute over the face a series of spots. Having covered the area desired with this base, now with a circular motion of the right hand distribute further from these spots the base applied to the face so as to give an equal consistency both for color and diameter of material over the entire face, the ears, if exposed, under the chin, and on the neck, and blend it out to nothing at the neck line. There is one point in particular which has been omitted in our opening paragraph and that is this: The face of the subject should be cleansed, preferably with soap and water, so as to remove all make-up such as powder bases, eye-shadow pencils, mascara, both motion and dry rouges. This is very important for, if this is not done, when applying your grease base you come into contact with that portion of the face from which there is the natural secretions, when grease meets grease the grease will miss on these points of secretion and load on the points which are dry, which tends to give you an uneven base.

Having completed this operation, the next step is to cleanse the hands. Take a quantity of witch-hazel in the palm of one hand, rub the hands together, and by a gentle pressing or slapping motion pat the entire surface now covered with the foundation. Now, again cleanse the hands and repeat.

The purpose of this operation is firstly to decrease the diameter of the make-up base applied to the face which when the powder is applied will be thinner and permit a free actuation of the face without giving the effect of, or making the subject conscious of any mask-like effect. Also, it is the same principle as previously expressed in reference to painting. If you use a brush on a wall with a regular stroke you are bound to show in your paint the bristle-marks of the brush, but if you take a large brush and stipple the surface an even grain and texture is the result. This applies to the handling of the foundation in the same way to produce the same effect.

The foregoing is for the application of grease foundation only. In the event that you are using a water soluble material as a base such as pan-cake make-up, body liquid, or a self-saponifying powder base then the method is as follows: The cleansing of the face as in the first instance here expressed is the same. The next is to take a quantity of the material to be used, first making sure that when it is a wet ingredient that it is thoroughly mixed or shaken up. Put a quantity of this material in a receptacle, use a soft silk sponge which has previously been well-soaked and squeezed dry. Dip this in the material and apply the material to the face with even strokes, being careful that no quantity of the material collects in the natural crevices and orifices of the face.

Having done this, now take the hands, which have been cleansed, and with the same circular motion previously mentioned smooth the entire surface. There are many mediums, manners, and methods of doing these aforementioned operations. But in the experience of the writer these have proved to be the most satisfactory and effective. It is in my opinion better to express and explain any method by simple direct terminology and phraseology than by high-sounding technical phrases. Therefore I trust that the foregoing is clear in the manner described. This practically constitutes all that is required in the application of make-up foundations. The next step in completing a make-up will be given in the next issue of International Photographer.

PATENTS

Last month the following patents of interest to readers of International Photographer were issued by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and trade mark counsel.


A film advancing device having spring mounted claws to engage the film, a spring to advance the claws and film, and a crank-operated mechanism to disengage the claws and move them back to the first position.
INTERNATIONAL

Claims.

A plurality series and a plurality of said layers being from finely divided material.

No. 2,122,946—Film Feeding Mechanism. Pedro Lira, Santiago, Chile. Application Dec. 30, 1934. 4 Claims. (Cl. 88-18)

A film feeder having a reciprocating film carrier, a rocker for producing and transmitting reciprocating motion to the film carrier, and a compressed air operated piston and cylinder means for continuously forcing a contact between the rocker and the film carrier.

No. 2,123,445—Film Developing Apparatus. John F. Van Lawen, Los Angeles, Calif. Application Sept. 7, 1937. 15 Claims. (Cl. 271-23)

A motion picture film developing device wherein the film passes over a spool so as to force the spool against a drive roller when the film is shortened.

No. 2,123,329—Apparatus for Making Process Shots in Motion Picture Photography. Stephen Geison, assignor to Columbia Pictures Corp. of Calif., Ltd. Application April 3, 1936. 4 Claims. (Cl. 88-16)

An apparatus for making process shots in motion picture photography, a stage floor, a supporting member pivotally mounted at one end to swing horizontally over the floor; camera, screen and projector units suspended from the supporting member in such order and means for moving said units relative to each other free of the floor; and means for swinging the supporting member.

No. 2,124,139—Apparatus for Developing Films. Glen M. Dye, Minneapolis, Minn. Application Dec. 31, 1934. 21 Claims. (Cl. 95-89)

A machine for developing films, having receptacles for holding developer, etc., a conveyor with carriers for immersing the film in one receptacle, raising the film, advancing it, and lowering it into the next receptacle, a device for imparting a series of vertical reciprocating movements to the film while it is in the receptacle, and a series of baffles to prevent fogging of the film.

No. 2,124,139—Apparatus for Projecting Lenticular Film. John Eggert and Gerd Heynner, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main, Germany. Application Nov. 3, 1934. In Germany Nov. 8, 1935. 4 Claims. (Cl. 88-16.4)

Apparatus for projecting motion pictures in natural colors comprising a source of light, a cylindrically lenticulated film bearing color records on the lenticular side of which film faces the light source, said film being positioned in an aperture of a prism, a prism grating movable in the vertical axis of the prism and in a plane parallel to the film gate aperture and composed of a plurality of prisms which are wider than the lenticulations of the film, the individual prisms being radially arranged about the periphery of a disc, the axis of rotation of the ring being parallel to the central axis of the film gate, said grating being movably supported between the light source and the film in a plane parallel to the film with the prism grating including the range of colors from the extreme blue to the extreme red imaged by each lenticulation in register with the color filter records back of the lenticulation and with the long axis of one of said prisms of said grating which fall directly between the light source and the central axis of the film gate parallel to the film lenticulations, and means for rapidly moving the prism grating in a plane so that said prisms move in a direction substantially transversely to the film lenticu-
tions at a rate sufficient to render invisible dark strie produced by the edges of the prisms.

No. 2,124,297 — Polarization Device for Cameras. Karl Herrman, Jena, Germany, assignor to the firm of Carl Zeiss, Jena, Germany. Application May 12, 1937. In Germany May 30, 1936. 2 Claims. (Cl. 95-64)

A light polarization device for cameras which is hinged to permit of its being placed or removed from in front of the lens, and may be rotated in order to transmit the various planes of the incident light.


A film pull-down mechanism comprising the combination of a film advancing member, a rocking slide bearing for said member, an eccentric, a drive shaft for said eccentric, a connecting member slidably connected to said bearing and pivotally connected to said eccentric, means for imparting an oscillating motion to said film advancing member under control of said connecting member, a second connecting member pivotally connected to said eccentric, a cam, an operative connection between said second connecting member and said cam, a cam follower for said cam and an operative connection between said cam follower and said film engaging member for imparting a film engaging and disengaging motion to said film advancing member.

No. 2,124,571 — Method of Producing Photographic Image Carriers Provided with Precipitants for Coloring Dyes. Richard Gschopf and Karl Pökorn, Austria; said Pökorn assigned to said Gschopf. Original application Jan. 10, 1934. In Austria July 22, 1933. 2 Claims. (Cl. 101-149)

A method of producing a carrier for inhibition dye prints in which the gelatine layer is provided with precipitants for the dyes, consisting in introducing ammonia into a solution of gelatine, adding a dye mordant in the form of a complex acid thereto, adding acetic acid in amount sufficient to react with the ammonia to form ammonium acetate, and utilizing the resultant solution for making a carrier film.

No. 2,124,587 — Motion Picture Projector. William J. Morrissey, N. Y. Application Nov. 26, 1934. 2 Claims. (Cl. 88-16.2)

In a motion picture device, a motion picture film strip, a frame, a film gate, a sound gate spaced apart from said film gate, a series of free rollers for guiding the film to and from said sound gate, some of which are positioned between said gates, said series of free rollers being provided for carrying the film strip with a minimum of sprocket tooth ripple, an arm pivoted on said frame, an engaging roller carried by said arm and normally positioned in engagement with one of said free rollers positioned between said gates, a stud carried by said arm and spaced apart from said engaging roller whereby when said arm is turned to disengage the latter from said arm free roller for threading the device, said stud and said free roller define a predetermined length of film between said film gate and said sound gate adapted to form a loop when the arm is turned to re-engage said engaging roller with said arm free roller, and a sprocket spaced apart from said series of free rollers for pulling said film strip along a path formed by said free rollers.

No. 2,124,958 — Take-Up and Rewind Assembly for Motion Picture Projectors. Otto Wittel, assignor to Eastman Kodak Co. Application Dec. 17, 1936. 12 Claims. (Cl. 242-55)

In a motion picture projector, the combination with a support, a supply reel mounted thereon, a take-up arm pivotally mounted on the support, a spindle journaled thereon, a take-up reel on said spindle, frictional driving means for said spindle, said driving means normally supporting the take-up arm and its associated parts whereby
the frictional engagement varies with the weight of film on the take-up reel, a rewind mechanism for driving the supply reel, a control lever for starting and stopping said rewind mechanism, of a means connecting the take-up arm and the control lever whereby the arm may be raised upon movement of the lever, the arm is prevented from flying upwardly during rewinding, and the arm is supported thereby upon failure of the frictional driving means to act as a support, said means comprising a bracket having one end connected to the control lever through a pin and slot connection, the other end of said bracket being pivoted to the take-up arm.


The method of producing multi-color moving picture films in a predyed multi-layer light sensitive silver halide material, having at least three layers differently colored by dyestuffs of the shades necessary to form a multi-color image and each being predominantly sensitized for a spectral range such that each of the part images of said multi-colored image may be independently printed into said multi-layer light sensitive silver halide material, and a light sensitive supplementary layer having a sensitivity range different from that of the immediately juxtaposed light sensitive layer and being dyed with a dyestuff which absorbs sufficient light rays throughout the visible spectrum to give a substantially grey to black appearance, which comprise printing the multi-color part pictures into said material, printing another image into said supplementary layer, developing and fixing the latent silver images and selectively destroying the dyestuffs in proportion to the silver deposit.

No. 2,127,829—METHOD OF PRODUCING COLOR EFFECTS IN PHOTOGRAPHY. Willis H. O'Brien, Los Angeles, Calif. Application April 28, 1936. 2 Claims. (Cl. 88.16.4)

The method of producing colored photographic effects in motion pictures, which consists in photographing with a color camera a scene having portions of said scene lighted with a predetermined light intensity to cause said color camera to register said portions of said scene, preventing said color camera from registering other portions of said scene, photographing another scene, adding portions of said other scene to the color film produced by said color camera by projecting said second scene upon a screen, coloring said image projected onto said screen or selected portions thereof with desired color values, and re-exposing said color film in a color camera to photograph said projected and colored image on said screen upon the unexposed portions of said color film.

Editorial Note

The accompanying article on projection practice and equipment by C. N. Batsel, of RCA, is part of the symposium lined up by Paul R. Cramer, member of Local 150, IATSE, and contributing editor on Projection News. The editors of International Photographer regret that lack of space has caused us to withhold until succeeding issues, not only Mr. Cramer's own notes on projection news, but also a number of interesting news stories in other departments as well as our regular Books of Tables in various technical fields.

When the push-pull type of sound record is used, the minimum separation between the two halves of the sound record shall be 0.152 mm. (0.006 inch). When the squeeze-track is used with the variable-density record, the width of the sound record shall be 1.93 mm. (0.076 inch).

These dimensions and locations are shown relative to unshrunk raw stock.
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Hollywood, California, U. S. A.

engineers were in possession of approved films for locating the scanning light beam in the proper place. The test films referred to are made according to the standards set up by the Society of Motion Picture Engineers and are also approved by the Academy of Motion Picture Arts and Sciences. They are designed to locate the beam of light in accordance with Fig. 1, which is a reprint from the Journal of the SMPPE, Vol. XXX, No. 3, 1938. It shows that a scanning beam should be 84 thousandths of an inch in length, so that it will cover an area beginning 12 thousandths of an inch from the film sprocket holes and extending to within 25 thousandths of an inch of the picture area. The width of the area scanned being 84 thousandths of an inch, it is eight thousandths of an inch wider than the actual width of the approved sound track, which should be 76 thousandths of an inch and is located so that the center line of the track coincides exactly with the center line of the scanning light beam.

WIDTH OF TRACK. Sound track printers were designed so that they print or expose an area 100 thousandths of an inch wide that extends from a distance four thousandths of an inch from the sprocket holes to within 17 thousandths of the picture area. The extra width of the printed area is provided to insure that at no time will the scanning beam overhang the edge of the printed area, thus reproducing edge noise. It also provides limited tolerance for wear in the printing operation and in the soundhead.

The reproducer scanning beam being eight thousandths wider than the 76 thousandths sound track provides tolerance for wear in the reproducer, printers, and in the reproducer itself, up to this amount. Track positions that are off more than that amount will, of course, not be properly scanned.

WEAVE OF FILM. In the design of reproducing equipment provision has always been made for guiding the film past the scanning point. This is usually done by placing flanged guiding rollers in close proximity to the scanning light beam. These flanged rollers sometimes employ a fixed flange on the edge next to the sound track and a spring pressed flange on the other edge. This type construction permits the film to be continually pressed against the fixed flange. This generally insures that the sound track will pass the scanning light with a minimum of displacement.

The earlier design of reproducers employed a straight or curved friction sound gate as illustrated in Fig. 2, with a spring shoe that pressed on the film, keeping it in contact with the gate surface and consequently in the focal plane of the scanning light. The flanged guiding roller was usually placed at the top of the gate with the pull sprocket, which was usually coupled to the driving mechanism through a mechanical filter, either directly below the gate or placed in such a position that the film would pass over filter rollers between the sprocket and the gate.

Gate type reproducers are difficult to maintain and they are subject to the following troubles:

Worn spring shoe, which will result in the track running through in a misplaced position;

Spring tension on the shoe, if not properly adjusted, will introduce chatter, flutter, and sprocket hole rasp;

Lubrication wax, oil and dirt will collect on the shoes and gate causing chatter and flutter;

Worn pull sprockets will introduce sprocket hole flutter and rasp.

A great amount of research and design work has been done by the manufacturers to produce a soundhead reproducer which would be free
The machine is started. On the inside of the shell and mounted on a ball bearing concentric with the shaft is a wheel. This ball bearing mounting allows the wheel to rotate independently of the outside shell. The shell is filled with a specially selected oil of the proper viscosity to provide a "coupling" between the wheel and shell sufficient to bring the wheel up to speed with the outer shell when the machine is running. This "coupling" also enables the wheel to keep the shell and drum rotating at constant speed if the sprocket should momentarily slow down and cease pulling on the film. This type of construction is a "damped" device as it will not hunt or oscillate, since any tendency for the shell and drum to change its speed is immediately resisted by the pull of the free-running wheel through the oil coupling between it and the outer shell.

The pull sprocket which propels the film forward and rotates the stabilizer is driven through specially cut gears which insure its having constant speed. It is protected from take-up disturbances by the holdback sprocket which is located at the lower right-hand corner of the soundhead.

The entire sound reproducing mechanism, including the optical system, stabilizer, photocell and photocell transformer, is mounted on cushioned shock-proof mounting. This type construction prevents jar and mechanical vibration from getting to these parts and introducing micro

from gate and sprocket troubles and be capable of delivering sound to the amplifiers with good fidelity without introducing speed changes and unwanted noises and disturbances.

The result of this effort is the modern rotary stabilizer and soundhead illustrated by Fig. 3, which is a photograph of a M11030 RCA stabilizer soundhead. The features of this soundhead that make such sound reproduction possible are the rotating sound drum, the rotary stabilizer, and an optical system that employs an imaged slit on the film at the point of sound takeoff. The feature that insures freedom from vibration noises, such as microphone lamps and photocells, is the special cushioned free-floating mounting of the entire sound reproducing mechanism.

Constant location of the film as it passes the scanning light beam is obtained by the combination pressure and guide roller which holds the film in contact with the rotating drum at a point just above the sound takeoff. This roller, shown in detail in Fig. 4, is mounted on ball bearings so as not to introduce a back-drain or load on the film between the rotating gate and the pull sprocket. This roller has an adjusting nut so that it can be moved laterally and if found out of position it should be located and locked into the proper position by an authorized factory engineer with the aid of the track locating film previously mentioned.

Flutter. The rotating gate and rotary stabilizer combination, film path, and optical system employed in these soundheads are shown in their relative positions in Fig. 5. The principle upon which the mechanism operates to insure constant speed is the drum, which is mounted on the shaft whose other end carries the rotating stabilizer and is turned by the film as it is pulled forward by the pulling sprocket. This shaft is mounted in selected ball bearings and turns so lightly that only approximately two ounce-inches of torque is required to drive it at full speed. This light driving torque together with the soft loop of film formed by the film between the drum and the pulling sprocket prevents all ripple from the sprocket teeth getting back to the sound takeoff point. The rotating stabilizer is shown in Fig. 6 and consists of a magnesium, oil tight, hollow shell which is mounted exactly like a flywheel and fastened to the shaft. Being light in weight, this shell is easy to start from standstill and does not impose a hard pull on the film that so often damages sprocket holes when
phonop noises into the system.
The rotating drum will not collect wax and
and does not impose a strain on the film
with, consequently the sound is reproduced
of disturbances and speed irregularities.
Maintenance of equipment of this type is low
as there are no springs and shoes on the gates
between shoes and gates; hence the sound
is reproduced free of all disturbances and speed irregularities.
Consequently the sound is reproduced
free of all disturbances and speed irregularities.
Maintenance of equipment of this type is low
as there are no springs and shoes on the gates
requiring replacement and wear on the sprockets.
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BETTER THINGS for BETTER LIVING through CHEMISTRY
New Kodak 35's

Three new moderately-priced miniature cameras, the Kodak 35's, announced this month by the Eastman Kodak Company, incorporate many technical advantages generally associated with miniature cameras in a higher price range. Automatic control of film-centering and winding, automatic exposure-counting, lenses corrected for either black-and-white or full-color photography, and, in the models with faster lenses, a built-in self-timer and automatic device for preventing double-exposures, are among the features which will appeal to all camera users.

The Kodak 35 with Kodak Anastigmat Special f:3.5 lens has a Kodamatic shutter with five speeds to 1/200 second, plus self-timer. The shutter is set automatically for the next picture as the film is wound. This model will retail at $39.50. Another model, equipped with Kodak Anastigmat f:4.5 lens and Kodak Diomatic shutter with four speeds to 1/150 second, also has a built-in self-timer and a similar fully-automatic device for preventing double exposures. This model, with f:4.5 lens, will retail at $29.50. Both of these cameras have a convenient clip for attaching a Kodak Pocket Range Finder.

A third Kodak 35, equipped with Kodak Anastigmat f:5.6 lens, has a Kodex shutter with three
AGFA f.6.3 Clipper Special

The AGFA PD16 Clipper Special camera, an entirely new camera with a modern design similar to the Agfa Clur-Lux model, introduced earlier this year, has just been released and is now being shown by photographic dealers. The new Clipper Special is fitted with a fully corrected f.6.3 Anastigmat lens designed for shutter speeds of 1/25th to 1/100th second, as well as bulb and time. The Clipper gives fifteen 2½x3½-inch pictures on a roll of PD16 film, same size as 616. A telescoping, metal, pull-out bellows permits opening of sharpest for use. This type of construction does away completely with the necessity for bellows and is consequently "light leak-proof." The Clipper is supplied with a leather-covered frame and smoothly finished with a black-grained, waterproof covering and exposed metal parts finished in polished metal and black lacquer. Other specifications include an optical, direct-view finder, tripod socket, a convenient depth of focus scale, a hinged back and easy loading arrangements, and special eyepieces for attaching a neckstrap.

Professional Kodachrome

This month Kodachrome Professional Film for direct-color photography is available in cut-film sizes up to and including 8x16 inches, and in a type precisely color-balanced for high intensity tungsten illumination.

Identical in principle with the Kodachrome which has proved so successful for miniature cameras, Professional Kodachrome differs only in its suitability to professional and studio photography.

Kodachrome Professional Film is used with the same ease and simplicity as No. 135 and 828 Kodachrome Film for miniature still cameras. It is suitable for use in any camera which takes standard black-and-white cut film. Film holders are loaded, and single exposures made, in the usual fashion. A single exposure produces a positive print with full color. Fully color-corrected Anastigmat lens capable of good three-color work is suitable for color photography with Kodachrome.

While similar in purpose with which Kodachrome may be used is due to its structure. Through a single film, it has three separate emulsions—each selectively sensitized to a different part of the spectrum. Dry prints of each are made from each action as color filters and record the colors of the subject as negative image—in perfect, permanent register. In processing these negative images are converted into a full-color positive. Professional Kodachrome Film will, for the present, be processed only at the Eastman laboratories in Rochester.

Characteristics—Professional Kodachrome Film, Type B

Use: Single exposure in regular camera produces positive transparency in full color, without screen pattern.

Lighting: Balanced for high intensity clear Mazda Lamps.

Filter: None, when appropriate type of artificial light is used. Written 85-B for outdoor pictures.

