January, 1931

LOUDSPEAKER
FOR WESTERN PROJECTIONISTS

NEW YEAR

GREETINGS

January, 1931
EDDIE HARRIS

Asks—

"Are YOU Interested In A WELDED Film Splice — or — Does JUST A PATCH Satisfy You?"

Our Slogan: "The Splice is Stronger Than the Film Itself," is not merely a "catch-word"—It means that the break in the film is ACTUALLY welded as steel is welded—FOR PERMANENCY!

We feel, at this time, that an analysis of the working of ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT and the ordinary QUICK DRYING cements on the market, will clear up a mis-understanding as to the value of a quick drying cement and one of less volatility.

To WELD a break you must FUSE and MELT the broken pieces into each other to become ONE. To PATCH a break you just use an adhesive to make TWO SURFACES stick to each other FOR THE TIME BEING—They will come apart—in the case of film, ether will do that.

Ether being highly volatile, dries quick, hence can only get a surface grip on the film and soon opens!

ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT having low volatility evaporates slower BUT melts and fuses the broken film into a WHOLE.

A Film Splice made with 2 in 1 will STICK IMMEDIATELY but WILL NOT stand an immediate PULLING TEST.

MAKE YOUR SPLICE—REEL YOUR FILM IN CONFIDENCE—AND FORGET IT!

It's $1.25 a Pint Parcel Post

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2 CEMENTS INCORPORATED INTO 1 FOR USE ON SAFETY AND REGULAR FILMS

Hewes-Gotham Co.

520 W. 47th St.  New York
English Electric Company
ELECTRICAL CONTRACTORS

Specialists in all theatrical wiring, consisting of house lighting, projection room wiring and sound installations.

Season's Greetings

West Coast Cafe
Washington At Vermont

Los Angeles, 1931
Season’s Greetings

from

LOCAL 150, I. A. T. S. E.

Officials
TED ECKERSON
MORT SANDS
TOMMY ARMENTROUT

Los Angeles, 1931
SEASON’S GREETINGS

to all A. P. S. members
and their families

from
THE MEMBERS OF
SAN FRANCISCO CHAPTER No. 16
ROLL CALL
American Projection Society, Chapter No. 7

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WILLIAMS, DON HARPER
WOOD, GLEN M.
WOOD, GUY MARTIN
WOODARD, W. T.
WUTKE, LOUIS M.
YOUNG, GEO. H.
YOUNG, PURDON C.
NEW YEAR GREETINGS

METROPOLITAN STUDIO

PERCY ANGEL, Chief
JOHN LINAHAN
R. K. SMITH

LOS ANGELES, NINETEEN THIRTY-ONE

Season's Greetings

California Theatre
Huntington Park, Calif.

GEORGE YOUNG  FRED BORCH
New Year’s Greetings

Dawn Post Number 380

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“Your American Legion Post”

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The only Amusement Federation Post in United States, Meets first and third Thursday at midnight at Patriotic Hall.
Season’s Greetings

United Artists Studio
Projection Staff

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GEORGE FREEMAN
PERCY BREWER
H. C. BISHOP
CARL STEMMLER
JOSEPH J. (PHOEBE) VARTAN
HAROLD SWANSON
GLEN ALGER

•

Regards to All
NEW YEAR GREETINGS
from
Fox West Coast Studios
Projection Staff

E. L. ROBBINS, Supervisor of Projection
C. V. CHURCHILL
W. F. WEISHEIT
KENNETH REED
H. K. PORTER
AL PULLEN

H. C. RODDAN
GEORGE HURTLEY
E. J. SELVIDGE
JOE PIERCE
L. J. JONES
H. MOHLER

Los Angeles, California
1931

Nine
IN MEMORIAM

OUR UNION BROTHER

LESTER HESS

HAS GONE ON

BUT THE MEMORY OF HIS

GOOD FELLOWSHIP AND SMILING FACE

WILL LINGER IN THE MEMORY

OF HIS CO-WORKERS

—FOREVER
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TOWER THEATRE

OWEN F. STOWE
E. W. ANDERSON
CHUCK FOWLER
H. PERRISEAU

New Year Greetings

CAMEO THEATRE

W. E. PRESTON
A. E. BANDY
E. R. PIERSON
W. E. DE LAY
I want at this time to express to the Officers and Members of California Chapter No. 7, A. P. S., my sincere appreciation of the excellent work performed by the Chapter during the year.

The Projectionists of the American Motion Picture Theatre had thrust upon them, with inadequate time for preparation, the great responsibility of properly putting over the Motion Picture synchronized with sound. Failure on their part meant death to the industry.

The outstanding success of the synchronized picture is in no small degree due to the splendid co-operative work of the members of this Chapter. They have spared neither effort or expense in finding remedies for the many imperfections and failures in apparatus and have, through the medium of their excellent little Chapter publication "THE LOUDSPEAKER," distributed much valuable information to the craft.

The thoroughly efficient and unselfish work of the Officers calls for the highest commendation and this, in combination with the spirit of real craftsmanship shown by the members, is the greatest asset any organization can possibly desire.

The coming years will bring new problems, I feel assured that these will be taken care of by California Chapter with the same energy and spirit they have shown in the past and that the aims and principles of the Society for the advancement of the craft will be upheld to the highest degree.

GEORGE C. EDWARDS,
International President A. P. S.
BROTHER SIDNEY BURTON, President of California Chapter No. 7 A. P. S., whose initiative and perseverance coupled with an unusual amount of executive ability has made the rapid strides of his Chapter possible. Upon his shoulders has rested the Herculean task of guiding the destinies of this organization through the turbulent waters of early existence. His course was always a true one, directly toward progress and amicable coordination. His success has been acclaimed an achievement rarely paralleled and never excelled. We are proud in the knowledge that he will remain at the helm during another year, thus assuring us of another twelve months of progress.

And to those other officers who are retiring from office and taking their places among the other members we give our thanks. Theirs is the satisfaction of knowing a task is well done, their duty performed they are now better fitted to serve as members. We hope that we may some day be fortunate enough to again secure their services as officers. Until then,

*We Thank You.*
To 
Officers and Members 
of Chapter Number Seven

A review of the outstanding events and progress of Chapter No. 7 for the year 1930 indicates that as a whole it has been a very successful year. The birth of the 'A. P. S. Loudspeaker,' the national publicity and recognition we have received, the educational work we have carried on, the increase in membership, the meeting of June during the I. A. Convention, and finally the Second Annual Dinner-Dance and Frolic may well be cited as being milestones in the Chapter's history for 1930.

It is a sad fact that during the latter part of the year several of our number suffered from the unemployment condition that has prevailed throughout the entire country and these members are no doubt somewhat discouraged. There is, perhaps, no condition so lamentable as the one of a man who possesses ability, industry and ambition who is unable to find adequate vent for these faculties. The majority of our members possess these faculties and it is with great satisfaction that I observe a marked upward trend. It is highly probable that in the near future conditions will be so much improved that these unfortunate Brothers will all be lucratively employed.

Brothers, at this time it gives me great pleasure to extend my greetings to you. It is my sincere wish that each member of the Society and the organization as a whole shall be blessed with health, happiness and prosperity throughout the New Year of 1931.
San Francisco Chapter 16
Advancing Rapidly in Educational Work
By
FRANK L. SEAVIER

The next year brings forth many problems along projection lines which have never been taken up by any Society as yet. Our Chapter will endeavor, during the next year, to solve and explain through professors and engineers, these new problems.

So far, our lecture courses, which are held every Tuesday night of each week, are planned over a long period. Many surprises are in store for our members; simplified pictures will be shown for our Society—a television apparatus has been placed at our disposal; amplifier outfits which are of a new type—a new projector which will soon be placed on the market will be shown. Also, we expect to solve, in a clear and concise manner, some of the more intricate screen recording amplifying and projection ideas, which to some are quite intricate. We aim to have these explained in a simple way, so that they may be understood by all of our members. We also intend to have a few social evenings the next year.

During the year 1930, we feel a great good has been done our members. I wish to take at this time, the opportunity to thank all the officers of San Francisco Chapter No. 16 for the wonderful support they have given me during the year. Also, wish to thank those members who have given their time to make the success of our Chapter which has been made during the last year. Our attendance has been splendid. Along those lines at this time I wish to say... Those members from now on who fail to attend the lectures on each Tuesday night are missing the chance to obtain knowledge which they cannot receive from any books which are on the market now. I want to say that the continued prosperity of San Francisco Chapter No. 16 is placed on the shoulders of each and every member. Their interest and their attendance at these lectures are the only way that the Society can succeed. I admonish all members to attend these lectures, as the projectionists now have a great many problems placed on them, which have never been placed upon their shoulders before, and it is due to themselves and the profession as a whole, that they study, attend the lectures and carry the thought of the lectures and what they learn in their every day work.

Let me here express my own and the Chapter's deep appreciation of the wonderful lectures and the able manner in which they have been delivered before our Society by the Engineers of the E. R. P. I. and R. C. A. Corporations, as well as our most genial and learned Professor Reukema, who has given us many hours of his own time to help us solve our problems.

I wish to extend to the Loudspeaker and all of the members of Chapter No. 7, my deep appreciation for the many pleasant associations and help which they have given me.
TO ALL

A. P. S.
Officers and Members

Please accept my Personal Greetings of Good Will and Continued Prosperity

"May the next year be a banner year"

FRANK L. SEAVIER
President, San Francisco Chapter No. 16, A. P. S.
Although our Chapter, Number 20, is comparatively new, we have accomplished a great deal in getting a good start for the new year.

We have had a number of interesting and instructive lectures since our Chapter was formed in March of this year, of whom the following took an active part, in instructing the members in the study of Projection: Mr. Brisbin, Mr. Knox, Mr. Holcomb and Mr. Omer Wible, who are at this time connected with E. R. P. I.

We have recently rented a suite of rooms in the Abbington Building, which we expect to improve and use as a club room for the members as well as for business meetings and lectures.

We have engaged the services of Mr. Cruze, of the Oregon Institute of Technology, to give our regular lectures in the study of electricity. We also have planned to have the new type Simplex and Motiograph mechanisms, new type lamps and other pieces of apparatus for actual study in the club rooms from time to time.

This Chapter is composed of a group of men who are active in the study of this profession and take an active part in all of our meetings.

The officers of the Chapter are composed of the following:

President, J. T. Moore; Vice President, J. C. Porter; Secretary, A. E. Jayne; Treasurer, W. A. Whitten; Sergeant-at-arms, J. W. Stuerhoff.

The Board of Governors is composed of the above named officers, including L. M. Davis and E. M. Hazelwood.

All of the members enjoy the LOUDSPEAKER very much and find it highly instructive as well as entertaining. It is a fine medium in keep-
The distortion spoken of last month is not always as bad as it was pictured. Very often this distortion is reduced a great deal in the following stage. The transformer can be wired in two ways: so that a negative signal on the grid of the first tube produces a negative signal on the grid of the following tube; secondly, so that a negative signal on the grid of the first tube produces a positive signal on the grid of the second tube. When wired in the first manner the positive half wave, which was amplified a very small amount in the first stage, is positive when it reaches the second stage, where it is again amplified only a small amount, thus becoming a still smaller percentage of the total signal. If we reverse the primary connections to one of the transformers the positive wave in the first stage becomes negative in the second and so it is amplified normally this time, but the negative part of the signal in the first stage is positive in the second stage, so it is partially suppressed, thus evening up the two sides.

This evening up process does not straighten out the distortion caused by amplifying the different portions of the positive wave to a varying degree.

In Fig. 1 the horizontal line showing the strength of the magnetizing force can be considered as milliamperes flowing through the primary and through the tube. A represents a current of 1.5 mils; B, 2 mils, and C, 2.5 mils. The letters D, E, and F show the amount of magnetization in the core.

The negative half of the signal varies the current from A to B. This causes the magnetization to vary between D and E. The positive wave varies the current the same amount as the negative wave did, .5 mil., but the degree of magnetization only changes from E to F, a value not half as great as from D to E. That is the reason for the distortion.
The total change in the plate current is 1 mil. If a 1000 cycle tone is impressed on the grid the current variation will be about .1 mil, and it will vary about the verticle line B. When the current is maximum it will be represented by a line slightly to the right of B, 1 80 of an inch to the right of B, if B and C are 1/8 inch apart. When the current is minimum a line the same distance to the left of B will represent the current. Notice where these two lines would touch the curve, and imagine two lines extending to the right from these two points. They will be slightly above and below the horizontal line E, and nearly equal distances from E. This shows that there will be very little distortion due to saturation of the core.

If the 100 cycle tone is reduced so the current variations are the same as for the 1000 cycle tone. in other words, the volume is reduced, then the distortion will be the same as it was for the 1000 cycle tone.

Reducing the plate current moves B to the left. If it is moved to a position between A and B the transformer will work with very little distortion due to saturation.

When no current flows through the windings the troubles due to saturation are eliminated. The Clough system is one way of doing this. Fig. 2 shows how a transformer of this type is wired. There are quite a number of interesting things in connection with this system.

The diagram shows a resistance, a condenser, and the transformer coil, and it appears as though they were three separate devices. Silver Mar-

shall puts out a transformer of this type, but the resistance and the condenser are placed inside the casing that houses the transformer proper. Externally it looks the same as an ordinary transformer. There are four terminals which are marked in the regular manner: plate, positive B, grid, and negative C.

The resistance performs the same functions as in a resistance coupled amplifier. The main difference being in the value of the resistance, which runs from 20,000 to 50,000 ohms in the Clough type, while that used in a resistance coupled amplifier rarely is less than 100,000 ohms and in modern practice very often goes up to 250,000 ohms, depending on the type of tube preceding the resistance.

The low resistance makes possible the use of the same plate voltage used with the ordinary transformer.

The condenser not only performs the duties of the ordinary isolating condenser in a resistance coupled amplifier, but it also becomes a part of a resonant circuit formed by the condenser and that part of the coil forming the primary of the transformer. The primary is the portion of the coil between the tap and the negative C terminal. Neglecting the part of the coil above the tap, we can see that the condenser and the remainder of the coil are in series. The circuit being from the condenser on the tap, down through the lower part of the coil, through the source of C voltage, which is connected to the filament circuit, then from the filament of the preceding tube to the plate and finally to the condenser again. Only that part of the filament circuit is shown that connects positive C to the two filaments. The C voltage may be batteries or the drop across a resistance.

When a capacity and an inductance are in series the circuit becomes resonant at some frequency. The frequency depends mainly on the values of the capacity and of the inductance. When this circuit becomes resonant it produces a hump on the amplifica-
tion curve. Not only are the low notes amplified more because there is no DC in the primary, but due to the resonant circuit we can increase them still more, and just where we want to, because we can shift this hump by varying the size of the condenser. Of course we cannot do so ourself in this particular transformer, but the manufacturer has taken advantage of this fact and adjusted the various values so that the hum will fall where it will do the most good, somewhere below 100 cycles. This is in the region where the amplifier becomes less efficient and the loudspeaker response also falls off, so that the rise due to the transformer serves to straighten out the curve of the entire system at the low end.

Now that we know how the Clough transformer is built and wired let us see what the action is. DC cannot flow through the transformer because the condenser stops the flow of direct current, and when the tube is operating as it should, there is no current flowing between the grid and filament. Thus there is no DC whatever in the transformer, so the core does not become saturated.

To get the signal into the transformer a current must be made to flow in the primary, from the tap to the terminal marked minus C in Fig. 2. Since we have eliminated the DC we have only the signal current to contend with, and it is AC. The isolating condenser readily passes the AC.

If we impress an audio signal across the condenser and the negative C terminal it will be stepped up and transferred to the grid of the following tube. Since the source of C potential is bypassed by a large condenser, connected by the dotted lines from C minus to the filament, we can connect one terminal of the audio input to the filament of the tube instead of C minus.

As you will remember the variations of the plate current constitute the signal, and these must be made to vary the charge on the isolating condenser. This is where the coupling resistance comes in.

The first tube in Fig. 2 draws a plate current of 2.5 mils, which also flows through the coupling resistance. Whenever a current flows through a resistance a drop in voltage takes place. According to Ohm's law the drop equals the current times the resistance; 2.5 mils (.0025 amperes) times 20,000 ohms. This gives us 50 volts. The B supply is furnishing 90 volts to this circuit, 50 are consumed in the coupling resistance, so there are 40 volts left to supply the plate of the tube. That means a difference of 40 volts exists between the plate and the filament of the tube.

One terminal of the isolating condenser being connected to the plate is also at a potential of 40 volts in respect to the filament. The other side of the condenser is 40 volts negative in respect to the filament. The negative 40 volts is due to the bias put on the grid of the following tube. (40 volts is the proper bias for a '71 type tube). These two voltages being in series add up, making 80 volts between the two sides of the condenser. Since bias voltage in itself does not affect the operation of the transformer we will ignore it, as it will simplify the explanation. So we say there are 40 volts across the condenser.

Let us see just what takes place. When the amplifier is dead, there is

![FIG.3](image)

no charge on the condenser. Zero voltage across it. When we light the amplifier a current flows from one (Continued on Page 46)
The men pictured above have served California Chapter Number Seven well. During the past year they have given unstintingly of their time and energy. Their task is finished. Their remuneration is the gratification of knowing that their job is well done.

During 1930 the activities of our Chapter have expanded immeasurably under their faithful guidance. Our lectures have been of the highest calibre. Our social activities have been heartily enjoyed by the entire membership.

By their devotion to the high ideals of our Society they have won the esteem of A. P. S. men all over the country, and particularly they have won the respect and admiration of their brothers of California Chapter Number Seven. Our thanks to them. May all their efforts in their future ventures be crowned with equal success.
The men pictured above are the officers selected to guide the destinies of Chapter Number Seven through the next twelve months. By the act of accepting the various offices these men have incurred a serious responsibility. Their capability and progressive loyalty in the past has prompted their brothers to select them as their leaders. With only one exception they are new faces. Fresh from the ranks of active members, their ideas will be new, their enthusiasm undaunted by tedious details, and last, but not least, they are each well suited to the positions to which they have been elected. They take office at the first meeting in January.

To these men has come a high honor. We congratulate them. Under their guidance our Chapter cannot fail to go far and accomplish much during 1931.
P. A. C. CHIEF SPEAKS ON AIMS

By

THAD C. BARROWS

President Projection Advisory Council

It has been gratifying to note the progressiveness of the California Chapter of the American Projection Society and the energetic spirit of its members, which I had an opportunity to get a good “close-up” of during my visit to your city last spring.

I have heretofore expressed my appreciation of kindness shown me and am glad of this opportunity to more widely approve of your activities.

Though not a member of the A. P. S. I am a firm believer in craft and technical societies. I am a member of the Society of Motion Picture Engineers and the Projection Advisory Council. It was also a real pleasure quite recently to have a chance to closely cooperate with the Technical Bureau of the Academy of Motion Picture Arts and Sciences and their efforts to co-ordinate the technical activities of this industry. In appointing Harry Rubin chairman, Herbert Griffin and Sidney Burton, members of the Technical Co-Ordination Committee of the Projection Advisory Council, we believe, we have established an important precedent. It is always wiser to anticipate criticism and by working with the Academy as soon as they start anything which concerns projection, we shall undoubtedly secure much better results.

In my letter endorsing the “Standard Release Print.” I said “we believe, from the projectionist’s standpoint that the standard unquestionably represents a step in the right direction.” The Academy undoubtedly has done good work in the “Standard Release Print,” but it can only be successful through the practical co-operation of all progressive projectionists. The Projection Advisory Council was compelled to neglect a number of its other activities in order to closely cooperate with the Academy in the work of developing and distributing the “Standard Release Print.” We consider this a highly important task and the Council is always willing to work in the direction which it believes will secure the most satisfactory results. The Projection Advisory Council has a variety of ideas and plans, most of which have been put into effect to a greater or less degree. The Council will continue to serve in any way which will help raise the standing of projectionists and the standard of projection. We are at any time ready to temporarily abandon our own plans if we can accomplish more by cooperating with other organizations. We have clearly demonstrated that we can secure results which will be of benefit to the projectionists and the entire motion picture industry without coming in conflict with the work of any other organization.

We have had true cooperation from the members of California Chapter, American Projection Society, and Local 150 of the I. A. T. S. E. and M. P. M. O., and they can be assured that the Council will continue to take a deep interest in the advancement of these two organizations. Our activities and interest are international as well as national, but we know of no locality that is more entitled to our hearty support than Los Angeles.

With best wishes to all for happiness and prosperity in 1931.
STANDARD RELEASE PRINT
GAINING RECOGNITION
AND PRAISE » » »

Some time ago the Projection Advisory Council decided upon a system of visual changeover cues to be used by all producers. Their recommendations have been approved by the Academy of Motion Picture Arts and Sciences and the system adopted. Up to now very few western projectionists have declared themselves either for or against the system, although the prints so marked have been in use in some localities for several months. The east has been almost unanimous in its approval. Many letters have been received by the New York office of the P. A. C. from eastern projectionists stating their views on the subject. I am printing four average letters which give a fair idea of the general trend of several hundred received and relayed to me. After reading these letters every western projectionist should sit down immediately and write in his opinion and suggestions about the system. Point out the faults as you see them and give praise if you think it is due. Remembering, of course, that the system was intended to aid the projectionist without mercenary intentions and that your criticism should be constructive and not vindictive out of consideration for the originator’s good intentions.

The letters of comment that follow show that the writers have given considerable thought to the subject and thereby qualified themselves to discuss the subject.

I. A. T. S. E. & M. P. M. O.
Local 555
Postoffice Box 187, Carthage, Mo.
Nov. 21, 1930.

Projection Advisory Council,
New York, N. Y.

Dear Sirs:

In answer to your request that we acknowledge receipt of your letter of October 31st, explaining the "Standard Release Print Makeup and Practice," we wish to say we were very glad to receive both, and having looked through the magazine can say that we feel it will be a great help to every projectionist. We feel that this link between the Council and projectionists will be a great help at solving his problems. Wish to say that the projectionists of this Local will be glad to co-operate with you.

Yours truly,

(Signed) JOHN COMIR,
Secretary, Local 555.

INTERNATIONAL ALLIANCE OF THEATRICAL STAGE EMPLOYEES AND MOVING PICTURE MACHINE OPERATORS OF THE UNITED STATES AND CANADA
Local 265, P. O. Box 119,
Crawfordsville, Indiana.
November 18, 1930.

Mr. Laurence Jones,
P. O. Box 98, New York City.

Dear Sirs and Brother:

Received your letter of October 31st, enclosed with "Standard Release Print Makeup and Practice."

Wishing to portray, that since heretofore there has been no consideration afforded the projectionists, we are indeed honored.

Realizing the haphazard method of marking film for change-overs, in the past, we feel that since striving to obtain a better reception always, this new system will be a success and can assure you that we will co-operate in accordance.

However, on account of the very heavy bills, shown here and elsewhere, the problem arises on doubling reels, to counteract the shorts on threading up. We suggest that the doubling of all feature pictures will better the trade as a whole.

Wishing your enterprise a hearty success, and affording you our co-operation, we remain,

Fraternally yours,

(Signed) LOCAL UNION NO. 265.
H. HAROLD BELL,
Corresponding Secretary.
119 Wynsum Avenue,
Merrick, N. Y.
November 12, 1930.

Mr. P. A. McGuire,
90 Gold Street, New York City.

Dear Friend Mc:

I have your letter of November 5th, 1930, and the booklet of October 21, 1930, before me. I think the booklet is a very fine piece of work. This booklet, "Standard Release Print Makeup and Practice," is well written and describes very well the work that has been done by this committee. So many producers have gone to the trouble of printing a fine leader and made the number of the reel so small that it can hardly be seen. It must have taken some time and trouble to get all these producers to agree on a standard. All of them were so very far away from anything that looked like a standard. This will be a great help to every projectionist and it will also be a great joy to the audience. The click system now in use is a great failure. No two men wanted the clicks in the same place. I myself have worked with motors that picked up with three feet of film.

Where I am now, I need at least twelve feet and the extra five feet without sound. Now all this fine work will go to naught unless every manager of every theatre in the country is (Continued on Page 53)

Twenty-five
THE NATURE OF LIGHT

By

ROBERT D. CLARK, A. P. S.

Member Projection Advisory Council

Something of the physical nature of light may be interesting if not practical to men who make their living by means of light.

No one can say absolutely what light is. We have our theories which interpret most phenomena beautifully, but always there is something that defies explanation. We can only study what is most generally accepted.

A theory of light has many phenomena to explain. The more elementary problems are: means of energy transfer, rectilinear propagation, reflection, and refraction. More difficult of explanation are: color, interference, diffraction, polarization, special effects such as Doppler, Stark, Zeeman, and pressure shift.

The photoelectric effect, fluorescence, phosphorescence, and spectral series bring still more difficulties. Before we get through we shall probably find ourselves studying everything from radio to Einstein's theory.

The purpose of this article will be to discuss reflection, refraction, and interference. Following articles will take up other effects mentioned above.

First let us take the question of energy transfer. There are two possibilities: 1. Transfer of matter bearing the energy, or 2. Transfer of energy alone.

Newton advocated the first theory, which assumed light to be caused by the motion of minute particles traveling in straight lines.

This, "Emission Theory" compared reflection of light to the bouncing of rubber balls. In a pencil of light which is passing from air to a denser medium such as glass, the particles strike the glass and are strongly attracted by the molecules of the denser substance, and so bend close to the normal to the surface. However, experimental data does not bear out the considerations of velocity in the two media that follow this interpretation. Also in attracting diffraction and polarization, Newton's emission theory falls down hopelessly.

In 1678 Huygens, a Dutch physicist, propounded a new theory of light: the one we accept and use today. He said that the energy of light was transferred by wave motion. As we know wave motion, there must be some medium in which it can travel. For instant ocean waves are in water, and sound waves are in air or other material. We know that light travels through interstellar space where presumably there is no matter; therefore we have postulated a material to carry the light waves and given it the name of ether.

Huygens' wave theory goes much farther than Newton's emission theory in explaining the phenomena of light. The basic assumption is that from every luminous point there is a spherical wave front given off, and in turn every point of this wave front acts as the center of a new spherical wave. Thus we have light that left the source at a given instant, traveling in a sphere that is the envelope of all the past spheres.

If the source of light is a line or a plane, we have the same kind of action; every point on the line or plane is giving off its spherical wave front and the resultant is a plane wave.

Let RS be a right section of a reflecting surface. AB is the section of the wave front of a plane wave approaching RS. If RS were not there, by the time B reached B', A would
have reached A'. However, the point A acts as the secondary center of radiation, and the rays travel backward from RS. Draw a circle with center A and radius AA'. By the time B reaches B', A will have reached the circumference of the circle. A line drawn from B' tangent to the circle contains two points of the new wave front. If we make a construction similar to that at A at any point, X, on the initial wave front, we can see that A' B' is the envelope of all the reflected waves, and is therefore the new wave front. Obviously AB and A' B' make equal angles with RS and satisfy the geometrical laws of reflection. For perpendicular incidence the light is reflected gack along its own path.

**Figure 2.**

Let RS be a refracting surface, with the velocity of light in medium I, V, in medium 2, V'. AB is a plane wave front approaching RS. Here again, if RS had not been there, after an interval of time T, A would have traveled a distance VT (equal to AA' and BB') and the wave front would have been at A'B'. However, the velocity of light in medium 2 is V', and the distance traveled by the ray striking at A will be V'T. Construct a circle with A as center and radius V'T. This will represent the distance the wave from A has actually traveled in time T. Draw A'B' tangent to the circle. Draw XZ the path, with refraction, of the ray from any point on AB. It will intersect RS at Y. Construct a circle with center Y, radius YZ times V'/V. It will be tangent to A'B'. Thus A'B' is the new wave front. AA' and YD show the new direction of the refracted rays.

**Figure 3.**

A water analogy is useful in discussing interference. Suppose that two stones are dropped into a pool of water so that they set up trains of waves that have the same wave length, amplitude, and velocity. They are represented in Figure 3. Solid lines are crests of waves; dotted lines, troughs. Wherever the crest of the wave coming from A crosses the crest of a wave coming from B we have a wave with twice the amplitude of the original waves. The same is true of the troughs. These points of intensification come in straight lines; as CD, EF, GH, etc. In between these lines we find other lines, MN, NP, QR, etc., where trough is superimposed on crest. Since they are of equal amplitude they cancel, and we see a line where there are no waves at all. As this happens to water waves we might expect it to happen to light as well. By ingenious devices scientists have accomplished this. The first was Young in 1807. He used a slit aperture and a screen pierced by
JUST HOW CLEVER ARE YOU?

What's Wrong With This Circuit?

![Diagram of 214-A Panel for Deaf Sets]

During the coming fifteen days write to the editor and tell him what is wrong with this circuit. There will be a series of five of these puzzle circuits. The projectionist who sends in highest percentage of correct answers will receive an award well worth the effort. Those who do not win the award will gain a knowledge of the various circuits which will be valuable to them, perhaps more valuable than a prize. Write in your answer now.

two pinholes. Others have used prisms, lenses, and mirrors to get the effect. They use monochromatic light, say a yellow sodium flame and get regular bands of yellow and black.

The strange thing is that we see interference phenomena practically every day and don’t know it. The bright colors we see in a film of oil are due to interference of the light reflected from the back surface of the film with light reflected from the front surface. Here we have light of all wavelengths, so the bands of the same width, but overlap causing the rainbow effect. Soap bubbles and cracks in glass get their color the same way.

It would seem we ought to be able to get interference from any two sources of sodium light. Actually we find that we must use the same source for both interfering waves. The explanation is that the phase of light is constantly changing, and no two different sources keep in phase. However we must have light from two sources, so we split the beam of light we have, and by reflection or refraction bring the two parts together again to interfere.

It may be of interest to know that there are practical applications of interference phenomena. The interference caused by reflection from the two sides of a thin film of air between two glass plates, shows the accuracy of the surface planes. Where there are considerable irregularities there are many narrow crooked bands. When both surfaces are accurate planes there will be uniform illumination or darkness or wide bands.

Newton’s rings are seen when a lens of a long radius of curvature placed on a flat piece of glass is illuminated. There is a large spot in the center which is surrounded by rings of different colors whose radii are dependent on the thickness of the air film between lens and plate.

Interference fringes are also used to test the parallelism of the two sides of plates of glass.

(To Be Continued).

Twenty-eight
Nine Months of Progress

By

J. O. ELLERY, JR., A. P. S.

San Bernardino Chapter No. 19 was chartered March 24, 1930, and at that time elected the following officers: H. E. Reynolds, President; C. R. Douglas, Treasurer; A. W. Moes, C. B. Winn and J. O. Ellery, Jr., Board of Governors.

Since that time, a bare nine months, Chapter 19 has firmly established a progressive policy under the able and industrious management of our president. Brother Reynolds has inspired the other officers and members by his unselfish devotion to the high ideals of the Society.

The meetings of our Chapter are held at Ontario, Calif., at the clubhouse of the American Legion. By having our meetings in Ontario, we save considerable time for some of our members since this town is about midway between the towns wherein our members work. Dinner is served before the meetings, after which we receive the educational program provided by the officers.

We secured the services of Mr. N. E. Brown, of Los Angeles, for a series of lectures which were just completed. Mr. Brown is an eminent authority on sound amplification and his lectures were a source of real help to all of our members. For the 1931 educational program we have been promised a series of lectures by E. R. P. I. engineers.

Our little membership started with twelve and now we are up to sixteen, with several men to be initiated in the very near future. Looking back to the first months of our existence we believe them to be nine months of progress. Looking ahead toward a full year in 1931 we believe even more will be accomplished.

The hearty New Year Greetings of our Chapter are extended to all A. P. S. men everywhere. We wish you every happiness.
NEW YEAR

A. P. S. LOU

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Chief Projectionist

R. L. MACDONALD

M. H. TOENSING
ACADEMY OFFICIAL PRAISES A. P. S.

By

LESTER COWAN
Manager Technical Bureau

One of the biggest developments in the motion picture industry during the past year has been the spirit of better relationship among the technical crafts. It takes the teamwork of ten thousand men to give each talking picture to the public, and Sound has increased the problems and responsibilities all along the line. The technicians of the industry have responded in full measure. In this respect the projectionists, through their leaders, have won the respect of the other crafts by their progressive attitude. The American Projection Society and the Projection Advisory Council are among evidences of this leadership.

The spirit that will carry the industry forward is being shown in the way the projectionists of the country are taking hold of the Standard Release Print. It is to the great credit of the American Projection Society that its Los Angeles chapter was active in this from the beginning and the president of the chapter, Sidney Burton, has been a member of the committee which worked out the present standard and is responsible for improving it in the future.

A good start has been made and the coming year will be the real test. Projectionists realize they are nearest to the public of all the technicians whose work enters into the finished product,—the show. More and more they are striving to help themselves and each other do a better job.

I even know of one instance where an APS member in a big city house drove seventy-five miles on his own time to get acquainted with and help a young fellow who didn't know any better than to mutilate the prints that came to his theatre. If the youngster isn't a member of the APS by this time he ought to be.

If the leaders are given proper support, I think that the misunderstandings, professional jealousies and so on that have hampered technical progress will be eliminated to a great extent. Such improvements as the standard release print deserve and must have the cooperation of all those who handle prints in studio, exchange and theatre. There are real problems to be solved and the only way they can be tackled is for the technicians of the industry to exchange ideas and experiences, to get together personally whenever they can and the rest of the time to take full advantage of their professional organizations, their publications and their increasing position of respect and responsibility in the industry as a whole.

LESTER COWAN,
Manager, Technical Bureau Academy of Motion Picture Arts and Sciences.

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1 · 9 · 3 · 1
GENERATOR TESTS

by

R. Van Slyker

In testing for a ground, disconnect the output leads from the load. Take a 110 volt test lamp, or better still, a 110 volt voltmeter. Connect one leg or lead to the ungrounded or hot side of the current supply, and take the grounded side and fasten it to the frame of the generator. Touch the other lead of the voltmeter or lamp to each of the generator leads. If there is any deflection of the voltmeter or glow of the lamp, it is an indication of a ground. A voltmeter is more accurate in showing a partial ground, showing a feeble deflection that would pass unseen in a test lamp, due to the smaller current passing. If there is a deflection shown on the voltmeter, place pieces of paper or any other insulator under the brushes of the generator and apply test lead to the terminals. If a deflection is still apparent the next most likely cause is that the brush holders have (due to oil and carbon dust accumulating in them) shorted to the frame. Disconnect the leads to them and test the terminals again. If there is any deflection of the voltmeter the trouble is in either the field coils or the brush leads themselves. Check through to the brush leads and examine them closely to see if the insulation is chafed or cracked, thus causing a ground. If these are all right cut out the field coils by disconnecting them from each other until the faulty coil is located. In the event that raising the brushes from the commutator stops any deflection of the voltmeter, it is safe to assume that the armature is at fault. Take the test lead and place it against one of the commutator bars or segments, and rotate the armature by hand, marking the grounded bar with a grease pencil.

Remove the armature and examine for loose binding, chafed wires, loose commutator bars or surplus solder. This routine should reveal any of the most common ills which develop in high voltage generators. Special stress should be made on the importance of making each test exactly as herein directed, making very sure that no detail is overlooked since any small item overlooked will render the test false and confuse the issue.

Season's Greetings

H. J. RILEY  H. T. CRAIG

FOX ADAMS THEATRE

LOS ANGELES, CALIFORNIA

Los Angeles, 1931

New Year Greetings

EARL LIETER

FILMARTÉ THEATRE

Home of Foreign Pictures

LOS ANGELES, CALIFORNIA, 1931
Chapter No. 7 Celebrates Second Annual Dinner-Dance and Frolic

The members of California Chapter No. 7, together with their wives, friends and associates in the motion picture world, gathered together at the Elks Club on December 16, 1930, to celebrate their second annual dinner dance and frolic. The occasion excited widespread attention among the celebrities of the motion picture world.

Film and Stage Celebrities Present

Miss Virginia Carlisle, of the M. G. M. Studio, was guest star and acting hostess to the projectionists and their guests.

Mr. Gene Morgan (King of Mirth) acted as Master of Ceremonies. Mr. Morgan more than justified his title of King of Mirth on this occasion. His antics and smart cracks were a source of continual merriment. Lester Cowan, Secretary of the Academy of Motion Picture Arts and Sciences, occupied a conspicuous place at the guest table. Mr. H. A. Bailey, the well known local showman, was among those present. The Projection Advisory Council was well represented by the First Vice President, Sidney Burton (Mr. Burton is also President of Chapter No. 7, A. P. S.), and Regional Vice President, T. H. Eckerson.

Dance and Entertainment Excellent

The committee on arrangements, headed by Brother Otto Felts, who was ably assisted by Brothers C. M. Fowler and Louis Wutke, secured the cooperation of many local firms in furnishing the many features of the evening’s entertainment. National Theatre Supply Co. supplied the music by securing the services of George Stoll’s orchestra, which is one of the most popular theatre organizations. The dinner was of real banquet proportions and was thoroughly enjoyed by everyone. The entertainment consisted of several acts, which were provided by Mr. Harry Bailey, who gave generously of his time to make this part of the evening perfect.

Evening Filmed

The spacious banquet hall of the Elks Club was converted for a short time into a stage when lights and cameras came into play to film in sound, the event. The banquet attracted so many of the celebrities of the industry that the Fox Film Co., United Artists and Metro-Goldwyn-Mayer studios sent cameras, lights, sound equipment and necessary personnel to record the event in celluloid. It is understood that the film will be used in the forthcoming issues of news-reels.

Dance Contest

An interesting event of the evening was a dance contest to determine the couple that excelled in the art of terpsichore. The first prize, a beautiful loving cup, was won by Mr. and Mrs. Bill DeLay. The second prize was won by Mr. and Mrs. Leonard Pyles. The loving cup and prizes were presented to the winners by the guest star, Miss Virginia Carlisle. The party was in every way a huge success. It was one of the outstanding events of the year and was conceded to be a most enjoyable evening by all present.

Greetings to All My Friends

J. B. (Pop) Kenton

Forty-one
Let's Have Co-ordination
by
P. A. McGuire

I have long had a persistent and enthusiastic confidence in the projectionist and my faith in him has been confirmed in many ways. I have seen projectionists at meetings of the American Projection Society and on many other occasions, taking an interest in their work and seriously discussing its problems when the rest of the world, which was not attending a night club, was asleep. I have heard projectionists on hundreds of occasions discussing technical matters which did not affect them financially at all, and personally only through the opportunity that improvement would present to enable them to do better work.

The American Projection Society, to the best of my knowledge, was the first technical organization of the motion picture industry and has rendered a great service to the industry through its many discussions of the theoretical and practical problems of motion picture projection.

The Society of Motion Picture Engineers has made some efforts to encourage interest in projection, but invariably the only papers and discussions on projection have been the work of practical projectionists. I would like to go on record here and state with positiveness that I never heard any discussions on projection during the meetings of the S. M. P. E. that had any real value, that did not come from such practical projectionists as George C. Edwards, Chauncey L. Greene, Herbert Griffin, Arthur Gray, F. H. Richardson, Lewis Townsend, Harry Rubin, etc. It is very satisfactory to observe that the S. M. P. E. seems to be making an earnest effort to put projection on a well organized and systematized basis and practical projectionists are being placed on the Projection Committee.

The recent activity of the Academy of Motion Picture Arts and Sciences is particularly gratifying and splendid results are being secured through the work of Mr. Lester Cowan, manager of the Technical Bureau of the Academy of Motion Picture Arts and Sciences. Mr. Cowan has brought into this field an enthusiasm, a persistence, an understanding and an ability to get results, which, I believe, mark a new era in the motion picture industry. It becomes evident that we have at last realized the interdependence of the various departments of the industry and the urgent need for coordination. We now have reason to believe that the high executives of the motion picture industry intend to give adequate moral and financial support to the work of the technical organizations of this industry. It is perhaps too much to hope that the industry will also give proper recognition to the work of the American Projection Society and the Projection Advisory Council. These organizations have done pioneer work in the development of certain important ideas. Disinterestedly they have worked to raise the standards of projection. I quote the following from a long article, "Let's Have Co-ordination," recently published in Theatre Management.

"This is the day of electric entertainment and technicians must work to present motion pictures in the way that will be most satisfactory to patrons. Back of the artistic side of the motion picture industry is a vast technical field, whose work offers infinite opportunities for flaws and failures. No single department of the technical field should be permitted to secure results with undue sacrifice of any other department.

"We all have but one purpose and that is to serve the public. No individual or organization has a superiority beyond the extent to which it can contribute to the quality of motion pictures as an indispensable and essential form of public entertainment and education.

"If the technicians of this industry, working through their organizations and with the support of the ex-
ectives of the motion picture industry, will work for the creation and exchange of systematized information. I feel sure that co-ordinated action can be secured, which will be of inestimable value.”

There is a slowly growing realization that motion pictures are not manufactured like an automobile in a single factory, but are an assembled product passing from place to place and finally delivered to the public through those little factories—the projection rooms—away up the top and at the back of the house.

Through the Projection Advisory Council we have been able to secure cooperative action along certain lines and slowly but surely are getting real results. I do not know of a single plan or idea sponsored by the Projection Advisory Council, which is not the result of long and intimate contact with projectionists. It is not strange that many of the excellent ideas advanced by projectionists have not been put into effect or that the Council is not able to secure more general acceptance of its ideas. There has been a woeful failure to realize the interdependence of the various departments of the motion picture industry and we are just about beginning to understand the urgent need for coordination.