Speed: Approximately one-third that of Eastman Portrait Panchromatic Film or Eastman "SS" Pan Cut Films.

Exposure Latitude: Moderate.

Tripod: Extra-sturdiness is useful only, without charge if three or more films are returned for processing at one time.

Sizes: Popular sizes up to and including 8x10 inches.

Kodachrome transparencies are free from screen patterns and have the extreme fineness of grain characteristic of the reversal process. The transparency may be examined as a proof, used for engraver's copy, used for the production of full-color prints on paper, by the wash-off relief method or other suitable medium, or for screen projection with suitable equipment.

Professional Kodachrome Film for studio use under artificial light will be known as Type B and will require no filter when used with light of correct color-quality.

The Type B film is color-balanced during manufacture. The film is so designed that lights are operated at a color temperature of 3200 degrees K. This type of light represents the average quality of light normally used for black-and-white commercial photography—that obtained from clear bulb xenon lamps of proper color temperature.

Types of Kodachrome can be used with Kodachrome Professional Film and Kodachrome Film: Type A, Type B, Type B, Type C, and Type D. All Kodak ASDs, Type C, and Type D are to be processed in Kodak laboratories.

The viewfinder is of long, tubular type, particularly easy to use because of the clear brilliant image it provides. It is mounted on top of the camera, and used at eye-level, thus insuring pictures which have the normal point of view a scene to be the picturemaker.

Focus is preset, with all objects beyond 10 feet for the Six-20, and beyond 15 feet for the Six-16 in permanent sharp focus. For pictures of near subjects, a supplementary lens is brought into action by pushing a lever just below the lens mount. An ingenuous safety catch locks the shutter release so that exposures cannot be made accidentally. Time exposures can be made with the shutter lever pressed. The lens muff is mounted in a fabric carrying cases with shoulder straps, and slide fasteners are available.

The Brownie Specials are suitable both for day lighting and for flash. They are light and compact, and are available for use when loaded with the new high-speed Kodak Super-XX Film. Prices are: Six-20 Brownie Special, $4; Six-16 Brownie Special, $4.50, and the Six-20 takes pictures 2½x3½ inches, and the Six-16 takes 2½x4½-inch pictures.

New Eastman Aids

Three new accessories for either miniature cameras and larger-size models are available for Eastman Kodak Company.

The tripod is a camera support for table-top photography, still-lifes, and many other indoor pictures. It is used on a convenient support—table, chair, or floor. The device also will prove useful in many outdoor picture situations.

Legs of the Tripod are sturdy and without joints. They unscrew from the solid metal head. The outfit can be carried easily in a pocket. The tripod has a leg-spread of 9½ inches, and 7 inches high. Each leg is rubber-tipped, notskid, and will not scratch or mar polished surfaces.

The Kodak Pan-a-pod is a revolving head, for use on the Tripod Top Tripod or any other tripod with standard screw. It insures a smooth, easy swing in either direction when panoramining with a still or motion-picture camera. The Pan-a-pod carries degree markings, helpful in making "panorama" pictures with a still camera. For a panorama, a series of pictures is made, the Pan-a-pod being turned the proper number of degrees each time, for a slight overlap. Almost a full circle can be pictured with the device. A locking screw holds the center of the Pan-a-pod head at any selected setting.

The Kodak spot copying camera support for use on any standard tripod. With it, a still or movie camera can be tilted to any desired angle and held firmly there with a turn of the locking screw. The device is rigid when locked, permitting long exposures without camera movement.

These devices may be used separately, or in combination. They are styled to make an attractive, convenient combinations, and, when used, provide: Kodak Tripod Top Tripod, $1.75; Kodak Pan-a-pod, $3; Kodak Tripod spotting Camera, $2.50; and all three in combination $7.80.
On the Cover: As early as July studio still departments start posing stars for the fall and winter holiday spirit art. Here is a beautiful shot from the Universal still department's portfolio of wintry scenes. The player is Nan Gray and the picture was made by Ray Jones, member of Local 659, IATSE, and chief of the Universal department.

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**Super-XX in Popular Sizes**

Four times as fast as ordinary films, and heretofore available only for miniature cameras, Kodak Super-XX, one of Eastman’s new series of emulsions, now is obtainable in all the popular rollfilm sizes and in film packs.

So sensitive is the new film that an inexpensive box camera, loaded with it, is about equivalent in speed to a camera with f/6.3 lens when loaded with ordinary film. Similarly, the f/6.3 camera, loaded with Super-XX, has a speed which approximates that of a camera equipped with f/3.5 lens when ordinary film is used.

Intended for the shortest possible exposures and for use under adverse lighting conditions, Kodak Super-XX is especially adapted for picture-taking by artificial light. Almost any camera loaded with it can take indoor snapshots by the light of only two Photofoods—one No. 2 and a small-sized No. 1—placed as specified in the Kodak Snapshots-at-Night instruction folder.

**Argus Enlarger Radical**

A new system of illumination, employing reflected light rather than conventional direct diffused light, is embodied in a new 35 mm enlarger just announced by the International Research Corporation of Ann Arbor, Mich., manufacturers of Argus Cameras and photographic equipment. Coolness in operation, greater protection to negatives, and flat-field illumination, with full brilliance to all parts of the negative, are provided by this development, the manufacturers state.

Designed for use with Models A and AF Cameras, or with a special enlarging lens and adapter mount, the new enlarger uses five lenses. When the camera lenses are used, f/4.5 aperture is provided. The camera diaphragm can be opened or closed to control light. When the Argus adapter lens and focusing mount are used, an f/5.6 triple anastigmat lens, with an aperture slide with f/8 and f/16 openings, is at the operator’s command.

An outstanding feature is the moulded bakelite book-type film holder. There is no glass in this unit. It is non-scratching and dust-free. It may be removed and inserted for 11X14 prints. It handles either single negative or strip film. Positive film tension is released with a full cam lever for moving film.

By the use of a 100-watt prefocussed projection lamp with its concentrated filament, the source of illumination for this new system closely approaches the ideal “point light” source for which enlarger designers have long striven. This small but extremely brilliant lamp is placed at right angles to the optical system and the center portion only of the lamp where the flattest and evenest illumination is available is picked out and reflected down through the condensers. This eliminates unwanted distorted light waves and permits placing of light source at a much greater distance from negative, making it possible to use more light with less heating. The reflecting medium also absorbs considerable of the light heat waves and provides all the diffusion needed without use of frosted or opal glass in the optical field. Extending toward better definition and the flatter, more brilliant field so much needed in miniature enlargers.

While the enlarger is designed to use either Argus Model A or AF Camera for the objective system, an f/5.6 triple anastigmat is furnished as separate equipment for those having other makes of cameras or who want a complete enlarger.

When the Argus is used for the lens system, the picture is then printed back through the same lens which originally made the negative, so that five lenses are actually used, three in the focusing mount and two in the condenser system. The f/5.6 lens used in the separate adapter is also a triple anastigmat precision lens, mounted and quickly attached. This mount provides three working apertures, f/5.6, f/8 and f/16.

Another innovation in design is a new type fast-loading framing casket which handles paper up to 8X10 on a 11X14 baseboard. The casket can be loaded without raising the masking arms.

Careful attention has been given construction of the removable film holder to prevent scratching negative and to eliminate dust. Tubing is held under positive spring tension and is released by a cam and lever arrangement. By inverting the film holder, the film is moved with respect to the lenses so that 11X14’s or even photosurals up to 40 inches wide can be made. Either single negatives or film strips of any length are handled.

A swinging, built-in red filter is standard equipment. The lamp house, exceptionally compact of glass-crystalline finish with chromium an brilliant red plastic trim, can be swung on to mounting arm for table-edge enlargement work. This is essential in photographic work. Enlargements up to 30X40 inches are easily attained this manner.

List prices of the enlargers are: Model E/ with plain base, $14.75; Model E/AE, with framing casket base, $17.50; Model EAL, with plain base and EAL-200 adapter mount and lens $18.50; Model ELE, with framing casket base and adapter mount and lens, $21.25; EAL-200 adapter mount and lens, $4.75.
Enlarger also Projector

The Optilite Photo Enlarger, a new machine, combines scientifically controlled enlarging facilities with a tilting arrangement which makes it readily adaptable for projection purposes. It is distributed by Intercontinental Marketing Corporation of New York.

In addition to this novel and money-saving convertible feature, the Optilite Enlarger has a special patented scratch and dust-proof film holder, a scientifically designed cooling system, and separate precision focusing adjustments for lens and projection bulb. Films are given bright, equal illumination by means of a 50-candle low voltage bulb and double condensers.

The Optilite will be available in Junior and standard and Deluxe models, both taking negative sizes from 35 mm to 2½ x 3½ inches.

Perutz Control Numbers

Since numbers along the edges of 35 mm film often fall between negatives and become confusing, positive identification of each negative has been made possible by the system used on Perutz daylight spools and cartridges. Intermediate numbers, such as 1, 1a, 2, 2a appear on each 35 mm load. This not only speeds up negative selection, but gives users of the Robot, Tenax and similar cameras and single-frame cameras a separate number for each picture.

Rogers with Ampro

R. B. Rogers has joined the Ampro sales organization and will serve as Divisional Sales Manager with headquarters at the New York office of the Ampro Corporation, 56 West 45th Street, New York, New York. Metropolitan New York will be handled intensively by Mr. Harry S. Miller.

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Eastman Lens for Color

UNPARALLELED CORRECTION for lateral as well as longitudinal color is claimed for a new long-focus lens of the EkTar series, just announced by Rochester by the Eastman Kodak Company. The new lens, an Eastman Anastigmat EkTar f:6.3 of 14-inch focal length, is designed for users of commercial and view cameras who require a lens "unequaled for the making of color separation negatives in accurate register." It is held to solve problems of photographers whose present "color-corrected" lenses are unable to produce color-separations that will superimpose properly.

"Special attention," Eastman states, "has been given to correction of lateral color which is particularly important in the making of color separation negatives. Numbered test plates are made with each lens and filed for reference."

Longitudinal color-correction insures that the lens will image objects of different colors sharply in the same film plane. Lateral color-correction insures that the three different colored images of the same object will be exactly the same size, so that each negative of a color-separation set will register correctly with the others and color-fringing be avoided in the final reproduction. Until the new EkTar was designed, the company claims there was "no lens offering guaranteed complete lateral correction...available for commercial work."

The 14-inch Eastman Anastigmat EkTar f:6.3 lens is mounted in a new-type light-weight all-aluminum barrel with "click" stops for positive diaphragm operation. Its wide coverage, the announcement states, allows full use of the adjustable front and back of 8x10 cameras. For protection against damage, a strong velvet-lined box and two lens caps, front and back, are supplied with each lens. Mounted in all-aluminum barrel, with lens caps and protective box, the Eastman Anastigmat EkTar f:6.3 lens—14-inch is priced at $175.00.

Agfa Tripods

DEIGNED ESPECIALLY for the use of amateur photographers, two new tripods possessing several distinctive features have just been announced by Agfa Ansco Corporation of Binghamton. The tripods are constructed of a carefully planned combination of cold rolled steel, forged aluminum, and machined brass for lightness and rigidity. They have four sections, telescoping legs that open quickly to extended position. The legs have a fixed design that results in unusual rigidity and resistance to wobble or side-weaving. When closed, the legs form a compact, nine-faceted circle, one inch in diameter.

The Number 1 metal tripod which is furnished with a stationary head, measures 15 1/2 inches in length when closed, yet extends to a height of 48 inches. Its weight is 19 ounces. The stud of the Number 1 tripod is of the reversible type and can be adapted for either American or Continental tripod sockets by the removal of one screw.

The Number 2 metal tripod provides a ball and socket swiveled head that permits locking the camera at any angle, including straight up or straight down. The weight of the Number 2 tripod is 23 ounces. Its length is 17 inches closed, while it extends 49 3/4 inches opened. Both tripods are equipped with removable rubber tips that fit over the metal pointed feet and prevent scratching or slipping on polished floors. The Number 1 tripod retails at $5.95, and the Number 2 tripod at $4.95.

Price Cuts

BOTH BELL & HOWELL and the DeVry company are making substantial price reductions in their lines, particularly in projectors. Further information may be obtained from the manufacturers and their dealers.

New Argus Model C2

A NEW ARGUS Model C2 Speed Camera with Coupled Range-Finder, is being placed on the market at $25.00, with the dropping of Model C, brought out this spring, from $25 to $20.

The new calibrated, built-in, split-image sextant-type range finder accurately sets focus, with no need to lower the camera from the eye. Once range is found, operator can shoot instantly. The coupled range finder finds more than doubles speed in taking fast candid shots. As in the Model C, all controls are under two fingers, extremely convenient and making the C2 one of the simplest cameras to use. Exceptionally clear and distinct image appears through the range-finder eye-piece in full size. The view finder has a perfect infinity focus.

The new 50 mm "CINTAR" f:3.5 Anastigmat lens which comes on the C2, as standard equipment is rated ideal for miniature camera work.
providing all the speed required while retaining necessary sharpness and depth of focus. The lens is fully color corrected and is designed to produce clear crisp negatives that will stand enlargement to 1x14 and greater. Equipped with a front-operated iris diaphragm, entire objective system moves as a whole in a helical tube mount and focuses from 3½ feet to infinity. Each lens is individually tested and certified.

Interchangeable mounting of the lens permits use of various types of lenses and attachments which vastly widen the camera’s range of use. Among recent Argus additions to available accessories for this model are the Macro Attachment for close-up photography of small objects, and a new copy lens and portrait attachment. The shutter is behind the lens, of a new jar-proof design with a continuous range of speeds from 1:5 to 1-300 of a second and “bulb.” As illustrated, the camera presents a modern external appearance similar to the Model C, being well-proportioned and handsomely trimmed in metal and polished plastic, with black morocco leatherette covering. The body is designed to fit the hands conveniently, and all controls are conveniently located at the finger tips for ease and speed of operation.

Transparency Mounts

Two new types of projection slides for users of the Robot, Tenax and other cameras of one-inch square negative size are announced by Intercontinental Marketing Corp. of New York.

One of the new mounts is of glass and metal, and can be quickly taken apart for insertion or exchange of transparencies. The metal frames lock together without mess or possible damage to the film. Mounts are packed in lots of 25, in a carton which may be used for storing the slides after they have been filled.

The second type is a permanent mount consisting of two heavy cardboard frames, ginned on the inside, which hold the glass and film securely between them. Slight moistening of one frame seals the two frames together, providing dust-free protection. The cardboard acts as a shock-absorber in case of accidental dropping.

New paper masks for one-inch square film are also available, packed 144 to the box. These masks have a ginned inner surface, and hold the transparency firmly against the glass when applied.

The new Argus Model C2 with coupled range-finder. (Column 6, Page 3.)

Special Optics Service

A new Hollywood organization opened its doors this month featuring a by-product of its production setup of particular interest to the motion picture industry. American Telescope Laboratories, Inc., will engage in mass production in Hollywood of a complete line of telescopes, for the first time denoting the virtual monopoly of the foreign firms in that field. The new line-up, part of which is illustrated on Page 7, will sell at prices one-tenth to one-twentieth under comparable foreign made telescopes.

Having determined that the only practical manner of engaging in the business was to do their own optical work, the founders of the company, J. H. Magid and Rex W. Beach, have entered the field to such an extent that they are able to produce on short notice any optical parts, either special or standard, required for motion picture production.

The organization announces that they are fully equipped and qualified to manufacture special lenses, prisms, optical flats, mirrors, reflectors, etc., to any specifications. We specialize in intricate and unusual work and possess on our staff technicians thoroughly qualified to advise on any conceivable problem dealing with optics.

The new organization has showrooms located at 5870 Hollywood Boulevard near Bronson and extends through International Photographer a cordial invitation to all studio technicians to visit their new establishment.

Astronomy is following the same trend as photography in capturing public fancy as an interesting hobby, and the principal business of the new firm will be to cater to all angles of this interesting science, supplying telescopes of all types from those for the tyro to more complicated instruments for experts, schools, colleges, observatories and for military and naval work.

New line-up of Hollywood-made telescopes from American Telescope Laboratories, Inc., new organization, which offers as a sideline, complete production facilities in optics to motion picture industry. The new Hollywood firm’s standard product sells at prices from $135 to $550, drastically cutting in on monopoly of foreign manufacturers.
ARE YOU DRIVING A CAR WITH TWO-WHEEL BRAKES?

MODERNIZE STUDIO as well as THEATER LIGHTING

Modernized carbon arc lighting provides improved light for production, just as it does for projection. The new studio carbon arc lamps are gaining acceptance, on both monochrome and color production, as sources of photographic light especially well adapted to the modern technique of “key” or “precision” lighting.

NATIONAL CARBON CO., INC.

LOW INTENSITY PROJECTION, like a car with two-wheel brakes, is not adapted to the modern tempo of the motion picture industry. It doesn’t give your business the security which you desire. Theater goers want brighter screen illumination than it provides, a more comfortable level of general illumination, and more accurate reproduction of color. They are getting these advantages in the thousands of theaters now equipped with high intensity projection. These are the houses that are doing a capacity business.

Simplified High Intensity projection puts these same advantages within your reach. It will enable you to hold your present patronage and increase box office receipts. Yet the cost is surprisingly small.

Write for the free, illustrated booklet, “The Eternal Triumph in Picture Projection.” It gives a clear demonstration of the Box Office value of improved projection. Then ask your dealer’s admission to show you how little it will cost.

ECONOMICAL AND MODERN

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
CARBON SALES DIVISION, CLEVELAND, OHIO
General Offices: 50 East 42nd Street, New York, N. Y.
Branch Sales Offices: New York, Pittsburgh, Chicago, San Francisco
This effective shot of the 45-degree camera track built at 20th-Fox for a spectacular Technicolor shot is fully described in the accompanying story on next page. The still was made by Milt Gold, member of Local 659, IATSE.
CINEMATOGRAPHY

Eastman Super Films Ready


Latest chapter in the parade of motion picture emulsion progress was the appearance last month in Hollywood of advance test material of the new Eastman lineup of super-performance professional emulsions, featuring two sensational fast films and a new type of improved Background-X. The new films, which met with general enthusiasm from studio experts, will reach general trade release this month.

Highlights of the new stocks are presented here and will be followed in succeeding issues by complete technical data on the new emulsions, their performance, processing, etc. The new fast emulsions parallel similar "Plus-X" stocks made available in slightly different form to the amateur miniature camera field two months ago.

Plus-X, already widely tried out with success in Hollywood last month, is an emulsion with twice the speed of the familiar Super-X, with the same general color sensitivity, with finer grain but similar developing characteristics.

Super-XX has twice the speed of Plus-X, and four times the speed of Super-X, although with this great speed increase, virtually the same grain as Super-X and with approximately the same color sensitivity. It requires from one to two minutes longer development to attain similar contrast to the regular Super-X, since the high speed obviously produces a flatter picture.

The third new emulsion from Eastman is known as Background-X and is a special emulsion for outdoor photography and not for rear projection as the same might indicate. It has outstanding fine grain quality with approximately 80 percent the speed of Super X, which gives it double the speed of ordinary background film so-called.

45 Degree Track

Strohm devises unusual camera dolly setup at 20th for special race track scenes.

The search for new and more unique camera angles added another new bit of technique to the art of cinematography which will be seen for the first time in the Technicolor production, "Kentucky," which is now filming at 20th Century-Fox.

Director David Butler had filled a grandstand with people watching a horse race, and he wanted some means of getting a traveling shot from the back of the grandstand, coming down at an angle until it would rest on such principals in the cast as Loretta Young, Richard Greene, Walter Brennan and Moroni Olson.

After the cameramen had worked out the idea, it was presented to Walter Strohm, the studio's chief engineer, who perfected it on a scientific and technical basis.

A stout scaffolding was built on which tracks were laid, running down at a 45 degree angle. A special camera platform was built to run on these tracks, and an electric hoist, such as is used in running elevators, was used to work the cables which let the platform down or hoist it up again.

Many shots were made with the camera traveling from a height almost down to the ground at a 45 degree angle with varying rates of speed which could be controlled.

Main reason for the "science and engineering" emphasis was because the Technicolor camera equipment used is valued at $75,000, and no chances could be taken on anything going wrong, or of injuring players and technicians in the path of the heavy equipment.

New Stereoscopic Method

Louis H. Shirpser, Los Angeles inventor, completing experiments with radical system that eliminates gadgets and places third-dimensional effect on single film strip.

Entirely new slant on stereoscopic motion picture photography is being experimented with by Louis H. Shirpser in Los Angeles. The inventor, brother of Cliff Shirpser, member of Local 659, IATSE, has been perfecting various types of stereoscopic approaches since 1917 and is now in the final stages of developing a radically different instrument, principal feature of which is that the images go through one lens to a single film and no attachments are used by the spectator for viewing.

As most experienced technicians know, the subject of stereoscopic motion pictures ranks with natural color, television, binaural sound and similar perennial goals of the experimentally minded, as having been tried from scores of approaches, with many failures. Shirpser feels that he is on the right track in solving the many practical problems surrounding the commercial application of stereoscopic effects to motion pictures. He has applied for more than 50 patents on his device.

Shirpser, with his brother's aid, has photographed several reels of stereoscopic shots, and the accompanying stills illustrated here-with are from 8x10 enlargements direct from the motion picture film, which was shot at the Universal studio.

Whether or not Shirpser has actually achieved practical stereoscopic motion pictures, his ingenious approach to the solution merits attention, because, should his method be proved practical, it has already a number of practical features. It is photographed under virtually normal production conditions with standard cameras, using standard shutter speeds, etc. There is a loss of from one-fourth to one-half light stop over normal. A single device is attached ahead of the camera lens. A similar device would go ahead of the projector in projection, but Shirpser claims that even projection without the device will attain an approximately 75 per cent stereoscopic effect.

All processing and developing of the film follows standard studio practice. The same lighting now used for professional photography is used. There are no filters or gadgets of any kind in either the photography or projection, since the entire system is optical.

The actual device is a complicated looking metal box, approximately 8x3x3 inches. It contains a multiplicity of mirrors, arranged for individual control of each mirror, and so that these three separate images are sent through the camera lens and onto the film. The film records three separate images; there are three distances of focus, three densities and three angles. The two outside images are balanced off the center image, and can be regulated by viewing through a ground glass to the proper formula for photographing the scene. Shirpser plans a pre-set final formula with possibility of variations if necessary.

Believing that the inventor's long study and work on the problem, combined with its many practical features as compared with other methods of securing the third-dimensional effect, the editors of INTERNATIONAL PHOTOGRAPHER have arranged that the new device be given a thorough trial under ideal
conditions, with the cooperation of a number of progressive equipment manufacturers and technicians.

Results of these experiments will be published in the next issue of INTERNATIONAL PHOTOGRAPHER along with a complete layout of pictures on the Sherpsi device in actual operation.

**Camera Equipment**


_By G. M. Haines, Local 37, IATSE._

INTERNATIONAL PHOTOGRAPHER the past few months has been forced to leave out many interesting items through lack of space. We are pleased to pick up this month with the Studio Mechanic's Handbook and plan early resumption of others in our regular Table series.—Ed.

After several months of presenting grip equipment, which may be interesting because of the odd names and uses of the various devices, particularly to those not familiar with routine on the set, we change to camera equipment this month. This may be overly familiar to our Brother members in Local 659, but we are sure that many readers of INTERNATIONAL PHOTOGRAPHER will find it interesting.

Don't forget that publication of these pieces of equipment in INTERNATIONAL PHOTOGRAPHER is primarily for the purpose of accumulating all necessary information on these items of every-day studio use is for eventual publication as the industry's first practical handbook on the thousands of items of equipment used under modern production conditions.

We will sincerely appreciate hearing from

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**STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933**

Of International Photographer, published monthly at Los Angeles, for October, 1938.

State of California

County of Los Angeles

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Herbert Aller, who, having been duly sworn according to law, deposes and says that he is the Managing Editor of the International Photographer, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management and circulation, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, International Photographer, Los Angeles, California. Editor, Edward H. Gibbons, Los Angeles, California.

Managing Editor, Herbert Aller, Los Angeles, California. Business Manager, Helen Boyer, Los Angeles, California.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) International Photographers, Local 659, International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada, 501 Taft Bldg., Hollywood, Calif.

President, Hub Mohr; First Vice-President, Leo Shammoy; Second Vice-President, Lucien Ballard; Third Vice-President, Win. Skall; Financial Secretary-Treasurer, Gay M. Bennett; Recording Secretary, James V. King; Sergeant at Arms, Len Powers.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing all the full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affidavit has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is. (This information is required from daily publications only.)

HAROLD W. SMITH

(Signature of editor, publisher, business manager, or owner)

November, 1938—11
Any technicians with pertinent data on these items. As intended for final publication, each item will be pictured individually with complete descriptive data. We are particularly hopeful of securing the help of IATSE members in compiling this information, and we sincerely hope that all professional readers will accept our invitation to make suggestions or criticism on our coverage of the subject.

The particular information we are seeking includes: correct technical name; slang names used at various studios (eventually we hope to propose a workable standard terminology); size and other minimum specifications; brief description clearly defining the use of each item in studio production.

The items pictured this month are:

Top Left and Center: Rear and front views of the Rotating Prisms used with the camera to secure effects of actual motion in process and similar shots; these will cause a banking effect in shots of automobile and similar scenes with rear projection and special effects.

Top Right: Camera Head on small High Hat.

Middle Left and Center: Two views of a blimped camera on Velocipede.

Middle Right: Head on Baby Tripod with small High Hat alongside.

Lower Center: the Production Slate, which is photographed before each scene for the record.

Lower Right: typical Baby Tripod.

Another point we would like to make this month is that this department is trying to eventually make this a thoroughly complete handbook, a virtual catalog of every piece of equipment regularly used in picture making. We, therefore, would appreciate receipt of good prints of pieces of equipment, both from the many firms manufacturing equipment and from technicians who may have good close-ups of anything from cameras to baby spots.
Tri-Art Shorts

Tri-Art Film Productions is preparing a program of short subjects for release on the independent market. The organization is headed by Braheen A. Urban, veteran stage and screen player, who once was general director of the Canadian Grand Opera Association.

Alley to Lecture

Norman Alley leaves Hollywood the end of this month on a lecture tour of the eastern states extending through December and January, and Universal Newsreel has granted the ace member of Local 659, IATSE, a leave of absence to cover any period his engagements may require. Alley has placed Joe Johnson, veteran newsreeler member of 659, formerly with Paramount, to bat for him locally during his absence. Alley’s lectures will cover his newsreel experiences, climaxing with his Sino-Japanese war exploits, including his photographing of the Panay bombing.

“Professor” Russell

Jack Russell, veteran member of Local 659, IATSE, is in charge of the Insert and Research Departments at Columbia studio, where duties vary from supplying details of a marriage ceremony in Mexico to photographing every type of unusual shot required for pictures. Board members of Local 659 are calling Russell “The Prof” because of his wide knowledge and we expect to publish a story on the work of Russell’s department in the coming December issue of International Photographer.
Studio Clubs Joint Holiday Affair

Inter-Studio Club organization plans spectacular pre-holiday December event, with exhibits, salons, lectures as follow-up to successful inaugural exhibition; club notes by Haines.

A spectacular pre-holiday affair is being lined up for early in December by the recently organized Inter-Studio Camera Club, which brings together the various individual studio photographic clubs into an organization for mutual benefit and exchange with the cooperation of International Photographer, and the professional photographers, both motion picture and still, who are members of Local 659, IATSE.

This second general affair will feature a holiday salon, special technical exhibits, lectures and demonstrations by experts and a complete display and demonstration of the new fall lines of cameras and equipment by the important manufacturing firms. Final plans for the program will be mapped out at a meeting early this month of studio club officials and will be published in detail in the December issue of International Photographer.

The Inter-Studio organization is chaired by Ted Krise, of Warners, with George M. Haines, member of Local 57, IATSE, and a contributing editor of International Photographer, as secretary.

Sponsors of the Inter-Studio organization are officers of the following clubs: Columbia: Paul Murphy, president; Howard Edgar, secretary; Walt Disney; William Garrett, president; Judd Martin, secretary; Douglas Aircraft: Elmer Wheaton, representative; Paramount: Douglas Rudd, chairman; Virginia Printzla, secretary; 20th-Fox: Ralph Townsend, president; George M. Haines, secretary; United Artists: Harry Sunilby, president; John Wentworth, secretary; Warners: Ted Krise, president; J. L. Edwards, secretary.

Studio Club Notes

By George M. Haines

Following its successful initial joint program in September, the club last month staged a field trip to Whites Point, Palos Verdes, and similar special events will be staged in between the regular general sessions as the club program develops.

The 20th-Fox Club is to be congratulated on its president, Ralph Townsend. The interest and consistent efforts that he has put forth has made the club what it is today.

Warner Bros. Club, under Ted Krise, is showing marked progress and in its recent club salon was shown the results of enterprising efforts by the members.

Paramount Club, under Douglas Rudd, is taking advantage of the many fine prizes offered throughout the country by submitting prints. Judging by the quality of their work Paramount club members should be returned winners in many cases.

Paul Murphy, of the Columbia Club, at last month's meeting brought out the most efficient way of obtaining members, namely that of requesting each member to bring in one member at the next meeting—and as a result the club since has shown a nice growth.

United Artists, under Harry Sundby, is just starting a club and by the first of the year it is expected to be fully in its stride. Photography fans at United Artists should get behind Sundby and make the club an organization representative of the U. A. lot.

Research Insures Accuracy

Small production, “Duke of West Point,” is typical example of authentic presentation of scenes well known to millions of film fans.

By William Wallace, Local 659, IATSE

Typical of the way modern production organizations handle the problem of presenting on the screen scenes well known to millions of Americans is the careful research and checking for accuracy practiced by the Edward Small organization in making “The Duke of West Point,” for United Artists release.

Producer Small, before starting the picture, determined that it would have to be accurate in every respect. With this in mind, George Bruce, author of the original screenplay, spent several weeks at West Point and at the Royal Military College at Kingston, Ontario, before he started the actual task of writing. When the script was finished, he made another trip East and conferred with Academy officials to make sure that every little detail was in order.

Finally, when the cast, including Louis Hayward, Joan Fontaine, Tom Brown, Richard Carlson and Alan Curtis had been selected and the picture assigned to Alfred E. Green for direction, numerous other technical advisors were employed.

Lieutenant Walter K. Tuller, Jr., son of a famous Los Angeles attorney and a former West Pointer, was engaged as general technical advisor. He was present during the shooting of every foot of film for the production and had to approve of each little detail of wardrobe, set dressing, Academy etiquette and the like, before the cameras were permitted to turn.

When it came time to film the ice hockey sequences, Producer Small hired Arnold Eddy, graduate manager at the University of Southern California and ice hockey coach at that school, as technical advisor. Eddy personally supervised each of the hockey sequences after he had spent two weeks drilling his teams of players for the game as outlined in Bruce's script.

When it came to the football sequences, Pasadena's famous Rose Bowl was made over to resemble Michie Stadium at West Point and the male members of the cast donned football uniforms and played, while Joan Fontaine sat in the stands and cheered. Again demanding realism in his picture, Small engaged the famous “Dutch” Wilcox to pass on the grid play recorded by the cameras. In the rugby scenes, Major Alanson Bemis, a one-time English star, presided as technical advisor and for the boxing sequences, wherein Hayward and Curtis attempt to settle their differences with gloves, Hank Moslon, now a collegiate boxing coach, was engaged for a similar task.

“Because it runs such a close parallel to real life,” explains Producer Small, “The Duke of West Point” presented many problems not ordinarily encountered in making a motion picture film. After all, it is very easy for people who are well acquainted with certain things, such as life in West Point, boxing, playing ice hockey, football or rugby to quickly notice some error on the screen. This would naturally turn them into critics of the rest of the picture and they would be looking for more boners, instead of enjoying the production as a vehicle of entertainment.

Photographically, "The Duke of West Point" is a remarkable motion picture, in that every nook and cranny on West Point's famous reservation has been duplicated on the sets designed at the studio, hence it was simple to switch from the background shots made at West Point direct to the sets constructed in Hollywood.

If anything, an improvement can be noted, since the benefits of modern studio lighting brings the many West Point replicas their full artistic representation from a photographic standpoint.
This series of still pictures by William Wallace, member of Local 659, IATSE, for the Edward Small production, "The Duke of West Point," illustrates the industry's accurate research to obtain authentic picturization of familiar scenes as described in the accompanying story by Wallace. Also effective is the manner in which the stills indicate important story action. Much effort was devoted to insuring authentic atmosphere in the West Point and sports event sequences.
New Kodak Building

New six story addition to Rochester camera works to meet new demand for products.

The Eastman Kodak Company started construction last month of a six-story addition to the group of buildings comprising its camera works in Rochester. New building will measure 175 by 312 feet in area and is expected to be ready for occupancy in a year. The camera works, adjoining the general offices of the company, is the second-largest Eastman plant in Rochester.

Plans for the new camera works building have been under consideration for a year, according to Eastman officials, because “new types of photographic apparatus manufactured by the company and meeting a popular demand have imposed a need for more extended facilities in the manufacturing departments of the camera works and in the camera works engineering department, which is responsible for the design of new photographic equipment.”

Television Flash!

Paramount announces tie-up with Dumont Laboratories for television shows on film by January.

Just as we go to press comes an announcement from Paramount that it will be the first motion picture company to enter the television field—in an association with Dumont Laboratories, whose head, Allen B. Dumont, has been a pioneer in the cathode ray tube field.

Experimental broadcasts from Montclair, N. J., under a Federal Communications Commission are announced to start in January, with receiving sets to be made available to the public at the same time. The Dumont television system is said to have only a three megacycle wave band, permitting more channels than under other systems.

Paramount’s statement indicates a lack of confidence in any early use of coaxial cable for network television, which admittedly would cost billions of dollars, through emphasizing the use of motion picture film for recording programs for distribution to individual stations.

Watch for full technical details of this development with illustrations in the December issue of INTERNATIONAL PHOTOGRAPHER.
EASTMAN Super X won its top ranking on performance. The results obtained from its combination of speed, fine grain, and general photographic quality make it the world’s first choice in negative materials.

Eastman Kodak Company, Rochester, N. Y.

(J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)
Retired Printer

Landers & Trissell have machine that printed D. W. Griffith's famous "Birth of a Nation."

Contrasting strikingly with the modern streamlined equipment available for laboratory processing today, is a "retired" printer that decorates the headquarters of Landers & Trissell, Hollywood studio camera and equipment rentals organization. One of the industry's outstanding pictures, "The Birth of a Nation," was printed on the machine.

The outfit was designed by Sam Landers for experiments he was conducting when the local 659 member was cameraman and lab superintendent for D. W. Griffith. Just before completion of the picture in 1920, the old Triangle lot lab burned down and Landers' printer was the only one available. It was impressed into service for the picture that made film history with the first $2 show on Broadway.

Compare this venerable old piece of equipment with the modern equipment from Duplex, Art Reeves and Fried Camera Co., that have been pictured and described in several recent Tradewinds sections of International Photographer.

Dupe Coordination

Academy Research Council names sub-committee to work for standardization of lab procedure.

A new Academy committee was organized last month to investigate possibilities for coordinating the production of duplicating master prints and negatives. The committee held its first meeting late in October.


First work of the Committee will consist of coordinating and disseminating information on improved studio laboratory processes in connection with the making of prints and negatives for foreign release, to be subsequently followed with a program for the eventual standardization of domestic laboratory procedure in connection with the making of negatives and prints for the foreign field.

Exchange Benefit Dance

Film Exchange Employees Local B-61, IATSE, will stage a dance November 18, at the Diana Ball Room at Pico and Norton Streets, Los Angeles. The local is staging a Jitterbug Contest which will be judged by three judges from the Los Angeles Municipal Courts, for a Le Roy Prinz dance trophy, courtesy of the Paramount Studios. The contestants will be sponsored by the American Ball Room Association, under the direction of Doc Morris, the Association's secretary.

The affair is a benefit dance for the unemployed members of the local. Also a Waltz Contest will be held and the trophy will be given by the Universal Film Exchange. Music will be furnished by Stan Kenton and his orchestra.

SMPE's Fall Convention

Another interesting session by Society of Motion Picture Engineers; Dr. Kalmus of Technicolor and K. S. Gibson of Bureau of Standards win annual honors; abstracts of many papers given.

Highlighted by the honoring of Dr. Herbert T. Kalmus of Technicolor with the SMPE Progress Medal for outstanding business and technical achievement, and of K. S. Gibson of the Bureau of Standards of the Department of Commerce with the SMPE Journal Award for the most outstanding paper originally published in the SMPE Journal, the Society of Motion Picture Engineers held their fall convention this year in Detroit, Mich., October 31st to November 2nd, inclusive.

Sound recording, both film and disc, lighting problems of theatres and studios, 16 mm recording and reproduction, and miscellaneous applications of cinematography as well as papers on television and new equipment lent variety to the subjects presented and discussed by the engineers at the convention.

Dr. Kalmus delivered a paper that presented long-discussed progressive possibilities in color photography. He promised the industry a new color negative three to four times faster than any now in use and also emphasized that the Technicolor-Eastman cross-licensing agreements are producing active and intense research by announcing that complicated color cameras soon would be scrapped for a single film color process, obviously referring to the long-awaited professional 35 mm use of Kodachrome.

Television and unusual astronomical and undersea photography also developed outstandingly interesting papers, described here-with, and followed by as many abstracts of other convention papers as were available by air mail up to the time of going to press.

Films and Television

Aspects of television that have counterparts in motion picture practice were discussed by G. L. Beers, E. W. Engstrom and L. G. Maloff, of the RCA laboratories. Comparisons of the techniques of both arts were presented as part of a general program of
cooperation in which radio and movie engineers are keeping each other informed of new developments.

Relationship of the size of a television picture to the distance from which it will be viewed, and the number of "frames" or separate pictures per second necessary to produce the illusion of continuous motion to the eye were discussed. Other points covered were number of lines into which the television picture should be divided and method of interlacing lines for best results.

The paper also treated with the ability of a television system to convert the light reflected from objects of varying color into corresponding values of light shade. Problem is comparable to that of photography, in which objects in color are reproduced in varying tones of black. Another consideration was said to be characteristics of fluorescent screen of tube on which television picture is reproduced in home receiver, whose function is roughly comparable to silver emulsion used in photographic negatives and prints.

Among advantages expected from this program of mutual exchange of information between motion picture and television engineers is a more effective "matching" of one system with another, for transmission of motion picture films by television, and for possible future application of television devices to motion picture field.

J. J. Kaar, of General Electric, looked into the future at problems still to be solved before satisfactory television pictures will be available in the home on a national basis.

"Television differs from sound broadcasting in the importance of standards," Kaar said. "If television standards are changed, television receivers designed for old standards become useless. Because of this no responsible manufacturer would sell television receivers to the public until standards were fixed by the industry and sponsored by the Federal Communications Commission. The time is now opportune to bring television to the public, as research has reached a point where the picture image is acceptable to the public.

"The big problem ahead of television today," declared Kaar, "is: who shall pay for the television programs? In broadcasting, cost of programs is borne mainly by commercial sponsors. The public has been educated to expect a high degree of excellence in radio programs and it is doubtful whether mediocre program material in television would be acceptable. Just who is going to sponsor television broadcasts when a sizeable audience does not exist, is the big problem.

It is Kaar's opinion that when television is born, it must be born full-fledged, as far as program is concerned. This, of course, means great expense which will have to borne by the pioneers." 

Questions of greatest interest to the public are, "How good is television?" and "How much will it cost?" Kaar said that the size of the picture is limited by the size of the cathode ray receiving tube. A 12-inch tube is about the largest size practicable for use in a home cabinet. Such a tube will give a picture 7½ x 11 inches. While this seems small compared with home movies, it will still have considerable entertainment value, because the audience will rarely view television at a distance of more than four feet from the screen. Kaar predicted interesting future developments in television which will undoubtedly result in larger and brighter pictures, and that the coming years will bring great reduction in the costs of relaying programs in network hook-ups. Kaar concluded with "It's not to be construed that commercial television will await a solution to all these problems. Undoubtedly television will be commercialized in the near future and the problems solved as time passes—much the same, for instance, as was the case in the motion picture industry."

Telephoto Mike

A new microphone which acts as a "telephoto lens for sound" was described by J. P. Livadary of Columbia Pictures and M. Rettinger of RCA Photophone Laboratories in Hollywood. Device resembles a light naval gun, and contains scores of small pipes of varying length. Each of the pipes is "tuned" to a particular sound frequency. The individual sound pick-ups are combined and recorded all together.

In broadcasting, new device will enable engineers to get wanted sound at a distance, at the same time suppressing noises of local origin. For example, it can be used to pick up sound from various parts of an auditorium or outdoor stadium by focusing the telephoto microphone in desired direction. In the motion picture or radio broadcasting studio it enables use of a single microphone to collect sound from large orchestras or other sizeable groups of performers. Sound so gathered more closely approximates that received by a listener in an audience.

Unusual Photography

Problems of photographing planets and other celestial bodies millions of light years distant were contrasted with problem of undersea cinematography in two separate papers.

Professor R. R. McMath of McMath-Hulbert Observatory at the University of Michigan, described methods he uses to take motion pictures of solar bodies with a tower telescope and an apparatus he calls a "spectrohelio-inemograph," which is now one of the most powerful pieces of solar observation equipment in the world. Taking motion pictures of planetary bodies in motion is adding a great deal to man's knowledge of the stars and contrasts with drawbacks.