Executives of the motion picture industry have been largely responsible for the failure to understand the need for discussion and coordination. They have given comparatively little assistance to any organizations working for the betterment of the industry. It is, of course, true that motion pictures were put on a commercial basis about thirty-five years ago and the art of printing is about five hundred years old. The motion picture industry grew like “Topsy” and much allowance must be made, but in these times and in this country we move rapidly and we now have a right to expect better things. Through “collective thought” we get organized action and the executives of the industry should do more to support all societies and trade publications that are assisting in the campaign to improve technical standards. It is not sufficient to merely have technical societies of the industry as it is absolutely essential to have their findings and activities brought to the attention of every technical department in this field through the medium of trade and craft publications.

While we are discussing the obligation of executives to support cooperation and coordination, it is well for projectionists to ask themselves what they are doing along these lines. Projectionists who do not take an interest and give some support to such organizations as the American Projection Society, Projection Advisory Council and other craft organizations are not doing their full duty. Always small groups of men have been carrying on the work of these organizations and the entire craft deriving the benefit. The following is from an article signed “Clevelander,” in a recent issue of the American Projectionist:

“The I. A., both local and international, is primarily concerned with organization, wages, working conditions, rules and discipline, both as concerns ourselves, kindred crafts in the Alliance and other branches of the Federation of Labor. It is sometimes argued that the I. A. should provide all this research, investigation, standardization and education being undertaken by the P. A. C., and A. P. S., yet it seems clear to the writer that our International officers should not successfully be burdened with this work in addition to their already onerous duties. Were it handled within the I. A. separate departments would have to be provided for the work with additional finances, thus gaining nothing over the present plans.”

The I. A. cannot do the work of the various craft and technical organizations, nor can it very well officially approve of the activities of these or-
ganizations. We can be assured, however, that the I. A. would soon find a way to disapprove if their activities were objectionable. All these Societies are absolutely dependent upon the individual projectionist and his Local for the practical use and development of all plans made for the improvement of projection. The American Projection Society and the Projection Advisory Council are helpless unless we receive the support of projectionists. The Academy of Motion Picture Arts and Sciences and the Society of Motion Picture Engineers can do little for the advancement of projection without the active interest of practical progressive projectionists and the work of all these organizations has a greatly restricted value unless the industry knows what they are doing. The trade and craft publications provide a highly effective means of keeping well informed regarding technical matters as they affect projectionists and every projectionist should subscribe to at least one good publication.

Some projectionists belong to the American Projection Society, the Projection Advisory Council and the S. M. P. E., and in addition quite a few are actively cooperating with the work of the Technical Bureau of the Academy of Motion Picture Arts and Sciences. The cost of these various memberships is apparently not extremely burdensome. In many instances it will be most practicable to belong to only one organization and subscribe to only one publication. Where projectionists, however, do not find it possible to join at least one of these organizations, there is an undoubted obligation to see that their Local gives some kind of financial support and earnest active cooperation.

The day of individual effort has
gone by. We are all part of a tremendous and complicated system which works for or against us. And we must utilize every effort to develop and protect ourselves. No man is strong enough to stand alone. Through collective thought we secure organized action, and are therefore, dependent upon various organizations to produce practical results. Let us hope that every progressive projectionist will associate himself in some way with the American Projection Society, Academy of Motion Picture Arts and Sciences, Society of Motion Picture Engineers and the Projection Advisory Council. If, in addition to this, the projectionist will enlarge his contact by systematic reading of trade and craft publications, backed up by a little library of good technical books, he will be in a position to do his work better today and be prepared for change and improvement.

Progress continues ceaselessly under any and all conditions. For the individual or for all mankind to stand still means to go backwards. I have written about the California spirit before and am glad of this opportunity to observe and commend the plans that the California Chapter of the American Projection Society is making to enlarge its activities.

Season's Greetings

BOBBY HAMM
LOUIS WUTKE

LOS ANGELES, CALIFORNIA, 1931

New Year Greetings

HUGH SMITH
H. BANTAU

FOX-WESTLAKE THEATRE

LOS ANGELES, CALIFORNIA, 1931
(Continued from Page 21) side of the condenser, around the circuit to the other side. We say the condenser becomes charged. After the condenser is charged no more current will flow in either direction as long as the voltage across it remains unchanged. If the voltage across the condenser is changed to 41 volts a current flows for an instant, and it will be in the same direction as the current flowed when the amplifier was turned on. If the voltage be lowered to 40 again the flow of current will be in the reverse direction. If the voltage is lowered still further another similar current flows for an instant. Each time the voltage across the condenser is varied a current flows, the direction depending upon whether the voltage is increased or decreased. The important point is that the current flow is through the primary of the transformer. Every time the condenser is partially charged or discharged a current flows through the primary. This is the signal.

A signal is now put into the tube. This reduces the plate current to 2.25 mils on the negative wave. 2.25 mils will not cause so great a drop in the coupling resistance as 2.5 mils did. It will produce a drop of 45 volts (.00225 times 20,000). This leaves a voltage of 45 across the plate and filament of the tube, which is an increase of 5 volts. The increased voltage is also applied to the condenser, which becomes charged a little more. The charging current going from one side of the condenser, through the transformer primary, then through the C battery, over to the filament of the first tube, to the plate, and finally back to the other side of the condenser.

We can make this more clear by redrawing Fig. 2 a couple of times, leaving out everything that does not enter into the business of charging and discharging the condenser.

Fig. 3 shows the first step. The tube is represented by the resistance RP inside the circle. This is because the path from plate to filament in the tube looks like a resistance to the rest of the circuit, and acts like one; a varying resistance. The filament in Fig. 2 is hooked to negative B, so we draw the line from the bottom of RP to point Y at the negative end of B. The top of RP goes to X, to which is also connected the coupling resistance R and the isolated condenser. R and the battery B are in series as they are in Fig. 2. From the condenser we go to the transformer T, but we only show half of the transformer, the primary. The secondary does not enter into this. We also leave out the C battery, so the wire goes from T to Y. This looks different, but just imagine that the circle is a tube, which it represents, then study Fig. 2 and Fig. 3 for a second and you will see that they are quite the same.

Next is Fig. 4. This is exactly the same hook-up as Fig. 3. The portion to the right of X and Y in Fig. 3 is drawn in with dotted lines in Fig. 4, and to the left of the points X and Y. In Fig. 3 the condenser is connected to X. In Fig. 4 it is connected to the other end of the same wire. It is still connected at a point between R and RP. In Fig. 4, Y has been slid along the wire so it now is under RP. It was under B in Fig. 3. The transformer T is again connected to Y.

By another twist of the wrist we
change Fig. 4 into Fig. 5. The condenser is “slid” around from the top line to the left vertical line. Then we push the transformer down out of the way, that puts it on the bottom horizontal line. No changes electrically, just drawing it differently. The battery is also swung through 90 degrees and over.

Now we can read all the voltages vertically, making it easier to follow. It can be assumed that no drop in voltage occurs in T or in B. There are 50 volts across R, 40 volts left across RP, and of course the same across C. The current is 2.5 mils. The numerals in Fig. 5 and 6 show the voltages at the points indicated by the arrows.

On the negative wave of the signal the current is reduced to 2.25 mils. To make Fig. 5 conform to this new condition we must take out RP and replace it with another RP having somewhat greater resistance. Or if it is variable, increase the resistance slightly. That is more exact. It is what happens in the tube. The new values are: R, 45 volts; RP, 45 volts; C, 45 volts.

To explain the action when the current drops we will assume that we can break the wire between X and C just before the current falls from 2.5 to 2.25 mils. After the change RP will cause a drop of 45 volts, but C will only have 40 volts across it, due to the break between X and C. Fig. 6 shows this condition. A difference of 5 volts exists across the break. When the circuit is closed again a current must flow. The path of the current is from C through T, through RP, and back to the other side of C. This completes the circuit, and the current will flow until the voltage across C is equal to that across RP, 45 volts. The drop in current increased the charge on the condenser, and in doing so the charging current had to flow through T.

Actually, of course, the wire cannot be opened, and the charging current starts to flow as soon as the voltage starts to rise across RP. This happens the instant the current through RP begins to decrease, and is quite gradual.

When the current increases on the other half of the signal the reverse action takes place. 2.75 mils flow through RP. The drop in R becomes greater and across RP becomes less. The voltage across RP drops and as this occurs, C is discharging as long as the voltage across RP is falling. As C discharges the current is again going through T, but in the opposite direction than it did on the negative half of the wave. In this manner an alternating current is caused to flow in the transformer.

**Actual Occurrences No. 14796**

Manager buzzes fader up one—no response—another buzz and still no effect. Several buzzes more and still no louder. Manager on phone to projection room says: “How come, I buzz you several times and the sound is still soft.” Projectionist (?) : “Its loud enough already, the monitor hurts my ears.”

Forty-seven
THINGS IN GENERAL

by
The Editor

There comes a time in every progressive move when either a longer or shorter stride must be taken. We have chosen the longer stride. My colleagues and I made this decision after much deliberation. We believe that the projectionists on the Pacific slope, and all others who can be termed western, should have a publication of their own. We further believe that our strategic location in the immediate proximity of Hollywood, Culver City and Burbank, makes us the logical creators of such an organ.

The western projectionist has for a great many years been considered just a little inferior by his well meaning eastern brothers. This is a reasonable assumption on their part inasmuch as the westerners have acted the proverbial part of "hiding their lights under a bushel." In dealing with this complex as an issue to be overcome we believed that with encouragement and persistence the western projectionists could be induced to cast aside their shielding cloaks of modesty and show to the world, through the medium of his publication, that he is the equal of any of his fellow craftsmen anywhere.

Like their pioneer forebears, the western projectionists have been trail blazers. Their ideas have stolen into every phase of the industry, their originality in presentation and mechanical operation has won for them the coveted high place they now occupy. Upon them the industry leaned heavily during the historic transition from silent to sound pictures. Their response was acclaimed epical and has become a saga of the technical motion picture world. It is therefore only natural for us to presume that future problems will be solved with equal dexterity and that new chapters will be written to further immortalize his fame. It is our fond hope that this magazine will be allowed to record each month the steps of his progress.

To this man, THE WESTERN PROJECTIONIST, wherever he may be located, we pledge our efforts and the support of this magazine unstintingly.

Monthly Health Hints

Don't touch a high voltage condenser for at least five minutes after disconnecting it.

Your rectifier transformer is very potent to the touch. Lay off!

Never wash your mouth or teeth with your battery syringe.

Don't use a hydrometer for a fever thermometer. It might cause your tonsils to fall out.

Don't use Vitaphone needles for toothpicks.

Film cement does not mix well with Silver Fizz.

Never go to sleep in a Super-Hi Lamp house.
Willard Bridges, chief at United Artists, has returned from New York, where he supervised the opening of "The Bat Whispers" for the new United Artists wide screen picture. They call it Magnafilm.

That go-getter that goes and gets, none other than Brother H. C. St. Clair, has started his regular annual auto license getting debauch. See him about your new license, NOW! But don't forget, you can't all have number seven.

Why doesn't somebody write in some of the doings of the brothers so that we can make these Pin Spots HOT!!!

Brothers Young and Borch have been extremely busy installing a wide screen, new lamps, etc., at their cinema emporium in Huntington Park.

CRUSOE AND FRIDAY

Bill: Hello, Chuck. Have you seen Harry Perriseau?
Chuck: No, but I just saw Doc Prestons coat tails going around the corner. Hurry and you can catch them.

Brother Wallace Maxon, not content with seeing half the towns in the United States, journey with the Mrs. to Agua Caliente. We strongly suspect that the prime moving impulse was the desire to escape the arid climate of the home town.

Brother Jack Helm is now at the Columbia Studio, having been selected by Bro. Howard Edgar to fill a recent vacancy.

FROM OAKLAND, CALIFORNIA

Charlie Ball's latest inventive efforts are pushing him toward a perfect "Fader." We are told that a perfect fader automatically goes up on the right side. Charlie says he will accept suggestions.

Joe Carter's favorite outdoor sport is catching big fish then having to jump in after them.

Al "Putts" Paxton is the only chief in Oakland, he has a hat that proves it.

Bill Rose said he wouldn't have it "Infra-Red" because he doesn't know him.

Dan O'Brien has the number of all our golf players, his latest cartoon proves it.

Geo. Lancaster discovered that putting the fuses in upside down will not make the motors run backward.

Bill Rose says an automatic "fader" is Al Nagle, who always has his dough on the line.
The new year starts with a bang! At our first meeting in the new year we are to be the guests of Mr. C. A. Ashcraft, who is well known to all projectionists as the manufacturer of the famous Ashcraft Automatic Arc. Mr. Ashcraft has arranged for our entertainment in his establishment at 4214 Santa Monica Boulevard. Lunch will be served, after which Mr. Ashcraft will explain the proper method of maintaining and operating the new Super H I intensity lamps which he has developed for use with grandeur, magnascope or any of the wide screen systems. Mr. Ashcraft’s skill as a lecturer and host is well known, so no member will want to miss this lecture. Remember the date and address. Tuesday, January 6, 1931, 12:00 midnight, at Mr. Ashcraft’s factory, 4214 Santa Monica Boulevard, Los Angeles, California.

The second meeting of January will be held at the T. V. G. Building, 936 West Washington Boulevard, at 12:00 midnight, Tuesday, January 13, 1931. Lunch will be served (the first by the new committee), after which we will hear an educational lecture.

ALL MEMBERS ARE SINCERELY URGED TO BE PRESENT
Words alone will not suffice in showing, nor can they begin to express the appreciation felt by me in having the honor of Secretaryship of the American Projection Society, Chapter No. 7, bestowed upon me, a comparatively new member. I fully realize the precedent established by Brother Koskoff in the able fulfillment of the duties of this office, and I shall, to the utmost of my ability endeavor to follow the splendid example set forth by him.

FRED L. BORCH.

Retiring Secretary's Greetings

The opportunity of greeting and extending good wishes to my successor becomes an easy task. The new secretary of Chapter No. 7, Fred L. Borch, being one of the most capable and willing men available, the continued growth of the organization is assured.

The office of secretary is difficult and the interest of the selected man in his work reflects directly on the forward strides of the Society.

Exceedingly favorable comments from various corners of the country on our phenomenal growth, successful work and active interest in projection and its affiliated problems of sound, optics and general showmanship would not have been forthcoming if the body at large were not one hundred per cent for their officers.

My best wishes and sincere hopes are that California Chapter No. 7 continues to grow. I know that if the membership will support its new officers, cooperate with Fred Borch, as they have cooperated with me. For had I not had their support and confidence I couldn't point with pride to a two and a half year record of wonderful association. For this I am truly thankful.

The personal interest I have taken is evidence that A. P. S. men have confidence in our new secretary, that I am asking for and wishing Fred Borch a definitely successful term in the important office of secretary, California Chapter No. 7, American Projection Society. DAVID KOSKOFF.
Criterion Theatre
EXTENDS
Season's Greetings

LEONARD PYLES
T. E. DE LAY
W. W. WELLS
OTTO FELTS
Standard Release Print
Continued from page 25

also held liable with the projectionist to see that this is not ruined.
I have worked in two Fox Theatres where the managers would try every concocting method to kid the audience with trailers. They would order us to put these trailers in such places that we would have to cut the leaders or run out in order to get over their pet schemes. Some of these theatre circuits would have to teach their managers how to put on a show. I think it would be a good idea if such men as Oldkno and Arthur of Fox were put wise to some of the methods used by their managers. In some Fox Theatres they split the news to put a trailer in the middle of it. In the theatre where I am now all advertising is done either in front or behind the News. So the News is run solid.

The Projection Advisory Council will have its hands full to put this “Standard Release Print” over in the theatres. So don’t overlook the fact that you have men in the shape of managers to deal with who are more ignorant than many operators. I would like to see all advertising kept in one spot in the program and have it all together. If we must cut leaders and run-outs, let it be the News. Some of the Shorts I get today are as bad as when I was in that dump in Jamaica. They are awful. Only yesterday the manager wanted to know why some of the comedy was cut. He missed some of it.

More power to you, Mr; you have a big job on your hands and nobody knows it more than I do. With best wishes for your success, I am,
Cordially yours,
(Signed) W. C. BUDGE.
L. A. T. S. E. & M. P. M. O.
Local 525
P. O. Box 325.
Aberdeen, South Dakota.
November 8, 1939.

Projection Advisory Council,
Laurence Jones, Secretary.
Box 38, General Post Office,
New York, N. Y.

Dear Sir and Brother:
This will acknowledge receipt of your booklet, “Standard Release Print Makeup and Practice.” We note with interest and gratitude that numerous evils confronting the projectionist have been done away with. It is useless to state here what a benefit a standard nomenclature will be to the industry and this can only be appreciated after the projectionists throughout the country have been convinced of the feasibility of this plan.

Thanking you sincerely and assuring you of our co-operation in making this well known among the members, we remain,
LOCAL 525, L. A. T. S. E.
M. P. M. O.
(Signed) R. W. MERRIFIELD, Secy.

It will be a real pleasure to print any letters received on this subject. Only in this manner can you let the Projection Advisory Council and the Academy of Motion Picture Arts and Sciences have a true version of the success of the system in the field under your supervision. Write to the editor of the LOUDSPEAKER.

Thoughts While Stalling
Apologies to O. O. McIntyre

I wonder who puts in all the green back-patches. ... It was a great dinner dance, it Otto be. ... Who furnishes Fred Weaver's hair tonic? ... And who trims Dave's mustachio? ... All the conveniences of home in Perry's new layout for the Gumbiner Theatre. ... When is Connie going to furnish roller skates for his crew? ... The man who writes the best articles is also the most modest and retiring, he is J. B. G., of Oakland, Calif. ... Jerry Knowles' new rear shutter for Motiographs do everything but milk the cow. ... Our choice for Bean Brummel of the A. P. S. is Bill De Lay. BOY!!! but he looks slick in a tux. ... The most perfect choice of the recent election—Frank McBryde, sergeant-at-arms, what prowess. ... Who designed the old type fader most of us use? ... Why don't we hear from Art Negley? He must have lost his fountain pen. ... Jimmy Lucas should have been a traveling salesman, lots of jumps. ... Ouch! my operation!!!!. ... Our choice for after dinner speaker par excellent, Bro. Frank Seavier, of San Francisco. ... Wait a minute, I've got to make a change over ... Back again. ... I wonder if Adolph Menjou knows he looks like Pop Kenton, especially the mustache. ... You're probably disgusted with this line by now. ... So am I.

FRANK ERLER
HOME AGAIN, FELLOWS,
OFF THE ROAD.
Van Nuys Theatre
Van Nuys California

Fifty-three
San Francisco Chapter No. 17 Elects New Officers

The following officers have been unanimously elected to serve for the year 1931:

President—Frank L. Seavier.
Board of Governors—Harry C. Everett, Vice President; Frank Costello; Paul O. Gaffney.
Treasurer—Walter G. Reinhardt.
Secretary—John Ford, Jr.
Sergeant-at-arms—A. E. Murray.

A projectionist in a restaurant ordered steak and received it rare—too rare. The ensuing conversation followed: "Waiter, take this steak back and have it cooked." "Tis cooked," snapped the waiter. Projectionist: "Like heck it is. I've seen cows hurt worse than this and get well."

Dinner-Dance Celebration Local No. 306, N. Y.

A dinner and dance in celebration of the 17th anniversary of Local 306, M. P. Projectionists' Union, will be held Jan. 17 in the grand ballroom of the Hotel Astor. Sam Kaplan, president of the organization, is chairman of the committee.

Greetings
L. A. MOELLE
WARNER'S EGYPTIAN THEATRE
LOS ANGELES, CALIFORNIA, 1931

New Year Greetings
GOLDEN GATE THEATRE
K. GRAHAM
R. FLETCHER
Los Angeles, 1931
SEASON'S GREETINGS
from
EMBASSY THEATRE

Robert G. Haines, Mgr.
Henry A. Schelf, Asst. Mgr.
Jules R. Pfau, Projectionist

Los Angeles, 1931

HARRY CAGE

New Year Greetings

EL PORTAL THEATRE
LOS ANGELES, CALIFORNIA, 1931

Season's Greetings
from
TEX LESTER

Los Angeles, 1931

Season's Greetings
from
TEX LESTER

LOYD C. LITTON
CHAS. H. BALL Jr.
WILLIAM E. ROSE
JAMES B. PERRY
GEORGE F. DYER
BEN P. GILLARD
JAMES B. GILLARD

Officers Chapter No 12
Oakland, California
New Year Greetings

From

Multicolor Laboratory

SYCAMORE and ROMAINE

HOLLYWOOD, CALIFORNIA

Sidney Burton
Supervisor of Projection
The MARKEL Co. extends GREETINGS of the SEASON to American Projection Society Chapter Number Seven

The MARKEL Co.
Printers and Publishers
435 West Vernon Avenue, Los Angeles
Telephone AXridge 1522
Congratulations

to the
American Projection Society
Chapter Seven

Progress made by any organization denotes the quality of the men behind it. Our greatest aim is to be known as the most progressive manufacturers of:

SUPER HIGH INTENSITY PROJECTION ARCS
HIGH INTENSITY REFLECTOR ARCS
LOW INTENSITY LAMPS

and

ACCESSORIES FOR PROJECTION ROOMS

Ashcraft Automatic Arc Company
4214 SANTA MONICA BOULEVARD
The Best H. I. Combination Ashcraft Lamps . . .

BIO CARBONS

We dare say that 99% of the members of the A. P. S. will agree that the best high intensity results are secured with BIO carbons.

Breck Photoplay Supply Co.

Distributors of:

BIO CARBONS
ASHCRAFT LAMPS
CINEPHOR LENSES
SUPER-CINEPHOR LENSES
SUPERLITE LENSES
DA-TONE SOUND SCREENS
KAPLAN PROJECTORS
ROTH MOTOR GENERATORS
MOON REWINDS
WEAVER DOUSERS

1909 South Vermont Avenue • Los Angeles
Season's Greetings

Theatre Engineering Service Co.
1442 Beachwood Drive
Hollywood, Calif.

JAS. J. GRAHAM
A. P. S. No. 7

CHAS. C. REESE
A. P. S. No. 7
“Building Theatre Patronage”

By JOHN F. BARRY and EPES W. SARGENT

Extracts Reprinted by permission Chalmers Publishing Company, New York

BE TTER P R O J E C T I O N P A Y S

O-DAY audiences know good projection. They may not use technical terms in discussing it, but they do discuss it. They may not walk out on poor projection, but they avoid the theatre where it is permitted.

GOOD PROJECTION IN MANY CASES IS THE DECIDING ELEMENT WHICH DETERMINES PATRONAGE AT A THEATRE

RESPONSIBILITY

The theatre manager may not be responsible for the theatre site, for the quality of productions booked, for the equipment and decoration of the house, or even for the extent of advertising which is limited by an exacting advertising budget. But projection is something for which he is responsible. He cannot be efficient if he cannot supervise projection. There are instances where managers spend time complaining about the quality of photoplays available, when projection at their theatres is so defective that discriminating patrons would avoid the theatre no matter what was on the program. Good projection is demanded to-day from everyone—from executives at the studio who know that poor projection can ruin a good photoplay, right down to the patrons at the theatre.

IMPORTANCE

Why is projection important? The very nature of motion-picture entertainment makes it so. During such entertainment patrons like to feel that they are part of the story, living the action—moving, fighting, fearing, thrilling; moving on and conquering with the characters on the screen. Thus they live what might be called an “illusion.” They are carried away to the scene of the action, or, better still, find themselves right in the action. This illusion makes entertainment satisfactory. It cannot be satisfactory if something happens to spoil the illusion—something that reminds the patron that he or she is sitting in a theatre chair looking at a two-dimensional surface covered with light and shadow. Defective projection prevents the patron from slipping right into the story, and living through it with the characters. Defective projection can jerk the patron right out of the action of the story and spoil the illusion that is being lived through.

DEFECTIVE PROJECTION CAN MAKE SATISFACTORY ENTERTAINMENT IMPOSSIBLE

How necessary for entertainment is this illusion which depends so much upon projection is evident by comparisons. When you read a novel, your entertainment is satisfactory if you forget that you are reading print on pages. The skill of the novelist takes you right into the action, and against the background of the story you live through the action with the characters. An illusion is created. If, while you are reading, someone slams a door or disturbs you in some other way, the illusion is spoiled and you are jerked back to reality that you are just sitting in a chair with a book in your hand. The entertainment is spoiled. The same thing happens if the print is poor, if the lighting is defective, if the chair is uncomfortable.

At the motion-picture theatre, entertainment depends upon an illusion which is created by many, many details. But projection is one of the most important. Any one of a hundred small or seemingly small defects in the projector or the screen, or small mistakes by the projectionist, can spoil all that was done by the scenario writer, the director, the cast, and the long line of highly paid artists and experts whose genius was spent in the preparation of the film. A noisy machine, dust or oil on the lens, warped film, a bent sprocket, vibrations of the projector, careless change-overs, improper speed, a dirty screen, a carelessly fitted screen—these are but a few of the causes that can spoil what patrons pay to get and what high-salaried talent labored to produce—satisfactory entertainment.

FOR BETTER PROJECTION

Simplex THE INTERNATIONAL PROJECTOR

The International Projector Corporation : 90 Gold Street, New York
The Right Equipment Correctly Installed

Switchboards
Theatre Lighting Fixtures
Scenery and Draperies
Stage Rigging
Stage Lighting Devices
Projector Carbons
Mazda Lamps
Lobby Frames
Theatre Signs and Marquees

National Theatre Supply Co.
Offices in All Principal Cities
IN THIS ISSUE

"HOW TO STUDY"

By DR. Lester E. Reukema

February, 1931

Twenty-five Cents
30 Stores
—each backed by a great national organization always at your service

ORDER FROM OR MAKE INQUIRY AT YOUR NEAREST NATIONAL BRANCH
—SEE LIST

If It's for Use in the Theatre, National Can Supply It.

National Theatre Supply Co.
Executive Offices--92-94-96 Gold Street, New York
EDDIE HARRIS

Asks—

"Are YOU Interested In A
WELDED Film Splice — or — Does JUST A PATCH
Satisfy You?"

Our Slogan: "The Splice is Stronger Than the Film Itself,"
is not merely a "catch-word"—It means that the break in the
film is ACTUALLY welded as steel is welded—
FOR PERMANENCY!

We feel, at this time, that an analysis of the working of
ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT and the
ordinary QUICK DRYING cements on the market, will clear up
a mis-understanding as to the value of a quick drying cement and
one of less volatility.

To WELD a break you must FUSE and MELT the broken pieces
into each other to become ONE. To PATCH a break you just
use an adhesive to make TWO SURFACES stick to each other
FOR THE TIME BEING—They will come apart—in the case of
film, ether will do that.

Ether being highly volatile, dries quick, hence can only get a
surface grip on the film and soon opens!

ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT having
low volatility evaporates slower BUT melts and fuses the broken
film into a WHOLE.

A Film Splice made with 2 in 1 will STICK IMMEDIATELY
but WILL NOT stand an immediate PULLING TEST.

MAKE YOUR SPLICE—REEL YOUR FILM IN
CONFIDENCE—AND FORGET IT!

It's $1.25 a Pint Parcel Post

Also Makers of Tru-vision Parts, Fire X Liquid, Lens Paste, Rust Remover,
Gum Remover, Perfumes, Etc.

2 CEMENTS INCORPORATED INTO 1 FOR USE ON SAFETY AND
REGULAR FILMS

Hewes-Gotham Co.

520 W. 47th St.    New York
“Building Theatre Patronage”

By JOHN F. BARRY and EPES W. SARGENT

Extracts Reprinted by permission Chalmers Publishing Company, New York

**BETTER PROJECTION PAYS**

**SUPERVISION**

The quality of projection depends in some way upon the manager’s supervision. He is responsible for every detail of operation, and this includes projection. This does not imply that the manager should be blundering and interfering with the projectionist. The manager who tries to interfere without knowing what it is all about, is just as much at fault as the ignorant, over-cautious manager who lets projection go on without any supervision because he is afraid to speak. The ideal condition exists when the theatre manager is familiar with the problems and can talk the language of the projectionist—and when the projectionist, taking real pride in his work, desirous of putting the best possible projection in the same at the least possible cost, is capable and conscientious and thoroughly interested in the welfare of the theatre. Then the manager and the projectionist can discuss common problems, each confident in the practical common sense and the interest of the other. Poor projection has put theatres out of business and in many cases it was often someone else and not the projectionist who was responsible.

**PROJECTIONISTS**

Incaponable projectionists are rapidly dropping out of the business and their places are being taken by men with the professional attitude. These men expect the manager to be appreciative of projection problems, to be familiar with equipment needs, to be co-operative, and to supervise projection intelligently. The capable projectionist is not a mechanical worker whose duties are limited to loading the projector, and later placing the film back into the can. He is constantly improving his knowledge, interested in principles of electricity, heat, optics, lenses, light-and-shadow effects, photography and light mediums. He is familiar with the almost countless parts of the very delicate mechanism and he is using inflammable material which, when carelessly handled, can do untold damage and cause needless expense. Knowing the naturalness of moving objects, he can give the proper speed for the scenes requiring speeding up, and scenes requiring slowing down. In other words, the efficient projectionist is to be respected. He is a real asset in any theatre. His interest in his work and his desire to improve often depends upon the attitude of the manager. Consequently, it is no exaggeration to say that projection in the theatre often depends upon the manager’s tactful, sympathetic, encouraging common-sense handling of the projectionist.

**INFORMATION**

If the manager is properly informed, many economies can be practiced and projection can be properly supervised. The manager who can distinguish good projection from bad projection, watching it from different positions in the house, can help the projectionist whose opinion is based on what he sees only from the porthole of the projection room. When defects are noticed, inquiry should be made into the cause of the defect and provision made so that it will not happen again.

**ECONOMIES**

**CARELESS MAINTENANCE OF EQUIPMENT IS THE CAUSE OF MANY WASTED DOLLARS. PARTS SHOULD BE ORDERED LONG ENOUGH IN ADVANCE TO PREVENT EMERGENCIES AND TO SAVE THE EXPENSE ENTAILED BY TELEGRAMS.**

**CONCLUSION**

As far as the manager is concerned, good projection depends upon three things: Technical knowledge, good business sense, and a personality that will develop the proper relationship with the projectionist. All three are essential. Intelligent supervision will be difficult unless there exists a spirit of co-operation and mutual understanding between the manager and the projectionist.

**FOR BETTER PROJECTION**

**Simplex THE INTERNATIONAL PROJECTOR**

The International Projector Corporation : 90 Gold Street, New York
Earning the confidence of an industry...

Weaver Bros. Manufacturing Co.
LOS ANGELES, CALIFORNIA

Manufacturers of

Weaver Auto Douser
Distributed by National Theater Supply Co.

Weaver Curtain Control
Distributed by Armstrong Power Co.
In memory of our departed
Union Brother
WILLIAM M. FELLOWS
Local 150, I. A. T. S. E.
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Typical Scenes at Chapter Seven's Dinner Dance

Left to right—Mr. Wallace J. Maxon, Mr. James Pointner, Mrs. James Pointner, Mr. Gerald Knowles, Mrs. Gerald Knowles

Left to right—Mr. William Delay, Miss Pheobe Lanby, Miss Virginia Carlisle, Mrs. Leonard Pyles, Mr. Leonard Pyles
"HOW TO STUDY"

By

DR. LESTER E. REUKEMA
Professor of Electrical Engineering,
University of California, Berkeley.

ACCOMPLISHING ART
OF CONCENTRATION
ESSENTIAL » » »

For thousands of years in the history of the human race, education was a prized opportunity reserved for an exceedingly limited minority. The man who could read and write was an exception, books were so expensive and so limited in number that they were available only to the rich, and the working day was so long that only the leisure class had any time for study. Even today this condition exists in many countries of the world. Fortunately, however, education in our own country, and particularly in California, is available to everyone who wants it and is willing to exert a little effort to get it. Wages have increased until we can all afford to buy books and public libraries make them available to those who do not wish to buy them. Working hours have decreased until we now all belong to a more or less leisure class. We all have the time and the opportunity to study. Because education is so easy to obtain, however, because every one who wishes it can have it, we are likely to overlook the fact that education is just as much an opportunity to be grasped and valued now as it was when it was so rare and so difficult to obtain. In fact, an education is more necessary now than ever before. The more universal education becomes, the more handicapped is the man without it. And the handicap is of his own volition. Except in very exceptional cases, he is defeated because of his lack of ambition. It is easier to idle his time away during his leisure hours than it is to study. If he does start to study he gets discouraged before he has made an honest effort, or perhaps he just puts off studying as something which can be done just as well next week or next year. He excuses himself by saying that he never had a chance, that his early education was neglected, that lectures or books which his fellows are studying are over his head.

It would be well for all of us to read the lives of men like Lincoln or Pupin, and see how the will to succeed and to accomplish something worth while can surmount any handicap. Picture Lincoln as a boy, limited to a formal education of only a few months each winter in a single-room
school-house in the back woods, miles from his home, working his problems with charcoal on the back of a shovel by the light from a fireplace, trudging miles after a long hard day's work to borrow a book from a well-to-do neighbor, yet by his own efforts preparing himself to assume the highest position possible to attain in our country and to so shoulder up to his responsibilities that his name is revered today throughout the world. Picture Pupin, a peasant boy of Serbia, fired with ambition by hearing the story of Lincoln, working his way to America, the land of opportunity, educating himself until he became a power in his adopted country, a keen, clear thinker, one of our foremost educators, scientists, and inventors.

A PLAN OF STUDY IS NECESSARY

Study, to be truly effective, should be organized. To merely play at studying, reading in a more or less hit-or-miss fashion, when the fancy strikes one, now on one subject now on another, never really getting at the fundamentals of anything, never testing one's understanding of what has been read, will not get one very far. When a wise man wishes to save his money, he does not spend money first for whatever strikes his fancy, then save whatever is left. There will seldom be any left. Rather he plans carefully how to get the most value for money spent, and so budgets his income, no matter how small, as to include a substantial part for saving and careful investment. A wise man also budgets his time, so arranging his hours that he can spend at least a few hours each week in developing his abilities, in studying something worthwhile. Time so spent pays high dividends, both in money and in enjoyment.

If possible, join some group interested in and studying the same subjects as yourself. Such competitive study keeps up interest and gives one the opportunity of discussing the subjects studied and of hearing the viewpoints of others.

EIGHT

EFFORT IS NECESSARY

In studying, there is no substitute for personal effort. What we get out of anything depends largely upon what we put into it. Every worthwhile thing in life demands a price and it would be queer if wisdom, the most worthwhile of all, could be obtained without a struggle. The help of a good teacher usually enables one to learn faster, but the best teacher is the one who shows his students how they can solve their problems without his help, who teaches them to be self-reliant. Such a teacher develops leaders, who assume responsibilities confidently, who think for themselves.

To succeed in anything, whether it be sport, art, business, or anything else requires sustained effort, concentration, a stiff upper lip when things seem hard, good sportsmanship. A quitter never gets very far, and the man who merely plays at the game but shirks the hard work never makes the team. Notice the swimmers next time you go to the beach. Most of them merely play in the water, never swimming more than a hundred feet at a time, using strokes which waste half their energy in beating the water. Many of them have been playing at swimming for years and they never will be able to swim any better than they do now. To learn to swim well requires concentration, sustained effort, mastering the fundamentals one after the other. It involves studying the methods of others who are successful, then practicing these methods until they become second nature and can be done without thinking. Is the effort worth while? Who in the end gets most fun out of swimming, the one who can propel himself speedily through the water apparently without effort for long distances, whose every movement is graceful, who can take care of himself in the roughest water, who can save a life in an emergency, all because he was willing to pay the price (Continued on Page 22)
Ashcraft Air Blast Arc Lamp Successfully Demonstrated

Many New and Revolutionary Features Used » » »

Every projectionist is aware of the fact that the high intensity reflector arc, of all lamps used for projection work, is the most undependable. It is only within the last three years that attempts have been made to popularize this type of lamp. Within that time no radical changes or improvements have been made.

The first types of high intensity reflector arcs were non-rotating and practically an adaptation of the high intensity principles to the low intensity reflector arc. This method was found exceedingly unsatisfactory. First, for the reason that it is absolutely essential to rotate the positive carbon in order to maintain a picture free from discoloration. In the second place, the mirrors were of insufficient distance away to prevent their breakage and deterioration of the intense heat of the high intensity crater. Heretofore, every high intensity reflector lamp was practically the same, and its defects have been a nightmare to the projectionist.

When the word “arc lamp” is mentioned, immediately the thought of a burned, oxidized and black mechanism covered with ash and soot is called to mind. Only with the greatest difficulty has it been possible to keep the working parts of previous arc lamps properly lubricated, and this was necessarily done with special lubricant able to withstand high temperatures.

Manufacturers have evidently had it in mind that in order to secure the maximum efficiency from this type of lamp that it was absolutely necessary to cut the projected image of the element itself to the minimum. By so doing, mechanical strength was sacrificed to such an extent that the lamp was quite undependable.

It has been quite a problem for the projectionist to learn the method of changing carbons in his lamp in such a manner that he would not be liable to burn and blister his hands, the usual method being with pliers and screw drivers, great pains being taken not to touch the carbons at any point.

Perhaps the greatest fault to be found with the ordinary high intensity reflector arc is the present method of conducting the current to the positive rotating carbon. This method
is stereotyped in all lamps and consists of two blocks of metal clamped to the carbon by a spring. Every day, some times twice a day, it was necessary to remove these blocks of metal and file or scrape their surfaces to remove the oxidized metal. Some times during this operation the current-carrying leads would break off and many times screws were twisted off, making it necessary to dash madly to a machine shop to have the broken parts removed. Besides being of great annoyance the replacement of these contacts and leads was exceedingly expensive.

**Method of Eliminating Defects**

All of these defects were recognized by the Ashcraft Automatic Arc Co. and every attempt has been made to eliminate these faults. The job has worked out beyond our expectations and as a result we are placing on the market immediately the Ashcraft Air-cooled High Intensity Reflector Lamp. In this machine, perhaps the first lamp which can be termed a machine, the heat has been localized at the carbon tips. Every working part of this lamp, including contact shoes, carbon feeding mechanism, bearings, shafts and gearing, as well as all the current-carrying leads are entirely inclosed.

The burner consists of three parts: Positive assembly, negative assembly and the inclosed bed-plate. The bed-plate carries underneath all of the reduction gearing as well as the mechanism for throwing off the automatic feed and applying the manual operation. Each of the bearings carrying these gears and shafts is provided with suitable oil cups. The gears themselves are lubricated with grease or vaseline. Every gear contained in the mechanism is of steel, hardened and ground. Those gears which are spiral are provided in the thrust ends with ball bearing thrust bearings.

**Air Cooling Described**

Upon this bed-plate is mounted the positive and negative assemblies. The forced draft of air passes through a duct located on the lower part of the housing base and passes into the inclosed bed-plate where it keeps bearing, gears and lubricant cool. It then passes through the positive and negative assemblies. In passing through the positive assembly, the action is entirely vertical and passes over the contact shoes, the feeding mechanism, the ball bearing, keeping these parts sufficiently cool to touch at any time, no matter how long the lamp has been in operation. By keeping these parts cool it also cools the positive electrode the entire length except for that part which projects beyond the baffle plate. In this manner the carbon is prevented from oxidizing and deteriorating within, thus allowing the passage of a great deal more current than was formerly possible.

This air draft in passing through the negative assembly cools the bearings and leads located within and passes to the rear of the reflecting mirror which it cools to an appreciable extent. The air draft passing through the positive assembly escapes at the top through a suitable vent and is of sufficient force to blow the ash generated by the arc out of the lamphouse vent. It will be found that very little, if any, ash or deposit is left within the housing.

**Increased Current Capacity**

With the ordinary high intensity reflector lamp it is impossible to subject the positive electrode to a current in excess of 75 amps. With this lamp 85 amps, is normal—not the maximum by any means. The high intensity reflector arcs have been very limited in their range of feeds for various currents, it being found that above 72 amps, it was practically impossible to operate the motor at sufficient speed to keep the carbon in the proper position. We have allowed leeway both ways on this new lamp. The operator will find that while the control mechanism is sensitive it is also easy to set in the proper position.

It is difficult to realize the excessive amount of light generated by the addition of 10 amps. to the 9 mm.
The light generated by this lamp is suitable for the projection of the picture 40 to 45 feet in width.

Our only instructions to projectionists in properly caring for this lamp are that it be oiled weekly at those points provided. As far as contact shoes are concerned the projectionist may forget this point entirely. We do not anticipate that at any time these will demand attention.

**EQUALIZED DOUBLE CONTACTS**

The type of positive electrode contact used in this lamp is absolutely new. Instead of using the usual two contacts we use four, two on each side of the electrode. Those four contacts are equalized in such a manner that the full three-quarter inch surface of each contact will bear evenly on the carbon. The contact area has been doubled and so designed that the maximum of area is presented to the air blast. The total length of contact is three inches. The rear contacts never get hot. To the front ones is naturally conducted a certain amount of the heat from the carbon itself, but this heat is rapidly dissipated into the air draft. We find that the forward contacts do not burn, but their surfaces may become discolored from the action of the heat. This is absolutely unobjectionable and in no case except that where actual pits are discovered should an abrasive be used upon them. The polished color surface is highly desirable and a removal of this color is of no way a benefit.