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of carrying on these researches through crude sketches and later through still photographs.

How man continues to conquer the obstacles of space, below the earth's surface as well as above it, was brought out in a recent address by J. T. Johnson, son of the founder of the Victor Talking Machine Company which revolutionized home entertainment through development of the phonograph, told how he overcame physical as well as optical difficulties in designing methods and equipment for wresting some of the secrets of the water's depth through motion picture studies. Johnson carried on his researches from an 87-foot boat. He has taken thousands of feet of film, in the tropical waters off Dry Tortugas (about 65 miles from Key West) and in the Bahamas for the past three years. He illustrated his talk with a showing of some of his films.

F. J. Herman of Jam Handy Pictures, of Detroit, which is said to be the largest producer of industrial films in the world, envisaged a great future of steady growth for commercial pictures in this country.

Temperature of Color

It is commonplace for engineers to take the pulse of sound by measuring its frequency. Now they have found a way to take the temperature of color, according to E. M. Lowrey and K. S. Weaver, of the Eastman Kodak Company. Just as iron when heated changes in color from dark invisible infra red, through cherry red, to brilliant white, so the color values in the light of incandescent lamps change with the temperature of the filament of the lamp used in incandescent light. Thus, lamps of different color temperatures provide the most accurate reproduction of actual scenes. Measuring the color temperature of lighting in color photography makes it possible to control color values both in photographing and projecting them. Otherwise serious distortion results.

"Some Practical Accessories for Motion Picture Recording"; R. O. Strock, Eastern Service Studios, Long Island City, N. Y.

Addition of practical operational accessories to standard recording channels as purchased expedited operation and saves time. At Eastern Service Studios a number of such accessories have been designed and are described briefly. Included in equipment are following items: small collapsible, portable microphone boom for location work; special microphone suspension to prevent mechanical noise from getting into recording system; small mixer console for stage work, to permit maximum and minimum sound levels; accurate illumination meter, using a microammeter, for setting and checking recording machine exposure; a compact re-recording mixer console equipped with equalizers, effect filters, amplifiers, and conventional mikes; and a variable distance indicator and foot counter for use in re-recording rooms; a film play-back adapter for use on Western Electric film machine for location use; play-back horns for stage and location use; and an airbrush adaptation for loopy re-recording tracks.

"Improving the Fidelity of Disk Records for Direct Playback"; H. J. Hasbrouck, Jr., RCA Manufacturing Co., Camden, N. J.

Recent advances in equipment design and in matters of which recording disks are composed, have resulted in a larger lane range and frequency range having been extended, satisfying present-day requirements of motion picture and broadcast applications.

For reproduction, there is provided a new light-weight, high-frequency horn, which is lightweight and equipped with a permanent diamond point. This reproducer, in combination with its associated circuit, is suitable for use on all broadcast receivers.

Pre- and post-equalization are employed in the method described for making high-fidelity records, ensuring an extremely low noise-level. This absence of background noise together with the wide band, high-fidelity, no distortion, create an illusion of reality or "presence" during reproduction.

Under a great many playbacks are required of the cartridges, discs. However, because of low mechanical impedance of the RCA pick-up and improved composition of disks, it is possible to reproduce 75 to 100 times without appreciable increase in noise or distortion. Great care is taken to obtain information on various conditions of handling have been noted and are attributed chiefly to accumulation of fingerprints and dust on record surface. Gradual oxidation of lacquer coating must also be considered and guarded against, and the time when records of this type are intended for long preservation.


A study of various units, reproducing-system characteristics, including electrical and acoustical response data collected in interest of determining possibilities involved in obtaining an average characteristic for reproducing various film-projection units and combinations of principal and secondary speakers. With aid of a curve tracing having a long-constant cathode ray camera, a photographic record was made of the characteristic curves, with various forms and amounts of equalization and exploring their relationship to power-handling capacity of amplifiers. Following through system, this record shows characteristics of dividing networks involved for film projection and also gives acoustical response curves taken for comparison of loud speaker equipments under study.

Measurements of loud speaker combination included a high-frequency magnet and energized, low-frequency horn ranging from open back baffles to folded horns with specially designed rear-loading compartment, and high-frequency multivocal horns of various conical shapes. After establishing new characteristics of various equipments involved, careful listening tests were made over an extended period with samples of commercial prints and other recordings. A description is given of difficulties and problems encountered in an effort to obtain one overall characteristic, which would give satisfactory reproduction for all types of material. The final results are shown, with a short discussion of the problems encountered in future methods of combination, and concluded with recommendations for future designs and ratings.

"Some Production Aspects of Binaural Recording for Sound Motion Pictures"; W. H. Ofoff, a member of the New York, N. Y., and J. J. Israel, Brooklyn, N. Y.

Binaural sound recording for motion pictures has a long development history of worthy achievement, yet to date it has not found application on a scale sufficient to meet the public's demands. The picture inspection of situation reveals that, like stereoscopic pictures, there is not complete acceptance of any of the various theories and that lack of interpretation are so many that it is difficult to secure a consensus on what constitutes binaural sound recording for motion pictures. Instances are cited to show that "theoretically perfect" sound is not necessarily the objective; in fact, since it is the illusion produced, both by sound and picture that is in the final analysis the institution of the producer. The policing of sound may even destroy the illusion we are trying to create.

History of binaural sound recording for motion pictures is reviewed and special reference is made to recent methods and equipment. A short review of development since the work of these pioneers covers in a general way the binaural sound motion picture recording art to date. Production reports cover the use of both the direct-binaural and indirect methods of production. Production pictures are analyzed briefly and importance of editing process in production of finished picture is outlined.

"A Simple Sound Motion Picture Production Technique" is suggested, based upon the developments of authors, that may be quite readily adapted to present-day production technique. It is pointed out that perspective sound control, which is an important added feature, does not affect shooting stage operations; this control is suggested as a logical part of double-room operations. Some of effects produced include variations of apparent recording-room size from very small, say, 1,000 cu. ft. to vary large, say, 500,000 cu. ft. Another important effect is simultaneous yet independent movement of one sound-source with respect to another. Some possible applications of such movement. All these effects are possible with no movement whatever of the sound-source or with sources with respect to the microphones. Essentially same effects can be obtained with the possibility of using other systems with it. Further, it is possible to take a completed picture of the conventional monaural type and by a simple dubbing operation, provide practically all important binaural characteristics without any additional sound recording whatever.


Sometimes there arises necessity of introducing into recorded sound a liveliness that is not present in original sound-waves impinging upon microphones in recording studio. Reverberation chambers have been used to provide the additional effects which it is desired to have. It is possible to take a completed picture of the conventional monaural type and by a simple dubbing operation, provide practically all the important binaural characteristics without any additional sound recording whatever.


Some plants have been necessitated, precautions being taken to prevent sound which is not present in original sound-waves impinging upon microphones in recording studio. Reverberation chambers have been used to provide the additional effects which it is desired to have. It is possible to take a completed picture of the conventional monaural type and by a simple dubbing operation, provide practically all the important binaural characteristics without any additional sound recording whatever.


tall, but there has not been assembled in one paper a symposium of all types of equipment and light sources. It is the intention of the committee to correlate published and unpublished data on motion picture studio lighting in such a form as to make this report a referent for complete information on the subject. The various lighting units are numbered and briefly described in the article "Bibliography.' Tables give minimum and maximum beam divergences, carbon and bulb sizes. Journal reference numbers are given as a key to further specific information on any lamp or illuminating device. Details of light control devices and lamp filters is included.


From earliest days of artificial lighting of motion picture sets broadside type of unit has been a fundamental lighting tool. Regardless of type of light-source used in such lamps—whether mercury-vapor tubes, carbon arcs, or incandescent filament globes—the broadside is a lamp of the floodlight type, designed to emit a relatively wide flood of soft, moderately powerful illumination. It has withstood innumerable sweeping changes in its lighting and photographic technique including introduction and acceptance of spotlighting, change from orthochromatic to panchromatic film materials, changes from silent to talking pictures and from arc to incandescent light-sources, and represents growing popularity of natural-color photography.

This paper traces evolution of arc broadside only. It comments on design and performance of newly developed units with the intent to present a history of changes from simple arc broadside units to modern floodlight fixtures. By making comparison of these fixtures to various types of arc-broadside units, some of the problems encountered by early designers of arc broadside units will be shown.
A motion picture projector including a sound unit, a primary drive shaft, a housing receiving said shaft centrally thereof, a flywheel, cut-off shutter and pinion carried by said drive shaft, three gear wheels disposed about said pinion and in angular relationship with said pinion, a film feed sprocket driven by the first of the three gear wheels, a sound wheel sprocket driven by the second gear wheel, an intermittent sprocket and take-up sprocket, said intermittent and take-up sprocket being driven by the third gear wheel and said sprockets being located laterally of the plane of the drive shaft spindle.

No. RE355,286—Method of Making Compositional Effects. Roy C. Pomroy, Los Angeles, Calif., assigned to Paramount Pictures, Inc. Original No. 1,715,510, dated June 4, 1929. Application Jan. 5, 1931. 12 Claims. The method of producing a composite photograph embodying two component parts, that includes making a transparent image of one component, making a photographic silver deposit image of the other component surrounded by a clear ground, chemically transforming the silver deposit image into a transparent image, dichroically coating the transparent image of the second mentioned component substantially uniformly opaque to light but reflective of light to show its image details, superposing the two images and illuminating the first image by transmitted light and the second mentioned image by reflected light, and exposing a fresh acutic surface to the first image and the second image so illuminated and superposed.

No. 1,190,537—Apparatus for Copying Lenticular Films. Andre Delevoye, Paris, France, assigned to Henri Lynne Walker, Paris, France. Application Feb. 6, 1936. In Great Britain, Aug. 4, 1935, 1 Claim. An arrangement for copying lenticular film having a source of light for illuminating the original film, said light being distributed over a wider angle than the angular aperture of the lenticular elements of the film to effect substantially uniform illumination of the exit pupil of each lenticular element, said source of light being in an arc exceeding 180° and being disposed approximately in the plane perpendicular to the said lenticular elements so that the strength of the rays over a considerable range is proportional to the obliquity of incidence on the film, a film gate for the original film, and an image-forming optical system for projecting the image on the copy film.

No. 1,230,541—Art of Making Motion Picture Cartoons. Al Fleischer, New York. Application Dec. 14, 1936. 8 Claims. The method of making motion picture cartoons which includes making a series of drawings of an animated foreground figure with a circum-
scribed outline substantially black upon a substantially white surface, photographically making transparent positives of said drawings on a strip of motion picture film with said outline on said positive substantially opaque and positioning said positive film in front of and in contact with a strip of unexposed motion picture film in a camera; superimposing a separate sheet of transparent material upon each of said series of drawings and rendering the portion of said sheet appearing within the outline of said drawing opaque to and reflective of light, successively positioning said transparent sheets in front of a background, and successively photographing said sheets and said background through successive of said positives upon said strip of unexposed film in the camera.


A material for sound picture screens composed of two layers of fabric, the fabric on the projection side being open mesh and the other fabric being close mesh, and having a coating of light-dispersive material on the open mesh fabric and around the bases of the open meshes on the close mesh fabric.


In mechanism for translating a film having a sound track, a drive shaft, a driven member, a plurality of leaf spring elements, means carried by said shaft for engaging the inner ends of said leaf spring elements, and means to lock said circular elements in given positions.


The method of making a photographic print which includes passing light through a negative image, forming a real image of said negative image in coincidence therewith, and exposing a photographic emulsion to the light from said real image transmitted by said negative.

### Symposium Plans

The discussion of photo electric cells and associated circuits starting on Page 25 is the third of a series of up-to-the-minute technical articles on modern projection equipment arranged in symposium form by Paul R. Cramer, contributing editor of International Photographer, with the cooperation of engineers of the leading manufacturing companies and the major studios. Because of the great interest in these articles among projectionists and the comparatively limited circulation of this publication in the field in relation to the fullest possible benefit of the symposium, plans now are being discussed for the reprinting of the series for wider distribution and also its expansion for further coverage of new equipment from the standpoint of best maintenance and putting the finest show on the theatre screen.

International Photographer and the RCA company have received so many queries about a typographical error in which several lines were transposed in the initial articles of the symposium in the September issue of International Photographer. For the benefit of those who are saving the series, the following correction notice is published:

In "Theatre Sound Optical Systems," appearing in the September issue, the top six (6) lines of the second column on Page 26 should appear at the top of the first column on this page. The last line in column one will then read into the seventh line in column two as: "There are several styles of flament in use at present . . . ."}

### New ARC Test Reels

Effective immediately, the Academy Research Council will have available both variable area and variable density Standard Multi-Frequency Test Reels for use in checking sound reproducing equipment. The Primary Standard Reels contain a complete set of frequencies and Secondary Standard Reels a lesser number.

Prints of either type reel contain appropriate sound titles announcing each frequency and each print is individually calibrated to a film used as a calibrating standard. A sheet listing these calibrations accompanies each print.

The Council announces that experience in making up these reels indicates that the meter fluctuation for any one frequency within one reel is less than 1/4 lb.

Prices for the new test reels: Second Standard Reels, $17.50 each; Primary Standard Reels, $25.00 each. All prices f.o.b. Hollywood, Calif., and subject to a discount of 15% in lots of 10 or more ordered at one time.
Metal Diaphragm
_type_ I (M-3 Systems)

**OCTOBER 10, 1938**

Electrical Run. Measured at the Output of the Power Amplifier with a Resistance Equivalent to the Speaker Load Using the Academy Research Council Standard Multi-Frequency Test Reel (Corrected). Altec Test Film (ED-20, Corrected), or RCA Test Film (Catalogue No. 26571)

This characteristic for the above Type I equipments (M-3 Systems) has not been changed, and this Characteristic remains as specified in the original publication of March 31, 1937, and the subsequent publication of June 8, 1937.

*The tolerances of ± 1 db up to 3000 cycles, increasing progressively with frequency to a maximum of ± 2 db at 7000 cycles, should be rigidly maintained in adjusting equipment to these specifications.*

**ARC Revisions**

The Academy Research Council last month released revised Standard Electrical Characteristics for two-way reproducing systems in theatres, to supersedes the original specifications of March 31, 1937, and subsequent specifications of June 8, 1937. The new revisions are the result of further developments in reproducing equipment and follows extensive field tests conducted by the ARC’s committee on standardization of theatre sound projection equipment. As previously published the characteristics were all included in one curve (see Int. Photog. April, 1937; July, 1937), but the committee this time has made and released separate charts for the curves applying to the various systems. These are published herewith. The ARC committee plans to add data on additional systems as progress is made.

The revised Standard Electrical Characteristics as released cover the systems which are described by the captions accompanying the charts on this and adjoining pages.

Metal Diaphragm
_type_ I (M-4, M-5 Systems)

**OCTOBER 10, 1938**

Electrical Run. Measured at the Output of the Power Amplifier with a Resistance Equivalent to the Speaker Load Using the Academy Research Council Standard Multi-Frequency Test Reel (Corrected). Altec Test Film (ED-20, Corrected), or RCA Test Film (Catalogue No. 26571)

For optimum results with current studio sound recordings, Type I systems as indicated above, equipped with metal diaphragm speakers, should be adjusted to this Revised Standard Electrical Characteristic.

*The tolerances of ± 1 db up to 3000 cycles, increasing progressively with frequency to a maximum of ± 2 db at 7000 cycles, should be rigidly maintained in adjusting equipment to these specifications.*
RCA Non-Metallic Diaphragm
Type IV
OCTOBER 10, 1938

Electrical Run. Measured at the Output of the Power Amplifier with a Resistance Equivalent to the Speaker Load Using the Academy Research Council Standard Multi-Frequency Test Reel (Corrected). Altec Test Film (ED-20, Corrected), or RCA Test Film (Catalogue No. 26571).

For optimum results with current studio sound recordings, those two-way reproducing systems equipped with non-metallic diaphragm speakers (Type IV) should be adjusted to this Revised Standard Electrical Characteristic.

The tolerances of ± 1 db up to 3000 cycles, increasing progressively with frequency to a maximum of ± 2 db at 7000 cycles, should be rigidly maintained in adjusting equipment to these specifications.

Projection Symposium

Discussion of photoelectric cells and associated circuits from the projectionist’s standpoint.

By W. S. Thompson, RCA, Hollywood.

(A) Review of Articles 1 and 2

In Articles 1 and 2 of this series we have traced the development of the sound reproducer optical system, lamps, the film moving mechanism and film dimensions.

It is the general tendency of manufacturers today to make use of sealed tube optical systems of the imaged slit type, and to design film handling mechanisms that permit adherence to the SMPE standards for scanning dimensions.

In many soundheads being manufactured today, all friction and sound gates over which the film was formerly passed have been eliminated and rotating gates equipped with rotary stabilizers are used. This type of machine is exceptionally free running, easy to service and maintain and gives performance remarkably free from speed irregularities.
(B) PHOTOELECTRIC CELL CHARACTERISTICS AND DUTIES

In the scientific world there is known a general class of devices which are sensitive to radiant energy in the form of electro-magnetic waves. Since in our discussion of radiant energy we are primarily interested in waves in the visible spectrum, we will use the term "light waves" from now on. Photovoltaic cells are one class of these devices and are characterized by the fact that when the light waves fall on their active surfaces there is a voltage set up or a current flows or electrons are emitted. In general, photovoltaic cells may be classified into the following groups:

1. Photoconductive Cells.
2. Barrier Cells.
3. Photovoltaic Cells.
4. Photoemissive Cells.

(1) Photoconductive Cells

It was discovered many years ago that the metal selenium has the peculiar property of changing its resistance to the flow of electricity when its surface is exposed to light areas. Later on it was discovered that there were other metals which exhibited this same characteristic, the most important of which is thallium in the form of a sulphide.

There have been many attempts to use these substances in the reproduction of sound, and in the case of selenium there was a time when some few hundred theatres were using selenium cells in the soundheads. The chief objections to the use of these cells are their instability and the fact that their output decreases with increase of audio frequency. This decrease is due to a lag in the action of the cell. As the audio frequencies on the sound film go higher and higher the light fluctuations are faster and faster, and hence due to the lag in the cell the resistance changes become less and less. In the commercial cell just mentioned the decrease in output was about 3 db per octave, hence the amplifier following had to be equalized by that amount.

(2) Barrier Cells

The well-known Weston photronic cell is an example of this type of cell. The general construction of a barrier cell is to have a metal base upon which the photosensitive material, such as selenium or cuprous-oxide, is formed and then covered by a translucent conducting film. This film is usually metal or graphite. Whenever light waves fall upon the sensitive material through the conducting film there is set up a voltage between the film and the metal base. The barrier cell has never become very important in the reproduction of sound due to a high inherent capacitance between the output terminals. This capacitance, of course, is a function of any load impedance which might be used to couple the device to an amplifier and is of such a value that the load would have to be of the order of a few ohms before a satisfactory audio frequency response characteristic could be obtained. Such a low value of coupling impedance decreases the effective voltage to such an extent that the net sensitivity is too low for commercial sound use.

(3) Photovoltaic Cells

Even before the discovery of the photoelectric effect of selenium, it was found that voltacic cells could be made light sensitive by the proper choice of electrolytes and electrodes. Such a cell, in which the electrolyte is a solution of lead nitrate and the electrodes are cuprous-oxide and lead, has been put on the market at various times. Whenever light waves fall on the cuprous-oxide electrode a voltage appears between the two electrodes.

This type of cell has operating characteristics not unlike the barrier cell, but is subject to instability, polarization, and a somewhat slower action. All of these effects have kept it from being used to any great extent in the sound reproducing field.

(4) Photoemissive Cells

This type of cell is by far the most important one in the sound field, and hence will be discussed more fully. It has been found that when certain electrodes are introduced into a vacuum or a partial vacuum cell, and light waves fall on the cathode, it will give off electrons which will in turn be picked up by the anode. The anode, of course, will pick up more of these free electrons if it is maintained at a positive potential with respect to the cathode.

The metals which have been found to be the most sensitive as the cathodes are the alkali metals such as sodium, potassium, rubidium and cesium in the order of their mention. Later it was discovered that the oxides of certain metals were more sensitive, and that by special heat treatments even greater sensitivities could be obtained. One of the most sensitive cathode materials known at the present time is made by oxidizing a silver deposit and then exposing it to cesium vapor and finally giving it a heat treatment.

Since the performance of this type of photovoltaic cell is greatly influenced by the degree of vacuum within the cell, we will classify the tubes for further discussion as Vacuum and Gas-Filled Tubes.

VACUUM CELLS. The sensitivity of a typical vacuum cell with change of anode voltage and light flux is shown in Fig. 1. It should be noted that in the vacuum cell, as long as sufficient anode voltage is maintained to keep the operating range above the shoulder of the curves, that the cell is perfectly linear with the light flux changes. As we will see later, this is not strictly true in the case of the gas-filled tube.
Fig. 2 shows the spectral sensitivity of this typical vacuum cell. The sensitivity peak lying at about 8000 angstrom units is of great benefit when it is being used with the ordinary incandescent light sources, since these lamps radiate a large part of their energy in this region.

Gas-filled Tubes. An inert gas, such as argon, is introduced into this tube after it has been evacuated. The action of this gas is to increase the electron flow from the cathode to the anode for certain anode voltages and light flux. As electrons are being drawn from the cathode to the anode they collide with the gas molecules and if the anode voltage is sufficiently high their velocity becomes so great that ionization of the gas takes place and hence amplifying the current flow. The amount of the amplification is limited by the ionization voltage or glow-point of the gas beyond which point the action is unstable and injurious to the tube.

Fig. 3 shows the sensitivity curves for a typical gas-filled cell as compared to Fig. 1 of the vacuum cell. It should be noted that instead of flattening out at anode voltages above about thirty volts, the curves turn upward again, thereby giving greater sensitivity to the gas type cell. The microampere per lumen sensitivity of this tube is about three times that of the previous vacuum cell.

Due to the non-linearity of the curves in Fig. 3, it becomes necessary to work the gas-filled cell into a lower impedance than that necessary for the vacuum cell if the tube is to be used in a sound reproducer. Fig. 4 shows how distortion may be induced by too high a value of load impedance. For this reason good commercial soundheads used load resistance of less than 1/4 megohm for light flux of about .05 lumens.

The spectral sensitivity of a typical gas-filled tube is shown in Fig. 5, and is seen to be very similar to that shown in Fig. 2 in the important red and infrared regions; that is, around 6000 to 8000 angstrom units.

(C) Photoelectric Cell Circuits

Two of the most common uses for the photoelectric cell are to operate a relay or for sound reproduction in a theatre. Fig. 6 shows a conventional method of connecting a gas-filled photocell for the operation of a relay, and Fig. 7 for soundhead use. For these uses the gas-filled type is recommended due to its higher sensitivity for nominal values of anode voltage. Another application of the gas-filled cell is in a push-pull soundhead, two circuits for which are shown by Fig. 8. The use of the coupling transformer shown in this figure enables the cell to be coupled to the first amplifier tube by means of a low impedance link circuit. This low impedance link from the soundhead results in very low noise pickup.

Whenever photocells are to be used for measurement purposes, the use of a vacuum type is recommended due to its greater linearity and stability at high anode voltages. The decreased sensitivity of the vacuum cell in terms of microamperes per lumen can often be compensated for by using high loading resistance and high anode voltages.

A simple circuit for use in checking illustrations is shown in Fig. 9. For the solid line connection, the amount of current in the 45 tube will be at its greatest value for maximum light on the cell, while it will be least for minimum light on the cell for the dotted line connection.

An AC operated circuit for the measurement of illumination ratios is shown in Fig. 10. The two cells are illuminated from two different sources, the ratio of which is desired. One photocell charges the condenser C1 in one direction, and the other cell charges it in the opposite direction. If the sources of illumination are equal, the net voltage across the condenser C1 is zero, but if one cell gets more light there will be a definite voltage built up across this condenser, which in turn is amplified by the 6C6 and the 45 type tubes. The output of the 45 type tube may be calibrated in terms of the ratio of illumination of the two sources.

(Note: In all the circuits shown using vacuum cells, the grid circuit resistors in the first amplifier tubes are higher than recommended for these tubes. In order to keep the effect of the grid-cathode resistance of the amplifier tubes from affecting the measurements, the heaters of these tubes are all operated at less than rated voltage.)

In commercial soundheads the design engineers have had to face four general problems in coupling photoelectric cells to the amplifier circuits, viz.: output level of the cell, frequency characteristic, linearity, and noise pickup. To get the highest output level we would naturally use a high impedance for the cell, but such a load would lead to distortion and a poor frequency characteristic. The engineers then use an high a load resistance as is possible consistent with low distortion and high frequency response.

The matter of avoiding the pickup of extraneous noises by the coupling circuit has been the subject of much thought which has brought about three different solutions. One of these was to make the line from the cell to the first amplifier tube very short by locating a head amplifier right on the projector. Another solution was to lower the impedance of the coupling circuit to such an extent that a low capacitance, shielded line could be run from the soundhead to the amplifier without pickup troubles. The solution that RCA is using now and has used in the past is to provide in the soundhead a transformer to couple the photoelectric cell to a low impedance (250 ohms) shielded line which runs from the soundhead to the output transformer of the amplifier. The introduction of these two transformers to form the 250 ohm link circuit seems to RCA engineers to provide the greatest factor of safety possible.
Classified Directory

INTERNATIONAL

Camera-Accessory Dealers

Camera Equipment, Inc.
160 N. La Brea Ave., Hollywood, Calif. (Circle 6-5060)

Camera Supply Co.
1135 N. Cahuenga Blvd., Hollywood, Calif. (Circle 2-0416)

Faxon & Co.
4354 Sunset Blvd., Hollywood, Calif. (Circle 11831)

Harry Cameron Exchange
1609 N. Cahuenga Blvd., Hollywood, Calif. (Circle 1271)

Motion Picture Camera Sup. Co.
723 Seventh Avenue, N. Y. (Circle 9-7724)

Morgan Camera Shop
605 Sunset Blvd., Hollywood, Calif. (Circle 3101)

Camera-Accessory Mfrs.

Bell & Howell Co.
3848 Larchmont Ave., Chicago, III. (Circle 2-0524)

Duplex Cinema Equipment Co.
4572 Santa Monica Blvd., Hollywood, Calif. (Circle 4-1271)

Eastman Kodak Company
Rochester, N. Y.

Agfa-Ansco Corp.
Binghamton, N. Y.

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Pacific Cine Films
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1570 N. Vine St., Hollywood, Calif. (Circle 1569)

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Bell & Howell Co.

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5820 Hollywood Blvd., (Circle 8707)

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Mole-Richardson, Inc.
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Canady Sound Appliance Co.
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BETTER THINGS for BETTER LIVING through CHEMISTRY
Top Left, Agfa's De Luxe darkroom outfit, (Page 2, Column 2); Top Right, Bausch & Lomb's modernistic rectangular sports glass, (Page 4, Column 2); Lower Left, General Electric's new small-size foil-filled Photoflash bulb, (Page 2, Column 2); Lower Right, Bausch & Lomb's new book-style slide case, shown with their new Slide Viewer; case when closed simulates a fine book, (Page 4, Column 2). Please turn to next page for start of news of new products.
New Twin Arc Brod Introduced by Bardwell & McAlister, Inc.

A new Twin Arc Brod has just been introduced by Bardwell & McAlister, Inc., Hollywood lighting equipment manufacturers. This twin arc lamp combines two fundamental principles of operation which have been considered good studio practice for years, namely, a constant motor drive and a solenoid strike.

The mechanism consists primarily of an upper and lower carbon carrier mounted on slide rods and fed together by a screw which is driven by a motor. Mounted on the upper carbon carrier and moving with it on the feed screw is a striking solenoid employing a pair of clutches to bring the carbons to a predetermined gap for burning. This gives a quick striking feature which is necessary for light effects. During a burn, the clutches and solenoid remain "tight," the carbons being fed together by the motor. The light is very steady and of constant color, inasmuch as the carbs are constantly fed together at their rate of burn and therefore there is none of the transient variations in the gap, which are known to be one of the causes of arc flicker and color change.

This predetermined gap and the amperage in the arc circuit have been set to Technicolor specifications for photographic white light.

The lamp is acoustically treated, reducing its noise level to a point far below normal recording level. The motor has a special acoustical mounting designed to filter its characteristic frequency. Twentieth Century-Fox, having purchased a number of these lamps, found them exceptionally quiet for such pictures as 'The Little Princess,' starring Shirley Temple, 'Jesse James,' and 'Kentucky,' three of the outstanding Technicolor pictures of the year.

In the lamp’s construction, the reflector is of special optical design to give greater efficiency from a twin source. The glass reflector is standard size for studio use. It is made of two-inch strips of factor-lite glass, which design brings heat breakage to a minimum.

Two pointers with time scales on the side of the lamp, one for each carbon holder, show the operator at all times just how much burn has left in the lamp. When either carbon holder has reached the limit of its travel, a switch automatically cuts off the motor, thus not endangering the lamp from over-burning.

When used as a Scoop, the grid can be quickly attached to the head, permitting the lamp to be hung as one unit. As a Brod, with the grid on the stand, the head is cooler, lighter weight, and much easier to handle. The light center height is normally 4 ft. 4 in. With Stand extended, this is 7 ft. 2 in.

DeLuxe Complete Darkroom Outfit Addition to Agfa Line

New addition to the line of Agfa photographic equipment, a deluxe darkroom outfit that provides all the essential materials for developing and printing, is packaged in a substantial wooden box with a dark walnut finish. It includes new Agfa masking print-frame, new Agfa Safelight with bulb and filters for use when handling paper or film, and a copy of the popular 60-page illustrated book, ‘Developing and Printing Made Easy;’ three 5x7 steel trays finished with white, acid-resistant enamel, one dozen-sheet package of 4x6 Convex paper, one 2-ounce bottle of Rodinal developer, five M.Q developer tubes, one half-gallon size can of Agfa Acid Hypo, one eight-footed foot glass graduate, ten ten-inch stirring rod, one stainless steel thermometer, two stainless steel film clips, one foot of print dryer, four 12x12-inch blotters for drying glossy prints and one 10x12-inch ferrotype tin for drying glossy prints. The new Darkroom Outfit retails at $9.75.

New Smaller Foil-filled Photoflash from General Electric; Other Prices Cut

A new all-foil-filled "news" Photoflash Lamp—relatively small in size but high in effective light output—is announced by the Incandescent Lamp Department of General Electric Company at Nela Park, Cleveland.

Flash characteristics of the new G-E Mazda Photoflash Lamp No. 21 are such as to permit sure and easy synchronization. Small as a standard 60-watt Mazda lamp, the "21" permits users to conveniently carry more of these bulbs in the pocket than does the present larger No. 20 Photoflash lamp. Despite its relatively small size, the new No. 21 emits a flash rated at 50,000 to 60,000 lumens seconds as contrasted to the 45,000 lumens-second flash of the larger No. 20 Mazda Photoflash Lamp.

The new flash bulb is said to provide sufficient light to permit the taking of satisfactory pictures at distances up to 15 feet from subject when used with fast panchromatic film, with camera shutter set at 1/2000 of a second, and lens set at f:11.

When used with the new high-speed super-type film and the same camera settings, the new ash bulb provides sufficient illumination for taking pictures up to 50 feet from subject. A single No. 21 is sufficient for taking good pictures at distances up to 25 feet from subject even when used with a box camera (lens at f:11) and with the new super-
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On the Cover: The spiritual significance of the holiday season is captured effectively in this rich still of a church interior, photographed by Harry Osborn, member of Local 659, IATSE, for the Columbia production, "Let Us Live."

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speed "pan" film. The new G-E Mazda Photoflash Lamp No. 21 lists at 20 cents.

Also a 20 per cent reduction in the list prices of three Mazda Photoflash Lamps and a substantial reduction in the list price of Mazda Photoflash Lamp No. 20, effective December 1, were announced last month. Photoflash lamps affected are: No. 1, reduced from 25c to 20c; No. 2, reduced from 30c to 40c; and No. 4, reduced from a list price of $2.00 to $1.60. The No. 20 Photoflash Lamp is reduced from a list price of 25c to 22c.

New Vest Pocket Sport Glass of Compact Design with Wide Field from B & L

A VEST POCKET sport glass, of compact flat design, is announced by Bausch & Lomb Optical Co. for use at all outdoor sports or at the opera. The new glass is of three-power and rectangular in shape, designed to afford an exceptionally wide view rather than a high one. This makes it particularly suitable for the all sports, since the width of the field is 452 feet at 1000 yards. The black moulded plastic body in a modern design is 2½ inches thick when closed and weighs but six ounces. It comes in a leather zipper case, in buff, blue, green or black and is priced at $19.50.

New Slide Library Simulates Leather Volume for Library or Bookshelf

A MINIATURE Slide Library case simulating Florentine hand-leathered finish is now being offered by Bausch & Lomb Optical Co. in either red, green or blue. Re-enforcing a fine old volume, this slide library is designed to grace the library table or bookshelf. It carries 100 slides in arranged cubicles and is indexed on the inside cover. Measurements are: 6½x10x2½", a handy size for the photographer to carry when displaying slides. The new B & L Slide Viewer is also compactly built and may be easily carried.

Victor Announces Price Cuts and Two New Sound-on-Film Models

VICTOR ANIMATOGRAPH Corporation, Davenport, Iowa, last month announced substantial price reductions on 16 mm silent projectors. Model 13 A-$145 Projector, formerly listing at $148 complete with case, is now priced at $125 with case included. If 750 watt lamp and fast f:1.6 lens are desired in place of the 500 watt lamp and f:1.85 lens supplied as standard equipment, the price is $132.

The Victor Model 22 (1600 foot film capacity) has been reduced from $187.50 to $175. This is a "blimp" model which is enclosed in case during operation. Standard equipment includes 750 watt lamp and two-inch f:1.85 lens.

The company also has two new models of the Sound-on-Film Animatograph now in production. A $275 model with five watt output for operation on D.C. or A.C. is known as Model 31. A 14 watt output model known as the Victor 36 is to be supplied in three variations at $345, $365, and $370.

Continuous 16 mm Projector Has Advance Feed Principle

A NEW 16 MM portable Continuous Projector, which is being placed on the market in both silent and sound models by Victor Animatograph Corporation, Davenport, Iowa, embodies a patented "advance-feed" principle which insures trouble-free performance, and protection against film destruction. "Bugaboo" of continuous projection always has been eventual tightening up of, and the loss of freedom in the film windings in the film magazine or around the film driving rollers.

In the Victor continuous model, the film is wound loosely around two large wheels which are driven synchronously by an endless belt, which also acts as a conveyor for the film. The film literally hangs from the upper wheel, which actually carries the film instead of drawing it along. Size and revolving speed of these wheels have been so calculated that the film is fed off slightly faster than it can be taken up by the intermittent. Slack in the film is automatically controlled by alternate starting and stopping of the drive wheel.

A film-sack lever, consisting of an arm and roller, rests on the strand of film which is being fed to the intermittent. Excessive slack in the film permits this lever to descend to a point where it automatically disengages the drive member. No more film issues from the magazine until the excess slack is taken up by the intermittent. This in turn raises the slack lever, re-engages the drive member, and the magazine again feeds out film.

Usability of the film is greatly increased by a tremendous reduction

Top, Argus' new critical focusing enlarging case; (Page 6, Column 2), and the three new 16 mm lenses announced this month (Page 6, Column 2) Center Left, the Los Angeles made Syncro-Sound 16 mm motion picture camera, which Ampro will distribute nationally (Page 7, Column 1); Center Right, the new Argus all purpose copying bench (Page 7, Column 2); Bottom, Argus Model EFS photo-electric automatic speed printer for 2½ x 1¼ standard printers (Page 7, Column 2).
in surface rub or friction between layers of film. Added protection against film damage is provided by the Victor automatic film trips which automatically stop projection and film movement in event film loops are lost because of damaged perforations, incorrect threading, or defective splicing. Should spliced ends of the film, for any reason, come apart, film motivation is also automatically stopped, only delay in operation being time required to make a new splice.

The picture is projected onto the surface of an enlarging prism, which in turn projects at right angles to a rear projection screen. This screen is brought into position for use in much the same manner as the lens and bellows of a folding kodak.

Choice of 500 watt, 750 watt, and 1000 watt projection lamps inures screen brilliancy of the desired intensity, and a sharp, well-defined image even in broad daylight.

Craig Projector Editor Gives Home Movie Editors Studio Technique

Editing of home movies while viewing them on a screen, in the same manner as Hollywood professionals, can be done with a new and revolutionary type viewer, the Craig Projecto-Editor. Through a new principle in design, the Projecto-Editor permits the editing of motion pictures projected on a screen 2½x3¼ inches.

Outstanding feature of the Projecto-Editor is brilliant projection of the film without any flicker. In selecting the scene to be cut, film may be pulled back and forth by hand, with constant motion at any speed, and yet there is a picture on the screen at all times. This is made possible by the fact that the device has no shutter and no intermittent movement. Advantage of this is obvious; since when editing a film, the slow motion action can be studied carefully until the exact frame for cutting is selected.

In operation, the film is inserted over a gate and a sprocket and is pulled through by means of the rewinds. When the scene to be cut is framed, it is marked for cutting by means of a grease pencil. Short pieces of film from one foot up may be edited by hand and the action studied.

For convenience in editing and splicing, the Projecto-Editor is assembled on a 26-inch board with the Craig 16 mm Senior Splicer and Rewind Combination. Retail price is $49.50 complete.

Filmo Turret Eight 134-K Is Super Camera Engineering Achievement

A truly sensational Filmo 134-K super eight camera is Bell & Howell's latest engineering achievement, with rotating three-lens turret, telescopic viewfinders, critical focuser, multiple speeds and other features. Like the Filmo 70-D, its photographic big brother, the new eight is equipped with a rotating turret upon which three lenses may be mounted. Any lens is placed in photographing position in an instant by rotating the turret, which has an easy but sure position change mechanism, and the proper view-finder moves into place at the same time. The Turret Eight takes the 12½ mm, 1″ and 1½″ lenses. This setup offers the utmost in selectivity: long range, middle distance or great lens speed.

The 134-K uses the new projected area telescopic view-finder, which made a hit on the new Filmo 141 a few months ago. Mounted on the turret adjacent to each lens is the corresponding view-finder objective; and as the turret is rotated to place the selected lens in position, the view-piece. Once the optics are mounted on the turret, it is impossible to use finder is also moved to the turret position in front of the view-finder eye.

The Turret Eight further, each view-finder presents a full size image; and there is no masking to cut down the size of field. A rubber cup at the eye-piece excludes extraneous light and is a boon to persons wearing glasses. The view-finder is of the type known as "positive"; which means that no matter how the eye moves about the eye-piece, limits of the outlined field remain fixed in precisely correct position.

The standard lens is the Taylor-Hobson 12½ mm f:2.5 Mytal, a lens familiar to users of the Streamline Eight. A full line of lenses is available, including 1″ and 1½″ telephotos, speed lenses, etc. The Turret Eight also brings visual focusing to the 8 mm camera, for an improved critical focuser is built into the 134-K. By simply swinging the lens around in front of it and looking through the lens, while turning the focusing ring, the entire field is visible for pin-sharp definition. After the lens is focused, the turret is rotated to place the lens back in front of the film, and you are ready to shoot, confident of sharp focus. No more guess work!

The Turret Eight is available in two speed ranges of four speeds each—8, 16, 24 and 32 frames per second, or 16, 32, 48 and 64 f.p.s. The starting mechanism is a lever which starts and stops the camera smoothly and with no jar. Push it upward and you expose a single frame, for animation work. Push it down, and the camera gives sustained action.

The Turret Eight is equipped with the same automatic focus dial.
that has been excellent on the Streamline Eight. Every time the camera door is opened, thoroughly reducing the dirt stops back to zero.

The 134-K is housed in the light, sturdy, die-cast aluminum case that characterizes all Bell & Howell cameras. It is streamlined, as in some previous Filmo Eights, and the usual reliable exposure calculator is built in.

The case for the Turret Eight is compact, yet of amazing capacity. It will hold the camera with three lenses (up to 1/2-inch in focal length) in place, a Weston meter of any model, two extra rolls of film, extra lenses, and filters. An easily accessible, dust-proof compartment in the cover holds the filters. The case is of genuine brown cowhide, and a shoulder strap is included.

**B&H Offers New Type Continuous Projector Attachment**

The STRANGE-LOOKING object illustrated on Page 7 is a modern approach to "perpetual motion"—the new 800-foot continuous attachment of unique design announced by Bell & Howell for use with Filmo and Filmsound projectors. It is shown mounted on a Filmsound Model 138. This new continuous attachment has been developed not only to provide greater "flow" capacity than has previously been available in such a mechanism, but to incorporate features which add very appreciably to the life of the film used.

To eliminate friction between the film layers the attachment is mounted in a horizontal position so that the edge of the film bears the film weight. Design is such that the convolutions of film are caused to spread apart from one another, making the film run loosely in the attachment. In addition to friction between film and reels, and increasing the tension on the film at the sprockets, looseness of the film on the reels provides means for taking up variations in the overall length of the film due to shrinkage and to varying degrees of humidity.