The usual dowser is placed between the arcs and the reflecting mirror, but we find that it is practically unnecessary as during a considerable period of time the arc has been started and operated without using this unit. We do not find that the mirror suffered in any way, no particles being visible upon its surface. The only time we advise using the dowser itself is when burning the crater in a new trim. At this time there is a possibility of a certain amount of smoke shooting out upon the surface of the mirror.

The foregoing points we think will eliminate entirely the faults usually found in high intensity reflector arcs. We also feel that we are giving to the industry a lamp which can be cared for the same as a projector mechanism. It is mechanically strong, and at no time may the projectionist anticipate a break-down during operation.

**THE ARC CONTROL**

Regarding the operation of the arc control we have found it advisable to design this as an entirely separate unit, locating it upon the mounting rods projecting from the side of the...
CUEING DEVICE PROVES ACCURACY

A very unique test was made recently to ascertain the accuracy of the Theatre Engineering Service Company’s cueing device which is known as the Cue-Meter. The test was made in one of the best Los Angeles theatres during a regular performance. The first step was that of measuring the subjects to be shown and noting the length of each reel. Then all of the port holes in the projection room were closed except the projector ports, thus making it impossible for the projectionist to observe any visual cue for making fader changes, change overs or curtain closures.

BLIND TEST SUCCESSFUL

When the performance was started an observer was stationed in the auditorium to judge the success or failure of the cue-meter. The test more than proved the accuracy of the instrument. The technicians who were called together to witness the trial were very favorably impressed by the performance. The observer reported, after the show, that everything checked perfectly.

The manufacturers do not suggest that the projectionists, who use the cue-meter, close the port holes. They do say, however, that since the instrument is dependable under those severe conditions it will most certainly perform satisfactorily under the comparatively favorable conditions of regular use.

Entire element may be withdrawn from the lamphouse. This operation is very convenient for inspection and cleaning of the burner. The arc control slips off the mounting rods very easily and is connected to the burner assembly by means of suitable driving shafts slotted at the end, and fit into the driving pins located on the element bed-plate.

Every lamp of this type manufactured is furnished with a Pyrex mirror.

lamphouse. The motor now used is two and a half times as strong as that previously used, and has a range of speed of from 1800 to 3800 rpm, sufficient to accommodate any range of carbon consumption. The gearing from the motor to the drive shaft is, like the element gearing itself, steel and heat-treated.

INDEPENDENT FEED CONTROL

The forward feed of the positive electrode is regulated by the speed of the motor which is controlled by the rheostat located within the arc controller case. This is so flexible that no difficulty will be encountered in its setting or maintenance. The negative feed is entirely independent and is also regulated by an adjustment located within the arc controller case.

Nine different steps are provided which will accommodate a current range of from 68 to 90 amps., each step indicating a forward increase of speed in the negative electrode of approximately .003 of an inch. There are seven bearings within this arc control, each one provided with an oil hole. All the shafts used in this member are drill steel, exceedingly tough. These, operating in the cast iron bearings, will give long life to all working parts. The feed of the negative carbon is intermittent, the motion of the driving gears being interrupted from time to time by a cam action. All these motions are very slow and any wear occurring on these parts is of no consequence.

UNIT CONSTRUCTION

The blower providing the forced draft of air is located on the driving motor. This blower is noiseless in operation and delivers approximately 200 cu. ft. of free air per minute.

From the projectionist’s standpoint, an improvement of greatest convenience is provided in the unit method of assembly of the lamp. The whole lamp consists of three units: The burner assembly, the arc control assembly and the housing itself. By merely retracting the arc control and disconnecting the pin plug on one of the main leads, the

Twelve
Regulating Density of Sound Track
By Automatically Doing That at the Recorder
Technicians Have Reduced Materially
Effects of Ground Noises
By H. C. SILENT
Development Engineer Electrical Research Products, Inc., in Paper
on "Noiseless Recording Western Electric System"
Read Before Academy Technicians
Copyright, 1930, by Academy of Motion Picture Arts and Sciences.

It is common knowledge that, when
a sound print of the variable density
type is played in a reproduction ma-
chine, the volume of the reproduction
is low if the print is dark and if a
compensating adjustment is not made
by turning up the fader. In addition,
the ground noise of the film is also
low.

It has been a problem to take ad-
vantage of this latter fact with the
former methods of recording, because
the mere act of printing the sound track dark, while it reduced the
ground noise, also reduced the volume
of sound from the film.

This, of course, was undesirable.
In the method of recording which is
now being employed, these undesir-
able effects are overcome by regulat-
ing the density of the sound track at the recorder automatically.

It is well known that there is a par-
ticular value of density or transmis-
sion of the photographic emulsion
which permits of the loudest volume
from the film without exceeding the
photographic limits of good quality.
Deviation from this point is possible
without distortion if the volume or
percentage modulation applied to the
film is reduced. This can be taken
advantage of by causing the film to be
dark on low volume modulation, and
as modulation becomes higher we
lighten the film to the point where it
has the greatest possible carrying
capacity.

Noise Worst in Quiet
If this can be done without distor-
ting the volume of sound reproduced
by the film, then we shall have a con-
dition where the ground noise from
the film is low during periods of low
sound. Thus quiet intervals in the
sound will be quiet, and the ground
noise, even though it rises with the
sound, will always be more or less
drowned out by the increased sound,
so that there is an effect of consider-
ably reduced ground noise.

In other words, there is produced a
constant signal to noise ratio in which
the signal is always very predomi-
nant over the noise, and since the
noise is most noticeable in the quiet
intervals, there is a very real reduc-
tion in the amount of the ground
noise.

There are a number of methods by
means of which this variation in the
transmission of the film can be effect-
ed. If we examine for a moment the
light-valve employed in the Western
Electric system of recording we shall
see how one of these methods can be
applied. In the past this system has
employed a light-valve in which two
ribbons were normally spaced .001"
apart.

These ribbons were vibrated by the
sound currents, moving but a slight
distance on weak currents and a con-
siderable distance on loud currents.
The strongest currents would just
bring the ribbons into contact as they
vibrated. The space between them
was therefore greater than necessary
to permit the free vibration of the
ribbons on weak currents.

Vibrating Ribbons
A sound track recorded under this
method had a constant density cor-
responding to the one mil spacing
between the ribbons and this density was caused to vary with the voice currents but maintained always its constant average.

Under the new system of recording an auxiliary electrical circuit is associated with the light-valve, so that when the sound currents are small and the ribbons need vibrate over but a very small amplitude they are brought close together and this small vibration almost entirely fills the space between them. Then as the sound increases in loudness, so that the ribbons are required to vibrate with a greater amplitude, the spacing is automatically increased by the electrical circuit, so that it is always just a little more than sufficient to permit this vibration of the ribbons.

This is equivalent to altering the average spacing of the ribbons, so that it is at all times proportioned to the envelope of the sound currents. Now, if we regard the amount of light which passes through the average spacing of the ribbons to the film, we find that this light is considerably reduced during moments of silence or of low sounds, which results in a dark sound print.

No Volume Distortion

As the ribbons open up for increased sound currents the amount of light correspondingly increases and a lighter sound print results. Since the actual vibration of the ribbons under the action of the sound currents has been undisturbed in this process, the amount of change of light which reaches the film and in turn the reproducing photoelectric cell has been unaltered even though the total amount of light has been decreased.

Since the amount of change of light is unaffected, there is no volume distortion on reproduced sound as a result of this method of recording.

The extent to which the light-valve ribbons may be closed during quiet intervals is necessarily limited. They must not be completely closed, because it is not possible to construct a device which can instantaneously sample the amplitude of the sound currents and set the ribbons to their proper spacing without introducing expensive delay circuits as auxiliary equipment.

Technique Unchanged

Therefore, in setting up the device, the spacing of the ribbons is reduced to something considerably less than their normal spacing but not as far as complete closure. Furthermore, the latitude of the photographic emulsion is not infinite and also limits the extent to which the closure of the ribbons may be effected without exceeding the straight line part of the emulsion characteristic.

Since this new method contemplates recording over the same part of the film characteristic, and within
the limits of this characteristic previously utilized, there is no change in film technique. The processing which produced the best quality of reproduction with the former method gives the best quality with this new method.

Referring to Figure 1, which is an approximate characteristic of the ground noise obtained from film of various densities, the point A indicates the approximate density employed in normal recording. By shifting the ribbons to have something less than their normal spacing, we can increase the density during the quiet portions of the sound track to point B. This results, then, in a reduction of the noise in the quiet intervals.

**Automatic Spacing**

Then, as the sound currents are applied to the valve, its spacing automatically varies, so that it at all times has sufficient carrying capacity, as represented by the spacing between the ribbons to carry the applied sound currents. A slight amount of margin is always established as a factor of safety, in order that a sound which builds up suddenly will not clash the ribbons. The manner in which the carrying capacity of the light-valve or, in other words, the spacing of the ribbons varies with the applied sound currents is illustrated in Figure 2.

It will be seen from this that for weak sound currents below certain minimum amplitude the ribbon spacing is always the minimum, and the averaging spacing is unvarying. As the sound currents build up to near their maximum amplitude, it is seen that the average spacing of the ribbons (or their carrying capacity) is gradually increased up to a maximum which corresponds to that of the normal light-valve.

As the input is further increased, there is no further increase in the ribbon spacing, and clash occurs as in the normal light-valve.

It is entirely possible to continue the carrying capacity of the ribbons upward by allowing their spacing to exceed the normal spacing. No useful purpose is served by this, however, since the carrying capacity of the photographic emulsion would be exceeded by so doing and the effect equivalent to clashing of the light-valve would be maintained.

Therefore, the device has been purposely arranged so that photographic overload and light-valve overload occur simultaneously, if the recording lamp has been set for normal recording.

The general principles of noise reduction for sound records on film may be applied to other than the present form of light-valve recorders by making circuit changes as required by the particular type of equipments involved.

**Relatively Simple**

Operation of the apparatus employed in this recording system is relatively simple, although considerable time and effort have been spent on its development. The equipment is divided into two units—an amplifier situated usually at the location of the main amplifiers and a control unit fed by the amplifier and situated at the film recorder. Adjustment of these units is simple and means are provided for checking the adjustments quickly and at fairly frequent intervals.

At the present time commercial recordings are being made with a reduction of ten decibels in the ground noise. It is expected that as more experience is gained in the use of this equipment the noise reduction may be increased. Even ten decibels is a very noticeable reduction and permits an extension of the volume range to a point where sound previously completely obscured in ground noise became definitely a part of the reproduction with a consequent considerable enhancing of the dramatic effect and naturalness.

The practical elimination of this ground noise in the theatre gives to the audience a feeling of being present at the action and a removal of the mechanical from the sound.
JUST HOW CLEVER ARE YOU?
WHAT'S WRONG WITH THIS DIAGRAM?

Puzzle Circuit by R. E. Clark, A. P. S.

During the next 15 days write to the Editor and tell him what is wrong with this circuit. This is the second of a series of five puzzle circuits. An award will be presented to the projectionist who sends in the highest percentage of correct answers. Get your corrected diagram in early.

The correct answer to last month's puzzle circuit was sent in by Bro. P. C. Young of the M. G. M. Projection Department. His drawing appears below.

Out of the dozens of answers received Bro. Young's was the only one completely correct. Most of the answers were correct in all but one detail. They failed to detect that the 42A input and output was reversed. Our congratulations to Bro. Young. His score is perfect so far.
Standard Release Print
Comments » » »

Last month we asked for the opinions of all western projectionists in the important matter of whether or not they approve of the Standard Release Print in its present form or not. We received considerable response in the form of letters which range in opinion from hearty approval to total condemnation. It is not our job to agree with either, but to print all communications in the hope that someone will either totally justify the system in its present form or suggest a more practical method of arriving at the desired end. Of one thing every one is sure something had to be done to correct the faulty methods of changeover cueing which was prevalent until recently. The Standard Release Print has not cured all of the old faults, but it has without a doubt opened up new avenues of thought which will eventually solve the problem.

Read these letters then write in your own. Let's all have a say on this important subject. We will all have to work with the final solution.

INTERNATIONAL ALLIANCE OF THEATRICAL STAGE EMPLOYEES AND MOVING PICTURE MACHINE OPERATORS
of the United States and Canada
Local No. 175 M. P. M. O.

Tacoma, Wash., Dec. 30th, 1930.
Mr. Lawrence Jones
P. O. Box 98, Gen. P. O. New York City, N. Y.
Dear Sir:

Your letter of recent date with pamphlet of "Standard Release Print Makeup and Practice" was received some time ago and has been brought to the attention of members of Local 175.

Sincerely yours,

(Signed) W. G. SLOAN, Secy. Local 175.

INTERNATIONAL ALLIANCE OF THEATRICAL STAGE EMPLOYEES AND MOVING PICTURE MACHINE OPERATORS
OF THE UNITED STATES AND CANADA
Local No. 210

Billings, Mont., Dec. 2, 1930.
Mr. Laurence Jones
P. O. Box 98, General P. O.

Dear Sir and Brother:

The "Standard Release Print Makeup and Practice" was presented to our members. Having already handled a few of them, they were more or less familiar with them and were very glad to learn that the practice was to be used universally. We have no criticisms to offer as yet. All we can do is congratulate you on having induced the producers to adopt a standard system. What is now needed is a lot of co-operation between operators and exchanges.

Rest assured that Local 210 will do all they can to make what seems to be the best thing that has happened yet, a success.

Fraternally,

(Signed) M. B. HALL,
Secy-Treas., Local 210

Local No. 210

Harrisburg, Penna., Dec. 9, 1930.
Mr. P. A. McGuire
Box 98, G. P. O.,
New York City,

Dear Mac:

It has been my intention for some time to write to you relative to the "STANDARD RELEASE PRINT," but I have been away so...
much of late serving the I. A. in adding one of our Locals get agreements I have been rather over to.

I wish to compliment all those who had a hand in the promotion of this step which is in my right direction but as a whole I believe it be a step in the right direction even if improvements come along later which would be expected.

The knockers and boosters very seldom do any work, it is the go-getter, so I hope you feel elated over the job that has been done for professional as pertains to the Standard Release Print markings.

Again complimenting you and wishing you the season's greetings and my very best wishes.

Sincerely yours,  
(Signed)  
ARTHUR WILKEY  
RICHARD VAN SLYCKER  
Local No. 156, I. A. T. S. E.  
Los Angeles  

Gentlemen:

In the interest of "Better Projection", I would like to state that in past years Union Projectionists in this country made strenuous efforts to end film mutilation, and to stop the unsightly "Punch Marks", as a means of cueing for change-overs. This necessity was slow, hard work and was reaching the practical success.

There were and always will be projectionists that will mutilate film with scratch marks and other unsightly blotches in the film, for change-over. These are the men who, even today, are working in the smaller and suburban theatres of this country, who will ever stop these men from butchering film, except a means of changing over that is trustworthy and practical in the line.

You can well imagine the surprise of the very projectionists throughout the country who work in the right direction, when they began to receive the so-called new Standard Release Print with huge unsightly black dots in the upper right hand corner of the distinct throw-back and tearing down of hard fought for betterment in projection.

A most unusual fact is the very studios who aided in the struggle for better projection and gave every assistance within their power to help the eradication of "Punch-marks" and other unsightly blotches in the foreground, are the foremost in handing out the black dot system and expecting the projectionists to be able to use it.

The theory of the Big Black Dot is remarkable to say the least, and is that of aiding the poor projectionist, who is naturally and consistently unable to change-over without a miscellaneous assortment of "Punch-marks," "Back-patch dots," "Black-out," "Unidentified blots," and various other.dotless doings.

I doubt very much if a projectionist in the country ever received a "Print" that had any use in his struggle for better projection and that it was first released and the former cue cards they sent with some pictures were worse than useless due to some other than doubling up the show and leaving plenty of frames out when re-assembling. In the city the system of using the huge black dots is a joke.

In second and third run theatres they are unable to use them as the majority are missing and black patches and scratch markings are substituted through necessity. In one print it was noticed that a combination of nearly all the old evil acts which the big black dots had tried to change over never replaced and someone had hand painted a choice assortment of blotches for.

How the sponsors of the huge black dots expect the poor country projectionist to be able to use such a system of make-up of change-over, I do not understand. If so, I am sure it means what is puzzling a good many old heads in the business.

The "Black Out" and "Black Dot" regarding to the audiences who wonder why the projectionists put big black blotches on the film and why it is a dark scene passions of colour and the picture. If this isn't the reaction to the old days when cranking a machine was the height of something or other, what is?

How anyone in a group of men could be insane enough to try to foster anything like this on the modern projectionist is hard to realize. There is only one answer and that is attaining at personal publicity by the parties responsible for the black dot system.

It is to the discredit of the Projection Advisory Council that they would permit their names to be used in sponsoring a proven worthless, and useless system of change-over, when the public and professional are, and have shown nothing in this long heralded and highly publicized release print that is supposed to aid the projectionist, that has not been in use off and on for many years.

It certainly seems that this is another attempt to induce in the popular past time of passing the buck to the projectionist.

(Signed)  
RICHARD VAN SLYCKER  
Local No. 156, I. A. T. S. E.  
January 5th, 1921  
Bridgeport, Connecticut.
TRANSFORMERS
AS APPLIED TO PUSH-PULL CIRCUITS

The 246-A input transformer in the 49-A amplifier is somewhat similar to the Clough type. Plate current is supplied to the tube through a 375000 ohm resistance. One end of the primary is connected to the tube by an isolating condenser and the other end returns directly to the filament of the tube. In the Clough transformer the return from the primary is through the C bias, which is necessary because the primary and the secondary are one winding. This is one of the differences between the two transformers. The primary and secondary on the 246-A transformer are entirely separate. There are points for and against both methods. Where the return from the primary is made directly to the filament all filtering problems are done away with. When the primary and the secondary are the same winding the return must be made to minus C, which causes the signal currents in the primary to flow through the C bias resistance. If this is not well bypassed by a large condenser it is apt to cause feed-back, which may be positive or negative, and may or may not be serious, depending on the design of the amplifier.

In the case where both the primary and the secondary are common it usually requires less wire for the same voltage step-up than it does where the two are separate windings. In the 246-A this is offset by using permalloy for the core.

Permalloy is a core material having extremely high permeability. This means that for any specified degree of magnetization it requires less turns on the primary for the permalloy core than it does for the core made of ordinary material. When it is possible to use fewer turns in the primary the step-up ratio can be made greater. This is because the number of secondary turns are limited, as was mentioned in the early part of this series, for the reason that the high frequencies are bypassed more and more as the number of secondary turns are increased.

Now you say, why not reduce the primary of the transformer using the ordinary core? This would give the higher ratio of transformation all right, and above three hundred cycles this plan would work very well, but on the lower frequencies the signal would not be transferred from the tube to the transformer efficiently. This is because the inductance falls off at the low frequencies, and when the inductance drops the impedance also drops. To efficiently transfer the signal from the tube to the transformer the primary impedance at the
lowest frequency to be amplified must be at least twice the plate impedance of the tube. This means that the primary cannot be reduced and still have good reproduction of the low notes unless a core is used that has a higher permeability.

The drawback in the use of permalloy is that it saturates so easily, and when once saturated, or if it receives a sharp blow, its magnetic properties are ruined. It can no longer be used. That is why no plate current is allowed to flow through the windings. This must also be kept in mind when testing. To test one of these transformers in the ordinary way would ruin it. This will be taken up at greater length in the chapter on testing.

Getting back to the more conventional types of transformers again, let us see what is required to prevent saturation. The shunt feed method can be used in connection with any transformer, and in the writer’s opinion will improve the performance whenever used, with one exception. This is when a transformer is designed for a large plate current, but is used with a tube that draws only a small plate current. The term shunt feed is applied to the type of circuits we have been discussing, where the plate is fed through a resistance and the signal goes to the transformer through a condenser.

In the design of modern transformers the manufacturer takes steps to keep the core from becoming saturated, and this is done by making the core large enough so that the primary current does not cause saturation.

Someone suggested a method to counteract saturation by putting an additional winding on the transformer. This winding is similar to the primary, and a current having the same value as the steady plate current is passed through it in such a direction that it tends to produce a flux in the core in the opposite direction that the plate current produces. The sum of the two effects is zero. No flux is produced in the core excepting that due to the signal. As far as the elimination of the tendency of the core to saturate, the idea is O. K., but there are other things wrong with it, among which is the fact that the additional winding acts as another secondary, a partially shorted secondary, which puts a load on the primary. This is not desirable as a rule. So far no one has put out such a transformer.

In push-pull output transformers saturation effects are not present to any great extent. The primary is tapped in the exact center. This point is connected to positive B. The ends of the primary connected to the plates of the output tubes. When the tubes are evenly balanced, when they draw the same plate current, the current from one tube tends to produce a flux in one direction and the current from the other tube tends to produce a flux in the opposite direction. The total flux due to the steady plate current is zero. When the tubes are not exactly alike a flux is set up in the core by the difference of the two currents. If one tube takes 30 mils and the other takes 31 mils a magnetic flux is produced in the core of the same strength as would be produced by a current of 1 mil flowing through one-half of the primary winding, which is not serious. This is one of the reasons why the tubes in any push-pull stage should be as nearly alike as possible.

One maker puts out a push-pull input transformer of the Clough type.
In push-pull input transformers the ends of the secondary go to the grids of the tubes in the push-pull stage. Being of the Clough type the primary is part of the secondary, and the center tap must go to negative C. The other end of the primary is another tap taken off of one of the halves of the secondary. This tap is connected to the isolating condenser, just as it was in the single side Clough transformer. The plate is fed through a coupling resistance. This transformer combines the features of push-pull and of the Clough system. At first thought one may think why use the Clough system when push-pull balances out any magnetization due to the plate current. That is true of the transformer described in the above paragraph, but that one was an output transformer, the plates of two tubes were feeding into the transformer. This one is an input transformer. There is only one tube feeding into the primary. There are not two plate currents that can counteract each other. The one steady plate current will tend to magnetize the core if it is allowed to flow through the winding. The Clough system prevents this.

The use of push-pull makes it easier to obtain good quality and hum-free reproduction. Any hum introduced into the system by heating the filaments with AC balances out, unless the grid and plate returns are way off center. Any small ripple left in the plate supply after filtering also balances out. A push-pull stage can be constructed so that rectified but unfiltered current can be supplied to the plates of the tubes and still get hum-free reproduction. This is partly due to the fact that it is the last stage. There is no amplification beyond this point. Such a thing is impossible in the preceding stages.

While a stage of push-pull is itself more costly than straight single side amplification is, the extra cost can nearly be offset by a smaller filter in the plate supply. Another item is the saving in the plate and grid circuit filters, which usually are necessary to prevent feed-back.

In the power stage of an amplifier the signal currents are large and when push-pull is not used the filtering of these currents is often a problem, as they must be kept out of the plate supply, neither can they be allowed to flow through the grid bias resistance, as either of these will cause feed-back, to the grid of the power stage, or, what is still worse, to some of the circuits in the preceding stages.

In a stage of push-pull this is not a problem since the total current taken by the tubes is nearly constant. When one of the tubes is taking maximum plate current the other is taking a minimum current. As the current drawn by the first tube starts to decrease the current taken by the second tube starts to increase.

Besides input and output push-pull transformers there are also interstage push-pull transformers. When these are used the last stage and the stage preceding it are both push-pull. In these transformers both the primary and the secondary are center tapped. The tap on the primary going to positives B and the tap on the secondary going to negative C. Two such stages give extremely high quality of reproduction.

**CHAPTER SEVEN DUES DUE**

Bro. H. R. Cage, Treasurer of California Chapter No. 7, announces that the first quarter dues are now payable. Checks should be made payable to American Projection Society Chapter No. 7. This applies only to the members of this Chapter.
HOW TO STUDY

Continued from page 8

in real effort necessary to excell in anything, or the man who all his life has merely played at swimming? Is it not probably true also that the man who merely played did not get as much real enjoyment out of his playing as the other did when working hardest to accomplish what he set out to do. The same thing holds true of studying anything. The one who earnestly and honestly tries, never willing to admit that what others can do he cannot do, is the one who is headed for success. He is also the one who gets the most enduring enjoyment out of life.

In beginning to study, remember one more thing, namely, the hardest effort comes at first. Once one really forms the habit of studying, it ceases to be an effort. The more one learns, the easier studying becomes. Things which seemed difficult have a way of becoming easy when tackled with courage, and the satisfaction of accomplishment far outweighs the effort expended.

HOW TO READ

Practically any line of studying involves reading, since practically all of the knowledge won by the human race sooner or later finds its way into books. Books are a record of the accumulated experience of mankind, and if we are to profit by the things which others have found out, we must get a large part of our knowledge from the printed page. Few people read effectively. They read the words, but the ideas remain vague. When they have finished reading a book, unless it happens to be a story, they would find it difficult to remember accurately and clearly a half dozen things included in the book, and those things would more likely be disconnected illustrations than the fundamental truths which the illustrations were meant to clarify. To get out of this bad habit, try repeating to yourself at the end of each paragraph the gist of the subject matter contained in it. With practice this should become easy. With a little more practice, one can readily recall the essential ideas of a whole chapter.

To do this, something more than mere memory is necessary. The subject matter must be understood. One must think as he reads, see why things are so, note the various steps through which the author arrives at a conclusion, weigh the evidence, try to draw conclusions independent of those drawn in the book. Do not accept blindly anything merely because it is printed in a book. Ask yourself whether a statement sounds reasonable. If it does not sound reasonable, is it because it is clearly contrary to common sense or may it not sound unreasonable merely because you know so little about the subject. In the latter case, consider the reliability of the author. Is he in the habit of making wild statements, does he tend to exaggerate, have you found him to be inaccurate or careless, or purposely misleading? This habit of weighing the evidence, of basing conclusions on facts rather than on prejudice, is one of the most valuable advantages to be gained from careful systematic study.

When reading, have a dictionary close at hand and use it. Make sure that you know the meaning of every word you read. This is especially important when reading scientific articles, where accurate knowledge of the meaning of terms is necessary to a correct knowledge of the subject. Moreover, keep a record of the things read, so that if you ever wish to apply the knowledge you may quickly and easily find the article in question to refresh or to make sure of the accuracy of your memory. Also make a list of things not understood, so that you can look them up in further detail in some other book or ask someone who knows to explain them to you.
HOW TO LISTEN TO A LECTURE

One of the most important aids in getting the most good from any lecture is to think about the subject beforehand. Determine what you already know, and things about which you particularly wish to find out. Pick out the doubtful points which you hope the lecture may clear up. Then listen to the lecture attentively, thinking as you listen. Take notes, but not too copiously. Do not try to get everything down on paper. Pick out the important principles, the fundamental ideas. Watch for key words, which will recall the subject matter to you vividly when you review the lecture. If anything is not clear or if you do not agree with the speaker, do not try to settle the question in your own mind then. If you think too long on a doubtful point, you will miss the following points in the lecture, possibly losing the thread of it entirely. Merely jot down a word or two to enable you to remember to think the doubtful matter out in detail later.

If, after the lecture, there is opportunity to ask questions, do not hesitate to seek to clear up in your own mind doubtful points. The man who is not ashamed to ask questions is the man who learns. Never pretend to know what you do not know. Do not say you understand when you do not. Only a fool is afraid of betraying his ignorance by asking a question.

Think over the lecture afterward. Try to make an outline of it, first the main points, then fill in the details and illustrations or examples. Seek to tie up the new knowledge with things already known. Ask yourself why things are so, how they have probably been ascertained, whether a knowledge of them is important, how you can use the knowledge.

TEST YOUR UNDERSTANDING

One of the finest ways of testing your understanding of a subject is to write what you know about it, for clear and logical writing requires clear and logical thinking. Make an outline first. Think the subject over carefully, form clear ideas. Decide where to go to get further material on the subject or to clear up doubtful matters. Finally, put your books to one side and write your ideas in the best English you are capable of using. Include sketches if they will make the subject any clearer. Then read carefully what you have written. See if you can make it any clearer, easier to understand, or more convincing. Think up all conceivable arguments against what you have written, and see if you can prove that these arguments are erroneous.

Another test of your understanding of a subject is to work problems illustrating the principles involved. When problems are assigned, try working them in several different ways. Try to devise some way to test the accuracy of your answers. Above all, see that every answer is a reasonable one. It is often possible to guess fairly closely what an answer will probably be. Try guessing the answer before the problem is worked. This often is the means of catching a numerical error in your work which leads to a ridiculous answer. Make up similar problems and work them so as to get added experience.

Do not say that you cannot work a problem because you do not understand mathematics. This usually means that you are unwilling to make the effort to think. First formulate the problem clearly. Be sure that you know definitely what is to be determined. Then put down what data is known, also what things apparently must be used to get the final result. See whether you can obtain these necessary data from the data at hand. Determine the logical steps of reasoning to obtain the desired answer.

When problems are returned, marked wrong, always remark them. Prove to yourself that you can get the correct answer. The way to clarify your own ideas is to concentrate on correcting your mistakes.

The third method of testing your own understanding of a subject is to (Concluded on Page 25)
P. A. C. ACTIVE IN SAN FRANCISCO BAY DISTRICT

The activities of the Projection Advisory Council in central California and particularly the bay cities, San Francisco, Oakland and Berkeley, have gained considerable impetus. The chief reason for this was the appointment by vice president Burton of George J. Lancaster to the post of contact man. Mr. Lancaster is very active at present in the interests of the Standard Release Print.

To this end of bringing about a more thorough understanding of the Standard Release Print makeup, Mr. Lancaster delivered an address to the Film Board of Trade of San Francisco on the subject. This address was reported in its entirety. It follows.

MR. LANCASTER’S ADDRESS

Little can be said in addition to the message contained in this address. His hearers were favorably impressed and offered their support in making the Standard Release Print successful in their territory.

Mr. Chairman, members of San Francisco Film Board of Trade—

I feel greatly honored to be here this evening, to speak on the practice of Standard Release Print makeup. You have all, by now probably received and read the yellow booklet sent out by the Academy of M. P. Arts and Sciences, Technical bureau. So I will briefly outline its birth and growth.

We are all familiar of the disgraceful practice in the past in the mutilation of film by the operator of yesterday, the punch mark and oil artist. Today is another advancement in the science of motion picture industry and projection, and the so-called grindhouse methods are about to pass westward.

For the past 10 months a system has been worked out by a committee of experts under the supervision of the Academy Producers Technicians of which Mr. Irving G. Thalberg is chairman. With Mr. Thalberg, experts such as Sidney J. Twining representing sound laboratories, Sidney Burton, representing the projectionists, N. H. James Brower, exchange representative, A. J. Guerin of the release prints production, Gerald Rackett, then manager of technical bureau, James Wilkins, film editor, and Donald Gledhill, secretary of M. P. A. and S. “The Standard” has been endorsed by the standards committee of the Society of M. P. Engineers upon recommendation of the society’s projection committee. Acknowledgement is therefore expressed on behalf of the academy to the many technicians including the 17 major Hollywood studios, the Association of Motion Picture Producers, Hollywood chapter of American Projection Society, the American Society of Cinematographers, Society of Motion Picture Engineers, Film Board of Trade and Projection Advisory Council.

The studios will now, whenever possible, start the action on fades. The visible signal for start motor will show as a round black dot against a light background and as a white circle against a dark background in the case of a fadeout or night scene, printed in the upper right hand corner of four consecutive frames, the first of these frames is exactly 12 feet from the end of the picture. The change over cue is marked the same as the start motor cue.

The motor cue is 12 feet from the end of the picture on the out-going reel. At 90 feet per minute, these 12 feet take eight seconds to run out.

It is a good plan for the projectionist to spend 15 or 20 minutes rehearsal per projector in order to determine the actual change-over footage and speed of projector start.

Exchange employees handling prints are expected to familiarize themselves with the standard specifications. Prompt reports should be
CHAPTER TWELVE INSTALLS
NEW OFFICERS

At a gala ceremony held at the club rooms of Chapter No. 12 the installation of the officers for 1931 took place. The newly elected officers are as follows: President Lloyd C. Litton, who was re-elected as recognition of his untiring efforts and able handling of the responsibilities of the chapter’s business during the past year. His aide-de-camp will be Frank Hester as Vice President, who has also displayed unusual talent along the same lines. Stanley Swartz will be Secretary and for Treasurer we will have our old stand-by with the asbestos fingers, George Franklin Dyer. As Sergeant-at-Arms we will have Dick Holdom. “Try and get in” was his greeting. For Board of Governors two popular brothers were installed. They are Leon Friedman and Bill Rose from Bay Farm Island. After the ceremony we all had eats and drinks and the usual lessons which happened to be on Faders. We believe the officers selected will steer our chapter well during 1931. They are real craftsmen and well suited to their positions.

given to the exchange manager of theatres not conforming to the standard. If the synchronous leader becomes damaged it should be replaced with a new one.

The projection Advisory council (of which I am a happy to be member) will be represented in different cities by a projectionist leader, appointed as contact man, who will work in conjunction with the film exchanges and film board of trade for the proper and harmonious maintenance of the standard—going into the field to instruct projectionists if necessary. I feel highly honored to be selected by Mr. Sidney Burton of the projection advisory council to serve you in the great drive against the mutilation of film, and to put over the standard release print in a graceful manner.

CHAPTER NINETEEN
TO HAVE LIBRARY

San Bernardino, California, Chapter No. 19, A. P. S. has taken steps to provide each of it’s members with a complete library of projection books. A committee has been appointed by President H. E. Reynolds, to investigate the worth of the many works offered on sound, optics, projection and kindred subjects with the view of selecting those publications best suited to complete the library of an up to the minute projectionist.

CHAPTER SEVEN ENTERTAINED

On the evening of January 6, 1931, the membership of California Chapter No. 7, A. P. S., was entertained by Clarence Ashcraft of the Ashcraft Automatic Arc Co. of 4214 Santa Monica Boulevard, Hollywood, Calif. A buffet lunch was served to the 106 men who were present after which Mr. Ashcraft introduced the Chapter to his newest product, which is a high intensity reflector lamp which far excels any other product of its kind yet developed.

"HOW TO STUDY"

Concluded from page 23

explain it to others. This often brings out doubtful points you would not otherwise have thought of and gives you good practice in thinking as you talk. If you cannot explain a thing you do not understand it. Practice explaining to yourself first. See how clear you can make things. After explaining to another, review the explanation in your own mind, think how it could have been made clearer, more convincing.

Following these suggestions may not make you a Lincoln or a Pupin, but it will add to your success and to your happiness, it will give you the power to think and speak more clearly and accurately, it may even put dollars in your bank account and help to keep them there.

Twenty-five
Horns and Speaker Units

By
D. B. McGOWN, A. P. S. No. 7

The function of the loud-speaker, as its name suggests, to produce loud enough sound so that all may hear. The fact that the loudspeaker is actually a motor is a conception that is slightly different than ordinary but it is a fact. A motor is actually any device that changes energy from one form to another, as for example a heat motor that changes the heat of explosive gasoline and air mixed by the carburetor, into mechanical energy produced by the motion of a piston in a cylinder. Other forms of motors will suggest themselves to anyone, but in the case of a loudspeaker the driving unit is an electric motor which operates on speech energy alternating current, and which drives a diaphragm, which produces sound by the motion of the diaphragm.

The sound actually results from a series of alternating compressed and rarified air conditions, almost in the form of layers, which result in vibrations in the air, and which when they reach the ear produce the result we call sound. The pitch of this sound is determined by the frequency of the alternating current supplied to the unit; the volume of the sound depends on the magnitude or amount of energy delivered to the receiver, and the tone quality is a result of the number of combinations of various frequencies which simultaneously reach the unit, and which may or may not be a "pure" or complex tone, which is determined by whether or not there are harmonics and overtones of the basic frequencies present.

There are two general types of loud-speakers in general use in theatre reproducing systems. Both operate on the same principle, whereby a coil of wire is held by a diaphragm between the poles of a powerful electromagnet, and if the said coil is fed with the speech current, the coil will displace itself backwards and forwards, exactly in accord and in proportion to the current supplied as alternating current energy from the Electric type of horn unit drives a small metal diaphragm which produces practically a uniform piston-like motion, and which drives an air-column composed of a long horn, commonly known as an "exponential" horn. This air-column serves as an actual mechanical load for the speaker unit, and requires considerable energy to drive it, as the inertia if a column of air twelve or fifteen feet long is considerable, as obvious, when it is realized that the entire air-column moves in and out of the horn slightly with the motion of the diaphragm.

The other type of unit uses a much larger diaphragm, which is composed of a paper or other non-resonating cone, with the driving coil at its apex, and which drives a relatively large column of air thru a short distance, the cone being free to move back and forth slightly due to a leather or other soft flexible support for the edges. This is the type horn that is used with the RCA Photophone and several other systems. When the unit is mounted in a short tapering square wooden horn, the approximate size of the horn unit at one end and spreading out to several feet square at the outer end, the result will closely approximate the same as obtained with the longer air column system described above.

In any type of horn unit, the two most important things to be obtained are the reproduction of all frequencies equally, over the entire audio range, and what is a dependent function) the obtaining of reason-
able electrical to mechanical efficiency in the conversion of electrical energy to sound. The hardest thing to obtain in most sound reproduction work is to obtain a uniform response over all frequencies, but fortunately if the resistance and impedance of the moving coil is kept very low, the response of the coil will be almost entirely independent of the applied frequency. This condition is easily obtained in speaker units, by making the moving coil of a few turns of wire of relatively large size. Therefore it is a universal principle, based on sound engineering, to use speakers of low speech input impedance, as well as being an easy manufacturing function to make the coils the same way.

It is not quite so easy to make the coil support entirely flexible and capable of lateral motion, but it is by no means impossible. The mounting of the coil on thin metal plate, with rigidly secured edge, as with the Western Electric type of unit permits but little motion, but when attached to a suitable air-column, this small motion is readily and efficiently transformed into sound. The RCA type of speaker is capable of more lateral motion than the other type. but due to the inertia of the coil and large diaphragm, the response is liable to decrease at the higher frequencies, unless means are provided to increase the energy in these frequencies, which is fortunately easy to do, by proper equalization either in recording or reproducing, as may be desired.

In actual overall efficiency, there is probably a slight advantage in the air-column speaker, like the Western Electric, but suppose a speaker is capable of converting but 25% of the electrical energy into sound, (a very good percentage, incidentally) if the receiver could be rebuilt or designed to convert twice as much, or 50% of the energy into sound, the difference would only mean 3 db difference, or one fader step less in the case of the more efficient speaker, and even if the speaker unit attained 100% efficiency, which is of course impossible, it would only result in a decrease of 1 step more on the fader.

The actual power these speakers are capable of handling is quite small, in watts. A single W. E. type 555 receiver will handle about the total energy of 2.4 watts, (plus 26 db) which is the maximum undistorted output of a 42A amplifier, when the receiver is properly loaded with a 15 type horn. More energy than this will damage the unit, due to the fact that the coil may tear loose from the diaphragm. The RCA type units will handle slightly more energy than this, but here again the limit is soon reached, when the coil will be unable to handle the load, and either the speaker will blast badly, or it may loosen or tear the coil from the cone. The obvious remedy is to add more units, thru a proper impedance matching transformer.

Common types of speaker units, such as are used on radio sets, and the like are generally entirely unsuited for reproduction for theatre or auditorium use, and should not be used, as they will not stand the energy necessary to produce the sound required to fill a theatre auditorium.

E. R. P. I. OFFICIAL SENDS GREETINGS

Open letter to Mr. Lawrence Jones, Secretary Projection Advisory Council:

Dear Mr. Jones:
I appreciate very much my election as a life member of the Projection Advisory Council.
I wish to take this opportunity of expressing my appreciation of the co-operation which has been accorded us by the projectionists of the country in connection with the introduction of sound talking picture equipment in theatres in the United States.
Wishing you a Very Happy New Year and continued Prosperity, I am.
Sincerely yours,
H. M. WILCOX, Operating Manager
THINGS IN GENERAL

By

THE EDITOR

We have embarked on our journalistic journey. The new larger size seems to have met with general approval. For this we are truly grateful. We might add hastily that no small group of men could possibly create a craft magazine which would be truly representative of the western projectionist. This can only be done by the western projectionists themselves. To the end of making our magazine fill the need for a Pacific coast publication by serving the entire craft we sent messages to each of the western A. P. S. Chapters inviting them to participate in the enterprise by sending in the news and technical matter available in their districts. As you know many responded. To them and to them alone the credit should go for the success of the last issue and upon them rests the responsibility of a western publication. Without the aid of every western chapter we are hopelessly lost.

There are several chapters from which we have not heard. These chapters should communicate with the editor at once so that we can establish relations through which this magazine can better serve the projectionists in his district. We have incurred a serious obligation by presuming to represent the western projectionist. BUT the burden is not ours alone, it rests equally upon every A. P. S. man in the west. Let’s get together and combine our efforts to better the craft in the west.

The interest being taken in this magazine by studio executives is very gratifying indeed. It has been my pleasure and privilege to interview during the last month several of them who are well known. Mr. Douglas Shearer of Metro-Goldwyn-Mayer expressed the opinion that mutual benefits will be accrued by the exchange of ideas made possible by publishing a magazine in the close proximity of the studios and circulating it extensively to the projectionists in the field. Mr. Shearer the technician in charge of sound at the M-G-M studio which places him in direct contact with all of the latest developments in this important branch of the industry. He was kind enough to offer his co-operation in the compilation of technical news for the western projectionists delectation.