If the film should become either torn at the perforations, or broken anywhere along its length, the perforation is instantly stopped by the automatic protective switch supplied with the attachment. To further increase film life a substantial cover has been provided to enclose the reel entirely except for openings necessary for the film to feed in or out. The possibility of film scratching due to dirt and grit in the air is thus minimized.

The new B&H 800-foot Continuous Attachment is for use with 16 mm films, either sound or silent. Eight hundred feet of sound film, at 24 frames per second, provides a 22-minute showing; silent film at 16 frames per second provides a 33-minute showing, before repeating. Showings of these extra lengths are very much desired by those exhibiting at fairs, conventions, etc.

The continuous attachment is now supplied for Filmo silent projector Models 57 and 129, and for Filmsound Models 120, 138 and 142 with the exception of the variable resistance models.

**General Electric Drops Prices on Eight Still and Movie Projection Lamps**

SUBSTANTIAL reductions in the list prices of high-efficiency lamps designed for still and motion picture projection, effective December 1, 1938, were announced last month by the Incandescent Lamp Department of General Electric Company.

The projection lamps affected by the price reduction range from 300 to 1000 watts. Full details are available at retail outlets.

**Complete Line of Insurance Protection on Cameras, Etc., from La Sance**

JOSEPH H. LA SANCE, well-known to studio technical workers as proprietor of the Paramount Golf Range on the site of the present CBS Radio Center in Hollywood, has developed a complete line of insurance protection for cameras, projection machines, films, accessories and portable sound equipment. Upon expiration of his lease La Sance returned to the insurance business in which he had been an executive for many years, and is particularly specializing in technical equipment insurance. All insurance handled by La Sance is in long-established stock companies.

**Daylight Type Professional Kodachrome Now Available Up to 8x10**

PROFESSIONAL KODACHROME Film is now available in a type accurately balanced for daylight use in a number of popular sizes up to and including 8x10 inches. Identical in faithfulness of color reproduction with Professional Kodachrome Film, Type B, recently announced for studio use, the new Professional Daylight Type, extends advantages of Kodachrome in large sizes to the professional and commercial photographer who wishes to make direct color photographs out-of-doors.

Since the Professional Kodachrome Film, Daylight Type, is now available are: 2x4/3x4 inches, 6x9 cm., 9x12 cm., 3x4/0.4 inches, 4x5 inches, 5x7 inches and 8x10 inches.

It can be used in ordinary cut film holders and can, therefore, be used in any camera along with such holders. Any good Anastigmat lens properly corrected for transverse and axial chromatic aberration (any lens which gives critically sharp definition everywhere in the field for panchromatic film) may be used satisfactorily.

When Professional Kodachrome Film, Daylight Type, is used in sunlight or light of equivalent color-temperature, no filter is required. For this film, a Weston rating of 5 is recommended. Average exposure in sunlight for an average subject is 1/25 second at f/6.3.

While color balance of Professional Kodachrome Film, Daylight Type, is adjusted to produce correct rendering with average noon sunlight, without a filter, certain filters may be employed to compensate for variations in daylight color with different conditions of weather or subject, when such arises, the choice of the photographer is to produce correct illumination at a color temperature higher than that of the direct sunlight. Filters which may be required under various daylight conditions are:

- **72 A**
- **2 A**
- **1 A or 2 A**
- **1**
- **None**

Professional Daylight Type has moderate contrast and fair latitude, permitting some tolerance in exposure and normal contrast in the lighting of the subject. However, exposure must be more carefully calculated than with the black-and-white films commonly used, and lighting contrast must be known beforehand.

Color saturation and contrast of full-color transparencies made on Professional Kodachrome Film are such that satisfactory three-color prints can usually be made from them without employing masking methods. These transparencies are especially suitable as originals from which color separation negatives can be made for the preparation of color prints on paper by the methods commonly used, and for photomechanical reproduction.

The new film is packaged in boxes each containing six films. Also included in each box is a return envelope, to be used when fewer than three films are returned for processing at one time; extra sheets of black paper for packing between exposed films, an instruction booklet and a gummed address label.

All films must be returned to Rochester for processing. When three or more films are returned at one time, there is no processing charge; when fewer than three films are returned at one time, a 50-cent service charge is made. The processed transparencies are returned to the photographer in protective sleeves of clear Kodapak, which are removed only when the transparency is used for making separation negatives.

**Agfa Ansco Cuts Prices on Many Films Effective December 1**

AGFA ANSCO announces new lower prices, effective December 1, 1938, which apply to most sizes of Superpan Press roll film, Superpan and Superpan Press film packs, 55 mm Ultra-Speed Pin miniature-camera film, and 35 mm Infra-Red miniature-camera film. All Agfa panchromatic roll films, 35 mm packs and 35 mm miniature-camera films now sell for the same amount in each size. Details of the new price schedule are available at all retail outlets.

**New Lines of 16 mm and 38 mm Lenses for Special Purposes from B&H**

BELL & HOWELL announces that the recently introduced Extol f:1.5 is but the forerunner of a complete line of new 16 mm special purpose lenses now ready for the trade under the names "Extol," "Acura" and "Luxam." The new lenses are designed as offering a high degree of color correction and producing fine, sharp pictures on color film as well as black-and-white. There are a number of modifications, all as optional equipment for Bell & Howell 16 mm cameras includes the following: 15 mm f:2.8 Acura in focusing mount, one-inch f:1.5 Extol in focusing mount, one-inch f:1.9 Luxam in focusing mount, two-inch f:2.8 Acura in focusing mount, three-inch f:2.8 Acura in focusing mount, four-inch f:2.8 Acura in focusing mount.

Two lenses trade-named "Anpex" and "Telate" for Filmo 8 mm cameras are also announced in the new line: 12½ mm (1/4-inch) f:2.5 Anpex in focusing mount, and the 1½-inch f:3.5 Telate in focusing mount.

**Spectip on B&H Filmo 141 Aids Photographers Wearing Glasses**

SPECTACLE-WEARING picture makers are accorded protective recognition in basic design of a camera in the new Filmo 141 movie camera, recently introduced by Bell & Howell. It has a spy-glass type viewfinder provided with a special soft-rubber "bumper" which prevents spectators from coming in contact with the harder camera material.

This innovation, called the "Spectip," provides a shallow soft-rubber cup...
Bell & Howell's Continuous Projector (Page 5, Column 1).

with its center aperture bonded to the viewfinder eyepiece. Although firmly attached to the camera, the Spectic can be instantly removed when desired.

The cupped shape of the Spectic provides just enough resistance to take up the shock of ordinary contact without damage to the spectacles. It has been demonstrated by many tests that upon mere contact of spectacles with the Spectic, the movie-maker involuntarily adjusts spectacles and eyes to the correct viewfinder sighting position.

An important feature is a knurled edge which prevents the Spectic from acting as a suction cup when in contact with the operator's glasses.

Ampro to Distribute Syncro-Sound 16 mm Camera East of Rockies

Ampro Corporation of Chicago, manufacturers of 16 mm silent and sound motion picture projectors, have just completed arrangements as the exclusive United States sales agents (east of the Rocky Mountains) for the Syncro-Sound 16 mm sound-on-film camera, manufactured by Gumbiner Syncro-Sound, Inc., 3337 Wilshire Blvd., Los Angeles, California. Catering to unskilled operators, the manufacturers claim to have constructed a combination that will give the best professional results and have the greatest flexibility of application with the minimum of operating controls.

The Syncro-Sound Camera has a sprocketless sound drive (an exclusive Syncro-Sound feature) which allows simultaneous recording and cine operation. A combination carry case and blimp provides extreme ease of set-up and efficiency. Exceedingly flexible—it takes single system pictures on all types of film, and can be synchronized with any camera for double system, or with any projector for recording narrative synchronized with a silent picture. A precision erect image view finder which is optically correct shows exactly what the operator is getting on the film. The set-up has high quality, wide range recording, with good recording from 50 to 600 cycles. Power requirements are simple as the entire equipment consumes 120 watts from 50 to 60 cycle lighting circuits. For location work a small, lightweight converter may be purchased that will operate the camera from a portable 32-volt battery. The tripod is light in weight, yet rugged enough to support 150 pounds, with double spirit level mounted on the free head. It looks squarely and easily in any position and height is adjustable from 32 to 64 inches.

Easily portable, the equipment packs into three black fabricated cases with chromium trim. Combined weight of all is 120 pounds. The complete sound picture equipment consisting of camera, amplifier, tripod, two magazines, microphone, one picture lens, carrying case, with all connecting cables, F.O.B. Los Angeles, Calif., is priced at $2975.

Argus Makes Number of Additions to Miniature Photography Line

In a flurry of activity by the Argus organization a number of new devices were announced by the company last month, all calculated to fit into miniature photography as valuable accessories or time-savers.

Speed Printer

A revolutionary new Electromatic Speed Printer, Model EFA, enables the photo finisher and even the most inexperienced amateur to make uniformly correct prints in the new standard 2½x4¼ size direct from any 35 mm double-frame negative. The new fully-automatic Argus printer eliminates much calculation, guess-work and uncertainty.

Through ingenious use of two photo-electric cells and a novel electric circuit containing a radio tube, the EFA automatically controls exposure time for each frame in accordance with the negative's density, and is so rapid in its action that it requires but five seconds to complete a print from a negative of average density. It operates on 110 volt, AC or DC current.

The new printer has four lenses, two optically ground and matched condenser lenses, and two lenses combined to form the achromatic objective lens. The surface reflector system gives flat field illumination. The use of standard 2½x4¼ ready-cut Bromex paper, proportioned to the 35 mm negative dimensions eliminates trimming and other annoyances. The printer has a perfect fixed focus, which further makes operation easy and simple.

Two levers are provided, one of which sets the timer for hard, medium or soft paper, while the tone-selection lever permits choice of contrast, medium or soft effect as desired. Beyond setting of these levers, placing the paper and touching a button, no further action or judgment on the part of the operator is required.

Automatic accuracy of exposure control is such that from a whole roll of film, bearing negatives of widely varying density, prints of exceptional uniformity are produced. The new Argus EFA brings the advantage of exceptional economy. On two 2½x4¼ prints from rolls of negatives, the negatives cost no more when made with the Argus printer, than would ordinary contact prints from negatives of approximately 2½x4¼ size. It is estimated that prints made on the Argus with Bromex paper cost less than a penny a picture. The new printer is rigidly constructed, with an all-wood cabinet, and is mounted on rubber feet for stability during fast operation. It retails at $35.

Photar Exposure Meter

The Photar, a photo-electric exposure meter of sturdy quality and precision construction, is priced at $8.75. Compact and convenient to use, it provides excellent legibility with large rapid-calculation dials, and has been proved thoroughly dependable in tests conducted in the Argus labora
tories. With its introduction into the market Fusion, the Photar is made in accordance with the Weston patents, the Photar conforms to the range of speeds prescribed by the Weston ratings, and will go high enough to include the new hi-speed films.

All-Purpose Copying-Bench

A wholly new and ingenious type of equipment for Micro and Macro-photography is the Argus Techniscope. Teachers, students, labora
tory workers and amateurs will find in this one combination unit at low cost, equipment which is ideal for taking pictures through the microscope, for making or copying stereopticon slides, for making close-up photographs of small objects, for copying letters, manuscripts and book pages. The new Argus Techniscope is exceedingly useful in reducing and magnifying negatives, for copying letters, manuscripts and book pages. The new Argus Techniscope is exceedingly useful in reducing and magnifying negatives, for copying letters, manuscripts and book pages. The new Argus Techniscope is exceedingly useful in reducing and magnifying negatives, for copying letters, manuscripts and book pages.
There's a new speed limit in Hollywood

All Hollywood is talking about speed these days... the heretofore unheard-of speed of Agfa's two new 35 mm. films.

The scope of photography, limited by the speed of previously available films, has been extensively widened by AGFA SUPREME, which is twice as fast as Superpan!... and by AGFA ULTRA-SPEED PAN, which is three times as fast as Superpan!

In spite of its amazing speed, SUPREME shows great improvements in grain size, color balance and gradation over Superpan and other comparable supersensitive films.

ULTRA-SPEED PAN, designed for newsreel photography, is being widely used in Hollywood whenever extreme speed is called for.

These two new Agfa films, recognized by the Academy of Motion Picture Arts and Sciences as the greatest contribution to the technical advance of the industry during 1937, are available today. Try them... at once!

Made by Agfa Ansco Corporation in Binghamton, New York.

AGFA RAW FILM CORPORATION

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Tel. Hollywood 2918

NEW YORK
245 West 55th Street
Tel. Circle 7-4635
Future of Television

Academy Research Council report, bolstered by expert opinion, indicates television technically "past the corner" but economically still "blocks away"; five to ten years off commercially.

(Two subjects that have taken top space in technical trade journals of the theatrical and allied fields during the past year have been television and color photography. This month's lead story of INTERNATIONAL PHOTOGRAPHER deals with television. Next month we will present a round-up of news and opinion on color, both still and motion picture.—Ed.)

An accumulating crescendo of ballyhoo and conjecture about television reached its peak last month with the almost simultaneous release of a front page newspaper splash that Paramount had jumped into television with both feet and the annual report on television of the Scientific Committee of the Academy of Motion Picture Arts and Science Research Council. The first development caused considerable pro and con discussion amongst technicians, which now is simmering down to acceptance of the fact that Paramount's venture is fundamentally experimental. The Academy report, cautiously and conservatively worded, puts an accurate finger on the pulse of television progress.

Reading between the lines of the report, there are to be found two fundamental conclusions, which are supported by independently expressed opinions of a number of experts, who, however, refuse to be quoted.

The first conclusion is that television, technically speaking, is no longer "just around the corner," but is definitely here; but the second conclusion is that economically speaking, it is "blocks away."

Television, all experts agree, is now entering the stage of development where refinements and detail improvements will be the principle objectives of research activity. But from an economic standpoint, all the important factors, upon whose decision the practical commercial application of television depends, stand to gain little and lose...
much, including John Q. Public, the ultimate audience.

Neither the radio industry, the major electric equipment manufacturing companies, nor the motion picture industry, stand to acquire anything but red ink and headaches by a precipitate leap into television. Virtually all informed experts are privately in agreement that despite the sensational technical progress of television research, its practical commercial application on any important scale is from five to ten years in the offing.

This pessimistic viewpoint, at least by comparison with the optimistic publicity on television now in circulation, is further supported by the rigid control being exercised over the field by the Federal Communications Commission. Unusually strict requirements are being demanded of those seeking experimental broadcast licenses and the conservative opinion of the important factors, whose tremendous investments might possibly be endangered, is definitely reflected in government circles. The governmental position, of course, is primarily based upon a policy that the public must be protected from wildcat television merchandising.

From the technician's point of view, all experts are in agreement that Hollywood's army of technical experts will supply the backbone of television production personnel, and when it reaches practical development, but few there are who will hazard a specific opinion as to its effect upon radio broadcast and theatre personnel in both the managerial and technical fields.

Commercing with this issue, INTERNATIONAL PHOTOGRAPHER inagurates news and mechanical coverage of television developments with a report by Paul R. Cramer, contributing editor on projection matters, on the status of television in and around Los Angeles.

This resume is followed by the complete verbatim text of the Academy report, which despite its pessimistic view as to any immediate television boom, strongly recommends that the motion picture industry "immediately proceed to a more thorough consideration than has been taken in the past of the prospective relationships between television and motion picture production and exhibition."

**Latest Developments**

*By Paul R. Cramer, Local 150 and Local 37, IATSE.*

Last month Paramount released to the public the story that beginning January, 1939, they would start broadcasting television, telling us that the Paramount Studios had acquired an interest in the Dumont laboratories in New Jersey, who in turn possess one of the few FCC experimental television broadcasting licenses, working I believe on a frequency of three megacycles.

This announcement naturally caused considerable comment among the Pacific Coast projectionists, bringing up the question of just how close is this television and what effect will it have on the present day motion picture theatre as well as the industry as a whole?

In checking the situation with expert authorities, I find quite a difference in the opinions of those that are supposed to be "in the know." Naturally, I went directly to the Paramount Studios, but they had no further information to supplement the press release of last month. When I talked to the technicians who will eventually handle this new equipment their answer was "We won't know a thing about it until the New York office drops it in our lap."

My next visit was to H. R. Lubcke, director of television research and broadcasting of the Don Lee Broadcasting System, whose basic station is KHJ, Los Angeles. In answer to a direct question, Lubcke says: "Television is definitely here, receivers are and have been available at a nominal cost (to those who will construct them themselves) but television is not and will not be ready to take its place in the theatre world for another five to eight years."

"It is quite true," Lubcke states further, "that large pictures have been received, but not large enough for use in a theatre. Although very clear and with a minimum of interference, KHJ (as you know) broadcasts pictures over Station W6XAO at 45 megacycles and accompanying sound at 97.5 megacycles. It is received within a radius of 20 to 30 miles with extraordinary clearness, and any reader of INTERNATIONAL PHOTOGRAPHER who desires a complete diagram for a television receiver, will receive one by return mail, if he will send us a large, stamped envelope, self addressed."

In talking with Brothers Meryl Chamberlain and William Weisheit of MGM and 20th Century-Fox, respectively, I found that they both agree television will assist the projectionist rather than put him out of work. Each studio broadcasting television will eventually employ a projectionist to go with each broadcasting crew, mainly because the motion picture technique will be universally used as the accompanying photographs illustrate. As Brother Weisheit reminds us, about fifteen years ago it was said that radio was going to put the motion picture theatre out of business, but instead it has assisted in building the theatre up to its present high standard.

The Hollywood offices of both NBC and CBS were very helpful in providing photographs of up-to-the-minute television broadcasting and reception activities of their experiments at eastern headquarters. Highlights of these are published herewith and with the excellent cooperation of the outstanding organizations now engaged in television research, we plan to present many more "inside" close-ups on television technique and equipment.

The accompanying layouts on Pages 9 and 11 indicate the progress made in television equipment and its close association and inter-relationship with motion picture technique and equipment as described in the report of the Academy Scientific Committee on television, which is published in full in this month's INTERNATIONAL PHOTOGRAPHER.

Figure 1 shows the inside of an NBC television camera. At the center of the intricate apparatus is the Iconoscope, or "eye of television." The rectangular plate plainly visible within the tube is the point where the picture to be transmitted is changed in the pattern of lights and shadows to corresponding electrical impulses. The upper portion of the camera shows the lenses used in focusing the scene to be televised on the light sensitive plate, in much the same manner as any other camera. The apparatus below the Iconoscope is used mainly in amplifying the electrical impulses generated on the plate. Several of these cameras are in use in the NBC television studios at Radio City, New York.

Figure 2 shows the rear view of the RCA experimental receiver for both sight and sound. The equipment at the bottom is the power pack, as well as the synchronizing unit. The Kinescope or cathode-ray tube is within the funnel shaped metal shield, having the fluorescent screen pointing upward, where the image is reflected to the scanner or viewer by a first surface mirror of high quality, thus giving a larger picture and providing the ability to move the picture up or down without having to move the equipment.

Figure 3 is one that will interest every projectionist. This is a photograph of the modified projection machine used to show motion pictures directly into the lenses of the television camera. The Iconoscope or television camera, is located just on the other side of the wall, where it is insulated from both electrical as well as manual vibrations. Note the extra large shutter mounted between the light source and the lens as is done in the modern theatre, also the placing of the driving motor in the rear of the projector head instead of below. This, I understand, is a modified Acme-Simplex portable projector using an RCA base with extra stanchions for bracing purposes. In the background is another type of projector, the description of which has been promised us for publication in next month's issue of
lighting is somewhat modified. The type of lamp used, the amount of candle power derived, and the number of lighting units used are decidedly smaller and less brilliant than those used in the motion picture studios.

Figure 5 gives an idea of the size of the present large television screen as compared with the average home receiver. Note, however, that the method of viewing the fluorescent screen of the receiver is through a mirror, thereby enlarging the image greatly. This mirror can be set so that the viewer can sit comfortably and still see the image perfectly.

Figure 6 is a simplified diagram of the NBC-RCA television unit. Figures 1 and 2 show the interiors of the two main pieces of equipment indicated in the chart.

Readers of INTERNATIONAL PHOTOGRAPHER who are interested in television may see a demonstration every Wednesday night at 6:30 p.m. at the club house at Plummer Park in Hollywood (Plummer Park is on Vista Street, one block north of Santa Monica Boulevard) where they may see types of receivers used at the present time, and hear a lecture on the construction of them. This demonstration is conducted by the Hollywood Amateur Television Society, a non-profit organization of which G. H. Seward is the president. Seward tells me that he will be glad to send to any reader of INTERNATIONAL PHOTOGRAPHER a schematic diagram for a television receiver with the key to the code of the various resistors, transformers, etc. Seward can be located at the Television Laboratories, 763 North Gower Street, Hollywood, or by telephone at HEmpstead 2567. Be sure that you send a stamped self addressed envelope if you want this schematic by return mail.

Complete text of the Academy television report follows:

Report's Full Text

The Research Council's first report on the status of television was released on May 15, 1936. The second report followed on June 15, 1937. With the present review we bring the subject up to date, at a time when the period of preliminary experimentation in the United States appears to be on the verge of transition to commercial application.

DEVELOPMENTS ABROAD

England took the lead in putting television on a public service basis with inauguration of regular transmission from Alexandria Palace in London on November 2, 1936. Two years have now passed and the results may be assessed. Notable progress has been made on the technical side and in the quantity and quality of entertainment, but these advances have not been reflected commercially. The situation was summed up not long ago in a British headline, "England Leads the World in Television—But Public Won't Buy." It should be added, however, that subsequently the annual radio show at Radiolympia (August 24-September 3, 1938), at which television was the main attraction, appears to have boosted television receiver sales considerably, and according to a current report one visual set (some of which include sound) is now being sold in the London area for every two sound-only receivers. If this is true, and if such a trend con-
tines, then British television is justified in hoping for better days ahead.

Considerable mystery surrounds the question of how much profit is being made in television. Estimates in British publications vary all the way from 2,000 to 9,000, depending apparently more on what the writer is trying to prove than on any reliable basis. Reports published in London appear to lie between 3,000 and 4,000, which, in a population of 10 million within the service area of Alexandra Palace, is a melancholy showing. And yet no one conversant with the situation at all can regard it as anything but a sign of failure. The reason is, that while sales have lagged, public interest has been sustained, and where there is interest there is a potential market. Nonetheless, it appears that television has not impresses even critical visitors from abroad. Among other manifestations it has expressed itself in a persistent demand for the extension of television service to the Midlands and the North, even while London has failed to justify the ex-

pense of what is already offered.

The experience of the British Broadcasting Corporation in this respect gives point to the caution with which American interests have ventured into television in the United States. The cost of nationwide urban com-

munication is staggering; even in England it is serious. Once the service has been undertaken it is almost impossible to discontinue it, and if it is to be continued, the public must be satisfied. Even if it eventually gets over the top and produces profits and employment, it may for a time dislocate existing industries. Thus in England, and in the United States, the problem of television trans-
mision in the presence, there are obstacles in the trade that television ballyhoo is running the sale of sound receivers without creating a com-

pensating market for television receivers. A parallel is furnished by the radio industry, which is taxing eight million licenses of sound receivers for the maintenance of service to a few thousand owners of television apparatus.

Nevertheless, the outlook is more difficult for television than for wireless. The technical progress we shall discuss later. Studio programs have improved, although it is generally agreed that they are still far below the average American level. The improvement in the area of natural broadcasting. The real achievements—and these account in large part for the unflagging interest in the new art—are visual broadcasts of sporting and ceremonial events. The importance of the first of these pictures is the game between the shorts, which has been an unflagging interest in the new art—are visual broadcasts of sporting and ceremonial events. The importance of the films and television broadcasts is their ability to reach the public in large numbers. A picture 12 feet by 10 feet has been shown in a theatre in Moscow, A. G., which has a cross-

licensing agreement with Farnsworth in the United States. There are also reports of a 700-

inch television. Cathode-ray tubes up to 26 inches in diameter have been built. The cost of receivers is said to range between $175 and $1,000, with $320 as an average.

The Germans have had a television-telephone service in operation between Berlin, Leipzig, and Nuremberg for some time, and this summer the coaxial cable was extended to Munich. Mechani-
cal scanning at 180 lines, 25 frames per second is used, and the reproduction is reported to be clearer than the present British television. The technical interest is in how the television signals are transmitted. The cost of the telephone is said to range between $175 and $1,000, with $320 as an average.

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Demonstrations other than those described above have been offered, but as we have not witnessed any of them with that attention it is impossible to pass judgment on them.

During 1939 the moderate extension of local television coverage is in prospect in various parts of the country. The Columbia Broadcasting System’s Chrysler Tower transmitter (in N. Y. City) is expected to be installed early in the year and to begin regular operation in the spring. A considerable number of applications for experimental television licenses are on file with the Federal Communications Commission, and it is almost certain that one motion picture company, has just been granted to the Allen B. DuMont Laboratories of Passaic, New Jersey, for a station in that neighborhood.

Parallel developments in Britain and Switzerland and advanced an amount, reported to be $50,000, toward the expenses of research for one year.

In Los Angeles, which, as we pointed out in our 1937 report, may reasonably be expected to carry over into the field of television its importance as a broadcasting and motion picture production center, a station of the Don Lee Broadcasting System has been televising for some years.

Progress will result in revolutionary change in motion picture production and exhibition, and this tendency constitutes a protection, if one is needed, for the other entertainment industries as well.

And yet, modern technology has its own dynamic imperatives. It will not and should not stand still. New industries are needed, and if their development is to be achieved in a smooth and problem-free manner, major industrial and financial support and understanding must be mobilized as never before. The radio has been a great public service. It has been a public service in the truest sense of the word. It has been a service to the people. It has been a service to the nation. And it is a service that we must continue to support if we are to have a radio that will continue to serve us.

The NBC television studio in Radio City, New York, is a room 50 feet by 50 feet by 18 feet, no larger than a single medium-sized Hollywood set. A surprising variety of scenery is accommodated in this small space. Since television, at the present stage, is dramatically a close-up art, the sets are small and can be disposed about the room in such a way that while the cameras are shooting one set, another is being moved into place, with a minimum of disturbance, for the next shot. The effects which are created in this studio are sometimes quite complicated. The director, one play a certain door was used, with a nameplate, as the exterior entrance of a residence; subsequently the nameplate was removed and the same scene shot but in the interior of an office in Scotland Yard; finally the whole wall was taken out and the same area became a cellar. Most of the sets consist merely of a back wall with appropriate props in front of it.

The NBC studio productions have been mediocre dialogue, stereotyped situations, and similar remarkable faults of material. These have been excused on the ground that the performances have not been public, the content has been regarded as purely incidental, the essential effort being to determine the visual possibilities of the medium and to solve technical problems. When the material has been up to the mark the results have been definitely entertaining, even with the small screen. One of our members who witnessed some of the demonstrations found it difficult to concentrate on the engineering features, his attention was constantly diverted to the action. This is as good a test of entertainment quality as any.

In June of this year a number of New York department stores demonstrated television transmission, using the Empire State transmitters. The pictures were mostly in the fixed area by three inch range and the receivers were priced at $195 for 1940 and $225 for 1941. A few sales were reported. The flurry ended when the transmitter shut down for adjustments.

The real test of public response will come next year, when regular service is initiated and receivers become available in the home. It is to be hoped that the demands this year will be met.

Engineering developments in the United States have been mainly in the directions outlined in our 1937 report, and parallel those reported abroad. The local and laborious, but steady. In general, the advances listed above for the foreign field are either the results of American invention, or they can be duplicated here whenever it becomes expedient.

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Males Undersea

Pictorial highlights of an unusual pairing of spectacular action pictures from one film company are presented from still collections photographed by Cliff Maupin, member of Local 659, IATSE, 20th Century-Fox. On Page at left, Maupin captures dramatic actio
Girls

from "Submarine Patrol," and on Page at right, "Tail Spin," affords the feminine contingent their quota of melodrama. Note the exploitation value of these typical stills and how the photographer has captured hints of dramatic story action in each shot.

Femmes in Air
the screen as they unreeled before you. The
newsreel football crew consists of Al Brick,
cameraman; Warren McGrath, soundman,
the writer of this yarn; Russell Brand, cap-
tion writer; and Paul Douglas, narrator.
At the end of the half, a special messenger
waits to rush the first magazine from the
Los Angeles Memorial Coliseum to the 20th
Century-Fox laboratories, where it is deliv-
ered into the competent hands of Mike
Leshing and Henry Goldfarb. At the same
time, the caption sheet describing the scenes
and identified by a number called and re-
corded on the sound track at the beginning
of each take, is delivered to Pacific Coast
Supervisor Jack Darrock.
In an incredibly short time, the developed
negative is rolling through the sound Mov-
iola. At the beginning of each scene a
number is distinctly heard. It is this num-
ber which aids Jack Darrock in selecting the
outstanding scenes because caption writer
Russell Brand, who called the numbers, has
distinctly marked those representing out-
standing plays.
Mentone at the stadium, Brick, McGrath,
Douglas and Brand are ready to leave after
finishing the last half. They rush direct to
the laboratory with the final film and soon
the best plays of the entire game are as-
sembled in a "rough cut" representing the
cream of the day's play. In a projection
machine especially equipped to run nega-
tive, the rough cut is previewed after which
a slight trimming suffices to reduce it to
the required length. With the final cut in
the hands of the printer, all hands turn to
for a much needed dinner. There is final
preview of the finished prints and they are
released to messengers waiting to rush them
to first run houses.
It all sounds pretty simple when de-
scribed in order on paper. In reality it is
a highly specialized branch of newsreel cov-
cerage. Each man has a definite job to do
which must be done in a manner gained
only from experience. Calling football plays
AS THEY OCCUR might seem like a sine-
cure. Try it yourself some time as you sit
and watch a game. It's a GIFT! Did you
ever get into one of those arguments on
intuition? All you need to become a firm
believer is to watch the newsreel cameraman
pass up play after play and then deliber-
ately grind on what turns out to be a wow?
If you want figures, consider that the aver-
age football game is covered in from 1200
to 2000 feet of film. As film goes through
the camera at the rate of 90 feet per min-
ute, this then represents from 1/4 to 22
minutes of a game that takes three hours.
And that includes crowd shots, rooting sec-
tion card stunts, marching bands, etc.

Newsreel film is being increasingly re-
sorted to to decide most issues of impor-
tance. Many times, newsreel film is closely
scrutinized to determine an issue. Last year
Al Brick's film was accepted as the only
accurate record of that long pass heaved by
Kenny Washington to Hal Hirshon in the
UCLA-Trojan game at Los Angeles Memo-
rial Coliseum. Sports writers were unable
to agree on the exact yardage traversed by
the pigskin in its aerial flight and that even-
ing a solemn assemblage of Los Angeles'
foremost football writers met in the 20th
Century-Fox projection room. All were
agreed that the yardage was between 70
and 75 but Brick's film, showing the side-
line markers, clearly settled the question at
62 yards. Bill Henry, sports editor for the
Los Angeles Times, discussing Brick Muell-
er's famous pass in the Ohio State-California
game of some years ago, and other long
passes in football history, had this to say:
"Kenny Washington's pass is the first of
these stupendous heaves subjected to actual
measurement in the movies. The Movietone
News film is remarkably clear despite the
dusk in the stadium and it will doubtless
be accepted once and for all as the longest
positively authentic touchdown pass ever
completed in college history."

Another point in this connection is that
coverage of sensational plays right up to the
closing minutes of the game, now is pos-
sible through use of the faster new emul-
sions developed by the film manufacturers.
Five years ago it would have been next to
impossible to get the Washington-Hirshon
pass under light conditions such as existed
that November afternoon.

Tests Continue
Experiments are still being conducted on
the Shirpsn system of three-dimensional ef-
tective photography, described in the November
issue of INTERNATIONAL PHOTOGRAPHER,
and results will be published in an early
issue.
Three Outstanding NEW FILMS

EASTMAN announces three important new negative films for the professional motion picture field.... *Plus-X*: fast, fine-grained. Unsurpassed for general studio work.... *Super-XX*: super-speed, surprisingly small grain. For difficult newsreel shots, or for use wherever exposure is a problem.... *Background-X*: ultra-fine grain, ample speed. For backgrounds. Also excellent for all-round exterior work.... These films not only make dramatic advances along their particular lines, but offer the high reliability and photographic quality typical of Eastman sensitized materials. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, Fort Lee, Chicago, Hollywood.)

EASTMAN *Plus-X*...
*Super-XX*...*Background-X*
B & H Fetes Dealers

Pre-holiday annual dinner and showing of equipment to western dealers highly successful.

An effective forward step in manufacturer-dealer relations was clinched successfully by the Bell & Howell organization last month, when their western district executives entertained the photographic dealers of the Southern California sector at dinner followed by a pre-holiday exhibition of the complete Bell & Howell line and their modern Hollywood branch service plant. So successful was the affair, with almost a 100 per cent response to the invitations, that B&H officials have decided to make it an annual event. Many dealers and their staffs came from hundreds of miles away from Los Angeles to attend.

Handled by H. W. Remerscheid, western district manager for B&H, and C. F. Carlson, western sales manager for the company, the dinner and exhibition were marked by an absence of commercial exploitation and by stress upon personal good-will relations. Carlson presided at the dinner at the Mona Lisa restaurant. Principal speakers were Remerscheid, who stressed the desire of every member of the B&H western district staff to establish friendly contact with the dealers; and Bill Winter, president, and Earl Boaden, secretary, of the Southern California Dealers Association, who reported briefly on the organization's past year record in establishing Southern California as a business relations "white spot" of the photographic retail field.

Following the dinner, the more than 400 guests visited the B&H Hollywood headquarters on La Brea Avenue in Hollywood, where in addition to a complete display of all equipment, including many new models and lines upon which there have been recent price reductions, the company's extensive repair service and special engineering facilities were specially arranged for inspection.

Color Print Service

Color Process Laboratories is ready with mechanical wash-off relief prints system.

Announcement that Color Process Laboratories, located at 837 North Fairfax Avenue in Hollywood, is now in a position to offer a complete service for the mechanical production of color prints from Kodachrome with the Eastman wash-off relief process is made by Fred Baker, veteran Hollywood cameraman, and a longtime member of Local 659, IATSE. The organization is now completing plans to provide complete, rapid service on color prints ranging from the 35 mm Kodachrome to new cut film sizes in the Eastman color film, which have been described in recent Tradewinds sections of INTERNATIONAL PHOTOGRAPHER.

Baker, in association with his partner,
Announcing

EASTMAN'S NEWEST, FASTEST 16mm. FILM
CINÉ-KODAK SUPER-XX

MORE than twice as fast as Ciné-Kodak Super Sensitive Pan, and over four times as fast as regular Ciné-Kodak Pan, this new super-fast film more than doubles the possibilities for making unusual movies under difficult conditions. Good movies much earlier or later in the day... on dark days... in slow motion, with telephotos or color filters, under poor light... of basketball games, skating exhibitions, parties, and other indoor activities... and movies indoors with ordinary room lamps (50 or 60 watts)—all of these are easy with Ciné-Kodak Super-XX.

Super-XX has such great speed that a neutral density filter (N. D. 2) is needed to prevent extreme overexposure when used with bright light. With this filter, having a factor of 4x, Super-XX can be exposed like regular Pan.

Super-XX is available in 16 mm. only—50-foot roll, $4; 100-foot roll, $7.50; 200-foot roll, $15; 50-foot magazines and packettes, $4.25. Prices include processing.

Christmas CALLS FOR COLOR

While you will undoubtedly want to make some unusual Christmas shots on Super-XX, Kodachrome is first choice for holiday movies—reproducing all of the scenes, decorations, and activities in their bright seasonal colors. Available in two types for both 8 mm. and 16 mm. cameras—regular, for color movies with daylight—and Type A, for use with artificial light. Prices, both types: For Ciné-Kodak Eight, $8.75; for 16 mm. cameras: 50-foot rolls, $4.75; 100-foot rolls, $9; 50-foot magazines and packettes, $5.
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Thomas Expands

Adds new private professional display room to Hollywood Camera Exchange.

CLIFF THOMAS, whose Hollywood Camera Exchange at 1600 North Cahuenga Boulevard, features one of the most complete lines of new and used professional and amateur equipment, has added additional large facilities for display and inspection of professional equipment. The new setup removes the bulkier professional equipment from the amateur and still department, so that professional cameramen and technicians may inspect cameras, dollies, sound systems, etc., more conveniently. Remodeling of an adjoining store space to provide the new accommodations was completed just as INTERNATIONAL PHOTOGRAPHER went to press and a pictorial layout of the new Hollywood Camera Exchange professional department will appear in the January issue.

New Zeiss Plan

The Fifth Annual Zeiss Ikon Photographic Exhibition, to be shown in New York after the turn of the year and then in major cities throughout the country, is a departure from the previous ones, in that it will be based on a nation-wide competition, with cash awards. There will be a popular ballot, and prints will be entered in definite classifications.

All entries should be submitted to Carl Zeiss, Inc., 485 Fifth Avenue, New York, and must be in their hands by December 15th.

The exhibition will be divided into three groups: (1) Pictorial Photography, (2) Press and Commercial Photography, and (3) Scientific and Industrial Photography. Awards will be given to the best prints in each classification, a first prize of $100, a second prize of $50, a third prize of $25, and three honorable mention awards of $10 each.
New Telco Color

Two color method with radical processing system wins favor with technicians.

Subject of considerable discussion amongst Hollywood technicians who have picked up inside information on its development is the new Telco color motion picture process. The organization, headed by Bob Hoyt, has been working quietly without any publicity or sales promotion, and has completed and is now editing a full length feature in Telco, "Winds of the Wasteland," exteriors for which were shot in Utah in the vicinity of Zion Canyon.

While a two-color process, Telco is reported by IATSE members who have worked on the production and by other expert studio craftsmen, to have a wide range of pleasing, natural tints, plus unusual sharpness of pictorial quality and depth of focus.

International Photographer is now preparing a fully illustrated layout and description of the Telco color system for publication in our January issue, and because of its unusual and radical processing methods, we believe this will be one of the most interesting articles on color to be published in some time.

Projection Symposium

Spot news on television; equipment review resumes with Thompson on amplifiers and power.

Readers of International Photog- rapher who have been following our series on modern projection equipment, will find the injection of spot news this month, starting on Page 9, with Paul R. Cramer's roundup of news notes on latest television developments, particularly as they affect the projectionist; along with the full text of the Academy Scientific Committee's report on television progress as it affects the motion picture industry.

The projection series will resume in our January issue with a general discussion of amplifiers and power supplies by W. S. Thompson, of the RCA Hollywood staff. This material, already in hand, is very complete and up-to-date and will be accompanied by 18 charts and circuit diagrams, some of which had not hitherto been available for publication.

Projection Contact

Recognizing the importance of the program which is being sponsored by the studios in connection with the general improvement of sound reproduction and picture projection, the International Projector Corporation has assigned Jack Durst as their factory representative in Hollywood. Durst has been identified directly with the development of the new Simplex Four-Star Sound Equipment. His experience in the industry dates back to 1928.

Salon Postponed

Lack of space and the decision of the Inter- Studio Camera Club to postpone their announced pre-holiday salon and equipment exhibition, scheduled for December, is responsible for the absence this month of news of the studio clubs. The committee handling salon plans decided that the inter-club organization had not been sufficiently been perfected, particularly in view of the addi-

tion of several recently formed clubs, to undertake such a big project at this time. However, plans for expansion and coordination of the studio camera clubs are being worked out and International Photograph er, in accordance with its policy of non-political coverage of studio photographic and technical activities, will accord the clubs news space about their program when the details are decided upon.

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PATENTS

Last month the following patents of interest to readers of International Photographer were granted by the U. S. Patent Office. These selections and brief descriptions of new patents were prepared by Robert W. Fulwider, well-known Los Angeles attorney, specializing in patent and trade mark counsel.

No. 2,131,741—Acetohalation Backing for Photographing Film. Gale F. Niles and Clement B. Starch, assignors to Eastman Kodak Co. Application Oct. 15, 1937. 10 Claims. A light-sensitive photographic element comprising a light-transmitting support having on one side thereof a sensitive photographic layer and on the opposite side an antihalation layer of polyvinyl phthalate and a dye.

No. 2,131,778—Means for Projecting Stereoscopic Pictures. A. H. Winstead, Asheville, N. C. Application Dec. 26, 1935. 5 Claims. A device for projecting stereoscopic pictures to be viewed by transmitted light, which has a pair of concave mirrors facing each screen but at equal and opposite angles to it, and means for projecting a right eye picture on one mirror, and the left eye picture on the other mirror.

No. 2,131,850—Motion Picture Machine. John M. Wall, Syracuse, N. Y. Original application July 11, 1935. Divided and this application Feb. 23, 1937. 4 Claims. A shutter for motion picture equipment, which has exposure apertures opening in it, and a closure plate adjacent the shutter arranged so that the effective opening in the shutter can be varied.

No. 2,131,974—Screen for the Production of Stereoscopic Images. Anne Henri Jacques de Lavis Saint Germaine, Versailles, France. Application March 22, 1935. In France March 24, 1934. 3 Claims. A screen for stereoscopic pictures having three lenticular networks and an unpolished screen surface, one of said lenticular surfaces being between the screen and the observer, and the other two lenticular networks being between the screen and the projector.