We next called on Mr. S. J. Lambert who is in charge of theatre contact for the M.G.M. studio. We were equally well received and were assured by him that we can expect contributions from him for early issues.

Our next call was Mr. William Newberry of the publicity department of the same studio. We requested from Mr. Newberry an article on the relationship of studio practices to the projectionist. He promised to comply with our request in the near future.

We left the M.G.M. lot happy in the knowledge that we had found many new friends for the projectionists and that we were going to be to some extent at least instrumental in bringing the two into closer contact with each other.

MISSING MEN ON ROLL CALL

In the last issue two names were omitted from the roll call of Chapter 7. They were Frank Erler and B. Platt. Both are very active in A. P. S. affairs and were omitted by an unfortunate error.
Word has come to us that Bro. Paul Mahoney has embarked upon the sea of matrimony. The lucky lady was Miss Dorothy Eva of Los Angeles. The ceremony was performed January 23. Bro. Mahoney is one of the best known old-timers in Los Angeles projection circles and his many friends join together in wishing him and his bride every happiness.

Bro. and Mrs. Gerald L. Knowles celebrated their first wedding anniversary January 7, 1931, by entertaining a few of their intimate friends at their home.

Bro. Dale Gillum made application for compensation from the War Department on account of being shell shocked while projecting the late epidemic on war pictures.

Brother Harold Swanson has left his position at the United Artists Studio and is now at the Mack Sennett Studio.

Local 150 at Los Angeles held their usual annual election of officers Dec. 23, 1930. With the result that an almost entirely new list of names will head that organizations affairs. The important officers for the new year are President C. C. Harden, Vice President M. Nielson, Secretary Morton Sands, Business Manager H. A. Starke.

Bro. L. J. Jones has the strangest shift on the Fox lot. He has just been promoted (?) to the graveyard trick in the lab. He shows up at 3:00 a.m.

City license has been issued to Bro. Joe Pierce of Fox lot. Congratulations.

FROM OAKLAND, CALIFORNIA

One Oakland’s Nash sedan has a kinda large bundle covered with black leather on the right running board. One cop was looking it over, lifting up the cover, then he smiled. “Tisn’t whot Oi tot it was.” A meek little boy with a cigar in his mouth standing there smiling like a fox eating yellow jackets, says: “Ever go bass fishing?” Oh, I forgot to mention. It’s Dyer and his outboard motor.—Putt-Putt.

Talking about Putts, we have a Putts here who was surprised when cleaning Faders that the dummy fader didn’t have wires in it. How’s zat?

And we have some more Putts on the green. There’s Cillard, Noonan, Nelson and Thomas. And another fellow working at the Roxie puts, too. He puts too dam much bait on his hooks. It’s Carter. yea. “Al, himself, ALL.”

“Free Wheeling” Al Nagle looks like a milyon. Reminds one of an advertisement for some nickle plate works. Accessories for his car is his hobby. I guess that’s all.

Twenty-nine
Chapter Doings
California Chapter Number Seven

The first meeting in February will be held in the T. V. G. Building, 936 West Washington Boulevard, at 12:00 midnight, Tuesday, February 3, 1931. The meeting will be devoted to business. Many very important matters have come up that should be discussed before the entire membership. All members will want to be present at this, the first business meeting of the new year and see the new officers in charge.

The second meeting in February will be held in the same hall at 12:00 midnight, Tuesday, February 17, 1931. A lecture has been provided for the members which will clarify considerably some very complicated phases of sound amplification. Lunch will be served in the Rathskeller in the building. The members are urged to make an effort to arrive promptly at 12:00 so that the evening's program can be completed at a reasonable hour.

Both meetings this month are for members only.
We are embarked on a new year, a year that I feel sure will be filled with real A. P. S. activity and progress. The good will created by the previous officers paves the way for amicable co-operation with all other academic and economic organizations in the industry. The splendid assistance of the Electrical Research Products, Inc., who furnished us with a series of lectures last year, created a bond of friendship that will never be forgotten by our members. The Academy of Motion Picture Arts and Sciences through their Technical Bureau manager, Mr. Lester Cowan, have given to us much valuable aid by keeping us informed as to the various activities of that body. The Technical Digest has come to each of us by courtesy of the academy.

The Projection Advisory Council has been a distinct aid to projectionists generally and of course to A. P. S. men because we have kept close in touch with the activities.

The R. C. A. Photophone, Inc., have expressed themselves as being extremely anxious to help us to better understand their equipment. Your officers are at the present time endeavoring to make suitable arrangements for securing lectures from R. C. A. engineers on their equipment. We expect to complete this arrangement in the near future.

Many other things are being planned by President Burton and the Executive Board for your benefit. You are promised a real treat at each meeting, so don’t fail to be there and profit by your own participation.
A FEW SPASMS BY J. B. G.

Fatal words on a two-man job: "Sound's my racket, so you run the show. Just call me if anything goes wrong.

Young lady entering projection room, stares around, wide-eyed, startled:

"Oh my! Oh my! Do you know what I thought this was when I came in?"

Our proud projectionist:

"Yeh, I know. You thought it was a power house, didn't you? With all these machines and amplifiers and dimmers and everything."

Young lady: "No, not exactly. I thought it was the ladies' rest room. Where is it please?"

First Projectionist: "What sort of a layout are you going to have at the El Drafte?"

Second Projectionist: "Not so bad. A Brenkert effect, two spots and three Simps."

First Projectionist: "Oh, so the crew's been selected?"

A note Bro. Rose left for Bro. Huston:

"No matter how strong our love may be, Fred, we can never have any children."

Shades of the immortal Tad's Daffydis:

His back was breaking, his head splitting and his eyes had been crossed for weeks, but he bent over to see what was wrong with the apparatus. Suddenly and without warning he straightened up and cried: "If the exciting lamp was out for the changeover would the amplifier?"

And a muggle or a noose for the projectionist who:

Talks about thick steaks the entire shift:

Whistles in cadence to the monitor:

"T's" when things are velvet, but who "we's" when he's pulled a boner:

Never thoroughly checks his partner's threading unless the manager is in the room, but at such time changes everything but the intermittent movement and the upper magazine.

CHAPTER SEVENTEEN
SELECTS NEW OFFICERS

Stattle, Wash.—Richard Crist has been named president of the American Projectionists' Society. Chapter 17, at an election banquet held at the Boulevard cafe. Other officials named to serve this educational organization of the industry for the coming year were Chas. Crickmore, vice president; George Kalushe, secretary; Ernie A. Clark, treasurer; Fred Jiencke, sergeant-at-arms, and J. A. Schlumb and H. B. Hobbs.

The new officers were installed by Locksley Clark, president of Chapter 11 in Vancouver, who also presented an invitation to attend a dance to be tendered the Seattle chapter in January.

Harold Simpson, Chas. Crickmore and H. B. Hobbs were named on the educational committee.

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Thoughts While Stalling

Apologies to O. O. McIntyre

Brother Art Brereton devouring a huge steak... Gyp Row, the beach town natives, name for the pier concessions... our idea of a tough break, the projectionist who ran the spot at the projectionists' dinner-dance... speaking of dinners the one Chapter 19 put up was the last word... Jim Ellory's quick humor... we'd like to see a picture of Brother Locksley Clark of Vancouver... just what is an E. R. P. I. engineer supposed to do... our choice for champion regular guy of the universe, Lester Cowan, who always seems to have time and useful advice for every caller... what makes Brother Ross so popular with the ladies... maybe its the zits... success by honest application, Clarence Ashcraft... Chet Allen's finger is now well, he was thrown from a mule and lit on it and various other better cushioned parts of his anatomy... who invented these celluloid exit march records... that feeling after a midnight matinee... what a surprise that election was to everybody... the much heralded noiseless film recording still seems to make noise, or perhaps it is only the mice back stage... Professor Reukema's new article... "How to Study", should wake some of us up... "in memorium" services are in order for Pop Kenton's pet jacksnipe... what use can burnt out condensers and dimmers be put to... Harold Swanson's perpetual smile... there must be some reason for it... the show is over let's go home.

High Voltage

Bill Ross: This is my electric suit. Pete Paris: What do you mean electric suit? Bill Ross: Sure, I wired for it and had it charged.

Right and Left

Doorman: My eyes are weak. Projectionist: Thats not strange, they grew in a weak spot.

Thirty-three
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Thirty five
CAESIUM CELL

Western Electric Company's
Newest Development

COMPARSED TO OLDER TYPES

By

HAROLD SWANSON, A. P. S. No 7

Recently there was placed on the market a new Western Electric Photo Electric Cell which we are about to compare with the potassium cells now in general use. To compare these two cells let us take their physical appearance. Although there is but a slight difference in the glass containers, the anodes are quite different. The potassium cell has a ring suspended in the center of the tube and the inside is coated with potassium. The caesium cell has a wire suspended in front of a curved metal plate coated with silver and then a coat of caesium. Hydrogen is used in the potassium cell, which helps the sensitivity of the potassium.

The illustration shows the various anodes. When installing the caesium cell, the wire and concave surface of the plate go toward the exciting lamp. In the potassium cell the ring is positive and the coating is negative. With the caesium cell the wire is positive and the metal plate is negative. The action of the light on the cells is identical. The electrons which are liberated by the light striking the light sensitive metal coatings are attracted to the anode or positive. This current varies directly to the amount of light striking the sensitive material, within certain limits.

Thirty-six

The caesium cell is far more sensitive than the potassium, the difference in range being about 14 D. B. or five fader steps. Potassium cells have an output of around six micro amperes per lumen, while the caesium cell gives out thirty micro amperes per lumen. This is a current ratio of five to one, which corresponds to 14 D. B. The impedance of a potassium cell is around eighty megohms, and the caesium about sixteen megohms, the impedance varying with the amount of light. The normal anode potential on the potassium
cell is 125 volts, the caesium is about 90 volts. The caesium cell will ionize on anything above 90 volts. Caesium cells should never be exposed to bright sunlight as this may ruin the sensitivity of the cell.

Due to the high gain of a caesium cell, it is possible to eliminate one stage of amplification in the projector system, although this is not the general practice. The caesium cell can be coupled with a transformer to the amplifier, while the potassium must be resistance coupled for best results. The usual method of using a caesium cell is to cut down on the attenuator or insert a loss pad until the proper level is obtained. By doing this the machine noise and other noises are greatly reduced.

In the illustration we have a graph plotting the response per unit of energy against the wave length of light in Angstrom units. By looking at the potassium curve, we find that its response is high in the ultra violet zone, and drops off in the violet and red zone to nothing at about 6400 Angstrom units. The caesium curve is very high in the ultra violet zone, then it drops in the violet and red zone to rise again in the end of the red and infra red zone, which is about 8000 Angstrom units. The zone between 3800 and 8000 Angstrom units is the limit of visibility that is the zone of color perceptible to the eye. The zone between 2400 and 8000 Angstrom units constitutes the wave length of white light.

Questions and Answers

Q. Why can't dry batteries be charged the same as storage batteries?

A. The chemical action that takes place in a storage battery is said to be reversible, that is, a certain chemical action occurs when current is taken from the battery, by reversing the current through the battery this action can also be reversed and the battery is changed so that it again is the same as it was before the discharge took place.

In the dry battery this is impossible. When current is taken from a dry battery the zinc is decomposed; and it is not possible to take the products of this decomposition and again produce zinc by putting a current through the battery in the reverse direction.

Q. Why is the sound printed 14 inches ahead of the picture on the movietone film?

A. Probably a correct answer would be that sound is printed 14 inches ahead of the picture because the movietone pick-up is located that far below the picture aperture.

No doubt what you have in mind is why don't they put the pick-up in the same position that the aperture is, then the sound and picture could be printed at the same place instead of staggering them.

One of the most important things about film reproduction is that the film move at a steady, uniform speed, otherwise the sound will waver or flutter. Since the film moves intermittently at the aperture it is obvious that it cannot be made to also move steadily, so movietone pick-up at this point is impossible.

McBride: I have invented a machine that will do the work of 10 men. It ought to help the unemployment situation.

Haskell: How come?

McBride: It takes 15 men to run it.

Thirty-seven
SOUND TRUCK USES ZENITH SOUND

A theatre on wheels which has been named "Miss California" recently made its appearance on the streets of Los Angeles and Hollywood. It is completely equipped for presenting sound motion pictures on a translucent screen by rear projection. The adaptation was made by Sound Engineer Charles Watson of the Breck Photoplay Supply Co. of Los Angeles for the American Broadcasting Co., who, it is understood, intend operating the equipment for exploiting talking motion pictures for local theatres.

Zenith Portable Sound Equipment was used. It is, according to Mr. Watson, particularly well suited to this type of work because of its compactness and its high quality of reproduction which is so necessary to maintain intelligibility on the streets where extraneous noises are so prevalent.

Harry Wenger
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—attempt to project a perfect picture without a Voltmeter and Ammeter in your arc circuit?

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a mis-understanding as to the value of a quick drying cement and
one of less volatility.

To WELD a break you must FUSE and MELT the broken pieces
into each other to become ONE. To PATCH a break you just
use an adhesive to make TWO SURFACES stick to each other
FOR THE TIME BEING—They will come apart—in the case of
film, ether will do that.

Ether being highly volatile, dries quick, hence can only get a
surface grip on the film and soon opens!

ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT having
low volatility evaporates slower BUT melts and fuses the broken
film into a WHOLE.

A Film Splice made with 2 in 1 will STICK IMMEDIATELY
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CAMERON PUBLISHING COMPANY, INC. Manhattan Beach, New York
The Modern Portable

by

CHAS. WATSON, Radio Engineer

The portable sound system herein described is the result of considerable time and engineering skill in producing an equipment that would have as many desirable features as possible and at the same time preserving the compactness necessary in a portable apparatus.

The outstanding feature of the Zenith Portable is its use of the standard Zenith projector mechanism with a sound head built in conjunction with it. The fact that most projectionists are already familiar with this head is an added advantage.

No expense has been spared in the construction of the electrical system to make it efficient, powerful and as portable as possible without sacrificing any points that are necessary to obtain good reproduction.

In describing the electrical system we will not delve into technicalities but will explain the operation and general characteristics of the amplifiers, etc., with the object in mind of

*Designer of the Zenith Portable Sound System.
giving to the projectionists a general working knowledge of the system.

High Gain Obtained

We attribute the general compactness and exceedingly high gain of the amplifiers to the correct use and very high gain of the uy224 and ux224 tubes.

As you will note in the accompanying diagram the input stage of the amplifier uses a ux224 tube and the preceding stage uses a ux230 the filaments of which are connected in series with a dry cell battery supply. The filament current is very low (60 milliamperes) and can be regulated by the variable resistance R3.

In order to compensate for the irregularities in the characteristics of the ux224 tubes a variable screen voltage regulator is used and when replacement tubes are necessary the plate current can be readily adjusted by its use in connection with the plate millimeter and push button marked ux224.

The millimeter in the circuit serves a triple purpose, namely plate mills of the ux224, which is .3 of a mill, plate mills of the ux230, which is 2.5 mills, and also the filament current which is as we mentioned before 60 milliamperes. These tubes are tested by means of the push buttons. It is also worthy of note that the filaments of both can be watched closely, thereby prolonging their life.

Correct impedance relationship is very necessary in this method of using the screen grid tube involving high input plate voltage and resistance coupling from the plate of the 24 to the grid of the 230. As will be noted from the diagram the input plate voltage to the 24 is 450 volts, the plate resistor being 750,000 ohms, thus introducing high impedance and a high voltage drop. Using a higher resistance value than 750,000 has a tendency toward non-clarity and should not be used.

Shielding Effective Through Isolation

Due to the fact that even with the best of shielding and the most carefully laid out wiring system used (Continued on Page 27)
Characteristics of High Intensity Arcs

by

D. B. JOY and A. C. DOWNES*

The amount of light used at the aperture plate of the motion picture projector has steadily increased until at the present time only the high intensity arc can furnish the light concentration necessary to satisfy the demands of the larger theaters. Recent changes which have been made and rumors of others about to occur in the motion picture industry have again emphasized the constant demand for more light on the screen of the theater. It therefore seems desirable to call attention to certain characteristics of high intensity arcs which may help in the solution of the ever present problem of increasing the useful light.

The light from a high intensity arc emanates from two distinct sources, the crater and the tail flame. The tail flame produces about 30 per cent of the total light from this type of arc, but is of no value for projection because it cannot be focused on account of its large size, shape and position. Therefore, in a consideration of the characteristics of the high intensity arc only the crater light should be studied. The characteristics should include candle power both directly in front of the arc and at various angles, the area of crater opening, intrinsic brilliancy and spectral energy distribution for the various carbon sizes and operating currents.

The literature 1 to 8, inc. contains angular distributions of candle power spectral energy curves, and values of intrinsic brilliancy, but in many cases the conditions under which they were obtained and the identification of the carbons are not clear. The spectral energy distribution curves for high intensity arcs given in the Bureau of Standards Scientific Paper No. 539 were obtained at the given currents and voltages but include the tail flame light. These curves are therefore only of value as a means of comparison, for practically none of the tail flame is picked up by the optical system of the high intensity equipment used for the projecting or taking of motion pictures.

Experimental Procedure

An arrangement for measuring the candle power and intrinsic brilliancy of the high intensity arcs is shown in Fig. 1. The arc is placed directly facing the comparison plate D. Between the arc and comparison plate are the shields A and B. C is a black box which contains the comparison plate.

The light from the crater passes through the holes in screens A and B, and is reflected from the comparison plate D to the Macbeth illuminometer E. The function of screen A is to cut out the light from the tail flame, negative carbon and negative...
arc stream. The hole in this screen is approximately 1 to 2 millimeters larger in diameter than the crater. This allows clearance enough to take care of any slight change in position of the positive carbon while rotating and gives a clear field approximately 1.5 inches in diameter on the comparison plate. The light from the small part of the tail flame which is included by this clearance is negligible. This was demonstrated by tests with larger and smaller openings in screen A. Screen B shields the operator of the illuminometer from the crater light. The hollow tube projecting from the side of the box furnishes the necessary opening for the illuminometer. The correct position of the crater with respect to Screen A and the comparison plate is checked by means of the substitution of a false back with an opening slightly larger than the field of view of the comparison plate, and a telescope F placed at the back of the opening, as shown in the figure. The angular distribution in a horizontal plane was obtained by rotating the lamp about the crater as the axis. The size of the crater opening was obtained by measuring the craters of carbons which had been burned at the various currents. The intrinsic brilliancy was calculated from the above data by the usual method.

The spectral energy distribution curves were made with practically the same set-up for excluding light other than that from the crater. They were made with a quartz spectroradiometer used in connection with a thermopile with calibrated transmission screens, according to the procedure described by Coblentz and Greider and Downes.

**Discussion of Results**

The candle power of the crater light directly in front of the arc is shown in Fig. 2. As would be expected the candle power increases with the current. When the same current is used on two different size carbons of the same composition, the smaller size carbon, that is, the one with the higher current concentration, gives the greater candle power.

The crater light is only approximately 68 per cent of the total light from the high intensity arc as measured directly in front of the crater. The additional light comes almost entirely from the tail flame which streams out of the positive crater.

The candle power as well as the steadiness of operation is affected by the angle and relative position of the negative carbon with respect to the positive crater and by the voltage maintained across the arc. The angle is usually fixed by the construction of the lamp. The best results were obtained when the relative positions of the negative carbon and positive crater were such that the negative flame just brushed the lower edge of the positive crater as shown in Fig. 3-A. If the negative flame bathed the lower outside of the positive crater appreciably, as shown in Fig. 3-B, the candle power decreased probably because some of the current was taken on the outside of the positive crater thus lowering the current and energy concentration on the inside of the crater. If the edge of the negative flame were considerably ahead of
the lower edge of the positive crater as shown in Fig. 3-C, it would not have as much tendency to keep the hot gases in the crater and would result in a lower candle power. It was found in the case of the 16 mm. carbons in the current range of 140-150 amperes, which is ordinarily used, that the best arc voltage was 73-83 volts. Below this voltage the negative was so close to the positive that the negative flame appeared to impinge on the hot gases in the positive crater with such force as to actually drive them out with a consequent unsteadiness and loss of light. Above this voltage the negative was so far away from the positive that the negative flame apparently lacked the necessary force to confine the gases in the positive crater and caused a loss of light from the crater area. With lower currents, lower voltages can be used.

The 13.6 mm. carbons in the current range of 110-125 amperes operated best at approximately 67-73 volts and the 8 mm. carbons in the current range of 60-70 amperes operated best at 48-55 volts. In general, if lower currents are used, the voltage should be correspondingly decreased. The effect of lower and higher voltages with the 9 mm. and 13.6 mm. carbons is the same as with the 16 mm. carbons although to a somewhat smaller degree.

The angular distributions of candle power from the positive craters of 9, 13.6, and 16 mm. carbons in the horizontal plane in a total angle of 80 degrees are given in Fig. 4 for a number of different currents. The candle power is slightly lower directly in front of the crater than at 10 to 20 degrees on either side. The candle power holds up remarkably well to the 40-degree limit measured and is only 10 to 17 per cent lower at 40 degrees than at the center. This accounts for the decided increase in the useful light from the high intensity arc when a mirror or condensers of large effective angle are substituted for the old style condensing lenses of small effective angle.

The light distribution is approximately the same for the different sizes of carbons and the different current values investigated as is clearly shown in Fig. 4.

The areas of the crater openings of the different size carbons at the various currents are given in Fig. 5.

The cross-sectional areas of the 9 mm., 13.6 mm., and 16 mm. high intensity carbons are 64 sq. mm., 145 sq. mm., and 201 sq. mm., respectively. It is obvious from the curves that the crater openings for even the higher currents are much less than the original carbon cross-section.
The decrease in crater opening for the lower current densities is due in part to the increased spindle or tapering of the portion of the carbon projecting from the positive holder. This increased tapering is due to the enormous decrease in the length of carbon consumed per unit of time for a small decrease in current which allows a longer time for the hot surface of the carbon close to the crater to burn away.

The size of the crater opening or light source of the high intensity carbons is important in considering the application of any optical system for it has long been recognized and clearly demonstrated before this Society\(^{11,12}\) that the light efficiency for motion picture projection decreases rapidly as the area of the light source increases.

The intrinsic brilliancies in candle power per square millimeter of crater opening have been calculated from the above values of candle power and crater opening and are plotted in Fig. 6. As in the case of the candle power, the intrinsic brilliancy increases very rapidly as the current is increased on any given size carbon. The values come within the range of those given in the literature\(^{17}\). It is believed, however, that this is the first time that data showing the change in intrinsic brilliancy for the currents and sizes of high intensity carbons have been compiled. It is interesting to note that practically the same intrinsic brilliances are obtained with the various sizes of carbons at the currents ordinarily used. These values, ranging from 500 to 750 candle power per square millimeter, illustrate quite forcibly the advantage that the high intensity arc has for projection purposes over the plain carbon arc with an intrinsic brilliancy of 130 candle power per square millimeter and the incandescent tungsten filament projector lamp run at overvoltage with an intrinsic brilliancy of 27 candle power per square millimeter,\(^{13}\)

Typical curves of the spectral energy distribution of the light from the craters of high intensity arcs are given in Fig. 7. The distribution closely approximates that of sunlight.\(^{9}\) The curves show that there is approximately the same amount of energy in the blue region as in the red region for the lower currents on the carbons. As these currents are increased as evidenced by the curves for the 13.6 mm. carbons, the red end of the curve increases faster than the blue so that at the high currents there is actually an appreciable preponderance of red as compared with blue. This is contrary to the distribution curves given in the Bureau of Standards Scientific Paper No. 539, but, as stated previously, the measurements tabulated in that paper were made on the unscreened arc and included the light from the negative arc stream and tail flame which amounts to approximately 32 per cent of the total light and which is known to give

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Huygens failed to explain the rectilinear propagation of light. "Huygens' conception of the manner in which wave motion was propagated was as follows: He regarded every point on the wave front as the center of a new disturbance. These secondary disturbances, traveling with equal velocity, are enveloped by a surface identical in its properties with the surface from which the secondary disturbances start, and this surface forms the new wave front."* Assuming this as true, let us examine the case of a plane wave front AB approaching an opaque screen PY.

![Figure 1](image1.png)

AB reaches PY and we have the new wave front CP. Considering any point M on this new wave front as an independent source of vibration according to Huygens' theory, we may draw the trace of the spherical waves that must come from M.

These are in part represented by the arcs with centers M. It appears that we should have illumination in the region behind PY, hence curved light rays.

Since the analogy to sound and water waves was much used, and these actually did bend around corners, the wave theory of light had quite a problem before it. Fresnel gave the satisfactory explanation of rectilinear propagation. To do this he made use of Young's discoveries about interference.

![Figure 2](image2.png)

Let AB be the trace of a plane wave moving left to right. Let us
examine the effect the secondary disturbances from AB will have at a point C. Draw CP perpendicular to AB. P is called the pole of the wave with respect to C. On PA and PB mark off points W, X, Y, Z such that WC is equal to PC plus one-half the wave length of the light, XC equal to PC plus two halves the wave length, etc. Then when the crest of a wave from P reaches C, the crest of the wave leaving W at the same time will be half a wave length behind, or there will be the trough of a wave from W there. In like manner there will be a crest from X, a trough from Y, etc. Intermediate points will have intermediate phase relations.

Where we have crest and trough superimposed this way we have interference, cancellation of the waves. Thus all the waves coming from AB are not effective in producing illumination at C.

To get the effective illumination at C we must sum up the effect of all the elements. There is a change in area of elements as one goes outward from P. There is also a change in intensity of illumination with increasing obliquity of the rays. The result of these two is that practically all of the effective illumination comes from comparatively few zones surrounding the pole. For elements farther out there is almost complete cancellation.

By mathematical and practical demonstration it has been found that the illumination at C is equal to one-half the illumination from the first element plus one-half the illumination from the last element. In cases where the last element is far away the second term is negligible. However, if we have P at quite a distance from C, and use a camera diaphragm to cut out the more distant elements, the effect of this second term is marked. Suppose we stop down until we have an even number of half period elements. Then the first and last elements will be out of phase when they reach C and there will be little light. If we have an uneven number of elements, the first and last will be in phase. They will reinforce and there will be more light at C than if there were no diaphragm there. Because of this rather strange action of interference it is true that we would get more light at C from the first element alone than from the whole wave.

How does this apply to the rectilinear propagation of light? Rectilinear propagation is only an approximation due to the short wave length of light. As in Figure 1 the waves do go around the corner, but they interfere and produce darkness.

At point Q, Figure 1, there will be illumination, but not the full illumination of the wave, for half the first elements of the wave have been cut off. Below Q the light will grow gradually dimmer as more and more of the effective elements are cut off by YP. Finally, say at J, all the effective or only partly interfering
waves will have been cut off and we have complete darkness below J.

This applies to waves other than plane with a similar proof.

To show why we can generally neglect bending, the diameter of the first zone for orange light and at 50 cm. from the light source is 0.05 cm. For a sound wave of middle C on the piano the corresponding diameter is about 76 cm.

Studying the shadow cast by an illuminated sharp edge we find that the light encroaches on the geometrical shadow, and the shadow on the light, but not with uniform diminution on both sides. Instead, there are light and dark bands in the light. These bands are called diffraction fringes.

\[ \text{Figure 4} \]

Let C be a luminous point emitting spherical waves, AZB a section of a wave, ZD an opaque obstacle with a straight edge perpendicular to the plane of the paper, RV a screen.

Now to find the illumination on RV. Let us consider the point R. W is the pole of R. We can consider the illumination at R the sum of the full half of the wave above W plus that part of the wave below W that is not obscured by the screen. We can divide the wave into half period elements as with the plane wave. Suppose WZ contains all the effective center zones of the wave. Then from R up we have uniform illumination. Below R there is a point S such that from X, its pole, to Z there is an even number of half period elements. There will be interference of the waves coming from X and Z and we will have a spot of minimum illumination. Between the pole of T and Z there are an odd number of half period elements and we have waves from Y and Z in phase to make a bright spot at T. Between R and U there are a succession of these maxima and minima that we call diffraction fringes.

Below U the illumination will grow gradually dimmer as explained before. The main part of the illumination below U comes from the first zone that is not cut off. As these diminish gradually the diminution of effect from U to V has no maxima or minima.

\[ \text{Figure 5} \]

If instead of ZD we have a narrow strip AB, we get fringes in the geometrical shadow as well as in the illuminated portion. The strip must be narrow enough that the light that is bent into the shadow from A and that bent in from B will overlap and produce fringes, as at XY.

These are two types of diffraction

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SHOWMANSHIP
by
LLOYD C. LITTON, A. P. S.

In our mad scramble to adjust ourselves to the addition of Sound to our projection equipment we have been so busy studying Sound Amplification, Reproduction and all the technical things that go with it that we have overlooked what I consider the greatest asset any projectionist can be endowed with, showmanship!

To even attempt to define the word “showmanship” is a bigger job than I care to tackle, because, it covers a multitude of qualities in various lines of theatrical endeavor. I do believe however, that I know what qualities it covers in a projectionist.

To begin with, a high grade Projectionist must possess several qualifications, he must have a thorough knowledge of mechanics to be able to recognize the effects of wear and maladjustment by analyzing the projected picture, he must be quite a skilled mechanic also to be able to service and maintain a moving picture projector properly, he must understand optic projection and have a good working knowledge of lenses and their application to moving picture projection, his knowledge of electricity, since the coming of sound amplification systems, should border on Engineering, to say nothing of what he should know about Theatre acoustics, etc., etc., yet possessing all these qualities does not mean that his work as a Projectionist will be the best, it is only when he combines all these qualities with a sense of Showmanship, that he becomes the real Projectionist.

I would say that a Projectionist is developing a sense of showmanship when he begins to realize that the results of all his skill and knowledge go for one thing only, the entertainment of others.

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It is then that he begins to work from an Audience point of view, he develops smoothness and ease of operation in handling the equipment, curtains close, lights come up, effects go on, change overs are made with clocklike precision, emergencies are covered with calm judgment instead of distraction, in short, the show goes on with smooth continuity and nothing happens to detract from the entertainment value of the performance.

His work becomes a pleasure instead of a nerve wracking job, he discovers there is technique in the handling of spots, floods and effects on prologues, overtures and stage reviews, his own personality creeps into his work and is reflected if the audience applauds an act or an overture they are not only applauding the particular performer or leader, but they are also applauding everything that went into making their performance a success, gives him a thrill of pleasure at their appreciation of his own contribution.

His jealousy of another’s ability and success gives way to admiration and he secretly applauds a well executed piece of work, in short, he becomes a real CRAFTSMAN instead of just a tradesman.
Standard Release Print Progressing

When the technical bureau of The Academy of Motion Picture Arts and Sciences asked for inquiries and suggestions from the projectionists concerning the Standard Release Print make up which has been adopted by the producers, they probably did not anticipate the deluge of criticism and praise which has been rained upon them from projectionists all over the country. The system was developed under the direct supervision of Lester Cowan, manager of the academy technical bureau, who appointed S. J. Twining chairman of the Standard Release Print committee. During the development of the standard this committee worked very closely with the Projection Advisory Council and the American Projection Society. Mr. Twining recognized this help by the projectionists organization by saying in part:

"Acknowledgement is hereby expressed on behalf of the Academy to the many technicians who contributed to the development of the Standard—including representatives of the seventeen major Hollywood studios, the Association of Motion Picture Producers, and the Hollywood chapters of the American Projection Society, the American Society of Cinematographers, and the Society of Motion Picture Engineers—to the Motion Picture Producers and Distributors of America for assistance in putting the Standard into effect, and to the Film Boards of Trade, the Projection Advisory Council and the American Projection Society for help in the maintenance and further development of the Standard."

He further demonstrated his broad-mindedness and co-operative spirit by saying:

"The specifications will be revised from time to time as necessary to further the general purpose of contributing to the highest quality of sound picture presentation."

This statement expressed more than anything else that the Academy expected that revisals and changes would be necessary before the ideal could be attained. It is very seldom that any big change is brought about in a single step. Mr. Thad. C. Barrows, president of the Projection Advisory Council, must have realized the fact that the first Standard was not perfect when he wrote, "We believe, from the projectionists' standpoint that the Standard unquestionably represents a step in the right direction." Mr. Barrows must have anticipated the present difference of opinion.

No Solutions Offered

A significant fact concerning the many communications which have been received by the Academy and P. A. C. from projectionists is that none offer any suggestions for a practical solution of the problem. They are fairly evenly divided between praise and condemnation which seems to point rather sharply to that fact that some changes, small ones, perhaps, but changes nevertheless, may be necessary.

A. P. S. to Offer Recommendation

Realizing the possibility of improvement to the Standard as it is now and realizing that its originators recognized the fact that from time to time revisals and improvements would present themselves which could be advantageously incorporated, Sidney Burton, president of California Chapter No. 7 of the American Projection Society, has set in motion a plan to secure a practical and workable improvement for the Standard. President Burton appointed a committee from the membership of Chapter No. 7 consisting of Wallace J. Maxon, Frank Erler, Ed Keller, James Pointer and T. H. Eckerson. The work of this committee will be to formulate a suggestion for improving the Standard. This suggestion will

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be submitted to the Academy committee for approval and adoption or rejection.

Other Chapters Invited

President Burton has, in collaboration with this publication, invited all the presidents of the various A. P. S. chapters to appoint committees to consider the many phases of the Standard and make whatever recommendations they deem advisable for its improvement. It is expected that the different chapters will be very anxious to co-operate with the Academy and the P. A. C. in this way. The aggregation of plans coming from the several committees will no doubt present angles which will prove invaluable. Messrs. Lester Cowan, S. J. Twining, Thad. C. Barrows, P. A. McGuire, Sidney Burton and many others are working very hard to perfect and put into practice a Standard which will prevent, by rendering it unnecessary, all unsightly scratches, etc., which have formerly been used for changeover cues.

Individuals Invited to Write

If you are not appointed on a committee or if you are not a member of the A. P. S. you are cordially invited to send to this publication your comments and suggestions. Only by this method can the industry be given the benefit of your idea. You owe it to yourself with those others who are giving of their time and knowledge for the benefit of the industry. Write in your suggestions today.

It is our policy to print each month those letters that come to us from the projectionists in the field. Their reactions and comments are most valuable to the Academy.

The following letters display considerable thought on the part of the authors and merit your consideration:

Oakland, Calif., Jan. 19, 1931.
Mr. Sidney Burton, Projection Advisory Council, 5126 Norton Ave., Hollywood, Calif.

Dear Mr. Burton:
Regarding the Standard Release Print, have an appointment Monday, 2:00 p. m., with the S. F. Film Board of Trade. Will send you a detailed report of the proceedings.
Do you think it would be practical for the producers to ship or assemble their features in two thousand-foot reels instead of the thousand? Since many of the authors and others have reverted back to the one man some taking out the turntables, I firmly believe that the doubled reels will solve much of the trouble we are trying to cope with.

Routine of a brush house operator runs like this: Reports to work at 3:30 p. m. New show comin in. Starts the amplified set, dashes for the News and Comedy. Rewinds to mark for a certain S. M. and C. O. and how. Then cuts in a trailer and turns the training wheels. He probably has one and two of the features hooked up. Warms up the projector m's and turns the lamps. He may start the show at seven. All this in thirty minutes. What kind of work do you think he is giving himself? Doubled reels from the factory will eliminate all this half way work and will give the operator a little more time to service the sound equipment and do the other work without even having to worry about the feature, as he knows it is already marked for C. Os. In this way he is not excited and can pay more attention to his show and last of all, the producers print is not checked, punched out, numbered.

Mr. Cowan told me that there was a difference in opinion between the projection supervisors of the large chain in the eastern man was against the doubling practice, that he in a short time would have it stopped. The western man was against the object to the practice, and lets his men do it. It seems to me that the eastern man's idea is purely personal, there doesn't seem to be any foundation to his objection.

A check on this could be made by the producers in this way: "All Quiet on the Western Front" was shipped out doubled. Compare this feature's ends with that of others, say at a certain length of time on the run. Also examine between 1 and 2 of the reels. As for the Standard Prints I found another flaw and I shall have to refer back to the doubling practice. Every time an operator doubles he cuts away portions of the leader or print frames. This of course shortens the length of the threading footage in the reels. The prints naturally have to be in their proper lengths to come out right. In other words, to be treated as a disc print would. But this is not being done here at all. I will say, though, the exchanges are doing their part in keeping the prints right.

With kindest and personal regards to you and all the boys. I am fraternal yours,

GEORGE J. LANCASTER.

New York, N. Y., Dec. 11, 1830.
Projection Advisory Council, Attention Mr. P. A. McGuire.
Dear "Mac" and Gentlemen of the Council,
Your letter of November 5th reached me shortly after I read the pamphlet on "Standard Release Print Makeup and Practice." I congratulate the Council for their part in the endorsement and wide distribution of this pamphlet and the Technical Bureau on this achievement. This is indeed evidence that the Council has emerged from a vague idea of possibilities with a practical reality.

When I recall the years of preaching by F. H. Richardson against the butchery of film with 51 varieties of change-over marks, the past indifference on the part of exchanges—and more recently in small theatres—the scratches made on sound film for change-over cues, the "Standard Release Print" is a remarkable achievement of much needed, advancement in film practice.

As my work takes me into the projection rooms of New York the opportunity to discuss this matter with the projectionists, get their reactions and advocate our co-operation. Any suggestions I might obtain in this matter I shall be glad to pass on to the Council.

Sincerely yours,
(Signed) ARTHUR R. SCHULZIE,
RCA Photophone, Inc.
Academy Officials Discuss Standard With Projectionists . . .

Lester Cowan, S. J. Twining, Donald Gledhill and Sidney Burton of the Academy Standards Committee called an informal meeting with several leading Los Angeles projectionists on the night of February 5th. The projectionists who acted as an advisory board were Magnus Nielson, Ray Haskell, A. C. Schroeder, Fred Humphrey, Jessie Grayson, Bob Babcock, Fred Weaver, Willard H. Fife and D. H. Koskoff. The editor was invited to represent the LOUDSPEAKER at the conference.

Standard Release Print Discussed

The various phases of the Standard Release Print was discussed at length. The first question asked by Mr. Cowan was whether or not the projectionists approved of the size of the black dot. After an exchange of opinions a vote was taken and it was unanimous that the dots should be reduced between a third and a half of their present size.

Location of Dots

The next question was whether or not the projectionists approved of the location of the dots. Several locations were suggested, but the consensus of opinion was that they should be placed in the lower right hand corner instead of their present location in the upper right hand corner. The principal reasons offered for this was that they would be less conspicuous in this new location and that they would have less chance of showing in characters’ faces. It was pointed out that this condition has occurred several times since the standard was adopted.

Change in Safety Footage Suggested

The present standard allows one foot of film for safety after the douser cue has gone through. It was decided that for absolute safety this space should be increased to three feet. It was further suggested that this footage should not include any essential dialogue, but that it should include non-essential sound. This latter would prevent the freezing effect of no sound at all.

Reel Lengths Discussed

Considerable time was spent on the subject of reel lengths. Mr. Cowan pointed out that the circuit chiefs in the United States are not agreed on whether single or double reels shall be used in their theatres. One of the largest circuits in the East insists that their projectionists run their shows on single reels. At the same time an equally large circuit in the West encourages their projectionists’ practice of doubling. The assembled projectionists were about evenly divided in their favor for one method over the other. Ray Haskell brought out many interesting points regarding the economies to be effected by the adoption of the double reel length as a universal practice.

Better Understanding

The meeting was a very profitable one to all concerned. The Academy representatives gained a fairly workable idea of the way the projectionists in Los Angeles are reacting to the Standard Release Print. The projectionists gained a fair idea of the magnitude and complexity of the problems being considered by the Standards Committee.

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Give the Musicians a Break

By J. B. G.

The writer is not a musician. He can't whistle, yodel, hum or otherwise carry a tune. And all he knows about notes is that he shouldn't sign them. His only contact with musicians has been with those who are employed in theatres. He has, as have other projectionists, made "cracks" about musicians that have not been compatible with the fact that both of the professions are internationally affiliated. The "cracks" were always personally aimed and not generally, and were based upon the axiom that some of the harmony dispensers are at worst, exasperatingly temperamental; though at best, extremely fine chaps.

Before the advent of sound pictures and the projectionist's subsequent increase in remuneration, a projectionist was too often a conceited operator; while an operator was merely a non-script, good-enough-egg, who invariably transferred oil when shaking hands.

The musician earned a rather fair salary and while no one carrying a card begrudged it to them, it would not be strictly honest to say that comparisons were not made and that these comparisons were not conducive to a foolish though potent bit of jealousy. It seemed that the two professions were figuratively as remote as the screen from the projection room and the number of feet in the program. Yet they were hopelessly bound, inseparable, each utterly dependent upon the other for a perfect presentation.

Then the talking fools walked where the silent angels feared to tread, and the sound opuses were upon us, with us, and part of us. The younger projectionists were jubilant, the older projectionists skeptical, while both the younger and the older musicians were captious, angry. As would be you and I!

During the first months of sound many petty altercations ensued, during which the "I'm for sound" men clashed with the "I'm against sound" men, with no men lost and but a few bad optics. The musicians, however, silently watched the box office receipts and knew the election returns early. In fact, before many of us had a chance to even stuff the ballot boxes. A pitifully large number of their members were crowded out, their thousands of dollars spent for lessons, their long years of study, their high hopes of a future, futile, dimmed and fading.

They took it gamely, nervily, welded together like true brothers in making the fight of their very existence. They are still making it. Every projectionist personally knows musicians who have been hit and hit hard: musicians who a few brief months before were on top of the world, but who are now counting off the days of a two weeks' notice and racking their brains to figure how to pay the next month's rent.

Gloating has been done, but it hasn't been done by the projectionists. Occasional exhibitors have

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Auto-transformers are a type of transformer in which part of the winding is used as the secondary, but only a part of it is used for the primary. This gives a step-up ratio. Auto-transformers are sometimes thought of as a variation of impedance coupling, and the auto-transformer is the result. The tap is placed about 2/3 or 3/4 the way up, thus giving a step-up of about 1½ to 1.

In some respects the auto-transformer is similar to the transformer and also to the impedance type of coupling. The primary has a very high impedance, which is a requisite for quality reproduction. The secondary being larger than the primary causes the increase in voltage applied to the following grid. The voltage gain is not as great as it is in the regular transformer, but this is not serious, as resistance or impedance coupling produces no gain other than that derived from the tubes. As some of the best audio transformers have a ratio of only 2 to 1, the auto-transformer makes a pretty good showing.

The music produced by auto-transformers may be as good as that produced by other forms of coupling. The type of coupling is not the all-important thing. At one time it was thought by many that no other form of coupling could approach the quality that resistance coupling gave. The present day transformers have changed that, and now there is little difference between the two types.

Going back to the Clough transformer again we see that it is really an auto-transformer. Forget the resistance and the condenser. Then we see a coil with three terminals, one at each end and a tap near the lower end. The ratio of the Clough transformer is greater than that of the ordinary auto-transformer.

Western Electric uses an auto-transformer between the second and third tubes in the 8-B amplifier. Looking at Figure 1 it is seen that the wiring resembles that of the Clough transformer very much. In place of the resistance a choke coil is used. This is called a retard coil. The choke serves the purpose that a resistance would, that is, the result is the same, but the manner in which it works is different.
Figure 2 shows the wiring of an auto-transformer. Notice that the condenser and the resistance are in the grid circuit, in the Clough transformer they are in the plate circuit. The condenser functions somewhat like it does in the Clough system. The resistance is not a coupling resistance, it is a grid leak. It keeps the grid properly biased. The electrons that gather on the grid must have some way to leak away from it, otherwise the grid will become charged to such a point that the tube will "block," it will then cease to amplify. The grid leak allows this flow of electrons away from the grid. The resistance is not too great, a value being chosen which will always allow the electrons to return to the filament faster than they can collect on the grid. Some of the signal is lost this way, but it is a very small amount and is of little consequence.

The values of resistances used for this purpose are usually much higher than those used with the Clough transformer, running from 1/2 to 1 megohm as a rule. A few years back the values were lower, sometimes 100,000 ohms being used, and not very often was the resistance greater than 1/2 megohm. The purpose of the low values was to stop "motorboating," a form of low frequency oscillation caused by feed-back. For a time the cause of the trouble was not so well understood. It was thought that the tube was blocking, that the electrons were gathering on the grid faster than they could leave via the grid leak, so a leak of smaller resistance was substituted and the trouble disappeared. This, however, caused a loss in amplification, especially at the low frequencies. Later it was learned that the real cause was feed-back from one circuit to some other circuit preceding it, so steps were taken to isolate the various circuits. This is accomplished by filtering all the grid and plate circuits, which means that the signal currents in any one circuit are kept there and are not allowed to flow through a common impedance, usually the B supply, setting up a voltage across that impedance at the signal frequency, thereby impressing the amplified signal back on the first tubes of the amplifier and thus causing the "put-put" known as motorboating.

Now let us get an idea about this filtering. Referring to Figure 3, the signal currents in the last amplifier tube, after passing through the transformer, are shunted back to the filament by a condenser; an impedance, such as a choke or a resistance, is in series between this point and the B supply to hinder the signal in passing on to the supply. In this way the signal is kept from going through any associated circuits where it would interfere with their operation. The other circuits are filtered in the same way. Suppose that Figure 3 now represents the plate circuit of the first stage of the amplifier. If a tendency to feed back were present the varying voltage causing it would encounter the resistance on the way to the plate, which would tend to decrease the feed-back. Now we come to the condenser, which shunts the remaining part of the interfering voltage to the filament and so to negative B, where it can do no harm. As a result of nearly perfect filtering some amplifiers are now used with grid leaks having a resistance of 5 megohms, and without the least tendency to motorboat.

Any auto-transformer wired in the conventional manner as shown in Figure 2 can be rewired so that it practically becomes a Clough transformer. A lower value of resistance is used and it is connected from the plate to positive B, the grid leak having been removed. The condenser is taken out of the grid circuit and put
in the lead from the plate to the tap on the transformer.

The same thing can be done with any other transformer. The lead going to the grid of the tube is left as is. The lower end of the secondary is connected either to the plate terminal or the plus B terminal of the primary. The end of the primary that has not been used is connected to negative C. Which end of the primary to connect to the lower end of the secondary must be found by trial, the connection giving the greatest volume is the one to use. The coils are then connected so that they are in phase. A resistance is put between the plate and the B supply and an isolating condenser connected from the plate to the junction of the primary and secondary. Figure 4 shows the two ways that the primary and the secondary can be connected together.

709-A DRIVE

A few cases have been found where pins which hold bevel gear on main drive shaft of this gear box have dropped out. This usually happens on the gear which drives 707-A Drive. In this case, the gear box may be taken apart and pin reinstalled, but should be set with a small center punch to avoid this pin from coming out again.

**SPASMS » » »**

*by J. B. G.*

Directory Solicitor: And your occupation?

Brother Rose: Sound projectionist.

D. S.: A what, sir?

Brother Rose: Er—a projectionist.

D. S.: I beg your pardon?

Brother Rose, blushing, but sticking to the good ship Nomenclature: A projectionist.

D. S.: You win. How do you spell it?

Brother Rose: Eh? Oh, ah—well, put it down like you did last year—operator.

There is that Scotch exhibitor, too, who demanded a replacement on his 4-A Reproducer, claiming that the needle wore out completely in a few months.

And while we're about it: That Scotch sound recording—the squeeze track.

Then again—ever discriminating and genteel—the LOUDSPEAKER tips its hat to the brother who blushes furiously when asking for the oil absorbent material for his projectors.

And the astute technologist, President Litton of Chapter 12, devoting his entire shift in attempting to weigh a heavy splice.

A touching tribute was paid Bro. “Gantry” Cates at the last meeting. He entered the hall, his shiny head bent low because he was three minutes late, and the entire membership started to chant: “Here Comes the Sun.”

Brother Nichols brought up a splendid point at the last meeting in which he explained that his propensity for emptying bottles was purely in the line of duty insofar as he is saving the corks which will be glued upon the walls of his theatre to improve the sound absorption.
JUST HOW CLEVER ARE YOU?
WHAT'S WRONG WITH THIS DIAGRAM?
Puzzle Circuit by R. E. Clark, A. P. S.

WESTERN ELECTRIC 43A AMPLIFIER

During the next 15 days write to the Editor and tell him what is wrong with this diagram. This is the third of a series of five puzzle diagrams. An award will be given to the projectionist who sends in the highest percentage of correct answers. Send in your answer early.

The correct answer to last month's puzzle diagram was sent in by Bro. P. C. Young of the M. G. M. Studio Projection Department. His drawing appears below:

This is the second correct answer chalked up for Bro. Young. All of the other answers received were incorrect in some way. Many were correct in all but one or two small items. We congratulate these other Brothers. All of the answers received showed real thought and we thank them for their interest. Better luck next time.

Twenty-four
FIRST MEETING FOR JANUARY
CHAPTER TWELVE, OAKLAND, CALIFORNIA

The year 1931 brings many new problems, the program just completed by the Board of Governors is entirely of an advance nature compared to last year's series of lectures and talks. It is gratifying to note the progressiveness of the membership and the co-operation of the ERPI and R. C. A. engineers who rendered their services to enlighten our minds of troublesome occurrences that came in our daily routine.

A good start has been made, the installation of officers, who are the same as last year with the exception of Vice President, Recording Secretary and Sergeant-at-Arms. The capabilities and initiative of our President, Lloyd C. Litton, and his line staff of officers each suited to the office they successfully carried last year, prompted the membership to unanimously re-elect them as their leaders. To these men the guidance of the chapter has in the past been undaunted, trying and successful. They are to be congratulated.

The series of lectures given before Local 169, I. A. T. S. E., by Prof. L. E. Reukema, University of California Extension Division, are of the highest caliber in sound projection and engineering. The problems encountered in this series provide excellent material for discussion at our meetings. The third semester now in progress covers many advance subjects in sound projection—The Nature of Sound, Kinds of Sound, Nature of Speech, Nature of Music, Nature of Hearing, Transformation of Sound Waves into Electrical Waves, Electrical Recording of Sound Waves on "Wax" Discs, Recording on Film, The Reproduction of Electrical Waves from the Disc and from the Film, and the Transformation of Electric Waves Back into Sound Waves. A glance at this resume of the third semester should prove beyond a doubt the value of this course in the future sound projection work. The local and chapter feels that to be successful and intelligent in the line of our chosen profession it is necessary to have knowledge of this branch of the industry not only in the graceful manner of projection, or the inner workings and maintenance of the sound equipment that we may be working on, but also of the cadenzas outside of the projection room and in the studios where the recording is placed on the film for the boys way up in the shelf, little thought of by the customers, to send out both in sight and sound.

Has it ever occurred to any of us up in nigger heaven, which IS part of the theatre, putting over the entertainment that we to rate the applause the musicians and actors generally get for the merits of their endeavors? If we did the manager would probably fall all over himself to see what the trouble may be. The only time we get the big hand is when something goes wrong with the system and that kind of a hand is not from joy of an act well done. It is meant as a raspberry and what in the hell is the matter with that guy up there? That is what we don't want and to keep our public from thinking about us in this manner is to put over a one hundred per cent show.

It is gratifying to know that some of our burdens have been lightened by the Standard Release Print. It is steadily gaining praise and recognition throughout the country. Letters received by the Academy of Motion Picture Arts and Sciences show that the make-up has been given considerable thought and discussion. We are glad the practice has been adopted here whenever the theatres get them, which will in time hurt the manufacturers of various devices for punching film purchased by the operator of the silent days.

It is a real pleasure to attend our chapter meetings, which are put over with an air of confidence, fidelity and friendliness.

Twenty-five
“rubbed it in,” but to the profound disgust of the projectionists. Indeed, the prevailing cloud in our new sky is the cognizance that our improved conditions have caused distress to others. And, therefore, to a man, we want to give the musicians the “break” they deserve.

We want to do this to help the industry, the musicians, and ourselves. Give the human music a chance! And if this be treason, coming from a projectionist, then treason it will have to be.

If the organist or orchestra is to play the titles of the news or the main title of the feature, show them the courtesy of hanging onto the fader like the proverbial leech until the correct split second. Don’t break into their only too few minutes of effort without warning, without allowing them to diminish to a suitable close. If a new silent strip is inserted during the show—see that they are notified. If an extra subject is to be run that they cannot appropriately accompany—inform them in order that they not be made ridiculous.

Sound is here to stay. This has ceased to be a hope. It is a fact! Dialogue will exist as long as the human ear can hear. The projectionist has everything to gain and nothing to lose by insuring, by his carefulness, that the two mediums do not clash.

If our theatre has organ solos, we should triple every effort we have made in the past to co-operate in gaining them a “hand.” And we should not, before this “hand” has subsided, run the fader to point fifteen to make the lion roar or the dogs bark realistically.

If the musician is to play the exit music—let us see that he is allowed to do so consistently—so that he will be spared the anguish of not knowing whether his music will be crashed into unexpectedly.

A projectionist couldn’t do his best if patrons sporadically held their hats in front of the projection ports, or playfully tossed lighted fire crackers into the projection room. No more can a musician do his best encased a few feet from horns which do not go into action at the same instant every performance.

Give the musicians a “break”! It’s like putting money in the bank. And possibly when the youth tentatively christened “Television” grows into manhood some of our wails for a “break” will be heard and answered. And possibly all of us won’t have to sell papers—or cigarettes—or unemployment apples—or worse yet, become managers!

CHARACTERISTICS OF H. I. ARCS
(Continued From Page 12)

a decided peak of energy in the blue and near ultra-violet end of the spectrum. This tail flame and negative arc stream light is not picked up by the optical system commonly used in either the Sun Arc or projection lamps and is not therefore a factor. It would seem from these energy distribution curves in Fig. 7 that the high intensity arc, particularly at the higher currents, is a very desirable light source for use in motion picture photography.

An example of the use that can be made of data of this nature is furnished by comparing the relative light which can be obtained on the screen when 13.6 and 16 millimeter carbons are used with the ordinary plano-convex lens combination. If the 13.6 millimeter carbons were to be burned at 120 amperes and the 16 millimeter carbons were to be burned at 145 amperes, the crater areas (Fig. 5) are 90 and 137 square millimeters and the intrinsic brilliancies are 737 and 620 candle power per square millimeter, respectively. It has been shown in the Transactions that for crater areas of 137 square millimeters the relative screen illumination with arc and lenses set
PORTABLE SOUND
(Continued From Page 8)

throughout, strong AC line noises and other detrimental effects leaked in when the P. E. C. amplifier was incorporated in the same case with the main voltage amplifier. The engineers finally segregated the P. E. C. amplifier from the main voltage amplifier that they can be isolated during operation but put into one case for handling. They can be instantly hooked together as shown in the photograph, by means of the flexible detachable plugs and cords.

The P. E. C. amplifier case contains the input stage of 224 and its associate stage 230-test jacks and meter, etc., the plate of the 230 connects through the connecting cord to the main voltage amplifier.

The main voltage amplifier consists of two stages of push-pull amplification and also the full wave rectifier, filter system, volume control, test meter and jacks.

The reason for using two stages of push pull is the exceptionally low AC hum and the large amount of undistorted output derived from its use.

The reader will notice that we use the ux210 or 310 tube in the output amplifier. The reason for this is that our experience with 250 and 345 tubes for this type of work has not been satisfactory. In talking picture reproduction any barrel distorted reproduction is met by the average listener with disfavor. Accentuation of the bass is detrimental. What is needed most are frequencies in the voice range and accentuation of the higher range. This has been done very satisfactorily.

In locations where 110 volts AC is not obtainable, but 220 or 440 is handy to attach to, a step down transformer can be secured for reducing the voltage to its proper value.

In case DC is the only supply available the equipment can readily be used in conjunction with a small DC converter. This makes it possible to use this system readily on trains, boats, etc., where no other type of electrical energy is available.

There will no doubt be in the near future considerable use of the various types of portable sound apparatus. They are particularly suitable for use in churches, schools, cafes, dance halls, private homes, etc., where temporary installations are desirable. It is therefore extremely fitting that every projectionist should have a working knowledge of this as well as the other systems on the market.

STRIP GEARS ON 707-A DRIVES

If you should have a case where fibre gear on 707-A Drive is stripped and a disc show is being run, the 707-A Drive may be removed and film threaded through film compartment of 1-A Sound Unit. When removing this 707-A Drive, the 700-A Aligning Tool should be inserted in place of 707-A Drive in order to hold castings of universal base in place. However, if you do have a film show and not over three teeth of this gear have been stripped, the 707-A Drive may be left in providing the bevel gear on 708-A Drive is set just beyond where these teeth are torn out. 707-A Drive will then obtain enough momentum in one revolution to ride over these broken teeth of gear.

Twenty-seven
THINGS IN GENERAL
By
THE EDITOR

Retrenchment Necessary

Now that the requiem for wide film has just about died out and the last lingering fragments of that “revolutionary idea” has been safely buried we are looking for the next development that will occupy the attention of the producers, projectionists and theatre owners. Television is still in the short pants stage of development with no prospects of reaching the commercial stage of development necessary for theatre use for many years to come. Optical projectors using no intermittent movement were widely exploited for years. There was a projector manufactured in Germany which was good enough to attract considerable attention in America. It was known as the Mechau and received a trial in America, but was finally discarded as impractical. In short, the story is that tremendous sums of money have been spent in chasing wild ideas up long dark alleys from which said ideas never emerge. It seems that an almost limitless amount of money is always available to promote any idea which sounds reasonably plausible whereas some of the smaller yet more important things are consistently ignored.

For example, a performance perfectly presented with reasonable embellishments such as organ solos, acts, overtures, etc., and capably handled by real conscientious projectionists who really make the best of the more or less ordinary equipment of the average modern projection room, will attract and satisfy more patrons than all the wide screens, optical projectors and similar innovations ever invented. It is not meant to infer that it is not advantageous to increase the size of the picture for panorama out-door scenes. This is most effective and is accomplished by the simple expedient of changing to a shorter focal length lens at the projector and cannot possibly be compared with the exceedingly expensive wide film systems.

It occurs to us that much can be done to better please the patrons without huge expenditures of money. A brighter, clearer picture that is steady on the screen and focused extremely sharp seems to be a small order, yet many theatres lack just that and at the same time contemplate large expenditures of money for wide screens, wide film projectors, etc. Our point is: Let’s get down to a fair degree of perfection in presenting film subjects and stage presentation before wildly searching for newer, faster ways of spending money.

—o—

Appeal to Westerners

It is the desire of this publication to be of service to each individual projectionist in the West. It is impossible, however, for a member of our staff to be present at each meeting of each A. P. S. Chapter in the West. It follows, therefore, that we must depend upon the members of each chapter for our information about their chapter and its members. We believe that the western projectionists will combine to make their LOUDSPEAKER the outstanding craft publication in America. Send in that story or news item today.

Learn to laugh. A good laugh is better than medicine. Learn how to tell a story. A well-told story is as welcome as a sunbeam in a sick room. Learn to keep your own troubles to yourself. The world is too busy to care for your ills and sorrows.
Bro. Frank Sawyer and members of the editorial staff of this magazine visited the regular meeting of Chapter 19 at San Bernardino at its meeting of January 27, and were royally entertained by the officers and members. After President Reynolds called the meeting to order things began to happen in rapid succession. First—Feed (of banquet proportions), second—business, third—a red hot lecture on amplifiers by Mr. N. P. Minor of E. R. P. I. closed the peppiest meeting we have attended in a long time.

Bro. Fowler is still wondering what became of the trick hats and whistles at the Dinner-Dance.

An emergency benefit baseball game will be played between Dawn Post and Maywood Post, American Legion, baseball teams at Wrigley Field. The day is Sunday, March 8, at 2 p.m. Prior to the actual game an entertainment will be given featuring the American Legion Band. Many stage and screen celebrities will be present. Wrigley Field admission prices will prevail.

After an absence of fifteen years, a projectionist recently returned home to his wife. Evidently he had succeeded in thinking of a new and original excuse at last.

A new member was ushered into California Chapter No. 7 at the meeting January 20, 1931. The fortunate man is Bro. Alonzo S. Bennett of Long Beach, Calif. Bro. Clarke Searle, also of Long Beach, was present to see the job well done.

From SAN BERNARDINO, CALIF.

Resistance Coupled Franklin from Riverside is still trying to find out what to do with the ash can.

Brother Bill Moes of Pomona has developed a large German goitre. No he's not sick—his chest slipped.

Paul Tuggy, radio technician of Riverside, gave Chapter No. 19 a very educational lecture on vacuum tubes at a recent meeting. Mr. Tuggy is well known as an authority on this subject and his lecture was very much appreciated by the membership.

We unanimously elect Bro. A. L. Hanson to the position of champion sleeper of the world.

Chapter 19 has just started a library for each of its members. The first acquisition was a copy for each of Radio Telegraphy and Telephony by Duncan & Drew. Several other books are being considered by the chapter for purchase in the near future.

Twenty-nine
Chapter Doings

California Chapter Number Seven

R. C. A. Photophone Lectures This Month

The first meeting in March will be held in the T. V. G. Building, 936 West Washington Boulevard, at 12:00 midnight, Tuesday, March 3, 1931. At this meeting Mr. Watson Jones of the R. C. A. Photophone Corp. will deliver the first of a series of lectures on R. C. A. Equipment. Don’t miss this first lecture of this important series. Preceding the lecture the usual lunch will be served in the Rathskeller.

The second meeting in March will be held in the same hall at 12:00 midnight, Tuesday, March 17, 1931. This will be an educational meeting. The second lecture by Mr. Watson Jones of R. C. A. Photophone Corp. will be delivered at this meeting. Lunch and social hour before the meeting.

Members of other chapters are cordially invited to join us at either of these meetings.

San Bernardino Chapter Number Nineteen

San Bernardino Chapter Number 19 meets at the American Legion Club House, 113 West E Street, Ontario, Calif., on the second Tuesday of each month at 12:00 midnight. Dinner is served after which a short business session and educational lecture are provided. A real worthwhile evening is always provided for our members.

Visitors from other Chapters are cordially invited to break bread with us and enjoy our meetings.
It is indeed gratifying to be able to announce the "main event" for coming Society meetings. Through the efforts of President Burton and his co-ordinates the services of Mr. Watson Jones, resident R. C. A. representative, have been obtained for a series of talks on photophone recording and reproducing equipment. Mr. Jones is recognized as being one of the leading sound technicians in the industry and the invaluable data which he has to offer should prove a real treat.

The Society is greatly indebted to those organizations which have co-operated so wholeheartedly in offering us such splendid speakers, men outstanding in their chosen branches of the profession, and it is indeed a rare privilege to meet these men face to face and share the fruits of their hours of study and research. We, here in the heart of the picture industry, do not fully appreciate the advantages offered us.

We are at times inclined to be a trifle lax in availing ourselves of the opportunity of obtaining first hand information from those devoting their efforts to the betterment of the art of talking pictures.

The series of talks offered by Mr. Jones will not deal with the elements of sound, tubes, their functions, batteries, and the like, but will be devoted to detailed explanation of the Photophone equipment. Each talk will feature a definite part of the equipment and when possible will be demonstrated by actual contact with the particular phase of the system under discussion.

The first of these lectures is to be held Tuesday, March 3rd, and of course will be preceded by the usual repast in the Rathskeller.

May I suggest that each and every member of the Society make a special effort to attend this, and every meeting of the series and reap benefits to be derived from it.
ACADEMY EXECUTIVE SPEAKS IN OAKLAND

Mr. Clinton Wunder, executive manager, Academy of Motion Picture Arts and Sciences, spoke at a luncheon of the Oakland Chamber of Commerce Friday noon, January 16th, 11:15 a. m., at the Athens Club, Oakland. Practically all the theatre managers in the East Bay theatres were represented. Several acts from the R. K. O. Orpheum and Fox Oakland theatres lent their talents for the entertainment. On Mr. Wunder's right at the speaker's table was seated Frank Seavier, representing the A. P. S., and on the left, Geo. J. Lancaster, representing the P. A. C.

Mr. Wunder's message was one of great promise of the continued success of the motion picture industry. The following are some of the high lights of his address:

His prediction is that talking pictures are here to stay for ever. He pointed out that the motion picture industry is the fourth largest industry in the United States and employs more people in all its branches than any other single industry of its size. The consistent popularity of motion pictures is due to the real service they perform for civilization. To illustrate this Mr. Wunder pointed out that many foreign people are learning the new Hollywood dress, fashions and speech from the screen. Another example of service was an incident in a certain South American city where a popular American made automobile increased its sales in that city because a film was shown with an automobile race and this car was the winner. Another case was in an American city when a strike closed all the theatres for several days. There were scores of holdups and burglaries that were attributed to the fact that the public had had its entertainment cut off. The crime wave stopped when the police chief ordered an immediate settlement between the exhibitors and projectionists so that the people would have some place to go.

Mr. Wunder stated that many cities in this country have recognized the value of sound motion pictures for educational work and have established departments to be known as the Department of Visual Education. These departments are functioning perfectly and are a great aid in presenting educational subjects.

Mr. Wunder closed his very interesting talk by stressing the fact that the Academy was anxious to work with the American Projection Society and the Projection Advisory Council in promoting their mutual interests in the industry.

"What kind of a dress did May wear to the party last night?"
"I don't remember. I think it was checked."
"That must have been a real party."
Thoughts While Stalling

Apologies to O. O. McIntyre

Some pictures I would like to run again . . . . A Woman of Paris, the only serious drama ever produced by Charles Chaplin. It concealed in real human fashion the peaks of emotion. It was at least fifteen years ahead of its time . . . . Lewis Stone in River’s End, a silent picture which literally screamed dramatic art . . . . Pola Negri in Passion, a colored production from Germany that made history ten years ago . . . . Chaplin and Cogan in The Kid, human interest and pathos never excelled either before or since . . . . Marie Dressler in Tillie’s Punctured Romance, a marvelous example of the mugging type of humor . . . . Mabel Normand in Micky, the picture that printed her wistful smile indelibly on the hearts of millions of picture fans . . . . Pearl White in The Iron Claw, a serial thriller that really thrilled. Even the sophisticated elders followed each chapter with breathless expectancy . . . . Ford Sterling in His Great Moment, a style of comedy now gone, but very popular at the time . . . . Douglas McLean in Going Up, the climax in a flight that made your hair stand on end never failed to bring the audience to the edge of their seats . . . . Quo Vadis, produced by the Italian company of Ambrosia, was a picture with a huge cast well handled by comparison with other attempts at that time . . . . the Desperate Desmond series produced by Nestor.

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Actors and actresses I’d like to see again . . . . Katherine McDonald . . . . Mary Fuller of the Edison Co. . . . . Marguerite Snow, James Cruze and Florence La Badie, the eternal triangle of the old Thanhauser Co. . . . . Marguerite Fisher, J. Warren Kerigan and Jack Richardson of the American Co. . . . . “Our Mutual Girl” who popularized the products of the Mutual Film Corp. . . . . Irving Cummings in Comet Comedies . . . . John Bunny, Flora Finch and Lillian Walker of Vitagraph.

These stars shown brightly and then flickered out while most of the projectionists of the present day were still in their swaddling clothes cooing at their proud parents. Projection is the only profession in the world wherein a man can be an old timer at thirty.

NATURE OF LIGHT

(Continued From Page 15)

fringes. There are others visible with slits, circular apertures, discs, stripes, etc.

When white light is used the bands are colored due to the unequal bending of light of different wave lengths. The source of light must be small a slit or a spot, for diffraction fringes to be observable. If the source is too large we have fringes from each point of the source overlapping until indistinguishable.

The colored rings around the sun or moon when seen through a thin cloud are due to diffraction. We can sometimes see diffraction fringes through our eyelashes.

Scientists have one important application of diffraction. It has been found that strips of opaque and transparent material separate light into spectra. This effect was first secured by the use of wires so the apparatus was called a grating. Now the diffraction gratings used are ruled on glass or speculum metal and commonly have about 15,000 lines to the inch. The work of analysis of ultra violet and infra red spectra is carried on using gratings on metal in which the diffraction is secured by reflection.

(To Be Continued)
LOUDSPEAKER
FOR WESTERN PROJECTIONISTS
Sponsored by California Chapter No. 7, A. P. S.

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date of publication of the issue on which the change becomes effective.
BE SURE WE HAVE YOUR CORRECT ADDRESS.
Condenser System for Wide Film

by

EUGENE H. ROONEY

(Reprinted from Projection Engineering, this being in our opinion vital information to every projectionist.—EDITOR).

The recent success of wide film and its probable adoption by the motion picture industry now brings to light a most perplexing problem. Considering the new standards of screen size and the change in film aperture to 1:2, it is more difficult to obtain a brilliant and uniform screen illumination free from chromatic aberration and ghosts.

Until last year the condenser system available consisted of a pair of plano convex lenses of different diameters and focal lengths. The most light thereby obtained on the screen with the use of one of the best high intensity arc lamps amounted to about 5,500 lumens.

It is a known fact that a parallel beam of light overcomes distance more efficiently. This thought caused the use of parabolic condensers. Since the film window is rectangular, the projection of a round spot means a waste of light. A full spot covering all four corners of the rectangular window was finally developed by means of grinding a horizontal curve on one side of a condenser, thereby broadening the beam of light in one direction. Steps were also taken to increase the amount of light emanating from the arc, in other words, the collecting angle was enlarged.

After the above tests and extensive research work in conjunction with both foreign and domestic optical firms, the Fish-Schurman Corporation of New York finally presented a special condenser system for wide film projection. This system consists of:

- one 5½" diameter Grand Special A cylindrical, spherical, bi-convex
- one 6" diameter Grand Special B parabolic, convex-concave.

It is made of genuine optical glass and the amount of light is increased to about 10,000 lumens to 15,000 lumens compared with the 5,500 lumens for the old system.

Considering the extreme heat to which a condenser is subjected, it is essential that it be made of special heat-resisting glass like IGNAL, which defies the heat and represents the best type of genuine optical glass.

The arrangement of the S. O. G. Condenser System, as seen in the illustration, is carried through as follows: Grand Special A is placed with its cylindrical curve about 3½" from the arc, its two marked lines in a horizontal position. Grand Special B is placed with its concave side as close as possible to the spherical convex side of Grand Special A, without, however, touching it.

RITUAL EQUIPMENT BUILT

A problem to many chapters has been solved by Bro. C. D. Fink, 572 Burdick Drive, Pomona, Calif. He has built a handsome set of pedestals for use in initiation. They are of modernistic design and are well made in every respect. They would be a splendid addition to any chapter's equipment. Any chapter desiring these pedestals should communicate with Bro. Fink direct.

Thirty-five
Health Talks For Projectionists

Every line of endeavor that ultimately led to a profession had a humble beginning. This humble beginning might well be termed the nucleus of that profession. The progressive stages between these two extremes might well be termed its period of evolution. In all cell life the progress of evolution tends toward a higher plane. Similarly the projectionist is fitting himself for a place among the professional men of the world.

The transition is perhaps difficult and there is a constantly increasing demand on his mentality. This increased activity promotes growth of ability in that organ of the human anatomy called the brain.

In defining the brain we would say that it is a highly specialized differentiated nervous tissue, located in the cranial cavity, functioning in co-ordination and pre-sentation. In this same manner we may define the relationship of the projectionist’s position to the theatre with the one exception, the location. He, being confined to the projection room. It is in this room that the projectionist does his work in charge of extremely valuable equipment.

I propose to write for the western projectionists a series of articles in view of helping them to safeguard that most important piece of equipment, the “human machine” that inhabits the projection room. The most common diseases that projectionists are susceptible to can be traced directly to the closely confined quarters in which he is forced to work. Lack of exercise, tedious nerve strain, poor ventilation, irregular eating, improper rest are all contributing factors to the functional disorders peculiar to projectionists.

By having a general knowledge of the cause and prognosis of a functional disturbance one is better able to build up a suitable resistance against that particular disease.

It will be interesting to note in passing through this series of articles how similar the human body resembles the sound equipment with which the projectionist works. This equipment is gone over and kept in a state of health at all times, thereby assuring perfect results.

The human body should be given the same consideration, for after all the greatest asset one can possess is health, and then, too—the survival of the fittest may be applied—psychologically and physiologically.

Another article will appear in next month’s edition.
RED PENCILS
By Frank Erler, A. P. S.

A few years ago we called upon the Film Board of Trade to help us get rid of the “punch and scratch” artist and just about had this pest stamped out when sound pictures came in, so some one thought up the idea of the back patch, which was a great idea. Then the “punch and scratch” artist started in again to improve on the back patch, the little click was not enough—he had to have two of them. It does not matter to him if the clicks are already in the reel, he must have his own special color or patch, some covering two or three sprocket holes so they can see the patch and the jump as well. They put it right across the center of the frame. He never gives a thought that the thick patch will soon tear across the sprocket holes and bang goes a nice sound track. Some of us try to pray them off, but the artist cements them on too well.

Now we are getting some fancy ones such as the letter Z, keystones, etc.

Sound has also put another weapon in the artist’s hand. The opaque lacquer. They now get the reels with lacquer along the sprocket holes and covering a foot of sound track. I suppose when the sound stops it is time to start the motor. Then they dot out the faces of characters in action with lacquer.

The red grease pencil is the worst of all. At first it would seem to be O. K., but one will draw a line near the sprocket holes about eight inches or a foot long. The next will put in a few crosses. Then the good old dots will come along for about eight frames. With all that grease the reel will be rewound a few times and the back of the film will pick up some of the grease and with the heat on the film wound up tight it will smear the sound track and down goes the sound. This happens on film less than thirty days old, so it must get worse as the film gets a little older.

Now we all thought that the trouble would be over when the new Standard Release Print got into effect, but we find the artist is just as bad. In the past month all visual dots were O. K., but the red pencil is still used as well as the click patch and in one feature a pin scratch was used alongside the visual dots. In two instances the footage numbers were lacquered out in the leader. Presumably the cut-over was made too soon and they showed on the screen so they had to be painted out.

Now, with the new Standard Release Print, is the time to teach the artist that his art is not wanted in the projection room of boys who are to put over a smooth show. The film exchanges should be called upon again by a committee from each district and request them to check where the damage is done and see if it cannot be stopped.

SAN FRANCISCO CHAPTER 16
OFFICERS » » »

In our January issue an error occurred. The caption appearing over the list of officers of San Francisco chapter No. 16 read 17. This error was called to our attention too late to be rectified in the February issue. The officers for Chapter 16 for 1931 are as follows:

President—Frank L. Seavier.
Board of Governors—Harry C. Everett, vice president; Frank Costello, Paul O. Gaffney.
Treasurer—Walter G. Reinhardt.
Secretary—John Ford, Jr.
Sergeant-at-Arms—A. E. Murray.

Under the progressive guidance of Bro. Frank Seavier Chapter 16 has made steady advancement. More good work is expected during 1931.

Ashcraft: “You must separate the condensers by a millimeter.”
Vencill: “I tried to, but I couldn't find a millimeter to put between them.”

Thirty-seven
CHAPTER 17
CELEBRATES BIRTHDAY

Chapter No. 17, A. P. S., which is situated in Seattle, Wash., has just passed its first milestone. It is one year old and is very robust indeed for its age. It has grown from eleven charter members to a membership of thirty-three at its first anniversary. Information comes from Geo. J. Kalushe that several applicants are to be initiated in the near future. This will undoubtedly bring the total membership well into the forties. Seattle is to be congratulated upon its splendid progress.

“I hear your son’s at college.”
“Yep.”
“Pretty good, I guess; he’s taking three courses. I’ve just paid out ten dollars for Latin, ten dollars for Greek, and a hundred dollars for Scotch.”

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Los Angeles Theatre’s Remarkable Equipment

By E. W. ANDERSON, A. P. S.

The Los Angeles Theater opened its doors to the public on January 30th, 1931, forty months later than the opening of the Tower Theater, which was the initial permanent sound installation on the west coast.

Forty months ago the Tower Theater could boast of having the latest in projection room layout and equipment. Today every piece of projection equipment is obsolete, due to new developments in projector heads, bases, lamps and amplifying panels.

Today the Los Angeles Theater, a two million dollar investment, independently owned and operated by Mr. H. L. Gumbiner, the man who had the courage to introduce sound to the West, possesses unquestionably the most efficient projection equipment in the world. Where it will stand in the scale of efficiency forty months hence is hard to guess.

Three Super-Simplex projector heads mounted on Universal bases, in front of Ashcraft Super High Intensity lamps comprise the picture equipment. For lighting the stage from
the projection room, there is an Ashcraft High Intensity Flood, two Hall & Connolly high intensity spot lamps and a Brenkert F-7 Brenograph equipped with Ashcraft high intensity lamps.

In order that an uninterrupted supply of current may be had there is a Westinghouse 110 volt, 300 amp. generator driven by a 220-volt 3-phase motor with a throw over switch with service from two power houses. Direct current is also available from the power company thus giving three sources of D. C. power. House lighting is also protected by service from two plants.

All projection machines, spots, flood and Brenkert effect machine, are on double pole contactor switches of ample capacity. Shunt resistances are also on contactor switches equipped with time limit relays so that in case the projectionist neglects to kill the shunt resistance it will automatically cut out at a predetermined time. Projection machine motors and Weaver dousers, with which all machines are equipped, are also on contactor switches. Are and shunt buttons for each lamp are located not only in each of the six control stations, but are mounted at the base of the lamp house as well. A volt and ammeter for each lamp is mounted on the front wall by the lamp which it meters. There are six control stations, one beside each machine, with pilot lights covering every switch in the station. Each control station is also a fader station. Projector stations each have cue-meters.

The amplifying equipment for this theater cost about $50,000. Due to the size and nature of the installation it was a time and material contract. The amplifying panels consist of three 41, four 42 and four 43 panels. There are also four 200 A out-put panels, one volume indicator panel, an amplifier for the deaf sets, and a portable non-sync table.

There are twenty-two horns in the house. Six are screen horns, the remainder being distributed as follows:

One in each of the cry rooms, two at the entrance of the theater, one at the small screen in the lounge, four covering the auditorium for re-enforcement and announcement use, two at the marque, two in the foyer, one in the main lounge and one in the broadcast room.

Sound volume may be controlled from a station located at the rear of the auditorium or the rear of the first balcony. On premiere showings a projectionist is stationed at one of these faders in preference to projection room monitoring.

A small room adjacent to the projection room contains two motor generator sets with their filters which develop the D. C. for speaker fields, exciter lamps, and PEC amplifiers. One motor generator is 50 cycle, the other 60 cycle, each served by a different central station, thus insuring continuous service as they are on throw-over switches so that either or both may be used.

Located adjacent to the projection room is a sound observer station. A large port enables the projectionist to gauge the sound. This little room has its own monitor, is equipped with a three-position mixing panel and one master mixer, a patching panel into which comes sixteen microphone circuits any three of which may be used at one time. Besides the signaling system between the broadcast and this station there is a direct wire to KMTR broadcasting station. Broadcast may be picked up from the stage, foyer, street or from the theater’s own broadcast studio located adjacent to the intermediate lounge. Announcements over the P. A. system may be made from any one of these stations.

Any public address system panel may be transposed with a like sync system panel in case of trouble by means of its key, thus making the entire amplifying system proof against shut-downs.

The new Los Angeles Theater is the first theater in the world to be equipped with the new Westinghouse
remote lighting control in which reactance is used in place of resistance for dimming. This equipment, installed at a cost of about $30,000, covers both stage and auditorium. The house lighting control board is located in the projection room. It was originally intended that the pro-

Nine
jectionist should operate it, but juris-
diction was granted to the Stage
Hands Local, hence a remote control
station was placed on the stage and
stage hands now operate it, although
all presets must be made on the mas-
ter board located in the projection
room.

By the use of reactance in place of
resistance as a dimming medium it
is possibly to preset light intensities
and maintain a constant color tone
during the entire dimming operation.
In the resistance type of dimming
where it is necessary to dim one color
until the dimmer shaft interlocks
with that of another color, to be
dimmed, the color tone changes. With
the reactance type of dimming, re-
regardless of the volume of light at
which any color may be preset, the
dimming of all selected colors takes
place simultaneously and the color in
the theater remains the same
throughout the entire operation.

The reactance of the different cir-
cuits is controlled by the degree of
magnetic saturation of the core of
the reactance coil of each circuit. This
degree of saturation is controlled by
a potentiometer located on the master
board for each circuit. These pre-
set potentiometers receive potential
from a 48 volt D. C. generator and
each potentiometer may be set for
any desired intensity of light by mov-
ing its contact arm along the winding
obtaining full intensity at one end
and black out at the other, and any
intermediate value by a correspond-
ing setting of the potentiometer. The
contact arm is connected through the
scene selector (this is a five-position
board) to the grid of a control tube
(a UX 226) which in turn operates
on the grid-glow tube in the same cir-
cuit. The grid-glow tubes receive
their power from the 110-volt A. C.
lines and their rectified output is put
through the D. C. coil of the react-
ance dimmer.

This new system introduces the
vacuum tube into theater lighting
control and will be dealt with more
fully in this magazine next month.

The entire remote control for this
board is enclosed in a small panel on
the stage. The selection of presets,
speed of changes, black outs, etc., may
not only be operated by a variable
speed motor from this station, but
each color may be operated manually
as well. In this panel are five scene-
flasher buttons, by means of which
any one of the five presets may be
operated instantaneously. Blackout
of either house or stage is accom-
plished at the pressure of a button.
For ease of handling, low operating
cost, beautiful lighting effects, and
every point by which theater lighting
control may be judged, this equip-
ment is in a class by itself.

Adjoining the projection room is
the film room and motor generator
room containing the generator for
the arcs and the four smaller generat-
ors for the reactance dimmer equip-
ment. The film room contains two
steel cabinets for lenses and spare
parts, film storage cabinets, steel
work bench and ample space for car-
bon storage.

All rooms of the projection depart-
ment are supplied with washed air
from the Carrier System and rein-
forging this ventilation is a booster
fan to take care of the intake; a sep-
ate exhaust system for the rooms;
a separate exhaust system for the
lamp houses, and a blower system
piped to each machine for cooling
apertures, slides, colors, etc.

There is an outside door leading
to the fire escape and two windows in
the projection room.

An outstanding innovation in this
Theater Remarkable is a reproduc-
tion on a screen 33 inches by 44
inches, in the main lounge room of
the picture being shown in the audi-
torium. As this small screen has its
own horn, it is possible for those pa-
trons of the theater waiting in the
lounge to see and hear at this small
screen the same picture that is being
shown on the large screen in the main
auditorium. This optical develop-
ment was designed by Dr. Francis G.
Pease, a noted American physicist,

(Continued on Page 32)
Ground Noise Reduction
R. C. A. Photophone System

Ralph H. Townsend

Ever since Thomas Edison made his first sound recording on a piece of tinfoil, reproduced sounds have been what we might call "victims of circumstances." This is true not only of phonograph disc reproduction, but that from film as well. Always has the listener been compelled to hear reproduced sounds of speech and music accompanied by needle scratch or extraneous background noises of various sorts.