No. 2,132,024—Film Rewind Device. Jacob M. Goldberg, Denver, Colo. Application June 23, 1936. 1 Claim. A film rewinding mechanism having an electric motor drive, and brakes for both reels, the brakes releasing when the motor is turned on and acting when the motor is turned off.


LIGHTING NEWS EXTRA

JITTERBUG BROADS' LOSE GROUND IN STUDIOS

Nobody like a jittery broad! Observers of trends and tendencies in Hollywood's studio point to this fact as basis for the present decline in favor of "jitterbugs" are broads. "Swing," "string-cutting" and "jitterbuggy" may still be arc high among the younger generation, but they are definitely out of favor with Hollywood's lighting experts.

In circles where "groove" refers to a well-tuned way rather than a succession of "hot licks," and a "jitterbug" may signify a flickers lamp rather than an exponent of the "Neary-A," stockiness, rather than flashy performance is sought. This is particularly noticeable of twin-arc "breadside" lamps, commonly known as "broads." A single flicker of a single lamp—unnoticed by the eye—may be picked up by the camera and made the occasion of broadcast blaring retakes.

DISPLACED BY DUARC

For this reason there exists on all sets where lighting is used an accelerating tendency to retire the earlier, jittery arc lamps and to replace them with the flicker-free Duarc.

An additional advantage to this policy is pointed out by the experts. Previous arcs have a considerable attention and frequent retimming, an especial liability where the lamps are used as overhead "screens." The longer-burning, dependable Duarc, used for this purpose, can operate without retimming for half a day's shooting or longer. The more modern Duarc doubly speeds production.

DUARC TELLS ALL!

CHAMPION TWIN REVEALS INSIDE SECRETS OF DEFEAT OF ARC FLICKER

Hailed as the first broadside are to defeat flicker, Duarc, Mole-Richardson's sensational champion, today broke a long silence to reveal inside facts of the amazing achievement.

"It is purely a matter of control," the champion stated. "Flicker has always been caused by starvation of the arc. A properly nourished arc—one in which the carbons are fed at precisely the right rate—will not flicker. If the feed gets behind consumption—or ahead of it—even the best arc must flicker. If the feed is not intermittent the flicker-free Duarc, will be flicker. For satisfactory performance, the feed must be continuous, directly proportioned to carbon consumption. DIAMOND CONTROL.

"Where two arcs are operated together, as in a two-arc lamp, this means that each arc must be fed independently. The majority of conventional arcs, planned for cheapness of manufacture, have ignored this important fact. Feeding both arcs together, by a single mechanism, which usually operates intermittently, they cannot avoid an unproportioned feed—feeding one arc perhaps too late for its needs, the other perhaps too soon. Flicker inevitably results.

"The flicker-free performance which has made Duarc the champion can be credited largely to the fact that each of the twin arcs is fed individually, with the carbons feeding with a continuous movement governed directly by the rate at which they are consumed."

HOLIDAY GREETINGS FROM THE FAMILY

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Phil Brownie
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pair of transparent sheets placed in contact with each other, the contacting faces being firmly ground.


A method of printing from a strip of lenticular film taken with various focal length lenses and provided with indicating marks where lenses are changed, whereby compensating means are automatically inserted.


No. 2,133,065—Follow Focus Device. Albert W. Tondreau, assigned to United Research Corp., Long Island City, N. Y. Application June 24, 1935. 10 Claims. A focusing finder for a camera with a lens turret wherein the rotation of the lens turret operates a cam to make a corresponding change in the focusing finder.

No. 2,133,076—Translucency Projection Screen. Bernard M. Bodde, Hollywood, Calif. Original application Nov. 22, 1935. Divided and this application June 15, 1936. 7 Claims. A translucent picture projection screen comprising a sheet of substantially transparent material free from a light diffusing ingredient in the body thereof, and a number of minute number irregular light reflecting particles protruding from the exterior of said sheet and providing a rough surface, the density of distribution of said particles gradually increasing toward the center of said sheet.

No. 2,133,085—Transition of Scenes on a Motion Picture Film. William V. Dreyer, Palms, Calif. Application July 11, 1936. 5 Claims. A scene dissolve wherein one scene is progressively "fogged out" and the succeeding scene is progressively less fogged until it is free from all fogging.


No. 2,133,713—Process for the Production of Color Films and Color Photographs. Peter Noerger, Vienna, Austria. Application May 23, 1935. In Austria May 29, 1934. 7 Claims. The method of producing colored photographs and kinematographic films, consisting in providing a web of transparent film having arranged thereon successive original images and a sensitized surface, and photographing successively the partial image in register with each other on the sensitized surface.

No. 2,133,743—Motion Picture Camera. Otto W. Gibbons, George Kenke, and Everett M. Porter, assignors to Universal Camera Corp. Application Jan. 28, 1937. 9 Claims. A film wind-up mechanism for motion picture cameras, which has a plate with outstandings lugs on it, attached to a shaft, and adapted to receive film spool engaging at least one of the lugs.

No. 2,133,820—Non-Slip Film Printer. Edward W. Kellogg, assignor to Radio Corp. of America. Application Sept. 20, 1937. 5 Claims. A driving apparatus having a driving roller, a member pressing the strip against the driving roller, a second driving roller, and an idler takeup roller.


No. 2,134,483—Apparatus for Printing Motion Picture Color Film. Robert T. Killman and Thomas A. Killman, Nashville, Tenn. Application Nov. 16, 1936. 10 Claims. A step printer for printing color film in which the negative film is advanced two frames at a time, and the positive film one frame at a time, both films advancing simultaneously and only when the pressure plates are released.

New Eastman Emulsions

Advance technical data on sensational new emulsions

By Emery Huse and Gordon A. Chambers, Eastman Kodak Company

(This authoritative compilation of technical data and practical production suggestions is by two well-known members of the Eastman Kodak technical staff that cooperates closely with studio technicians. It will be published and circulated by that company and is first published in International Photographer without any editorial changes or excisions.—Ed.)

The history of the development of the art of making motion pictures is extremely interesting, particularly so in some of its technical aspects. Outstanding among these technical considerations is the negative photographic emulsion which has undergone a tremendous change during the past twenty-five years.

The year 1913 marked the introduction of panchromatic motion picture negative films. Prior to this time motion picture films were but two in number, comprising a single negative emulsion, and a single positive emulsion on which prints were made. Generally speaking the same type of panchromatic emulsion was manufactured and sold until 1928 when the first motion picture series of panchromatic emulsions, known as Type I, was manufactured by the Eastman Kodak Company.

The year 1928 marked a definite turning point in the technical side of the motion picture industry, because it was in that year that the most notable advances were made which lead up to current practice. Aside from the introduction of panchromatic motion picture negative film for general use, sound photography was given its first chance in dramatic production. Likewise, studio lighting began its metamorphosis from arc lamps to Mazda lamps. Prior to 1928 there has been very little panchromatic negative film used. Introduction of Mazda lighting equipment at the same time that panchromatic film was being generally advocated provided an incentive toward more complete use of this type of film.

During the year 1928 it was found necessary to make an improvement in the panchromatic type of emulsion then in use which revealed itself as a faster and somewhat softer emulsion. This film was known as Type II. It was not until February, 1931, that the first radical departure was made in the panchromatic negative emulsion, for it was at that time that the first of the Super-Sensitive types of panchromatic film was introduced by the Eastman Kodak Company. This film was known to the trade as Super-Sensitive Panchromatic Negative, and it was adopted quite generally for use in motion picture production almost immediately after its introduction. This Super-Sensitive type of film was materially faster and finer-grained than its predecessor, and for the first time it gave the cameraman a much better tool with which to work. Likewise, it considerably enhanced the quality of his photographic endeavors.

Two years after the introduction of Super-Sensitive Panchromatic Negative the Eastman Kodak Company introduced an entirely different type of panchromatic emulsion to the motion picture trade, July, 1933, marked the first appearance of Eastman Background Negative. This emulsion was one of very high quality photographically resulting from an extremely fine grain emulsion structure. It was approximately one-half the speed of the Super-Sensitive type of emulsion. The new film was designed to fill a niche in the art of projection background work, and it was not long before this emulsion was generally adopted as the medium on which projection background plates were photographed. Prints from these negatives are projected onto a background screen in front of which dramatic action is photographed in a composite view. March, 1935, marked the advent of a new and improved panchromatic negative film. This film became known as Eastman Super X Panchromatic Negative film. It was somewhat higher in speed than its predecessor, Super-Sensitive, gave much less graininess and provided a marked improvement from the standpoint of photographic quality. At the time of this writing
(over three years later) Super X Panchromatic Negative is in general use in the motion picture industry.

However, on October 24, 1938, the first of another improved panchromatic motion picture negative film was introduced to the motion picture trade under the name of Eastman Plus X Panchromatic Negative film. This film has twice the speed of Super X, finer grain, and similar developing characteristics, all lending themselves to finer photographic quality. It is felt that this film will, in a relatively short time, replace Super X Negative.

One week later two other panchromatic films, again quite different in characteristic, were introduced. One of them known as Background X represented a modified background negative type. This film has about twice the speed of regular Background negative, or approximately 75 per cent of the speed of Super X. It has less contrast than the Background Negative, and approximately the same grain characteristics. It is felt that this film will be adopted generally as an exterior film for general motion picture work.

The other film, known as Eastman Super XX, is an emulsion of extremely high speed, and with a grain characteristic comparable to the Eastman Super X Negative. This Super XX film has a speed four times that of Super X Negative, and from the standpoint of its speed this film may be considered a special product from many standpoints.

Technical Data
A.—SENSITOMETRIC CHARACTERISTICS

A complete technical analysis of a negative emulsion involves a study of the many sensitometric characteristics among which are such items as speed, contrast, color sensitivity, grain, etc. The conventional manner of displaying data resulting from emulsion comparison is in the form of sensitometric curves. To this end exposures were made on the group of films under discussion in an Eastman Type Hb Sensitometer using the conventional negative setup. These exposed films were developed using a negative developing solution of the type employed in motion picture practice in a machine conforming generally to the principles involved in an actual developing machine. Probably the best first-hand information concerning these three new Eastman emulsions as they line up with respect to the current Background and Super X Negatives is to study the group of sensitometric curves presented in Figures 1 to 7. The times of development for which curves are given, were times within the range where normal sensitometric contrast could be obtained. In Figure 3 there is a direct comparison for Eastman Super X, Plus X, and Super XX films. Since a gamma of 0.70 is considered normal, it will be observed that under the conditions of these tests, that gamma was obtained in approximately the same time for the Super X and the Plus X, namely, nine minutes. For the Eastman Super XX, 16 minutes was required. It must be borne in mind at this point that these times of development should be considered only in a comparative manner, and not as actual developing times to be used under production conditions. Difference in developer formulas or in machines with their own peculiar systems will alter to some extent the actual time values to obtain a fixed gamma. Likewise the ratio of developing times between different emulsions is subject to variation.

Figure 4 presents the time-gamma curves of these three emulsions. It will be observed that curve "A" is drawn to represent the time-gamma characteristics over the range of times studied for both Super X and Plus X. An examination of the actual gamma values obtained on Figures 1 and 2 will show negligible differences between these two emulsions, hence the presentation of one curve for both films. This means that practically identical developing conditions now in vogue for Super X can be applied to the Plus X type.

Curve "B," Figure 4, shows the time-gamma characteristic of the Eastman Super XX emulsion. This is the emulsion of extremely high speed and as is usual with such high-speed emulsions the developing time factor to arrive at a gamma of, let us say 0.70, necessarily has to be increased.

Figures 5 and 6 show the sensitometric curves for a series of times of development for the Background and the Background X Negatives. Since the Background X is of inherently lower contrast than the Background, longer times of development were necessary to produce the same gamma. In practice Background Negative is used at a gamma of approximately 0.80, and it will be observed by study of the time-gamma curves in Figure 7 that this gamma is reached under the condition of these tests in six minutes for the Background Negative, and 10 minutes for the Background X. Again it should be brought out that these times are relative and apply only to these tests. The relationship between these emulsions, therefore, may vary somewhat for other developer formulas and machine conditions.

B.—SPEED

With the accepted Hurter and Driffield method of sensitometric analysis, which has been described in previous publications, it is relatively simple to compute speed values for various photographic emulsions. The speed of a photographic emulsion depends upon several factors which involve the type of developing solution, type of developing machine, and the degree of agitation during development in that machine. Therefore, for a group of emulsions tested under these various factors must be kept constant. It is then possible to make mathematical computations of speed which can be expressed in a definite ratio. By applying the Hurter and Driffield procedure definite speed values have been determined for the new negative emulsions, as well as for Background and Super X Negatives.

The following table gives the ratio of speeds between these various emulsions with Super X Negative expressed as 100.

<table>
<thead>
<tr>
<th>Films</th>
<th>Relative Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Negative</td>
<td>35</td>
</tr>
<tr>
<td>Background X</td>
<td>75</td>
</tr>
<tr>
<td>Super X</td>
<td>100</td>
</tr>
<tr>
<td>Plus X</td>
<td>200</td>
</tr>
<tr>
<td>Super XX</td>
<td>400</td>
</tr>
</tbody>
</table>
Considerable interest has been shown in very recent years on the estimation of speed by photo-electric exposure meters which are not available on the market. The most outstanding of these meters are the Weston and General Electric Exposure Meters. There is relatively little difference in the final results obtained with these two meters provided the meters themselves are in good condition, and the user applies some intelligence to his attempts to use them. Numerous tests have been made and it is felt that the values presented in the following table for both daylight and tungsten exposure conditions apply equally well to the Weston and General Electric meters.

<table>
<thead>
<tr>
<th>FILTERS</th>
<th>DAYLIGHT</th>
<th>TUNGSTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Negative</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Super X</td>
<td>24</td>
<td>64</td>
</tr>
<tr>
<td>Super XX</td>
<td>128</td>
<td>80</td>
</tr>
</tbody>
</table>

Again it must be borne in mind that these values cannot be rigidly applied, but must be used with an element of common sense.

C. Color Sensitivity.

From the standpoint of color sensitivity these three new Eastman films are fully panchromatic, and while differing slightly from Super X Negative in that there is somewhat higher green speed, they are insufficiently different to cause a realignment in the filter factors for the various common filters used in cinematography. Figure 8 shows the wedge spectrums of the three new emulsions together with Background and Super X. The following table gives the filter factors for those filters most commonly used in motion picture practice:

<table>
<thead>
<tr>
<th>FILM</th>
<th>FILTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background X</td>
<td>1.25, 1.5</td>
</tr>
<tr>
<td>Plus X</td>
<td>4, 5, 3, 4</td>
</tr>
<tr>
<td>Super XX</td>
<td>3N5, 5N5, G, 23A</td>
</tr>
</tbody>
</table>

D. Graininess differences between two emulsions are often expressed on a quality basis, that is, one exhibits more or less graininess than another in the case of two films being compared. Technically these differences can be shown by photomicrographs made from uniform areas of silver deposit of the same density developed to the same gamma. These photomicrographs presented in Figure 9 show the structure of the graininess. Generally, however, the relationship between the graininess of any two emulsions as revealed by the photomicrographs is evident in the practical tests as examined on the screen. It is interesting to note that actual production and experimental tests on the various films showed that the order of graininess as revealed by the photomicrographs is evident in the picture tests. In the order of relative graininess these various films may be classified as follows: Background Negative, Background X, Plus X, Super X, and Super XX.

A similar explanation is necessary here because one would expect that the grain size gradually increased from the Background to the Super XX. Tests show quite conclusively that there is relatively little, if any, difference between the Background and the Background X. The Plus X shows slightly more graininess than the Background Negative, but is definitely less than that revealed by Super X. On the other hand, there is a just perceptible difference between Super X and Super XX with the Super XX showing slightly more graininess. However, picture tests on the screen have to be examined with extreme care to detect this difference.

As a result, the degree of graininess presented by these five films. The very fine grain structure being represented by the Background and the Background X; the fine grain structure by the Plus X; and the normal grain structure by the Super X and Super XX.

E. Development.

It was pointed out briefly when discussing the sensitometric characteristics of these various emulsions that development can play an important role in the estimation of the value of a negative emulsion. It was shown by the sensitometric curves that Super X and Plus X have very nearly identical characteristics in this respect. The Background X shows an improved characteristic over the Background Negative in that the Background X requires slightly longer developing time. The only departure from normal developing procedure is shown by the Super XX film. When it is realized that the Super XX is an emulsion of four times the speed of Super X, it is not surprising in view of current manufacturing knowledge that this emulsion with its high speed should require longer than normal developing time when based upon Super X Negative as a standard. An increase in developing time of approximately 50 per cent will take care of the Super XX film.

F. Fog.

It has often been the rule rather than the exception that the faster, or more sensitive an emulsion is, the greater the tendency toward increased development fog. It is extremely interesting to note in the case of these three new films that when compared with the current films they all show less tendency to produce chemical fog upon development.

Recommendations

This simultaneous introduction of three new negative films by the Eastman Kodak Company marks the first time in the history of emulsion manufacture when so many, and such different, negative materials were introduced to the motion picture trade at one time. These three new films are markedly different from any existing products manufactured by the Eastman Kodak Company. It is therefore, quite in order to offer some recommendations as to the uses to which these films may be put, and to give an indication of the field in motion picture practice to which they are applicable.

1. Background X.

While this emulsion carries the same general name as Background film which is now in use it is not necessarily intended that this film completely replace Background Negative. However, since there is practically no difference in the graininess characteristics of these two emulsions it is probable that in many instances Background X will be used in place of the regular Background Negative. The most outstanding reason for this is its lower contrast characteristic.

The fact that Background X is a faster emulsion than regular Background Negative opens up another possibility for use which may prove very important. There has never been a film introduced to the motion picture trade with the recommendation that this film be used exclusively for exterior photography, but since the speed of this Background X is approximately 75 per cent that of Super X, this emulsion naturally falls
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into that category. Added to this is the contrast characteristic which is but slightly higher than Super X, and the grain structure which is nearly identical to Background Negative. These three factors, therefore, make it possible to recommend the use of Background X for normal exterior motion picture production.

2.—Eastman Plus X.

This emulsion is in a sense to be considered as a replacement for the Super X Negative. Up to this time there has been no condemnation of the Super X, and the presentation of the Plus X type was not made because of weaknesses in the Super X type. However, there have been requests for films of higher speed than Super X, and this emulsion, therefore, fits into that category. In the light of past emulsion knowledge it was not possible to make an emulsion faster than Super X without increasing the graininess characteristics, but with the advance in emulsion knowledge it has become possible to make a faster emulsion with even less grain. This is exactly the case with the Plus X emulsion. Previous paragraphs of this paper definitely prove that this Plus X emulsion with its double speed over Super X is of finer grain characteristics than the Super X. These two factors, therefore, make it imperative that this Plus X emulsion type be used in place of Super X. It should be stated too that the finer grain structure definitely lends to a finer photographic quality.

This emulsion, Plus X, should be used for interior photography, there being no necessity except under adverse lighting conditions to use a film of this speed for general exterior photography. For to accomplish it it would be necessary to alter lens stops, employ diffusion discs, filters, etc., for decreasing the effective exposure. There is no need for this with the films now available.

Another field in which the Plus X emulsion can be used to great advantage is in the making of the composite projection background scenes. With the speed of this new Plus X film it will be possible to stop down the lens and thus carry greater depth of focus and generally enhance the photographic quality. This film will prove of decided advantage over Super X for this work.

3.—Super XX.

As indicated in previous paragraphs this emulsion is one of exceptionally high speed and excellent photographic quality. The prime purpose behind the manufacture of this emulsion was the desire to give the cinematographer every possible advantage that film speed could give. News reel men particularly are often confronted with the necessity of photographing historical events under extremely poor lighting conditions. Camera lenses, and camera speeds, cannot be materially altered at this time. Therefore, the only possible chance of obtaining good photographs of certain events is dependent upon the negative emulsion's ability to pick up light intensity of low value. It is felt that this Super XX film will accomplish this.

There are also many conditions arising in the cinematographic art where high emulsion speed is needed. Often such conditions arise in actual studio practice. Since the graininess characteristic of the Super XX emulsion is not appreciably greater than the Super X emulsion now in current use, there is no reason at all why cameramen should hesitate to make use of this film when the need arises. It is unnecessary to add that this film should prove very useful for the photographic recording of boxing or wrestling matches, or any kind of sport or assemblage where the only light available is the general floodlighting condition of the auditorium type.

Conclusions

It is hoped that the facts and discussions contained herein relative to the three new Eastman Negative films will enable any interested cinematographer to make successful use of them.
CLOSE-UPS

Season's Greetings

INTERNATIONAL PHOTOGRAPHER'S increasing problem of lack of space is responsible again for the necessary holding out of a number of interesting articles from this month's issue, which brings this year 1938, to a close. During the coming year we hope to overcome this handicap through the cooperation and interest of a number of important manufacturers in the field.

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