In phonography this ever present background noise was and still is a source of untoward disturbance and annoyance. It has been reduced somewhat by careful attention to the many processes involved in record production. For instance the wax on which the original recording is made has a homogeneity and uniformity undreamed of in the early days of the art. Electrolytic copper anodes, carefully prepared solutions and accurate timing and temperature control now produce from the master record a copper plating of almost microscopic smoothness. The plastic compounds from which commercial records are pressed have been improved and refined to a remarkable degree.

But in spite of all this we still have needle scratch or surface noise to contend with.

With the advent of electrical recording the useful frequency range was greatly expanded. Electrical reproduction was capable of taking off the record all that was on it including surface noise and then what did we do? We found by analysis and measurement that a great deal although not all of the disturbance from background noise lay in the frequency range above 5000 cycles. Electrical filters being easily constructed we then proceeded to cut off by means of a low pass filter everything above about 4500 cycles. The surface noise disappeared to a considerable degree but so did most of the higher frequencies we had worked so long and diligently to include in our recordings. However, the ground noise was reduced and that was what we set out to do hence the experiment was a success.

The use of film as a medium on which to record sounds involved all of the trouble heretofore encountered in disc recording and reproduction. As a matter of fact there is a striking similarity between the processes. Instead of granular wax we now have to contend with emulsion grain; instead of graphitizing, plating and pressing we have developing and printing; instead of a plastic shellac compound we have another piece of positive film stock as a final record; instead of defective phonograph needles which do not fit the grooves we have light slits which get out of focus.

You are no doubt all quite familiar with the reasons why ground noise interferes with reproduction and there is no necessity for a discussion of that particular point. If there were no ground noise or extraneous sound disturbances speech and music would be clearer—we will all admit that. The question is how can the ground noise be kept out or removed without interfering in any way with the wanted sounds or frequencies.

* Supervising Engineer, RCA Photophone West Coast Studios
Mr. C. R. Hanna of the Westinghouse Company and Mr. C. W. Hewlett of the General Electric Company in the early part of 1929 did considerable thinking and research on this problem and at that time devised ways and means of accomplishing such an end. So far as we know Hanna's method is the basis of all those used commercially today.

Before we go further suppose we consider for just a few moments what ground noise is. A general definition would probably run something like this: "Ground noise is all sound evident in reproduction which was not present in the original sounds." You have all sat in theatres and heard this type of disturbance, but probably few of you have taken the trouble to try and analyze this background noise. It has been analyzed, however, and found to consist of disturbances from many different sources.

For instance during a take on a stage or set it is almost a physical impossibility to have perfect quiet. There is always a certain amount of set noise due to movement on the part of the many people who are on the set at the time, the cracking of arc lamp housings or incandescent lamp housings, noise due to the cameras and their driving motors, to say nothing of a certain amount of noise which is caused by traffic outside the studio or extraneous disturbances in adjoining studios.

The next source of noise is located in the microphones and their associated amplifiers. No matter how carefully an amplifier is constructed we always find a certain amount of noise due to circuit conditions and tube characteristics.

If we add all of the components of noise mentioned above we find that up to the film we have a total noise level which may and often does assume considerable proportions. In some instances actual measurements indicate that this noise level is as high as 20 db. Since all of these disturbances are included in the signal fed to the recording mechanism, whether it be an Aeolight, light valve, or vibrator, all of them make their impression in the resulting sound track on the film. Every film on which recording is made has a certain definite resolving power, that is, the ability to respond evenly to exposure. The emulsion on film which is susceptible to the action of light and development is a very sensitive medium. For this reason it is very desirable that it be treated with respect.

It is not reasonable to suppose that we can subject a film to under exposure and over development or over exposure and under development and get uniformity throughout the resulting opaque portions. In other words, unless the exposure and development is carried out with precision there is great possibility that the resulting granular structure will be a source of disturbance later on.

During the developing, washing, and fixing of film there are plenty of opportunities, even in a well ordered laboratory, for the film to pick up small particles of dirt. By small I do not mean particles of a size visible to the naked eye. These particles may be, and usually are, microscopic in size. Their ability to produce noise, however, is still considerable.

The handling of film, that is, of negative film and also of the positive stock, during the printing operation, is another potential source of noise. The developing and drying of the positive print is still another source.

You may well ask at this point how can the disturbance, due to a recorded sound track combine with dirt and make more disturbance. If you will consider for a moment the manner in which a sound track on film is reproduced as sound the answer will be quite evident.

Most reproduction from film is accomplished by interposing the recorded film between a source of light and
a photoelectric cell. The intensity and amount of light may be considered as fixed, consequently any change in the opacity or width of the sound track as it passes through the light beam will cause a variation in the current through the photocell. The output of any given cell varies directly with the amount of light change and is independent of the rate of light change. This being true it makes no difference whatever to a photocell whether the light is cut off or varied by means of a sound track variation or by specks of dirt or foreign matter on the surface of the film.

You will be shown later what a variable area sound track looks like and will note, too, why we are not particularly interested in varying density. In normal variable area recording the sound track is always made up of equal portions of exposed and clear film.

Any dirt or foreign matter getting on the exposed or dark side of the track would have no effect whatever, but should it get on to the clear side its presence would be noticed as noise in the reproduction. The reason for this is evident. Dirt is opaque and the dark side of the track is nearly so, but dirt on the clear portion would cause a change in the amount of light falling on the photocell and produce noise.

At normal gain settings during reproduction, the ease with which wanted sounds can be heard depends on the ratio of the recorded sounds to the ground noise level. In other words if the modulation during recording was low, i. e.: of the order of say 10 to 15% and we accumulated a little noise from each of the sources mentioned a few minutes ago we would find it difficult to distinguish speech or music above the noise level.

The problem then was how to drop the level of ground noise to a point where it no longer interfered with recorded sounds. Hanna and Hewlett did it by making opaque all that portion of the track not actually occupied by modulation. An obvious and simple solution wasn't it?

Their method was simple and effective, too. They merely took a little of the output of the amplifier just before it was fed into the recording mechanism, amplified it, rectified it and used the resulting direct current to furnish what may be termed a secondary control over the vibrator.

What happens is this: The output from an audio frequency amplifier is in the form of alternating current. The wave shape may or may not be symmetrical, but in all cases the current values during any cycle start at zero, increase to a positive maximum, decrease through zero to a negative minimum and then increase again to zero. If these values be plotted and a straight line be drawn through the zero points, this line may be considered as a base line above and below which the current values rise and fall. In RCA Photophone recording this base line corresponds to the center line of our sound track when the vibrator is at rest in its normal position.

Since the vibrator is designed to change its position with respect to this base line under the application of current changes, its position at any instant is determined by the value of the current at that same instant. As the current rises to a positive maximum, the vibrator twists to an extreme position in one direction. As the current falls through zero and decreases to a negative minimum, so the vibrator twists back through normal to an extreme position in the opposite direction.

Suppose now that some direct current were introduced into this circuit. It would have the effect of shifting the base line about which the vibrations took place to a new position and we would have a new zero line. Current changes and vibrator deflection with respect to the base line would remain the same as before but neither
would be the same with respect to the new zero line.

It will be noted that the value of the d. c. from the rectifier placed across the output of the amplifier is at all times proportional to the strength of the a. c. signal so we here have an automatic and positive control over this d.c. component or "bias" if you will. In other words, it is necessary only to choose first the new base line for the vibrator setting and second the proper value of the d. c. to return the vibrator to its heretofore normal position in the center of the sound track. Both are easily obtained and once set the ensuing action is simple, positive and automatic.

Ground Noise Reduction
R. C. A. Photophone System

HUGH McDOWELL, JR.

During the filming of the RKO production, "Hit the Deck," in September, 1929, musical effects were desired that would produce extremes in volume beyond the range of the normal variable area recording system. At this time, Mr. Carl Dreher, Director of Sound at RKO Studios, mentioned to the writer a system of recording devised by Mr. C. R. Hanna, of the Research Laboratory of the Westinghouse Electric & Manufacturing Company, for the purpose of eliminating ground noise and consequently permitting greater volume spread. The writer was much impressed by the principle that Mr. Hanna had made use of, namely, eliminating the unused clear portion of the sound track in the variable area method of recording, and proposed further investigation. The objection was raised, however, that as this system displaced the position of the sound track at minimum modulation to the edge of the film, it was of doubtful utility in commercial projection machines, as any weave in the film in its travel might cause it to lose contact with the scanning beam during intervals of low modulation. The writer thereupon set about devising a system which would retain the advantages of Mr. Hanna's, but would keep the sound track at all times in the center of the seventy mils allotted to it on the film. The writer is also indebted to Mr. C. W. Hewlett, of the General Electric Company, for the use of a portion of his system which is similar to Mr. Hanna's.

Natural sound film recording must meet two essential requirements, namely, good quality of pickup, and range of sound from soft to loud with only a tolerable amount of noise. In standard methods of recording, the former is accomplished, while the latter is restricted to the limiting factor of ground noise caused by the unused clear portion of the emulsion on the film, admitting unnecessary light to the photoelectric cell of the reproducing equipment. As the light reaching the photocell is in effect the carrier of all current within the cell, it
is evident that unused clear portions of the film cause the cell to produce energy not required by the legitimate sound, thereby producing extraneous noise in the output. Noise is also produced by the transparent portion of the film not being totally clear, but containing dirt, scratches, etc., which disturb the carrier in such manner as to cause additional noise, in effect, reproducing the dirt, scratches, etc. It is obvious, therefore, that in the standard method of recording, sound volume reaching the film must at all times be adequate to overcome the ground noise factor, which remains constant. This requirement restricts the compass of electrically reproduced music and is an obstacle to natural and effective reproduction.

The remedy for this condition in variable area recording is found in eliminating the clear portion of the film, except at times when the modulation requires it. With this accomplished, it is possible to allow the modulation to fall to its natural minimum and rise to its natural maximum, for with the clear portion of the film eliminated, ground noise no longer remains a constant quantity, but changes in proportion to the degree of volume.

Roughly, in standard methods of recording, the volume range from minimum to maximum is approximately 20 db., while with the anti-ground noise methods of recording described herein, the volume range may be extended to approximately 35 db.

Electrical and Mechanical Design
The following description of the device illustrated in Fig. 1 does not take into account later simplifications in design.

Connected to the output of the recording amplifier is a two-stage amplifier of sufficient power to operate a rectifier tube following. The d. c. output from the rectifier is then passed on to a direct current amplifier which amplifies the d. c. impulses of the rectifier, increasing their amplitude to any desired point, by varying the input voltage on the two-stage amplifier. The d. c. impulses are then fed through one-half of a voice coil of an electro-dynamic shutter movement to a resistance and battery of low voltage which aids the flow of current from the plate circuit of the d. c. amplifier to ground. Across the aiding battery and ground is connected the remaining one-half of the voice coil which is excited by the aiding battery when the normal plate current is depressed, due to rectified modulation.

It is seen, therefore, that two voice coils in series in this manner are excited in such a way as to cause one coil to exert pressure, when excited, in one direction, while the other coil exerts an opposite pressure when excited in the other direction. This balanced circuit of voice coils in the magnetic field causes pressure to be exerted equally and oppositely in both directions, and in opposite phase. To these voice coils is directly attached a moving shutter actuated by the voice coils which is placed mechanically in the beam of light reflected by the vibrating element of the recording system. The shutter, therefore, moves in proportion to the amount of input to the two-stage amplifier, moving outward under pressure of the rectifier and voice coil to accommodate the peaks of the modulation on the film, and moving backward when the modulation decreases, also under pressure of the voice coil. It is obvious, then, that electromagnetic pressure is exerted in both directions in the functioning of the shutter.

The electromagnetic assembly is supported mechanically by a lathe carriage arrangement so that manual adjustments may be made to place the shutter in the proper position with respect to the light beam.

The vibration of the shutter is in exact accordance with the d. c. impulses of the rectifier, and, therefore, it admits light to the extent required by the peak modulation reaching the film at any given instant. When no
modulation occurs, the shutter is adjusted to admit to the film, light approximately five thousandths in width as against thirty-five thousandths width for the normal variable area recording system. It is seen by this that there remains about 10 per cent of the clear portion of the film that formerly existed. This factor in turn admits only about 10 per cent of the light formerly reaching the photoelectric cell in the projector, cutting down overall excitation of the photocell when no sound is in evidence, and consequently reducing extraneous disturbances in the cell.

The equipment used in recording during 1930 consisted of a two-stage amplifier-rectifier and direct current amplifier built in a steel box 18x18x8, internally divided, the partition separating the d. c. amplifier from the other units. The two-stage amplifier is operated from a small B-supply working from 50-cycle alternating current and supplying 250 volts to these stages. The direct current amplifier consisted of seven UX-250 tubes in parallel, fed by a 180-volt storage battery. A small meter control box containing two 0-to-500 milliammeters is used with a switch for breaking plate current and aiding battery current to the voice coils. Each voice has connected in series with it a milliammeter indicating the variations of current in each circuit. A variable resistance is also used in series with the battery to adjust its value so as to make the voice coils balance electrically, that is to say, when one is at maximum current the other is at zero, and vice-versa. These meters, therefore, represent the movement of the shutter.

Summary

Work on the system described was first started in November, 1929. Practical results were obtained in February, 1930, and the device put into production on Radio Pictures' "Dixiana," in March, 1930. "Dixiana" was released in August, 1930. After further development, the system was again used on Radio Pictures' production "Half Shot at Sunrise," released in September, 1930. Since this time, development has continued with the aim of simplifying and reducing the amount of apparatus necessary and to procure simpler adjustments in operation. The device will continue in use on forthcoming RKO productions.

Ground Noise Reduction
R. C. A. Photophone System
*L. E. CLARK

The recording edge in a variable area system is normally adjusted to the center of the track. If for any reason it becomes shifted, it can be returned to its correct position by either manual movement or by the application of a small direct current of the proper magnitude and direction to the vibrator strings.

In the Hanna device, the edge is set normally to a position close to one edge of the sound track and a device arranged so that direct current is passed through the galvanometer strings in such a direction as to force

Due to the many photographs embodied in Mr. L. E. Clark's paper a large section of it has been omitted. We believe, however, that the subject will be well understood from the accompanying articles.—EDITOR.

the edge toward the center of the track and in such amounts that the edge is back to its normal position when a 100 per cent modulated signal is applied to the system.

(Continued on Page 36)
San Francisco Chapter No. 16 Entertains Visitors

By FRANK W. COSTELLO, A. P. S.

Chapter No. 16 was pleasantly surprised to learn last Tuesday morning that Bros. Wallace G. Crowley and Harold E. Alford had arrived in town. Their unexpected arrival prevented us from planning a sumptuous form of entertainment befitting two industrious young fellows, but with the cooperation of our President, Frank Seavier, and Paul Gaffney, of the Board of Governors, the boys were introduced to some of the interesting sections of our city, including Chinatown and North Beach. Somewhere in their travels, they encountered Danny Knowlton, District Superintendent of E. R. P. I., and George Lancaster, Division Representative of the Advisory Council. From there on, Brother Seavier escorted the boys through some of the secluded haunts of San Francisco. They returned to headquarters in time to attend our regular Tuesday evening Chapter meeting, and might say here, that although the meeting was sort of impromptu and scented with mirth, it was one of the most important and interesting of the year. Brother Seavier was feeling twenty years younger that night and conducted the meeting more as a master of ceremonies would.

The first speaker on the program was Brother Lancaster, who explained in detail the standard release prints—their advantages, minor inaccuracies and the future possibilities. George likes to bring a little comedy into his talks, and he kept us entertained all through his speech. Danny Knowlton next gave us an interesting talk on the new E. R. P. I. screen. Quite a jump from an amplifier tube, but Danny can lecture on anything pertaining to a theatre. Brother McGown of A. P. S. No. 7, now with the Department of Electricity, outlined briefly to us the work he is engaged in at the present time, namely, equipping police automobiles with radio. Brothers Crowley and Alford then gave us a clear and concise explanation of the aims and policies of THE LOUDSPAKER, and the work they are doing towards bringing before our fellow projectionists, information of a technical and practical nature, which is in direct line with our work. Being located in the geographical center of the motion picture industry, surrounded by scores of technicians, laboratories, studios and research engineers, they are in a position to secure this information more readily than a staff of representatives in a far off city not in close proximity to the heart of the industry.

San Francisco Chapter No. 16 voted unanimously to subscribe to THE LOUDSPAKER, realizing that it is the true mouthpiece and representative of the Western Projectionists. Our Chapter feels highly honored by the visit of Brothers Wallace G. Crowley and Harold E. Alford, and we extend to them, and all members of No. 7, A. P. S., a cordial invitation to visit us whenever convenient.

San Francisco Chapter No. 16, American Projection Society, had the extreme pleasure last evening of meeting two well known celebrities—Dr. McKenzie and R. H. Hart, who gave us a very interesting, as well as instructive lecture. Dr. McKenzie is a pioneer in research work involving sound engineering. In 1914, he received his degree of Doctor of Phil-
Several months ago the projectionists at the Alcazar Theatre, Bell, Calif., Clyde McGinnis and Clyde Salyer, decided that the date strips attached to coming attraction trailers were an eyesore. To remedy this they made their own, copying the background title card after the Fox Movietone News blazing sun. Each title having an in and out fade and set over for sound on film. This not only matched the trailer to which it was attached, but prevented motorboating when the fader was accidentally left up a second too long by reason of the fact that the sound track was solid black.

The success of this system suggested a further step, that of dubbing sound on the house titles. They watched their chance and when a sound on film variable area subject came in they had just the right music to fit their titles. They rushed it to a laboratory and had it dubbed into their original negative. Prints made from this negative have fitting sound scores. This bit of cleverness on the part of these progressive projectionists have saved the Alcazar audiences from a bad dead spot in their show. This is a step in the right direction. It is hoped that many other projectionists will follow their lead.

osophy. In 1922, he accomplished creditable results in producing sound on film, and has continued from then on in scientific research work, and at the present time is consulting engineer for E. R. P. I.

Mr. R. H. Hart, Superintendent of Personnel for Western Division, has long recognized the valiant efforts of A. P. S. Chapters throughout the country, and particularly in the West, to improve their knowledge of sound recording and reproducing, and he has been instrumental in procuring for us lecturers well versed in sound and electrical engineering, who have imparted to us, first hand information that has been a great help, and which could not have been accessible from books or literature on the market at the present time.

When Mr. Hart took the platform and said: ‘Boys, it is indeed a pleasure for us to be with you,’ we could plainly see that he was sincere in his remarks and assured us that all available information and future data on subjects of vital interest, will be forthcoming to us. Dr. McKenzie elaborated extensively on modern methods of producing sound on film, and the characteristics of amplifiers in reproducing the finished product, and his explanation covered all details which were of great benefit to us. Dr. McKenzie and Mr. Hart mentioned also that inasmuch as Chapter No. 16 is aggressive and takes such a whole-hearted interest in all technical information and explanatory workings, coincidental with our profession, it will be a pleasure and a delight to furnish us with the necessary data and technical advisers, that we may receive first hand information on all new developments in our industry.

Chapter No. 16 wishes to extend to Dr. McKenzie and Mr. Hart our sincere thanks and appreciation for the services they have rendered us.

Editor’s Note: American Projection Society has received the recognition of the foremost engineers in sound recording and reproducing. To all those who do not belong to the A.P. S. and who are eligible to join—why not avail yourself of this opportunity to be a participant of information which is the aggregate accumulation of world renowned research engineers?
Three Position Screen Unit Developed by Weaver Bros.

The modern trend of motion picture presentation is to change the size of the screen to what has been named magnascope proportions. At other times the same screen is used for wide film or grandeur proportions. This is done by moving the top masking piece and the side masking pieces to allow a greater expanse of screen surface to be revealed. The actual moving of these masking pieces present a very complicated problem since it must be done quickly, silently and accurately. Realizing all of these facts, the Weaver Bros. Manufacturing Co. of Los Angeles conducted a series of experiments in view of building a motor driven apparatus which would fill all of these requirements and could be remotely controlled from the projection room or the stage switch board. The outcome of these experiments is the Weaver Bros. 3-Position Screen Unit, which is announced elsewhere in this issue. This unit is a marvel of accuracy. It can be set to stop the masks at any predetermined location. It is very easily operated by only four switches, one for each of the three sizes and one for stopping the apparatus in case an error is made in pressing the wrong switch.

Several unique features are incorporated in the apparatus. A pilot light is used for each position which indicates the position of the masks at all times. This reduces the possibility of error to a minimum. The entire apparatus is very compact and is housed in a metal box which can be mounted on the screen frame. The motors are suspended on material that will not transmit the vibrations of the motors to the frame of the screen. This is a big feature since it renders the unit practically silent in operation. In the event that the ropes become entangled and the motor stalled no harm is done because the designers have provided for this contingency in two ways. First, a heat relay is in the motor circuits which prevents damage to the motors. Second, the unit can be disengaged with a clutch mechanism which makes it possible to operate the masks manually.

One of the outstanding features of the unit is its flexibility. Regardless of the position it is in the projectionist can go directly to any other position by merely pressing the button for the next size desired.

Another very desirable feature is that there are absolutely no working parts in the open. This reduces fouling to a minimum.

Several installations have already been made and they have proven entirely satisfactory in every way. These units are a distinct advancement over the old types of mask controls. It is freely predicted by those who have had the pleasure of seeing this unit in operation that it will win instant endorsement wherever shown.

IT MUST BE TRUE » » »

Bro. John O'Connell, Secretary of the San Francisco Labor Council, tells about a man seen walking down the center of Market Street shouting, "No, No," repeatedly. An officer stopped him and asked what was the idea. The man paused long enough to say, "I'm a Hollywood yes-man on a vacation."
Celestial Control
By J.B.G.

The scene opens where our mortal scenes close: The Gate. A lone figure stands there. He is panting, perspiring freely and biting on something. That something is his tongue; for he is nervous as Saint Peter parts the emerald portiere and steps forward. To think that he, Brother William Rose, has really done so! To think that he would die to see the day when he would greet Saint Peter! It was unbelievable. It truly was!

But here he is; and here is Saint Peter. And between them nothing but the ether being pierced by their nervous appraisals of each other. For (you'll have to learn sooner or later, anyway) Saint Peter is also nervous. To think that he would hold the day when this projectionist mortal would come under his ken! It was unbelievable. It truly was!

"Just a minute," called Saint Peter, "I've a hunch from Notre Dame that you're in the wrong isle."

William paused, counted ten, and then decided to test the splice. "Nope!" he boomed, glaring defiantly at Saint Peter. "I'm in the right aisle and the right joint! The usherette with the lace cuffs and heavy mascara directed me here—and here I stay!"

"Well, Bill," stalled Saint Peter, (for he's a pretty good door-man), "You don't look so hot to me and I'm not at all sure you belong up here, but business is bad and I'll take a chance."

"Thanks," said Bill, showing his intense relief by kicking out a ten thousand dollar chunk of gold from the steps and heaving it at the platinum screen. "Who's the chief? Any smoking? Do the usherettes bring up the schedules?"

At these pertinent questions Saint Peter smiled broadly, spread his arms out and bent forward in a low bow. "There are no chiefs—no schedules; this is Heaven."

"W-what?" gasped Bill, as though finding the overtime on his check without an argument, "Run that slide again."

"This is Heaven," reiterated Saint Peter graciously. "Pick up your crescent wrench and screwdriver and find yourself a suitable palace. Be gone."

And so Bill, mightily grateful and this being in Heaven! How asinine, how incongruous, now, were the directions his mortal friends had given him in suggesting where he could go! He felt buoyant, youthful, imbued with the same inexhaustible vitality he had when sound first came in and when he carried the fader at point fifteen to assure the horns o' plenty. Nothing to worry about now. But was there? And then poor Bill began to worry.

Was this but a preview of his qualifications? Would he make some misstep or misframe only to find himself hurtling downward, downward, to shovel the proverbial coal instead of the proverbial snow? He recalled that initial scrutiny Saint Peter had scanned him with. And trembled. He had felt that before, on earth, when he entered a strange theatre to do re-
Projectionists,
Attention!

THE Standard Release Print which has come to play such an important part in our profession has been in operation for a sufficient length of time to allow all projectionists to become fully acquainted with its operation.

Its mechanical and theoretical practicability has been thoroughly tested in thousands of projection rooms throughout the country. Many ideas have been evolved by the projectionists that would be invaluable to the Academy of Motion Picture Arts and Sciences in their attempt to develop the standard into a perfect working system.

It has been decided therefore to distribute a questionnaire to projectionists throughout the country which will seek to determine the representative opinions of the men in the field concerning possible improvements for the standard.

The American Projection Society . . .

. . . has arraigned itself solidly behind this movement, realizing that by this method the Standard can be made into the ideal and will represent the best available technical information. This information can only come from you projectionists in the field.

On the reverse side of this insert is a questionnaire which should be filled out and returned to the Editor of The Loudspeaker at once. Address 1264 Welton Way, Inglewood, California.

Your suggestion may be the answer that will definitely solve this question of change-over cues in a manner suitable to all concerned.

Fill out the form on the next page and mail it in now.

Justify the confidence of the industry in the projectionists by responding TODAY.
SURVEY ON HOW TO IMPROVE THE
RELEASE PRINT STANDARD

This is a part of a national survey to get the constructive opinions of projectionists who have had experience with the Standard Release Print. It is sponsored by the Technical Bureau of the Academy of Motion Picture Arts and Sciences with the co-operation of the American Projection Society and the Projection Advisory Council.

The Standard will be enforced as it is or changed, depending on what theatre projectionists want.

Since the producing companies started to release reels with uniform leaders and cues, many letters of comment have been received. Most of these said the Standard was a big step forward. Many also offered suggestions for improvement. The questions raised by these suggestions have been analyzed and it has been decided to put them up to the projectionists of the country for an answer.

Every projectionist is urged to give his opinion and experience. This will guide the producers in making Standard prints so they will be best for threading and change-over in all types of houses. The improvement of the Standard and its maintenance by projectionists and exchanges will mean that no projectionist will have to work with a print that has been mutilated with punch holes, pencil marks, scratches, or unnecessary patches.

Name .................................................................................................................. Local No.
Theatre ................................................................................................................ City, State
Seating about. .............................................................................................. If circuit, what circuit
State run your theatre gets ........................................................................
Sound Equipment: ERPI .............. RCA .............. Other (name)
Theatre uses about .......... per cent sound-on-film; about .......... per cent sound-on-disc; about .......... per cent silent. Projectionists per shift

The cues in the Standard Release Print were intentionally made fairly large to start with. Now that projectionists have had experience with the Standard the cues can be made smaller, or their length or position can be changed if desirable. Or the cues can be done away with entirely if any better plan is offered that can be put into effective and economic operation in all the talking picture theatres throughout the country.

Are the cues about right now? .......... If not, suggest improvements in size, number of frames, position or any combination of these.
(Size) Is the present size right? Should the cues be larger? Should they be a third smaller? Half present size? Present size, but on fewer frames? (Number of Frames) Is four frames the best length? Should cues be only three frames? Only two? (Position) The cues are in the upper right hand corner now. Is this the best place? Should they be in the lower right hand corner instead? Do you have any other suggestions on cues?

While many pictures now being shown were cut and released before the Standard went into effect, the number of non-Standard prints will decrease. Once a picture has been released on Standard the responsibility for keeping it so is on the exchanges and the projectionists as outlined in the instruction booklet.

In general are the leaders and cues in good condition on the Standard prints you get? That is: The synchronizing leader? The start motor cue? The change-over cue? The final 8 frames after the change-over cue? Is any exchange sending you prints released on Standard, but which the exchange has not properly inspected and kept according to Standard specifications?

Western projectionists are here given the opportunity to express themselves on this important question through the medium of their publication. Each city wherein a chapter of the American Projection Society is located will have an appointed member of the Western Projectionists Co-ordination Committee that will function in conjunction with this canvass. Other cities will receive the same service by communicating direct with THE LOUDSPEAKER.

Regardless of your location, the size of your city, the class of your theatre or the type of service you use, your answer is important. Send it in NOW. Address:

1264 WELTON WAY, INGLEWOOD, CALIF.
Latest Academy Publication
“Recording Sound for Motion Pictures”
available to Projectionists . . .

While a few projectionists have opportunity to go through the Hollywood studios, the Western chapters have frequently had the advantages of speakers able to review the technical production end of pictures from first hand experience. The educational program of the Society has never been limited to just the equipment of the projection room because a good projectionist running a sound show comes in contact with the work of all the technical crafts all down the line back to the studio.

The new book, “Recording Sound for Motion Pictures,” which is being published by the Academy of Motion Picture Arts and Sciences, provides in complete form all of the information on the subject that a projectionist requires. While it has several good chapters on sound projection it was written by the leading sound engineers of the big studios as an extension of a school for studio employees that was conducted by the Academy.

It deals in a thorough way with such subjects as Practical Technic of Recording in the Studio and on Location; Booms, Blimps and Microphones; Different Systems the Studios Use—Vitaphone, RCA Photophone, Fox Movietone, Western Electric Light Valve; Acoustics of Sound Stage and Theatre; the Film Laboratories and Their Work; Assembling the Talking Picture and Technical Terms for the Motion Picture Technician. There are also chapters on sound reproduction by S. K. Wolf, John O. Aalberg, F. L. Hoppera and R. H. McCullough.

The book contains 400 pages with over 200 diagrams, charts and photographs of studio operations.

One of the provisions made by the Academy was that before the book should be available to other readers, first consideration should be given those within the industry.

Members of the American Projection Society

and other progressive projectionists can take advantage of a special pre-publication offer to get the book for a dollar less by ordering before May 1. The pre-publication offer is a price of $4. After the book is published on May 1 the retail price will be $5.

In order to take this opportunity, fill in the coupon herewith and send it with your check or currency for $4 to the EDITOR of THE LOUD-SPEAKER.
lie. He must pull himself together! He would be cautious. He would exercise every care to lose no loops. He would prove to the old gent that he appreciated his admittance here. He would. Yes, he would! And when our Bill said he would, he would!

Suddenly looming up before him was a girl, a delicately proportioned girl with wide, innocent eyes and luscious red lips which were parted and smiling. Bill missed a fader step, then took three to make up for lost time. But just as he reached the lass he recalled his resolution. Stopping with a jerk that would loosen any flywheel, he forced himself to answer the question:

"Can I afford to speak to this gorgeous mass of pink flesh and feathers? Will I, by so doing, arouse the disapproval of Saint Peter, who in recourse may send me back to Earth?"

And our Bill answered: "No. I cannot, will not, take the chance!"

And so deciding, he turned away from the lass, who indeed was now wondering what was the trouble with this egg, and retraced his steps to Saint Peter.

"Pete," said he, bringing his problem into focus at once, "There's a neat chunk of femininity over in yonder diamond field. What's the worst I can get if I speak to her—you know—knock myself down to her—that is—er—"

"My boy," replied Saint Peter beatifically, "Didn't I tell you this was Heaven? Make friends of whom you choose."

"You mean the sky's the limit?" gasped the incredulous Bill.

"There is no sky," smiled Saint Peter, very coyly for a man his age. "And Paramount-Publix, Fox-West Coast, or R. K. O. haven't even a toe-hold. This, you dumb-bell, is Heaven."

And so Bill ran back—fairly flew back—over the celestial road. And she was still there, this blonde lass of the delicate proportions and the luscious red lips which were parted and smiling. And the smiling lips, as Bill skidded to a halt, smiled even more—and their lusciousness seemed even more luscious!—and her blonde, silken hair, even more blond and silken!

"Hello, biggie boy," came tingling from her lips, as though surely a four-manual Wurlitzer nestled within her breast to lend the sweetness to her voice.

"Heb—heh—hello," stuttered Bill, standing there wavering, and panting, and sighing, and feeling for all the world as though he had run the news with the outside horns off, so glorious did she seem—this creature of creatures—this superlative dream of dreams. "I—I was wondering if maybe I could speak to you," he mumbled at last, his audio stages at low, low ebb.

And she smiled again, this girl, and made a deft, light movement as she jumped to feet which appeared like little mice, so small were they and so fast did they carry her to him.

And there this cute little trick stood, right in front of our Bill, her fragrance bewildering him, her nearness causing his strained heart to motorboat. She raised her soft arms, her dainty hands reaching for the lapels of his coat, her fingers fondling his A. P. S. button, then creeping upward to his manly, speciously-shaved chin.

"Merciful grid-leaks!" yelped Bill, "I can't stand this! I want to know your name. I—"

But the lass only snuggled closer as she asked: "Why do biggie boy want to know my name?"

"So's I can tell you mine," answered Bill, "... and then we can figure we've been introduced and—"

"And what?" was the lass's tinkling query.

"An—an—and then we can shake hands," finished our embarrassed Bill.

"Silly biggie boy," reproached the lass. "In Heaven we don't shake"

(Continued on Next Page)
Fixing of standards for release prints was the biggest problem solved in 1930 from the standpoint of projection, declared President Thad Barrows of the Projection Advisory Council at a luncheon last month at the Astor.

Mike Levee, executive manager of the Paramount West Coast studio, spoke on noiseless recording and other subjects. He pointed out that the new valve, which permits an increased range in recording range, allows the continual running of a picture at one fader level. This eliminates regulation on the part of operators in the booth who, owing to the various machine noises about them, are not in a position to effectively control the sound volume in the auditorium, he said.

William F. Canavan, president of the I.A.T.S.E. and M.P.M.O., asserted that much booth equipment is out of repair owing to depressed business conditions which caused exhibitors to postpone this cost. Few interruptions occur nowadays in the projection of sound film programs owing to the competency of operators, he said. He described current pictures as "fine."

Keeping reproducer equipment clean is the best preventative against breakdowns, said H. M. Wilcox of Erpi. He stated that the greatly reduced number of emergency calls to his company indicates that projectionists have become intimately familiar with equipment.

Lester B. Isaacs of Loew's said he failed to see any particular improvement in booth equipment but believed that the operators themselves have improved in their work.

Others who spoke briefly were: J. P. Lilley of Harrisburg, connected with the Department of Labor; P. A. McGuire, Harry Rubin, Sam Kaplan and N. D. Golden. Attendance at the luncheon represented various cities outside of the metropolitan area, and included a good-sized delegation from Boston.


Continued From Page 21)

hands. What on earth do you do that for? Up here we always kiss instead."

"Oh, yeah!" cried Bill, bending forward . . .

And at this second—of all seconds!—something big, and hard, and knuckled, struck Bill flush upon the jaw. He fell back, his head buzzing mightily, the projection room making a crazy arc about him, while a deep voice shouted:

'I don’t mind trying to untangle you from these condensors, but you’re not going to kiss me—even if you are taking 1150 volts!"

And you can believe it or not, but that’s that! FINIS
CELL VOLTAGE CONTROL FOR SOUND ON FILM APPARATUS

The G-M Laboratories, Inc., Grace and Ravenswood Avenue, Chicago, announce an accessory to the head amplifier of sound on film apparatus which permits economy of maintenance of photoelectric cells, and improved tone quality. This device consists of a 40,000 ohm wire sound cell voltage potentiometer, which supplies the means for properly adjusting the voltage on the photoelectric cell to obtain the proper cell output.

When used in conjunction with Visi-tron type "A" photoelectric cells, the following advantages result:
1. Maximum photoelectric cell life with the resulting economy in cell maintenance.
2. Improved tone quality and lower background noise.
3. Ability to absolutely match the output of the two projectors so that the fader may be set to the same point for each.
4. As the photoelectric cell slowly depreciates, compensation for this change may be made by slightly increasing the cell voltage. Thus, instead of high output when the cell is new, and gradually decreased volume as it grows old, absolutely uniform performance during the entire life of the cell may be obtained.

The cell voltage potentiometer can be obtained with shielded two conductor cable for installation in or near the head amplifier. A toggle switch is provided as a part of the potentiometer to prevent undue battery drain when the sound equipment is not in use. A cell coupling resistor adaptor can also be supplied which makes possible the wiring of the cell voltage potentiometer by removing the coupling resistor, and inserting the adaptor in the resistor mounting.

The price of the cell voltage potentiometer complete in metallic shield, with cut-off switch, two feet of shielded and cloth covered two conductor cable and adaptor, is $3.00 net.

SPASMS » » »

By J. B. G.

A news item in Inside Facts:
"S. F., Feb. 6.—A couple of tough guys, with projectionist aspirations, walked into the National Theatre Supply Store this week and took away two projection machines."

Just a pair of potential projectionists "breaking in"—

Or possibly they were a couple of squeeze-nickel circuit managers curious to set eyes on some new equipment.

* * *

And in the same issue of Inside Facts is a story concerning a projected nationwide circuit of dime theatres, which states in part:
"... Overhead will be practically nothing. There will be no staff apart from the manager and janitor."

Either their budget chief has slighted one little detail—or we're in for an awful shock!

* * *

It took place at the Fox-Oakland:
A remote-controlled screen mask for Magnascope was being installed with the consequent changing of lenses and masks. A future executive in the embryo form of a door-man, witnessing the tests, remarked:
"Great! That'll help the sound a lot!"

"In what way? How?" queried someone.

"Sap!" grunted the door man disdainfully, "Can't you see when they change lenses how much larger the sound track is?"

Twenty-three
JUST HOW CLEVER ARE YOU?
WHAT'S WRONG WITH THIS DIAGRAM?
Puzzle Circuit By R. E. Clark, A. P. S.

This is the fourth of a series of five puzzle diagrams that have created a wide-spread interest. Many answers have been received on the previous puzzles. Why not try your luck? See if you can correct this one. Send in your answer early.

STUDIO PROJECTION SITUATION DISCUSSED IN NEW YORK
C. C. Harden and H. A. Starke Attend Conference

In order to eradicate a rather complicated situation existing in the studio, President William F. Canavan of the I. A. T. S. E. and M. P. M. O., called a conference in New York. The object of the conference was to adjust the jurisdictions of the various local unions whose members are employed in the studios. The various unions affected were represented by the following officials: Local 150 Projectionists, President C. C. Harden and Business Manager H. A. Starke; Local 37 Studio Mechanics, Lew Blix; Local 695 Sound Technicians, Harold Smith; Local 659 Cameramen, Business Manager Howard Hurd.

No definite conclusions were arrived at during the conference. The many complicated phases coincident to reapportionment of jurisdictions prevented definite action until a thorough investigation had been made. President Canavan therefore appointed Brother Walter Croft of Kansas City, Mo., as his personal representative to visit the studios and make the necessary readjustments. Brother Croft proceeded at once to Los Angeles, where he has been very busy making a survey of the situation. It is expected that he will make his findings known in the near future.
TRANSFORMERS — TESTING

For some time past we have been discussing transformers. We have studied them from many angles and have learned something about most of the different types used in audio frequency amplifiers. This chapter will deal with the testing of the various types of transformers we have had under discussion.

Before going into the details of testing let us see what can happen to a transformer. The windings can become open-circuited; they can become grounded; they can become short-circuited, either the entire winding being shorted or just a few turns, or sometimes one or more complete layers of a winding becomes shorted. Where the transformer consists of more than one winding a short might occur between two or more of the windings.

There also are other forms of trouble that should be included. These are conditions that are external to the transformer. The transformer being O. K., but the trouble being in the connections, or a transformer of the wrong type is being used.

Getting down to business, let us look over the things we have to keep in mind when testing for open circuits. First, we need a source of voltage, so that a current can be sent through the winding to be tested. Then we need some sort of an indicator to show whether the current is flowing or not. A battery and a buzzer would seem to fill the above requirements, and if the transformer is one that supplies the filaments of the tubes in an amplifier the test can be made satisfactorily with them.

It won’t do just to connect the battery and the buzzer together and then connect two wires from them to the secondary of the transformer. The winding may be open and yet you may get a buzz. A glance at the diagram of the amplifier will show that the test circuit is not only across the tube filaments, and if the filaments happen to draw around one-half ampere or more the testing current flows through the filaments instead of through the winding, you get a buzz, but it does not show whether the test is through the transformer or through something else. By removing the tubes this path around the transformer is also removed, but in many amplifiers a resistance is hooked across the circuit, sometimes at the tubes, sometimes at the transformer, or it may be in some remote part of the amplifier and you may not be aware of its presence. The moral: Disconnect the winding you are testing. Even though no other apparatus is connected across the transformer after the tubes are removed, there may be a defect in the wiring, a short circuit, or a ground, that will again throw you off.

It is a good plan to try the test circuit occasionally. As you go along
making one test after another and get a buzz each time there is no sense in making a separate test to see if the battery and buzzer are working. The fact that you get a buzz through some circuit shows that the test set is O. K. The first time that you do not get a buzz try your tester by touching the two free ends together. This may seem useless, as the test set has been working all along, but things go wrong with testing outfits just as much as with other apparatus. Usually they go wrong more often, because they are usually made up of haywire stuff that happens to be handy.

In the case of a transformer used as the coupling medium between tubes the battery and buzzer will not work. The resistance of the windings in an audio transformer is so high that enough current cannot pass through them to operate the buzzer. A battery and a flashlight bulb is also of no use for the same reason, but we can use a battery and a meter, either a voltmeter or a milliammeter. The battery and the meter are hooked in series, the same way that the battery and the buzzer were connected, and they are used in the same manner. The difference being that the meters are so much more sensitive, they operate with a much smaller current.

When using a milliammeter it is best to use one having a fairly low reading, especially if the winding being tested is a secondary, as the resistance of an audio transformer secondary is extremely high, and if you use a 250-mil meter the deflection will be so small that it will be hard to see if there is any movement of the needle at all. For this kind of testing I personally use a 10 mil meter or a voltmeter. When using a meter that has a full reading of only 10 mils great care must be taken not to ruin the meter. If this meter is used to test the winding of the filament transformer we discussed before, then we have to protect it in some way, and this is done by connecting a fairly high resistance in series with the meter and the battery. A one thousand ohm resistance will do fine. The value is not critical, but it should be high enough so that the current will be kept below the highest reading on the meter. Using a 1000 ohm resistance and a flashlight battery of 4½ volts the highest current that can flow, which will be when the two test leads are touched together without any other apparatus in the circuit, will be 4½ mils. This is safe and yet it gives a large deflection of the needle that is easy to see.

This resistance can be left in series with the meter, even when testing high resistance windings, because then it is small in comparison with the resistance of the circuit under test and will hardly cut down the reading at all, besides protecting the meter. It is hardly necessary to mention that in checking a test set using such a meter as this, it must be done with the resistance in the circuit, both to protect the meter and because the resistance is part of the testing outfit, so it must also be checked.

A voltmeter is used in about the same way as the milliammeter is used, except that no resistance need be kept in the circuit, since the meter can be connected directly across the battery. That is one of the things it was intended for. The voltmeter has enough resistance internally to keep the flow of current low so that it will not be ruined. We can put voltmeters in two classifications, low resistance and high resistance. Either can be used for testing, but the readings will often be different. That has no bearing on the result of the test. On the low resistance winding of the filament transformer the readings will be alike on both types of meters, but the readings obtained when testing an audio transformer will differ a great deal. The high resistance meter will give a reading very close to the actual voltage of the battery, the low resistance meter will probably give a reading about 80% lower than the

Twenty-six
battery voltage. This makes no difference, as any indication on the meter shows that the circuit is complete.

When the above tests are made on transformers of the Clough type, that is, when the two test leads are applied to the plate terminal and the plus B terminal of the transformer, the primary is not being tested, but the coupling resistance is then being tested. This is O. K., as it is usually the resistance that gives trouble. While it is possible for the primary in this type of transformer to open up it is not very likely. If the test is being made on a transformer wired in this fashion, but having the resistance and the coupling condenser external, then, of course, the primary could be tested this way.

There is one other very convenient method of testing the continuity of transformer windings. That is by using a pair of headphones and a battery. The phones and the battery are connected together, then a wire from the battery and another from the phones are touched to the ends of the winding. A click should result if the circuit is continuous. It should click again when the circuit is broken. The loudness of the click depends on the resistance of the circuit and the voltage of the battery. Even an open transformer winding quite often gives a faint click when the test leads are applied to the terminals, but none when the circuit is opened. This click is due to the capacity of the turns of the wire. A few tests made on a good transformer secondary will soon give an idea as to how the click should sound. The difference between the click an open winding gives and the click produced by a good winding is very decided and cannot be mistaken. It is best to try it out on the secondary because it gives a weaker click than the primary does, the resistance of the wire is so much greater.

Carbon Saver Developed in San Francisco

A very unique idea in the way of carbon savers has been developed and put on the market by H. C. Everett and Frank L. Seavie of San Francisco, Calif. Brothers Everett and Seavier are Vice President and President respectively of the San Francisco Chapter No. 16, A. P. S. The carbon saver consists of a tube with an inside left hand thread to receive the pencilled end of the carbon butt. The tube feeds through the rollers of a high or low intensity lamp forcing the otherwise useless butt through to the arc in exactly the same way that a long carbon would be fed through.

One extra double reel can be run with absolute safety by using this device. The E. S. Carbon Saver (which is the name which has been given this device) has been built to sell at six dollars per pair. This price is very conservative considering the precision machinery and high grade material employed.

On recent trials this saver demonstrated its efficiency by saving approximately 15 per cent of the carbons used in the same period of burning time previously.

"Is there a projectionist with a soul so dead but that he'll admit:"
Having grabbed a hot carbon butt with his fingers?—
Having run the fader up on the wrong side?—
Having gone to the door to see who wished admittance when the knock came from the monitor?—
Having wished the immediate demise of the manager who excitedly intruded when there was trouble?—

Twentys-seven
THINGS IN GENERAL

By
THE EDITOR

The Western Chapters of the American Projection Society are rapidly recognizing the advantage of publishing their own craft magazine here in the West. Further participation is anticipated as fast as the remaining chapters become fully cognizant of the real policies of their publication.

Chapter No. 12 Endorsement

President Lloyd C. Litton of Oakland Chapter Number 12, proposed at their regular meeting on Monday evening, February 9, 1931, that the membership consider the proposition of a group subscription to The Loudspeaker, for the entire membership. One of the brothers immediately proposed a motion to instruct the secretary to arrange the details of this group subscription for the membership. The motion was seconded at once and was carried unanimously.

San Francisco Chapter 16

President Frank L. Seavier of San Francisco Chapter Number 16 advised us that his chapter, consisting of one hundred and fifteen projectionists, went on record as endorsing The Loudspeaker. At their meeting on February 24th, they voted unanimously to subscribe to and assist in every way possible The Loudspeaker.

San Bernardino Chapter No. 19

At a meeting in January The Loudspeaker was officially recognized as the publicity organ of that chapter. President H. E. Reynolds and Secretary J. O. Ellery, Jr., were very definite in their belief that their chapter should endorse the principles of the magazine and the service it is trying to render to the Western chapters.

Northern Chapters

It is expected that the friendly cooperation now existent between this publication and the A. P. S. Chapters in Portland, Seattle and Vancouver, will crystallize in the near future into a perfect working machine. A Western steam roller of progress within the craft.

New Projector Repair Service in Los Angeles

Los Angeles is to have a new and completely modern projection machine repair shop. The repair work will be done under the direct supervision of Bros. Louis Wutke and C. M. (Chuck) Fowler, who are very popular members of California Chapter No. 7, A. P. S. Bro. Wutke has been closely connected with the work of repairing all makes of equipment for many years. He recently resigned the position of shop superintendent for the Los Angeles branch of the National Theatre Supply Co. This position naturally gave him a wide experience in this field.

This new shop is located at 3608 Farris Drive, Culver City, and is fully equipped to supply emergency heads, supplies, etc., to theatres desiring rush service.

Bros. Fowler and Wutke are anxious to demonstrate their ability to turn out the type of work that will give complete satisfaction. It is expected that their many friends in the industry here will be delighted to learn their new enterprise.
Our union brothers, C. C. Harden and H. A. Starke, report that on their recent trip to New York they were very cordially received by everyone with whom they came in contact. While they made visits to the Long Island studio where they were entertained by Bro. Jack Winick. Many other interesting visits were made among which was a trip through the famous Roxy Theatre. They report that they were extended every courtesy and that the New York projectionists were extremely anxious to co-operate with them in every way.

San Francisco Lodge No. 21, Theatrical Mutual Association, held its annual Theatre Benefit Tuesday, March 10th, at the Capitol Theatre. Acts were furnished from all the leading theatres in San Francisco, who donated their services to this worthy cause. The attendance was remarkable considering the inclemency of the weather. As many of our A. P. S. members belong to Lodge No. 21, T. M. A.—in fact, several of our members are past presidents, we changed our A. P. S. meeting to Monday in order that we could lend our support to this wonderful order, which is founded on the order of Charity, Benevolence and Fidelity.

President Frank L. Seavier of San Francisco Chapter No. 16, has gone to the hospital to undergo an operation which we all hope will benefit him and that he will be back in our midst very soon.

**IDIOSYNCRASIES from San Francisco**

Brother Ryan, after playing off the third tee at Ingleside golf links last week, miscalculated the distance and never found his way back to the fairway.

* * *

Otto Roush is wearing wide angle glasses so that he can see both ends of the magna screen.

* * *

Brother Knoblock remarked that "Peculiar things come out of the Spot Light" when he is on shift.

* * *

"Deacon" Jones can warble "Sweet Adeline" much better since he had his tonsils removed.

* * *

Dan Potter relies wholly and solely on coal oil to make the hair come out.

Mr. Watson Jones of the R. C. A. engineering staff gave the first of a series of lectures on R. C. A. recording and reproducing apparatus at the regular meeting of Chapter No. 7, March 3rd. Mr. Jones had ample equipment on hand for illustration and he succeeded in bringing out many extremely interesting points concerning the maintenance and operation of R. C. A. equipment.

Bro. R. H. McCullough added another theatre to his large family last month by opening the Stadium, a nifty neighborhood house on West Pico St. Bro. McCullough is supervisor for Fox West Coast Theatres.
NEW LOCATION FOR MEETINGS

The first meeting for April, taking place Tuesday, the seventh, will be held at Dinah's Shack, located at the intersection of Washington Boulevard and West Adams Street. This will inaugurate this establishment as the regular meeting place of Chapter Seven. A full course chicken dinner will precede each meeting.

The lecture course on R. C. A. Photophone equipment by Mr. Watson Jones will be continued through the courtesy of the R. C. A. Photophone Corporation.

The second meeting will be at the same place Tuesday midnight, April 21.

Both of these meetings are open to Members of Local No. 150 and any visiting A. P. S. Members.

San Bernardino Chapter Number Nineteen

San Bernardino Chapter Number 19 meets at the American Legion Club House, 113 West E Street, Ontario, Calif., on the second Tuesday of each month at 12:00 midnight. Dinner is served after which a short business session and educational lecture are provided. A real worthwhile evening is always provided for our members.

Visitors from other Chapters are cordially invited to break bread with us and enjoy our meetings.
Hear ye, hear ye, hear ye! The regular meeting of Chapter No. 7, A. P. S., scheduled for April 7th will inaugurate something entirely unique in the way of society gatherings. Through the efforts of Brother Floyd E. Baume negotiations have been completed with the management of Dinah's Shack, located at the intersection of Washington Boulevard and West Adams Street, for the holding of the semi-monthly meetings at this establishment, widely known for its excellent food. A full course chicken dinner will precede each meeting. There is ample space for initiations and the showing of educational film, parking space galore and the full assurance of the management that all within its power will be done to make everyone feel at home, and enjoy "a real evening."

The lecture series offered through the courtesy of the photophone corporation and conducted by Mr. Watson Jones, who, to say the least, certainly knows the "fine points" of holding his audience, is fast gaining in popularity and strength.

The regular meeting of the Society of March 17th was opened to all members of Local No. 150, I. A. T. S. E., and certainly brought gratifying results. By the large attendance at this meeting we feel assured that this course is a welcome one, and that the Society is greatly indebted to those making it possible.

Efforts are being made to obtain the services of Dr. Knudsen of the University of California for a series of talks on acoustics. Dr. Knudsen is identified as one of the foremost authorities on this subject, and the privilege of hearing him is one to be long remembered. Further details will be announced at a later date.

Remember the meeting of April 7th at Dinah's Shack, Washington Boulevard and West Adams Street.
Prof. Lester F. Reukema to Deliver Lectures to Chapters 12 and 16

President Loyd C. Litton of Oakland Chapter, and President Frank L. Seavier of San Francisco Chapter 16, have succeeded in securing the consent of Prof. Lester E. Reukema to deliver a series of lectures before their chapters. Dr. Reukema is connected with the Electrical Engineering Department of the University of California at Berkeley, and is famous all over the world for his marvelous achievements in electrical experimenting and development. Dr. Reukema has written the lectures especially to fit the needs of the projectionists. They embody the elements of electricity from the simplest rudiments clear through to the most complicated phases employed in sound systems. The membership of both chapters are very much enthused about the course and it is freely predicted that great benefit will result from these lectures.

LOS ANGELES THEATRE
Continued from Page 10

who is at present engaged with Dr. Albert A. Michelson of Pasadena in much publicized experiments to check the speed of light.

The light for this small screen is picked up by a prism ¾ inches by ¾ inches located three inches in front of the projection machine objective lens. This light is projected through a tube making nine 90-degree turns before reaching the screen located in the main lounge room 130 feet below. This prism although taking 15 per cent of the light coming from the projector, does not divert enough to be noticeable on the big screen. The brightness of the small screen is more than equal to that of the main picture screen. This innovation is a source of constant wonder and delight to those viewing it in the lounge and does not seem to detract in the least from their interest or desire to see the same thing repeated on the big screen in the auditorium.

Much credit is due Mr. H. R. Perriseau, who drew the specifications for the projection room; to Mr. De Palma, the electrical research engineer, who supervised the sound installation, and to Dr. Pease for his wonderful optical system that made the lounge room picture possible.

The projection staff consists of Chief Projectionist H. R. Perriseau, C. M. Fowler, E. W. Anderson, W. E. De Lay and Arch Negely. All are members of California Chapter No. 7, A. P. S.

"Why do you term your wife an angel?"

"Because she’s always ready to fly, she’s continually harping, and she hasn’t an earthly thing to wear."

OF COURSE
LITEKRAFT
Theatre and Stage Lighting Equipment was specified—and used—throughout the magnificent NEW
LOS ANGELES THEATRE
but the crowning achievement was the installation in their marvelous projection room of our new type
OVERSIZE
PORT SHUTTERS
(Pneumatically Controlled)
which have been approved by ALL Inspection Departments having jurisdiction.

Theatre Equipment Division
C. W. COLE & CO.
LOS ANGELES
320 East 12th St. WEstmore 2259
Thoughts While Stalling

Putting fuses in upside down with Geo. J. Lancaster......One of my greatest thrills came when the air ferry took off from the water on the Frisco side.......While we're speaking of Frisco, let's mention the spots, not the kind that float in front of your eyes but the kind you like to be on or in........Seavier and Litton should do a vaudeville skit and call it the "Perfect Hosts." They qualify, and how!.......Those sea gulls who decorate you, but not for bravery........The seemingly inexhaustible humor of J. B. G..........his reference to the Mexican army titles—he's a regular guy who pens real gems of rhetoric with no apparent effort........his flowing ease has always been a source of wonder to me........darn glad he's getting on the staff.......That fresh air in Frisco was great but where was the famous fog?.......Two of the most beautiful sunshiny days imaginable just past........W. G. Reinhardt, who officiates at the Golden Gate Theatre, has perfected an amazing array of innovations to lighten his burdens and render errors next to impossible........People seem to move faster in the Bay District than they do in the south, everything seems peppier than it does in the south; examples are the meetings of Chapters 12 and 16—fast moving action.......If projectionists became proportionately livelier as you travel north, the boys in Chapter 11 must have hot puppies from galloping around so fast.......How much traveling does a guy have to do before he can drop off to sleep instantly in a Pullman berth?.......How many of the fellows are working out the puzzle diagrams that are carefully tangled up for them by Bro. R. E. Clark?...........As near as I can figure out I'm the only projectionist in Los Angeles who is not all set for the chief position with the new Hughes Franklin Circuit.......but I'm expecting the 'phone to ring any minute.

Loudspeaker

Have you wondered what all the fellows are talking about? A $1.50 will solve the mystery for you. They are all reading the LOUDSPEAKER. If you haven't sent in your subscription, do so at once, because you are missing something that is vital to every projectionist.

The LOUDSPEAKER is published by projectionists, for projectionists all over the world. Keep in touch with all the newest and latest in the projection craft by subscribing for the LOUDSPEAKER.

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Explains in detail the construction, operation and care of sound recording and reproducing equipment.

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CAMERON PUBLISHING COMPANY, INC. Manhattan Beach, New York

Thirty-four
Oakland Chapter 12
Meeting Full of Action

Honored by the presence of Brothers Wallace G. Crowley and H. E. Alford, Editor-in-chief and Business Manager, respectively, of The Loudspeaker, Chapter 12 enjoyed one of the liveliest and most beneficial meetings of its existence February 23rd.

Although a holiday, the membership turned out in large numbers to pay respects to the high-ranking officers of the craft magazine. Nor was it a futile gesture; for the personal contact with these zealous workers, their expressed aims and ideals, found Chapter Twelve in positive, co-operative accord.

Working the tough opening spot on the bill, Bro. Crowley tendered the show a brilliant start in discussing the two phases that assure the longevity of our craft; the economic and the academic. He forcefully reiterated the fact that one could not exist without the other, but that although converging in the final analysis, they were macadamized differently for the travel.

Brother H. E. Alford fitted nicely into the deuce spot with a few well chosen and well accepted remarks concerning the problems of The Loudspeaker, although the impression was somewhat prevalent that his mind was also grappling with the problems of an upper berth.

Associate Brother Dan O’Brien—the young old reliable—filled the third spot in his inimitable way with a practical, common-sense appeal for cleanliness in the projection room. Dan possibly feels that he is being overworked by President Litton, inasmuch as he is being called upon at nearly every meeting, but when an act “clicks” as Dan does, what recourse has a president?

Chas. Herbst, Jr., Superintendent of Service of the Northern Branch of the R. C. A., and well remembered for his two recent discourses on R. C. A., accepted the fourth spot on the bill and in conjunction with Mr. Watson Jones, of Hollywood, provided the educational “meat” of the evening. Sparing neither trouble nor expense, Mr. Herbst and Mr. Jones displayed a complete theatre model installation of the latest all A. C., new impedance type head, R. C. A. apparatus.

Mr. Jones attacked his task of explaining the virtues of the improved model with an avidity born of experience. The assemblage grouped around the apparatus with interest while he went into unexpurgated explanation concerning the various units, pausing frequently to answer questions and to allow the brothers to handle the display. It was the most elaborate educational feature yet served Chapter Twelve. Mr. Herbst, Mr. Jones, and R. C. A. have the gratitude of the entire membership.

Brother Miles, exercising his chef proclivity, directed the nourishment finale in the banquet room. There was no music, for soup was not served, but the lines and entire company performed with the gulping exuberance of troupers climaxing a performance long to be remembered.

* * *

CONGRATULATIONS » » »

Professor L. E. Reukema, who gives a lecture to Chapter Twelve men every Friday and who fathered the long-to-be-remembered “HOW TO STUDY” article in February’s Loudspeaker,, is receiving the congratulations of his many friends upon the arrival of a baby boy, February 9th. The Loudspeaker joins in the clamor!

Thirty-five
GROUND NOISE REDUCTION
(Continued From Page 16)

The method used to produce this direct current in amounts which are proportional to the alternating-current input to the vibrator, consists merely in amplifying a small portion of the incoming signal to a point where sufficient power is available, rectifying the output of this amplifier, and after filtering, applying this direct current to the recording galvanometer along with the original incoming signal. The schematic drawing Fig. 2, shows this. The equipment within the dotted rectangle is the elimination equipment.

All of this apparatus is standard, involving no new principles. The amplifier is simply a bridging amplifier with an input impedance high with respect to the circuit from which it is fed, and with an output of from 3 to 5 watts. The output is a low impedance to match the circuit into which it feeds. The rectifier is of the cuprous oxide type, full wave, and has a very low internal resistance. The filter is a simple low-pass filter designed to fit the impedance between which it is intended to work. The circuit diagram, Fig. 2, shows these values.

The calibration of this amplifier is equally simple. The recording edge of light is normally set to its position at one edge of the track and a 1,000-cycle note is impressed on the system in sufficient quantity to produce 100 per cent modulation. This will naturally cause the vibrator to deflect to about half track in one direction, while the reverse half of the wave lies an equal distance off the track. The gain on the bias amplifier is then turned up until the signal lies symmetrically in the center of the track, filling it in both directions. This amount of bias, balanced for a 100 per cent signal, will automatically be the correct amount to control any modulation up to full track, and the equipment is now ready for use.

Papers by Ralph H. Townsend, Hugh McDowell, Jr., and L. E. Clark, at a meeting of the Technicians Branch of the Academy of Motion Picture Arts and Sciences. Published by the Academy, Hollywood, February, 1931.
HEALTH TALKS
for Projectionists

The entire body is a chemical structure, containing all the primary elements of both the organic and inorganic matter. In every cell of the body, chemical actions are constantly going on.

Metabolism is the name given to the building up and breaking process; added also, is the eliminating of waste materials. This process results in energy, and is so important that life is dependent on this constant series of chemical reactions. Its equilibrium governs the individual’s state of health.

Some glands manufacture and secrete a fluid that is alkaline in reaction. The body using it as a medium in controlling the equilibrium, or balance between the acids arising during Metabolism. Nature attempts to more or less maintain this alkali base. If an acid condition continues in excess, it would show that there is a deficiency of a substance controlling the production of alkali. And there would be then established one of the forms of Acidosis, characterized by a retention and accumulation of carbonic acid (H2CO3) in the tissues, which is frequently followed by coma, and sometimes death. An Acidosis may also arise from the retention of a fixed acid in the blood by reason of a defective elimination.

Only recently through much research and study, has there come to be a full understanding of what is known as the Deficiency Diseases, resulting from a perversion of Metabolism. For in the absence of certain chemical substances, the disease may be prevented, unless the changes have become too great and the tissue cells deteriorated.

For while the body builds its own chemicals, some of which are found in everyday commercial use, it is quite sensitive to chemicity that gain entrance through improper channels, and in such a state that the body is unable to assimilate, or render harmless. This, then, if allowed to remain in the body, constitutes a poison. It may be in the form of an Acid or a Gas. Some foods being the usual cause. However, should a deficiency be suspected, it is deemed advisable to consult a physician for a correction of the disturbance, before it can become chronic and develop into a more serious complication.

Though fortunately the body is endowed with regulating properties, and if properly assisted with sunshine, rest, and pure air, will continue its physiologic function normally.

“I am convinced that people of certain temperament should be discouraged from going anywhere near a theatre,” says a magistrate. We’ve heard that type of actress, too.

Thirty-seven
EDDIE HARRIS

Asks—
“Are YOU Interested In A
WELDED Film Splice — or — Does JUST A PATCH
Satisfy You?”

Our Slogan: “The Splice is Stronger Than the Film Itself,”
is not merely a “catch-word”—It means that the break in the
film is ACTUALLY welded as steel is welded—
FOR PERMANENCY!

We feel, at this time, that an analysis of the working of
ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT and the
ordinary QUICK DRYING cements on the market, will clear up
a mis-understanding as to the value of a quick drying cement and
one of less volatility.

To WELD a break you must FUSE and MELT the broken pieces
into each other to become ONE. To PATCH a break you just
use an adhesive to make TWO SURFACES stick to each other
FOR THE TIME BEING—They will come apart—in the case of
film, ether will do that.

Ether being highly volatile, dries quick, hence can only get a
surface grip on the film and soon opens!

ODORLESS—FLAMEPROOF—2 in 1 FILM CEMENT having
low volatility evaporates slower BUT melts and fuses the broken
film into a WHOLE.

A Film Splice made with 2 in 1 will STICK IMMEDIATELY
but WILL NOT stand an immediate PULLING TEST.

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Society of Motion Picture Engineers

AIMS AND PURPOSES

By EMERY HUSE

The Society of Motion Picture Engineers was founded in 1916 by a group of technical men in the motion picture and allied fields. Its purpose is best expressed in its constitution by the following statement: "Advancement in the theory and practice of motion picture engineering and the allied arts and sciences, the standardization of the mechanisms and practices employed therein, and the maintenance of a high professional standard among its members."

The Society is composed of the best technical experts in the various research laboratories and engineering branches of the industry in the country, as well as executives, technicians, cameramen and projectionists in the manufacturing and producing ends of the business.

The Society has within its organization many committees whose duty it is to collect and present to the Society at the conventions and in its journal the latest data along the lines of their various endeavors. They offer to the members of the Society an authoritative source of research and a solution for many problems. The motion picture industry benefits from these various endeavors of the Society from the standpoint of better equipment with which to work, standardized methods of procedure and technique resulting in a savings with the ultimate aim to aid in the production of better pictures and improved theatre conditions.

The Society holds two conventions a year in various cities. It is extremely pertinent to state at this time that the Spring Convention of 1931 will be held in Hollywood, California, during the week of May 25th. At these meetings papers are presented and discussed on various phases of the industry, theoretical, technical and practical. Demonstrations of new equipment are also often given. In all, a wide range of subjects is offered and in many instances the authors are the highest authorities in their distinctive lines.

In 1930 the Society discontinued the publication of its Transactions, which appeared only following each semi-annual convention. In its stead was substituted the monthly Journal of the Society.

At the Spring Convention of 1928 in Hollywood the Pacific Coast Section came into being. At that time
EXCHANGE CO-OPERATION

It is not the intention of this society to show any partiality among film exchanges, nor to give preference to any one particular apparatus, but when it comes to our attention that unusual efforts are being made to eliminate some of the annoyances of which the projectionist has to contend with, we feel that the sponsors of these acts should be commended for the whole-hearted co-operation they have shown us.

The Paramount Film Exchange in San Francisco has installed four splicing machines in their inspection room, which cuts, scrapes and patches film in five seconds—insuring a splice that will withstand excessive strain and so give us more confidence in the first presentation of a new show. Bro. Fred Sundquist of Chapter No. 16 has charge of the pre-view room at the exchange and is rendering valuable assistance to the projectionists as well as to the exchange. Films are being renovated periodically and standard releases are kept in conformity with specifications.

SAN FRANCISCO LECTURE SERIES

Prof. Lester E. Reukema has to date delivered thirty-three lectures to Chapter No. 16 and each one has brought enlightenment in some form or other to all of us. Copies of these lectures are distributed to all the members and are kept on file as a reference book. The professor is very thorough in his talks and when we consider that in the early days of sound pictures when we were not altogether familiar with sound apparatus, his lectures seemed a little incomprehensible to us, but now, in glancing back over what we have already been through they throw a better light on the subject and the boys today are following the articles more closely. Not only that which is already established, but new developments in the sound industry are holding the attention of every one. Professor Reukema is following new additional improvements in the craft and delivering up-to-date lectures to us weekly. We hope to have an unusually large attendance from now on and occasionally a luncheon will be served prior to the opening of the meeting.

there were approximately forty members enrolled, including men serving in various capacities in the motion picture field. At the present time there are approximately one hundred active and associate members. Since that time the Section has endeavored to hold periodic meetings presenting to the local members papers and discussions on pertinent topics. The Section really functions as an open forum—and usually a general invitation is extended to the industry to attend and join in the discussions. To various projectionists for whom this resume of the Society's activities is written this general invitation is likewise extended.

The affairs of the Pacific Coast Section are conducted by its officers, who include the chairman, secretary, treasurer, and a board of managers composed of two members of the society. There are also several committees operating in close harmony with the officers. Meetings are held monthly and notices of such meetings are sent to each member.

In closing, the society would like to extend to the readers of "LOUD-SPEAKER" a cordial invitation to take part in the meetings and discussions of the Pacific Coast Section of the S. M. P. E.
The Ortho-Krome Screen

By T. L. DOWEY
Electrical Research Products Inc.

The screen is an important factor in controlling the results obtained with talking pictures, and Electrical Research Products, Inc., has naturally given careful study to the characteristics of different types.

While this investigation resulted in several commercial types being rated as acceptable, the form of screen now known as ortho-krome was found to have certain outstanding merits which make it unique. It is the invention of Mr. A. B. Hurley, a New York physicist and authority on physiological optics. It is of interest to note that in addition to possessing satisfactory acoustic qualities for sound picture use, it is light in weight, flameproof and permits a saving of projection lamp current. However, its distinctive feature is the manner in which it eliminates eye-strain by the application of certain principles of physiological optics. In addition there is a decided improvement in the appearance and definition of the picture, especially when colored.

It is well known that the component colors occur in different proportions in light coming from sources of different nature, such as the sun or the various kinds of artificial lights. Although two sources may both be radiating the same total quantity of light. The quality of the light is, therefore, not necessarily identical. For example, taking sunlight as standard, a high intensity arc lamp produces blue and violet light in relatively large amounts, while red and yellow are prominent in the light from an ordinary incandescent lamp.

The eye functions best and is least subject to strain when exposed to daylight or to illumination having a spectrum resembling daylight. Under high intensities the pupil of the eye involuntarily contracts, to protect the eye against damage, while under low intensities it enlarges so that the retina will receive enough light to permit distinct vision. The reason why daylight or similar illumination does not cause eye strain within the ordinary range of intensities is because at each intensity the opening to which the pupil adjusts itself for protective purposes, is also enough to admit sufficient light for distinct vision. However, under illumination having a spectrum markedly different from that of daylight, this natural balance is upset, and when the pupil is opened sufficiently to admit the total amount of light necessary for distinct vision, too much light energy of the frequencies which are unduly prominent in the artificial source will be admitted to the eye. On the other hand, if the pupil is closed sufficiently to protect the eye against these excessive intensities, distinct vision will be interfered with. In this way artificial lights tend to produce conditions to which the eye can not fully accommodate itself and eye strain necessarily results.

The undesirable condition just described had never been taken into consideration in the manufacture of motion picture screens until Mr. Hurley initiated the experiments which led to the development of the Ortho-Krome screen. The reflecting surface of this screen is treated with pigments in a carefully predetermined manner, so as to compensate for the type of light with which the screen is to be used. The result is that the reflected light does not unduly tax the adjusting powers of the eye so that eye strain is eliminated and at the same time the apparent brightness and definition of the picture are increased. The projection lamp current can con-Continued on Page 20

Nine
Visual Education In San Francisco

By FRANK W. COSTELLO

With the introduction of sound in motion pictures three years ago the status of the projectionist has been somewhat changed, but it has been proven that the projectionists were ready for the emergency which confronted them and met the situation well qualified to undertake the additional responsibilities placed upon them. As far back as twenty-five years ago, synchronized sound with motion pictures were placed before us, and although the results were not gratifying, the optimists did not lose faith and in 1913 came forth with what they considered a great improvement in synchronized apparatus, only to find that the audibility of this new device (invented by Edison) did not respond favorably to a critical audience and so the reality of sound pictures faded from our minds—at least temporarily.

From the time that motion pictures were first placed on a commercial basis the realization that projectionists (or operators, as they were then called) would play more important roles in the future, were apparent in the minds of some of our leaders, and although most of us working at the craft today may recall to mind many who have worked diligently for the welfare of the projectionist. A. P. S. Chapter No. 16 wishes at this time to mention Bro. W. Q. ("Pop") Woods, who, from the inception of motion pictures, has taken an active part in promoting the interests of men confined in the small enclosure, who had the major responsibilities and received the least recognition until recent years. Bro. Woods predicted years ago that the projectionists would be in the future called upon to perform duties that were inconceivable at that time. The plans he proposed and made effective included the adoption of an educational program whereby the men were not only kept abreast of the times, but given an insight to the future. Of his time and literary ability, Bro. Woods has always given freely and generously and the boys feel proud and honored to have a man of his caliber in our midst.

Always an educator, directly or indirectly, a few years ago "Pop" accepted a position with the Visual Education Department of Public Schools as chief of projection. The equipment of this department consists of two machines, stereo and spot with M. G. sets in the high schools and some fifty 35 m.m. portables in the elementary and junior high schools, and a reserve supply of both 35 and 16 m.m. machines at the central office, which, with the necessary films are distributed to schools not having a projector of their own, and Bro. Woods personally operates from four to six shows each day when the films are leased and must be shown to as many schools as possible in a short time. These pictures are all of an educational nature, often consisting of a horticultural achievement, depicting the propagation, blending and natural growth of fruits, flowers, etc., through interval exposures extending over a period of months, enabling the students to grasp their problems clearly and in a short space of time through their undivided attention. Many other educational subjects are shown to the children through motion pictures such as the interior of manufacturing plants, graphical descriptions of chemical reactions covering the known laws of physics and chemistry, etc.

The Board of Education is very fortunate in having a man like "Pop" Woods as Chief of Projection in the schools, for in addition to his long experience as a projectionist he has developed a clear understanding of the educational requirements of children and is in a position to suggest the proper selection of reels to meet the occasion.

Ten
Photo Electric Cells

By RICHARD VAN SLYKER

About the least known part of sound apparatus now used by the projectionist is the photo electric cell. This unusual tube has been brought to its present state of perfection within the last few years.

The photo effect phenomena was first discovered by Dr. Hertz, who, in 1887, while experimenting with the actions of a spark gap, noticed that the impedance of his spark gap was affected by the radiations (the ultra violet ray) of another nearby experimental spark gap. Preceding Dr. Hertz an English experimenter by the name of Willoughby Smith, while working with selenium resistances for transmission purposes, discovered in 1817 that the selenium he was using would change its resistance when exposed to light rays.

Next in adding to the information of photo phenomena was Dr. Hallwach who, in 1888, discovered the fact that certain negatively charged metals (surface charge) became less negatively charged when exposed to the radiation of ultra violet rays. Then, in 1889, Schmidt in Germany noticed that crystals of cuprous oxide (cuprite) used as electrodes, when immersed in a sodium hydroxide solution became more positive when the solution with the immersed electrodes was exposed to light rays.

After these men came the scientists Elester and Geitel who evolved the fundamental principles and theories of the photo electric effect in various minerals. These men practically completed the evolution of photo phenomena about 1905 and are responsible for the real advancement of the photo electric cell. Since their time the Arcturus and X-cell are the only notable contributions to the advancement of photo electronomy by virtue of their components.

In the day of Elester and Geitel the vacuum tube which is now in universal use for amplification purposes was unknown and instruments to use the currents and effects of the photo electric cells were not to be had, and the only means of determining the actual presence of photo phenomena was a crude though sensitive instrument called a fluroscope composed of thinly beaten gold and silver leaves suspended within a glass container.

One of the contributing difficulties with which the early research workers were confronted with when experimenting with photo sensitive materials was that the underlying principles were hard to segregate due in the main to the three most prominent manifestations of the photo sensitive material which can be classed as follows:

(1) The actual emission of photo electrons from the electrically conducting body due to impinging light rays. This is true photo electric phenomena.

(2) The ionization of the media (gas or element) surrounding the cathodes and anode causing a current flow due to the emittance of photoelectrons.

(3) Changes in the media surrounding the cathode and anode due to changes in temperature and voltage.

Numbers one and two are produced by the action of light rays, and due to their nearly directly proportionate ratios are most useful in sound work. No. 3 is caused by excessive polarizing current in the photo electric circuit and extraneous applications of heat transmitted by either light ray or metallic connections.

We now have in commercial use three distinctly separate types of pho-
to cells, or better still, light sensitive cells which are classified as follows:

No. 1. The photo electric.
No. 2. The actino electric.
No. 3. The becqurel voltic (photo voltic).

This comprises the entire range of photo cells that are in general use in sound work.

In returning to the first named photo cell, the "photo-electric," it is seen that there are a great many types on the market that use as many kinds of photo-sensitive materials. The predominating minerals used are sodium, potassium, caesium. This by no means restricts the alakloid metals which are sensitive to light. We also have rubidium, barium, lithium, strontium, which react to light in an appreciable degree. These elements are among those that emit the photo electrons when a light ray strikes them. The photo electrons are emitted in streams or better, as a cloud from the surface that the light ray impinges upon. The gas in many cells is to provide a stronger means for the polarizing current to pass through, thus realizing a higher output of the photo cell.

The gas is ionized (made conductive) by the photo electrons as they speed to the anode as shown in Figure One. The gases vary almost as much as the photo elements used, not only in pressure and weight, but in characteristic molecular arrangement. The various gases which are most responsive to ionization are helium, neon and argon and Western Electric's argon, which is suspected of being a combination of neon and argon. These gases are termed "noble" gases by virtue of their ionization properties.

There are also marketed photo electric cells which are called hard cells or vacuum cells. These do not have gases in them depending mainly on the emission of photo electrons as a means of current flow.

In going a little further in the gas and polarizing voltage relationship it is noticed that in commercial photo electric cells there is a large variance of pressures and attendant voltages due to the type of materials used and cubic content of the containers or envelopes. In some of these cells the maximum voltages are less than 100 volts, while others use voltages in excess of 250 volts. In obtaining the maximum response to frequencies in sound work it is, up to a certain limit, which is governed by the amount and pressure and molecular arrangement of the gas to increase the polarizing voltage to obtain a greater degree of amplitude in the photo electric cell without sacrificing sensitivity.

The maximum voltages are held within limits necessitated by what is known as glow discharge, "similar to a neon tube glow caused by intense illumination and excessive voltages." The voltage must be less than the point which causes this form of hysteresis in the photo electric cell, and is determined by the gas content.

The photo electric action takes place in a photo electric cell when a ray of light (constant or pulsating) enters the cell and impinges upon the cathode which carries the photo sensitive material. These elements upon receiving the light rays respond by emitting a stream of photo elec-
trons (negatively charged electrons) which flow through the gas to the anode (collector) at the same time ionizing the gas causing the polarizing current to flow, which permits the continuation of the circuit with the amplifier. In photo cells which do not use any form of gas the emitted electrons are the only means for the polarizing current to pass which acts similar to the flow of electrons from the filament to the plate in a radio tube. These photo emissions are nearly directly proportionate to the amount of light received, and thereby are easily computed in terms of photo cell output. An efficient formula as given by the Jenkins Laboratories is as follows:

\[ L = \frac{C \times A}{D^2} \]

which gives a fairly accurate means of determining the current output of nearly every type of photo cell. It is to be remembered that the standard light measure, the lumen, which is equivalent to one foot candle incident upon one square foot of surface. It must also be remembered that photo sensitive elements differ greatly in their response to various light spectrums and to the maximum light energies. In the graph shown the various predominating elements and their response to the wave lengths of their particular characteristics.

You will see that although the potassium curve reaches nearly the highest point in the graph the caesium and selenium curves utilize the portion of the light spectrum where the light energy is greatest giving rise to a greater degree of amplitude in this type of cell.

Next in the order named are the actino electric cells which are photo cells that change their resistance when exposed to light rays in nearly direct proportion. As an example, visualize a variable resistance which when exposed to light would decrease in its resistance similar to turning

---

**Fig. 2.**
the knob on a rheostat. This is what happens in a selenium or actino electric cell.

Up to very recent times selenium when used as in photo electric work was found to have a very slow response and a large degree of lag. This word lag, as used, is used as a measurement of time required for the selenium or any photo sensitive cell to return to normal and is not to be confused with the meaning as a phase difference between two voltages.

This fault was overcome to a large degree by spreading the selenium about .0014 cm thick on a non-conductive base and connecting some form of metallic electrode at the edges or ends of the selenium film. One more or less successful cell that was marketed used thallium similar in many respects to selenium. This was handled nearly the same as selenium. These cells were practically useless so far as sound frequencies were concerned as they were entirely too sluggish and had too great a lag interval to transmit with any degree of fidelity the rapid light pulsations which we have in sound film.

![Selenium Cell Diagram](image)

The only notable development in a selenium cell in which the objectionable features, i.e., lag, and bulk are eliminated is made by the Pacific Research Company of Los Angeles and is a revelation in the photo sensitivity of actino cells. This cell successfully passes from 10 to 10,000 cycles per second with a nearly flat curve which is very remarkable and is extremely rugged and no amount of strong light will impair the sensitivity to an appreciable degree. A peculiar feature is the fact that this cell has no polarity and can be directly coupled to the amplifier with only a special transformer capable of matching the cell's impedance with-

**MONTHLY HEALTH HINTS**

Hang up the receiver before telling the manager what you really think.

Don't stick your finger through the grating in a Simplex rear shutter. Something MIGHT happen to it.

Don't check framing with the light on the aperture by looking through the lens.

It is not advisable to check the voltage in a 211E socket with your fingers.

Don't hold the safety switches on the 43A amplifiers in by hand. You will probably find out why they are put there.

Never point your finger while close to moving gears. The resulting hamburger is not edible.

Don't prop your fire shutter up. (No explanation necessary).

Don't forget slips count while changing the top horn unit.

out the need of a head or pre-amplifier. This cell uses the maximum of 18 volts and works well with 9 to 12 volts. The current drain is approximately one mill of current. The light sensitive surface is about 1/4 inch square and is composed of very fine lines engraved in a non-conductive base upon which a metallic conductor is placed and then nearly all removed. Over this exceedingly fine conductive base the selenium is applied and then processed. A glass cover is then fitted and the cells enclosed in a form of moulded tube, approximately 7/8 of an inch in diameter and 11/2 inches long. This cell is most sensitive when near the visible yellow light spectrum.

(To Be Continued)
Oakland Doings
By J. B. G.

Choosing Saint Patrick's day, Local 169, I. A. T. S. E., celebrated its twenty-fourth anniversary with a banquet that belittled all previous efforts along banquet lines. Held at the Hotel Leamington and consuming four solid hours without a dull moment, the arrangements committee provided the Oakland projectionists and their guests with a banquet not soon to be forgotten.

President Bishop, as toastmaster, worked in Bro. Rose as master of ceremonies. Bro. Rose, beaming in sheer exuberance, green carnation in lapel, introduced the entertainment, which was of high caliber and enthusiastically received.

A full course dinner was served, interspersed with music from Kerns' Orchestra, songs by Al Mason and numbers by Betty and Her Three Beauties.

From precedent much is expected of a 169 banquet, and the arrangements committee, consisting of Al Daul, F. Garbutt, I. Cohn, A. C. Paxton and C. Ball, have those who attended in their undying debt by producing a banquet that exceeded all expectations.

Still gasping, wobbling a bit, but in possession of an incentive to exist for another twelve months, 169 awaits the next annual.

* * *

From another source (Bro. George Lancaster, to be specific) comes this one. And it is sad.

Some sixteen brothers were collected in front of the Oakland Orpheum prior to a recent T. M. A. banquet which was to be held in an Emeryville cafe. Al Daul came out, greeted the gentlemen, and after instructing them to follow, stepped into his Studie and hove majestically into the nocturnal winds with the eager others trailing in fourteen cars.

Lancaster, with Gibbs seated beside him, piloted trailing car No. 1. All went well for a few blocks until Al Daul slipped by a green light which chameleoned into red for the other cars. When the light went green again Lancaster picked up behind a Studie (right! a different Studie) and the parade serenely proceeded. In fact, the parade serenely proceeded for miles, left turning, right turning, winding through darkened North Oakland streets and allies, blowing horns and in general delighting the sleeping citizens.

The driver of the Studie, being neither deaf nor dumb, and undoubtedly possessing a watch and wallet besides a cheering bit of recent newspaper information concerning hold-ups, attempted to lose his pursuers. Capone would have done the same.

"Ah!" exclaimed Lancaster. "Al's trying to shake us. What a chance he's got!" And so, far into the night, and far into the country the automobile caravan trekked its boisterous way, with the leader growing more desperate with every futile turn.

Finally, beaten and exhausted, a nervous wreck ready to give himself up, the luckless one drove into his own driveway, jumped out and kangarooed for the front door which his startled wife held open.

Brother Lancaster neglected to tell the LOUDSPEAKER operative just what he did at this point—but we retain our original idea. At all events fourteen cars (some of them practically paid for) wended their somber way out of the wilds to eventually arrive at the Emeryville cafe. There they found Al Daul. In truth they could have found him there for an hour—for he had been there that long.

There is a distinct moral to this story, but why reduce the LOUDSPEAKER circulation for the mere privilege of rubbing it in?
Standard Discussion
By GEO. A. LANCASTER, P. A. C.

The Standard Release Print and Make-up that has been worked out by a committee of experts under the supervision of the academy producers technicians of which Mr. Irving G. Thalberg is chairman, is now in practice universally.

Experts such as Sidney J. Twinning, representing sound laboratories; Sidney Burton, representing the projectionists; N. H. James Brower, exchange representative; A. J. Gerin of the release prints production, Gerald Rackett, the manager of the technical bureau; James Wilkins, film editor, and Gerald Gledhill, secretary of the Motion Picture Arts and Sciences. The Standard has been endorsed by the Standards Committee of the Society of Motion Picture Engineers upon recommendation of the society's projection committee, acknowledgement is therefore expressed on behalf of the academy to the many technicians including the seventeen major Hollywood and Long Island studios, the Association of the Motion Picture Producers, Hollywood Chapter of American Projection Society, The American Society of Cinematographers, Society of Motion Picture Engineers, The Film Board of Trade and the Projection Advisory Council.

The standard applies to prints with sound on film, sound on disc, combination, or silent. It is so designed to better enable projectionists to make change-overs without rehearsals or marking and mutilation of the prints. The studio will start and finish picture action on fades whenever possible, otherwise significant sound will be kept at least five feet from the start and finish of the picture. This insures steadying down of the incoming projector, before significant sound is reproduced, and allows a margin of safety for change-overs.

The Standard uses visible signals for motor and change-over cues. The visible signals will show as a round black dot in the upper right hand side of the picture frame and as a white circle in night scenes and fades.

The start motor cue is twelve feet from the end of the picture on the outgoing reel. At ninety feet per minute these twelve feet take eight seconds to run out. This does not apply to all projectors. The problem is to determine how many feet of leader the incoming projector will pick up in the eight seconds. Motor pick-up speeds on different types of installations and equipment varies.

Exchange employees handling prints are expected to be familiar with the standard specifications and are requested to report to the Film Board of Trade of synchronous leaders that are mutilated or ends of film punched, scratched or otherwise damaged, that are received from theatres.

Exchanges are doing their part in maintaining the standard by careful inspection, there will be no need for projectionists to mark or alter the print in any way. This disgraceful practice must pass with the operator of yesterday, and will not be tolerated in the future.

The Projection Advisory Council will be represented locally by a local projectionist leader who will work with the exchange and Film Board of Trade for the proper and harmonious maintenance of the standard, under the direct supervision of President Thad Barrows and Executive Vice President P. A. McGuire.

The projectionist has a great responsibility, a failure to maintain the right standards means that all that the producers, directors, actor and cinematographer have striven for loses much of its artistic and commercial value, but the best projectionist in the world can do no more than his apparatus enables him to do, the condition of the equipment the ex-
hibit or offers him to operate. Managers should not expect much from equipment in poor and run down condition. The indignation between the projectionist and manager should pass with the theatre of yesteryear, that harmony must exist is evident. Any manager who is unwilling to face these facts—who is afraid to ask the public to pay the bills for those things is restricting his own progress and turning people from the box office to other forms of amusement.

Today the operator has to be a thoroughly responsible expert. Operating is by no means his whole job. He has to have brains and use them. He has to know something more than a smattering about a very delicate and complex variety of electrical equipment. He has to assume a large share of the responsibility for the delivering of entertainment for which customers are paying at the box office.

The job is no longer a mechanical one. It cannot be executed with a strong back and a weak mind. The public buys admissions to our theatres with the expectation that in return it will receive good entertainment, comfortable and pleasant surroundings and the maximum safety.

Progress continues ceaselessly under all conditions. For the individual or for mankind to stand still means to go backwards. No man is strong enough to stand alone. We are all a part of a tremendous and complicated system which will work for or against us, to prevent a backward step we must constantly improve our work to meet new conditions which call for finer entertainment and showmanship.

The American Projection Society was the first technical organization of the motion picture industry, and has rendered a great service to the industry through its many discussions of theoretical and practical problems. Local unions and A. P. S. chapters are now taking courses in the Extension Division of the University of California under the tutelage of Prof. L. E. Reukema.

SIDELIGHTS OF AN OAKLAND MEETING

A tidal wave of interest in R. C. A. followed Mr. Jones' statement that the outfit used standard tubes which would function in ordinary radios.

We wonder what the service engineers actually think of "one-man" rooms?

And why Associate Brother O'Brien always gulps, as though about to choke, when saying "Projectionist?"

Long-shot: The huge expanse of carpeted sea that separated President Litton from the customers due to holding the meeting in a hall large enough to accommodate a National Bootleggers' Convention.

Inspiration: The invariable attendance of Brothers Chas. Zielinski, William Horton and C. R. Faruot, who travel many miles over dark highways to participate in the festivities.

Impression: Brother H. E. Alford isn't mad at anybody.

Brother Nagle received straight-line response with this one: A man and wife were leaving a theatre after reviewing a recent war picture.

"It's faked!" raved the husband.

"It's not!" contradicted the wife, with fire in her eyes. "It was true and I can prove it!"

"All right, prove it," challenged hubby.

"Why you simpleton! Didn't I see with my own eyes all of those bullet holes in the film!"

Cleve Beck spills one concerning a college youth too extravagantly indulgent with liquor and women. Upon his father's demand that he cease one or the other the son acquiesced, but asked:

"Which one should I cut, Governor, the liquor or the women?"

"The liquor, son," replied the father. "You can drink when you get old."
The Eighth Art

*By DR. CLINTON WUNDER*

All motion pictures that touch on the commission of crimes show some form of punishment or restitution for criminal behavior. In January and February, 1931, 48 feature pictures were released by studio members of the Motion Picture Producers and Distributors of America and only 9 of these were the type of picture in which sex or crime had any degree of prominence. Of these latter 9 pictures, 8 received endorsement by one or more official reviewing groups in Hollywood, representing great national organizations including the D. A. R., the University Women's Association, Y. M. C. A., Federated Women's Clubs, the International Federation of Catholic Alumnae, etc.

The motion picture has brought the stage to millions who otherwise could never have hoped to visit Broadway. Our Industry seeks constantly to raise the level of quality of its productions. Self-imposed codes and standards of good taste have had much to do with the steady improvement in the quality of motion pictures. Hollywood is conscious of its responsibility and although it is no easy task to seek to please one hundred million people of various minds, yet Hollywood has found an increasing endorsement of its program on the part of those who register their opinion at the box office. Certain leaders of organizations representing a total membership of six and a half million people are co-operating in a constructive movement for better pictures. Opposed to this group is an insignificant number of men and women who find nothing good in motion pictures and prefer their own intolerant standards and who seek through politics to dictate what the American public shall see and hear in their theatres. The motion picture does not glorify crime and the picture is rare in which violations of the accepted moral codes go without penalty.

The best proof of the ever-increasing quality of motion picture plot and portrayal is found in the productions themselves which you have witnessed—in the dramas, epics and comedies shown in the current year.

The motion picture is the American people's chief recreation at the close of the day's work. It is an antidote for the troubles and cares of the day, an inspiration for tomorrow, a tonic to renew ambitions, a bringer of laughs and of good cheer. The industry is conscious of the trust put upon it and is seeking to the best of its ability to live up to its responsibility as the holder of this magic tool which has come to be the eighth art.

From January to July in 1930 the representatives of those public groups which examine motion pictures in Hollywood, reviewed 607 new films. Out of the total 607 reviewed, 9 pictures out of every 10, or 86%, of them, won the endorsement of at least one group. These reviewers are shown motion pictures five mornings a week in the Academy studio and are free to make their own independent reports to their own national headquarters, which, in turn, distribute them to group leaders throughout the United States.

We have been charged with corrupting the morals of foreign nations, yet the report of the Indian Cinematograph Committee published by the government of India Central Publication Branch in Calcutta in 1928 after hearing witnesses of all kinds from every part of India and Burma and after seeing a large number of films, stated that without exception the committee was satisfied that the overwhelming majority of films certified for public exhibition in no way tended to demoralize the Indian public or to bring Western civilization into contempt. This committee was created by act of the Indian Legislative Assembly.

Ronald Y. S. Cheng is one of the
SPASMS

By J. B. G.

Overheard and released in confidence:

Bro. Daul: "How do you feel after the banquet?"
Bro. Moore: "Fine. I'm just getting back to subnormal."

* * *

Bro. Miles, whose chin has dug a shell hole in his chest from years of observation port peeping, grumbling: "Automobile petting has so demoralized balcony mauling that a fellow might just as well look at the screen these days."

Outstanding representatives of the New China in America. In his own country he has been the head of a training school for teachers and at the present time, at the behest of his government, he is studying the American school system and American and European theories of educational administration, at Teachers College, Columbia University. Says: "In any case, China owes a great debt to American pictures. A vast population—four times that of the United States—is looking toward America for ideals. Your civilization fascinates my people. And they learn of you mostly through motion pictures."

"Turkey, so far as is known, neither has nor contemplates film censorship of any kind. It is true that a new municipal regulation in Istanbul (formerly Constantinople and no longer the capital of Turkey) prohibits motion picture attendance for children under eight years of age. Nothing startling about that. Similar police regulations are in force in many cities of our own country. Insofar as the regulation applies to very young children, it applies to British, German and other films shown in Turkey. Nevertheless, because a foreign newspaper abroad preferred to interpret this as a 'ban on American films,' an entirely false report is circulated to the whole world through the medium of an American publication."

It wouldn't be ethical to mention his name, but we know a man who soaked his bench vice in a solution of alum and water—thinking he would then have a self-healing condenser.

* * *

The fastidious executive was inspecting the projection room. After aligning the film cement bottle, scissors, schedule frame, etc., his exacting eyes turned upon the projectionist to discover with angry repulsion that the man's necktie was askew. With an impatient step he straightened the offending tie.

"Thanks," muttered the projectionist.

It was the final blow. "Never, never! abbreviate your speech!" thundered the executive. "If you are so pressed for time—if your duties are so exhausting that you cannot speak fully—remain silent! Never show your appreciation with the expression: 'Thanks.'"

This off his chest, the executive passed into the generator room. He straightened the push broom so that it was in artistic accord with the conduit. He shifted the cans of projector and dynamo oil so that they were in harmony with the starting box. He reversed a package of fuses so that the reading was right side up. As he started to leave he noticed the emergency mercury-arc rectifier, the tube of which was a bit oblique.

Grumbling, he grasped the a. c. electrodes to remedy the discrepancy. As the current took possession of him his feet flew out, his immaculately attired body convulsing like a silk streamer in a 90-mile gale. He was emitting wild moans of helpless agony when the projectionist stepped forward and pulled the switch.

Crumpled in a puffing, quivering, forlorn heap, the executive looked up at the projectionist and said:

"Thanks."

Nineteen
JUST HOW CLEVER ARE YOU?
WHAT'S WRONG WITH THIS DIAGRAM?
Puzzle Circuit By R. E. Clark, A. P. S.

This is the fifth of a series of five puzzle diagrams that have created a wide-spread interest. Many answers have been received on the previous puzzles. Why not try your luck? See if you can correct this one. Send in your answer early.

ORTHO-KROME SCREEN
Concluded from Page 9

sequently in many cases be substantially reduced. This increase in apparent brightness results from the absorption of the excess intensities by the screen. The pupil of the eye being no longer forced to contract unduly for protection, more light is admitted to the retina, which results in an increase in apparent brightness.

A further, though not unique, advantage of the Ortho-Krome screen is that it is of the diffusing type and exhibits practically the same brightness from whatever position it may be viewed in the average auditorium. This eliminates the type of visual strain which is encountered with screens whose brightness varies considerably with the angle of observation.

Under reasonably satisfactory projection conditions, the visual fatigue caused by viewing motion pictures shown on an Ortho-Krome screen is probably less than would result from spending the same time in reading, even under conditions normally regarded as very favorable.
TRANSFORMERS — TESTING (Continued)

SOME NOTES ON TESTING CONDENSERS

This month we discuss the testing of transformers in which the plate of the tube is fed through a resistance or a choke, such as the Clough type. RCA uses this type in some of their amplifiers.

Using a meter having a scale of 10 mils or thereabouts and a 4½-volt battery, a test was made across the plate and B terminals of a Silver-Marshall transformer. This transformer has a coupling resistance of about 50,000 ohms. The deflection of the needle was so small that it was hardly a reliable indication. Then a 45-volt battery was used in place of the other. The meter now reads ¾ mil, which showed that the circuit was continuous between these two terminals.

If this test had been made with a meter having a 0 to 1 mil scale a good indication would have been obtained with the 4½-volt battery, but meters of such sensitivity are not often found in projection rooms, and even if they were, one must be extremely careful not to overload them.

The 4½-volt battery was used again, and a pair of phones were used in place of the meter. A fairly loud click was had on making the connection and also on the break. This shows that the phones can be used if a meter is not to be had, or if the meters on hand are not sensitive enough. Not only are the phones extremely sensitive, but they are not very easily ruined by fairly high voltages. The 10 mil meter would be burned out if it would be hooked across 4½ volts for just an instant. The phones can be hooked across 100 volts without any damage being done to them. We are speaking about 2000 ohm phones. Low resistance phones could not be used for this sort of testing.

The next test was across the grid and negative C terminals, that is, the winding in the transformer. With 45 volts a reading of 2 mils was had. In this test or in the test across the resistance, if there is no deflection of the needle, or if the phones do not click, it means that the circuit is open.

The circuit from the plate terminal to negative C terminal still has to be tested. This is where the stopping condenser is located. Since DC cannot flow through a condenser we cannot obtain a reading on the meter. However, there is a small rush of current into the condenser when the leads are first touched to the plate and negative C terminals, this small current is sufficient to cause the needle to jump and immediately return to 0. With 45 volts and a 10 mil meter a very small kick was had on the meter.

Unless a more sensitive meter can be used it is better to make this test with the phones. Using the phones and 45 volts a good click was obtained. We have to know what the different clicks indicate. A resistance
and a shortened condenser sound alike, that is, when the condenser is situated as this one is, a resistance being in series with it. A click is had on touching the test leads to the circuit. Another click is had on breaking the connection if the condenser is shorted. A condenser that is O. K. will give a click when the contact is made, but not when the contact is broken. On placing the leads to the terminals of a good condenser a second time a click will not be obtained. This supposes that the condenser has not been discharged since the first test was made. The reason for not getting a click the second time is that the condenser is already charged; there is no flow of current into the condenser when the test leads are placed on the terminals a second time. Now we discharge the condenser by momentarily placing a wire across it. If the test is made again a click will be had as before.

Without discharging the condenser we reverse the test leads and touch them to the transformer or to the condenser being tested. This sends a current into the circuit in the opposite direction and has the effect of first discharging the condenser and then immediately charging it again, but the polarity has been changed. The terminal that is now positive is the one that was negative before. When this is done the indication is twice as great, whether it be on the phones or on the meter.

In testing condensers the following results will be obtained when the condenser is O. K.: A click is had when the test leads are applied. A click is had each time the leads are reversed and then applied. The phones will not click when the leads are applied a second time, unless they have been reversed. If the condenser has been discharged the phones will click even if the leads have not been reversed. No click is had when the connection is broken. When the condenser is shorted the following results are obtained: A click when the connection is made and also when it is broken. A click is had every time the leads are placed on the terminals, even though the leads have not been reversed.

Testing with battery and meter, when condenser is O. K. Meter gives a kick when leads are placed across the condenser.

Nothing happens when the leads are removed.

When the leads are reversed and put on the condenser the meter again gives a kick.

When the condenser is shorted: A reading is obtained on the meter. To impress this on your mind, get out the phones and a battery, and take the cover off of one of the amplifiers. Discharge the filter condensers by placing a metal object or wire across the terminals for a second. Connect the phones and battery and touch the two test leads to the condenser terminals. You need not unsolder anything, just leave everything in the circuit as it is. It does not matter that a number of condensers are connected across the one being tested. The results will be the same as though there were only one, with this exception, the click will be louder, or if you test with a meter you get a greater deflection.

As you touch the leads to the condenser the first time, note the click. Remove the leads, no click. Again place them on the condenser the same way they were on before, no click. Remove them and replace them three or four times, no click either on the make or on the break. Short the condenser momentarily as was done before. Test again and you get a click. Now apply the leads to the condenser four or five times, but reverse them each time. You get a click every time the leads are reversed and touched to the condenser. You do not get a click when the connection is broken.

To see how a shorted condenser acts fasten one end of a wire to one terminal of the condenser and fasten the other end to the remaining terminal. Use a wire that is long enough to make a large loop, so that you can
leave the loop hanging outside of the amplifier, making it impossible to replace the cover without first removing the wire. Such things sometimes are forgotten. When they are it's a case of no sound and possibly a burned out transformer.

With the wire across the condenser we have the same condition that exists when the condenser is shorted internally. Apply the test leads. The phones click every time the connection is made and every time it is broken.

Condensers cannot always be tested without disconnecting them. When the amplifier is O. K. and the set is turned off there is no circuit around the condenser. When something is wrong in the amplifier or a shorted tube is present the condensers are shorted just the same as when the wire was put across them for the test described above. In some cases a resistance is normally connected around the condenser, and so it is impossible to make a test until it is disconnected.

Testing with a meter is a little easier to understand, as one can see what is going on. In the case of the filter condenser it does not require an extremely sensitive meter, as enough capacity is present to make most meters jump. Use about 90 volts of battery and a volt-meter. If you use a milliammeter be sure to protect it with a resistance. Go through the same procedure as was outlined above in connection with the phones, and watch the action of the needle.

Another test can be made, using either the phones or the meter. Charge the condenser by connecting the battery across the terminals for a second. Remove the battery and place leads from the phones or from the meter across the condenser. The meter will give a kick, or if the phones were used a click will result on touching the condenser terminals. If no indication is had it means that the condenser is shorted, or at least there is a leak across it. This method is used when testing to see how long a condenser will hold its charge. The meter or the phones are not placed across the terminals at once, but two or three minutes are allowed to elapse between the time the condenser is charged and the time that the meter or the phones are placed across it. Electrolytic condensers do not hold a charge as long as paper or mica condensers do, as all electrolytic condensers have a small leakage current, and the charge soon leaks off. Good paper condensers sometimes hold their charge for days.

NOTE—In the balance of this discussion P will be used when the plate terminal of the transformer is meant, G for the grid, B for plus B and C for negative C.

Tests for continuity of winding and for shorted coupling condensers in transformers of the Clough type can be summed up as follows:

Using battery and phones.

Test from P to B, a click on the make and on the break shows that the circuit is continuous. No click shows that the circuit is open.

Test from G to C. Same as above test.

Test from P to C. A click on making contact but no click on the break shows that the condenser is good and the balance of circuit between P and C is continuous. A click on making the contact and also on the break shows that the condenser is shorted, but that the balance of this circuit is continuous. No click shows that the circuit between these two points is open. The condenser cannot be tested under these conditions, but it is probably shorted, as the current through the condenser is probably the cause of the open in this circuit.

Tests from P to G. Same as from P to C.

Continuity test from B to G is not necessary, but will give the same results as from P to C, except that the click will sometimes be a trifle weaker.

Continuity test from B to C is not needed. Results from this test are the same as those from B to C.

Using a battery and a meter for these tests:

A reading from P to B shows the

Continued on Page 32

Twenty-three
THINGS IN GENERAL

By

THE EDITOR

The Society of Motion Picture Engineers are to hold their annual convention in Hollywood this month. It may seem strange to many projectionists that I should devote space in this magazine, which is published solely in the interests of projectionists, to the S. M. P. E. activities. Perhaps some explanation is necessary. We here in the West have had for many years scores of highly trained technicians, scientists and engineers going about their duties in the studios, laboratories, colleges, etc., literally rubbing elbows with us. Until very recently these men were all total strangers to us. Their valuable experience and highly specialized knowledge of our business was lost to us because we had no means of contacting them. We thought that they were unapproachables who sat firmly entrenched behind imposing desks and were defended from intrusion by bespectacled secretaries and nasty-nice assistants. You can imagine our astonishment when we now find that these same men are not only approachable, but actually anxious to co-operate with us in our educational campaign. There are several very good reasons for this change. The progressiveness of the American Projection Society and the Projection Advisory Council has raised the standard of the projectionists to a higher level. They have gained for the projectionists the respect and consideration they deserve. These organizations are doing for the projectionists as a whole what they could never accomplish for themselves individually. For example, just picture any one projectionist securing a complete lecture course by a famous authority for himself alone or imagine him gaining press recognition without outside aid. These examples are of course preposterous, but they demonstrate the actual necessity and perfect functioning of these organizations. Through our organizations we are able to attract the attention of such distinguished organizations as the Academy of Motion Picture Arts and Sciences and the Society of Motion Picture Engineers. At this latter organization's convention in Hollywood this month there will no doubt be brought out many important developments. The Society of Motion Picture Engineers has contributed much in the past toward advancing the technical branches of the industry. The membership is composed of leaders in the motion picture and associated industries. I feel certain that that organization will follow the lead of the Academy of Motion Picture Arts and Sciences and co-operate fully with projectionists' organizations. Their influence and knowledge will, I feel sure, be freely given to aid the projectionists. The benefits from their co-operation will be many and will be felt by every projectionist in the West.

The West is very fortunate in having the convention of the S. M. P. E. here where we will be able to observe at first hand their progress. We hope that the delegates will accomplish all that they set out to do and that their stay in California will be a most enjoyable one.

Golfer to projectionists ahead: Pardon, do you mind if I play through? I've just heard that my wife is seriously ill?
President Frank Seavier of San Francisco Chapter No. 16 left the hospital last Friday and is recuperating at home. Upon leaving the hospital he improved 100 per cent under more favorable surroundings, for after all there is no place like home. We hope that he will be among us very soon. In the meanwhile Vice President Everett is wielding the gavel at our A. P. S. meetings.

**IDIO(NON)SINCASIES FROM SAN FRANCISCO**

*Warning to Projectionists with big ears*—Don’t stick your head out of the port hole. It has proven disastrous.

The name projectionist doesn’t necessarily mean that a man carrying a corporation has the exclusive right to the title. Several of our boys who are packing around excessive weight are contemplating forming a workout club in order to bring back the slim figure that they were once so proud of. Bro. Al Garcia is the organizer, agitator and pace-maker.

Duke Murray, our sergeant-at-arms, is planning or rather hoping to buy a seat on the Stock Exchange. His problem at the present time is figuring out how many revolutions the shutter will make before he accumulates the necessary amount.

Bro. Richard Van Slyker of Los Angeles Local No. 150 made a flying trip to Sacramento last month. He reports a very pleasant contact with Bros. H. M. Broady and Federoff, who are members of the projection staff at the Fox Senator Theatre.

Bro. Fred Borch, who is the right competent Secretary of California Chapter No. 7, has just purchased a new car. Bro. Vencill reports that increasing avoirdupois made more driving space imperative.

Art Schroeder is looking for someone to write a Hi-Powered article on trouble shooting on a Remington portable.

Bro. P. L. Studley is open for congratulations. He is a benedict. The bride was formerly Miss Esther Kisser. The ceremony took place March 16 at Santa Ana. The happy couple spent their honeymoon in Agua Caliente. Bro. Studley is at present employed at the Golden Gate Theatre.

The Southland has been honored by a brief visit from Brother Geo. J. Lancaster. Brother Lancaster hails from Oakland and has been very active in A. P. S. and P. A. C. activities in the Bay District. It is most regrettable that he could not linger longer in our midst.

*Twenty-five*
Chapter Doings

California Chapter Number Seven

The meetings in May will be held in the new meeting place, Dinah's Shack, which is so ideally situated for our membership. Dinah's Shack is located at the intersection of Washington Boulevard and West Adams Street. A full course chicken dinner will be served preceding each meeting. The meetings will be held on the first and third Tuesdays, May 5, 1931, and May 19, 1931, at 12:00 o'clock, midnight.

The feature of these two meetings will be the continuation of the lectures now being presented to the Society by the RCA Photophone Corporation.

Both meetings in May are open to members of Local No. 150.

A. P. S. men from all Chapters are cordially invited to attend.

San Bernardino Chapter Number Nineteen

San Bernardino Chapter Number 19 meets at the American Legion Club House, 113 West E Street, Ontario, Calif., on the fourth Tuesday of each month at 12:00 midnight. Dinner is served after which a short business session and educational lecture are provided. A real worthwhile evening is always provided for our members.

Visitors from other Chapters are cordially invited to join us at our meetings.
The first meeting of the Society held at "Dinah's Shack," Tuesday, April 7th, was, to say the least, "a huge success." The attendance, far exceeding expectations, proved conclusively that a change in menu and general atmosphere does much toward instilling the interest in those of the membership, who at times are apt to become a trifle lax in regular attendance. Many faces, not necessarily new ones, but some who for some reason or other have taken no active interest in Society doings the past months were noted and welcomed in no small way. It is indeed gratifying to see a turnout symbolic of the A. P. S. spirit and to feel that the efforts expended by those striving for the good of the Society have not been in vain.

A most excellent chicken dinner was served preceding the lecture and the management of "Dinah's Shack" is to be commended upon its splendid service and the manner in which its guests were handled.

This meeting, as were the two previous ones, was open to all Brothers of Local No. 150, I. A. T. S. E., and drew an excellent representation from that organization, there being approximately fifty non-members of the Society present.

The third of the lecture series on RCA Photophone was conducted by Mr. George F. Hutchins, the topic being "variable area recording." Mr. Hutchins explained in detail the various practical methods of recording now in use, and cleared in the minds of his listeners the principle of the so-called "noiseless recording."

This series of talks by the Photophone engineering staff has been received with the utmost interest, the secret of this being the deviation from the regular course into something just a "little outside our line," but extremely interesting and instructive. Each speaker appearing before the Society has been "a past master" in the art of holding his audience, even at such a late hour.
San Francisco Chapter No. 16
Entertains Lester Cowan

Mr. Lester Cowan, Manager of Technical Bureau, Academy of Motion Picture Arts and Sciences, visited San Francisco Monday, March 9th, for the purpose of bringing about closer co-operation between the projectionists, the Film Board of Trade, producers and studios in maintaining the standard release prints in proper condition at all times according to specifications in order that it may be adopted universally by all projectionists in making adequate change-overs and be kept free from all unnecessary mutilation.

Our treasurer, Bro. Reinhardt, and President Frank Seavier accompanied Mr. Cowan to the Film Board of Trade, where he discussed the Standard Release Prints with the exhibitors and Bro. Seavier informed the Film Board of Trade that Chapter No. 16, A. P. S., will follow up all reports on film mutilation and lend our support in keeping S. R. P. in proper condition. After the meeting of the Film Board of Trade Bro. Reinhardt took Mr. Cowan to lunch at the Palace Hotel where they talked over various subjects pertaining to the motion picture industry. Mr. Cowan had been in conference recently with Dean Hoover of Stanford University, who is willing to co-operate with Chapter No. 16 and supply us with prominent speakers from time to time.

Mr. Cowan attended our A. P. S. meeting Monday evening and opened a discussion on the merits and faults of the Standard Release Print. Many suggestions were offered by our members, which, if adopted, would enhance the popularity of the S. R. P. Sometimes, however, it is impossible to adopt what the projectionist would consider an ideal change-over system, as Mr. Cowan explained clearly that while it may simplify matters for the projectionists, it would be detrimental as well as expensive to the producers and distributors who have to be taken into consideration in working out a feasible plan. A few of the important suggestions are: Elimination of short reels of which there are plenty today of three to five hundred feet and adopt a standard of not less than 1000 feet . . . . placing of dots (or other identification marks which may be adopted) in a more remote section of the picture where they will not be so conspicuous to the audience . . . . placing of reel number (in smaller type) alongside of each footage number in order to check proper reel at a glance after it has been threaded and run down . . . . placing a 14-foot fade-out on the end of each reel . . . . process edge of all film . . . . Suggest to manufacturers of projectors that they use the ball bearing system and do away with so much splattering of oil on film.

Mr. Cowan has travelled extensively for the interests of the Academy of Motion Picture Arts and Sciences, is well versed on the subject of S. R. P. of which he took an active part in formulating and is in a position to receive and offer suggestions which will have a tendency to popularize the standard. After listening to his talk this Chapter was convinced more than ever that the S. R. P. will work out successfully to all concerned.

In his closing remarks Mr. Cowan complimented Chapter No. 16 on the splendid manner in which the organization is conducted, keeping free from politics and other detrimental influences and the Academy of Motion Picture Arts and Sciences is watching closely the progress being made by our A. P. S. Chapters, particularly those in the West, and is ready at all times to supply us with the necessary material to further our ambitions.

Chapter No. 16, A. P. S., greatly appreciates the assistance rendered by Mr. Cowan and the Academy of Motion Picture Arts and Sciences.
Thoughts While Stalling

I wonder if the deaf set is working . . . and how many people call for them in the audience . . . and while wondering let's wonder a real big wonder, how many sets are left after a year of loaning them to careless patrons . . . what became of the organ solos with hundreds of slides and chorus repeats we used to mix up about five years ago? . . . may they rest in peace . . . . the operator who used to lean out of his Main Street booth window and throw carbon butts at pedestrians on the sidewalk below . . . you notice I said operator and booth, projectionists and projection rooms were unknown at that time . . . . must be great to be a business manager . . . I meant that trip to New York . . . I notice a marked decline in the amount of bullseyes on the front walls of the new projection rooms . . . a few years ago everything had a pilot light on it but the water faucet . . . . and while we're talking about construction, let's give a brace of cheers for the guy who first put windows to open air in a projection room . . . . he must have worked in one of the other kind some time . . . . the champion radio fixer of Los Angeles County just dropped in—C. R. Spencer . . . . he must have bought a new tie—he's wearing a dream in blue . . . . he tells me one about the lady who couldn't understand how her radio tubes could be blown out because she didn't hear any explosion . . . . I suppose she would think a short circuit would have to have Crisco on it . . . . I hear Bro. Seavier is coming down to Los Angeles for a short stay, great luck for us . . . . Jessie Grayson's strict orders not to use his name . . . I hope he was kidding . . . what happened to the printed lectures we used to get—I think the shorthand reporter got writer's cramp . . . I feel that affliction coming on so I'm going to quit lest I pass into oblivion as he did—adios.

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Elementary Sound Physics

By ROBERT D. TIMMONS, A. P. S.

Sound motion pictures were given to the projectionists of the country to handle, we might say, like a thunderbolt out of a clear sky. Our work was increased a hundred fold with the introduction of strange equipment and the handling of that delicate child called “Sound.”

In the mad scramble to acquire the knowledge and ability to carry on our work in the manner expected of us we had to master intricate problems immediately without the study of elementary laws and fundamentals that are essential for a complete mastery of a great subject.

The following article, a brief resume of the underlying principals of sound written with more attention paid to definition than to engineering language of highly technical terms, I hope will be of interest to those that are interested in the fundamentals upon which our work is based.

Sound is not matter as it has no substance, but is a form of energy. We have two kinds of energy, potential and kinetic. Potential “ability to do something” and kinetic “the act of doing something or potential energy released.” Energy acts upon matter, disturbs or excites it.

Sound originates from the vibration of an elastic substance. By elasticity is meant the ability to vibrate when disturbed, quite a different interpretation of the word to what is meant when we speak of the elasticity of a rubber band or like articles.

All matter we know is composed of tiny particles called molecules that have the ability to move around within certain limits. The hardest piece of steel or of any matter that we call a solid is in reality not solid at all. If a microscope could be made strong enough what we call the hardest solid would appear like a layer of sand with all the particles moving to and fro. When energy is applied to a substance, such as striking a tuning fork; these molecules are forced out of their regular orbits. When disturbed like this the molecules strive to return to their former positions and to a certain extent the freedom and ability of these particles to move back and forth determines the elasticity of a matter. The more elastic the longer a substance will vibrate and hence the longer it is capable of emitting sound.

The following example will prove the above statements. Take this magazine and hit it against a table. One thud will be heard. Now hit a tuning fork against the table and a sound is heard that is more prolonged than the sound that came from striking the magazine. Upon examination the vibration of the magazine could not be detected by the eye, although it really vibrated for the small fraction of a second. The vibrations of the tuning fork can be seen almost as long as the sound is heard. The reason is that the magazine is not as elastic as the fork.

Sound is transmitted through nearly all kinds of substances, better through some than others. For the most part we are concerned with the transmission of sound through air.

Air, like other matter, is composed of molecules. Sound energy disturbs these molecules and they strive to get away from this force. In doing so they pile off on the side onto the molecules next to them. Now, there are more molecules in one place than originally. This displacement of molecules out of one spot is called rarefaction, “making fewer.” The piling on or getting together of the molecules is known as condensation. This action is what is known as sound waves.

As the start of sound waves is to
side and not at right angles like water waves they are called longitudinal waves. They also differ from water waves in that they spread out from the source in all directions. The molecules themselves do not travel any distance forward, but scramble back to their former positions. The distance that a molecule is displaced and has to go back is called the amplitude of the wave. Merely the sound energy impulses travel along to reach our ears giving us the sensation known as sound.

In our work we are not so much concerned with the speed in which sound travels. The velocity of sound through air is approximately 1100 feet per second.

A vibrating substance gives off as many sound waves as there are vibrations per second. The number of waves or vibrations per second is known as the frequency of the sound heard or emitted. No matter how rapid the sound waves are given off they can only travel at approximately 1100 feet per second.

The length of a sound wave, more commonly called wave length, is measured from the tip of one wave to the tip of the next, or from the tip of one condensation to the tip of the condensation of the next wave. Wave-length is also expressed as twice the amplitude of a wave.

For example, a tuning fork gives off 550 sound waves per second. The frequency of the sound emitted in this case is 550. As the sound waves travel 1100 feet per second the wave-length is 2 feet and the amplitude of the wave is 1 foot. The higher the frequency the shorter the wave-length and amplitude is readily seen.

There are three characteristics of sound that are essential in understanding the fundamentals and the application of sound. Pitch, intensity and quality or sometimes called timbre.

Pitch designates the highness or lowness of sound. It is dependant on the frequency. The higher the frequency the higher the pitch. Sometimes the pitch sounds apparently higher or lower than it really is because our ears are at fault and are more sensitive to one pitch than another.

The intensity of sound is the loudness or softness of the sound sensation received by the ear. It depends on the amount of energy given the source of sound. The intensity can be changed apparently by the use of sounding boards, megaphones and horns.

Quality of sound is the most important of the three characteristics. This has to do with the blending effects of sound. It is what determines our ability to distinguish noise from music, different voices or the different instruments in an orchestra or band.

When a substance vibrates it emits a sound from the vibration of the whole substance. This is called the fundamental vibration or sound. Also parts of a substance will vibrate independently and give off sound with the fundamental. This is called the vibrations of the segments. The point on a vibrating substance that connects the segments are known as the nodes. The sounds emitted from the independent vibrations of the segment are known as overtones. There may be one, two or more segments vibrating along with the fundamental vibrations and the sounds heard are known as the first overtone, second overtone and so on. Some substances will only give off a fundamental while others will vibrate in several segments and produce overtones. It is the strength and how many overtones produced that determines the quality of the sound.

An experiment that clearly demonstrates the above phenomena of vibrations is as follows. Take a string and stretch it from one end of a board to the other. Now insert two small pieces of wood at each end of the string, similar to the bridge of a violin. By taking some small pieces of bent paper and placing them at small intervals along the string it is ready to operate. Now draw something

Concluded on Page 32

Thirty-one
R. C. A. Official Addresses Chapter 16

How few of us will admit today that the reproduction of sound is perfect? It is true that great improvements have been made over the first recordings and the average audience today will say that the intelligibility of the programs are remarkable. The first motion picture ever shown some forty years ago was considered wonderful, but would not meet with favorable response today. Even pictures of fifteen years back if shown today would be considered incomparable to other forms of entertainment. Miniature golf for a brief period cut heavily into the box office receipts until the novelty wore off.

Mr. Charles E. Herbst, Junior District Supervisor for R. C. A. discussed briefly before our Chapter No. 16 the necessity for greater improvements in the future to hold the interests of our clientele and mentioned also that the laboratories and research engineers were working to gradually smooth out some of the obstacles which confront them at the present time. To bring out true naturalness there is room for great improvement in the high frequencies and laboratory tests to date with R. C. A. equipment have proven very favorably in eliminating ground noises, enabling them to cover a larger frequency range. With special film, frequencies as high as 15,000 cycles have been recorded with gratifying results. This year will show great advances over previous years toward bringing sound reproduction closer to perfection.

Concluded from Page 23

resistance to be $0. \, \text{K}$. No reading means the resistance is open.

A reading from G to C shows the winding is good. No reading shows that the winding is open.

From P to C or from P to G the meter will give a kick if the condenser is good and the rest of the circuit is continuous. If the meter shows a constant current to be flowing the condenser is shorted. If the meter does not kick and does not indicate a flow of current the circuit is probably open. It is better to make this test with the phones as the condenser is small and the charging current may not be large enough to cause the needle to jump. As was mentioned earlier in this talk, a second indication will not be had, either in the phones or on the meter if the leads are applied so that the polarity is the same as it was when the test was made the first time. By reversing the leads another indication will be obtained.

SOUND PHYSICS

Continued from page 31

along the string as a bow and some of the papers will jiggle off and some will stay on. The papers that stay on represent the nodes and the space between the segments that are vibrating independently. If the string was vibrated rapidly enough to give off sound the quality and character would depend upon the number of segments it was vibrating in.

Much of the trouble encountered in theatres of sounds that do not seem natural is due to reproducing machines that are not able to reproduce these overtones or harmonics exactly as they were recorded.

Very profitable study can be done by the projectionists of today on the elementary laws governing sound even though he has mastered various troubles in his work that makes the fundamentals seem of small account. Our libraries contain many volumes on the subject and can be had with little effort.

Simile: "As exasperating as a buzz when an exciting lamp burns out."

Thirty-two
HEALTH TALKS
For Projectionists

What is a nerve impulse? A volitional disturbance, traveling at a high rate of speed. It corresponds in a way to the electric current that the projectionist is quite familiar with, he knowing how necessary it is to have a complete material circuit from the dynamo before the electricity can be utilized in operating a motor.

In the body the brain corresponds to the dynamo, the efferent nerve leading from that structure corresponding to the positive wire, the tissues to the motor and the afferent nerve, leading back to the brain, we may term the negative wire, thus completing a material circuit.

Not only is it necessary to have a complete material circuit through which the immaterial works, but it is also necessary that there be unhindered transmission of the immaterial, over the material circuit. For example, you have the brain sending out mental impulses, which pass over the efferent nerve to the stomach, where they are expressed in the function of digestion. That is, the brain furnishes the stomach with the power, with which it carries on digestion. The afferent nerves take up impressions from the stomach and conveys them to the brain, for interpretation, from the information of what is occurring in the stomach, the quality and quantity of impulses are regulated as needed to carry on this process normally, through an involuntary nerve action.

Any disturbances produced depends upon the quality, quantity or a combination of function abnormally expressed, for it is found that different nerves convey mental impulses which, when expressed, give rise to different functions. There are certain nerves that have to do with the motor function, involving the tonicity and movability of muscles. There are sets that have to do with the sensory function. Still other nerves called trophic which act in the facility of nutrition. For instance, a person could have flaccid paralysis of the arm, showing an abnormal expression of the motor function, a numbness of the fingers showing an abnormality of the sensory function, a general chilliness indicating an abnormal expression of the calorific or heat producing function, expressed through the trophic nerve centers, sometimes caused by impaired nutrition.

One can readily see how essential the nervous tissue is in the body, and the part it takes in transmitting both physiologic and pathologic impressions. In some occupations and particularly the projectionist (who constantly works under a high nerve tension) if prolonged to a point of fatigue can place undue strain on the nerve centers and cause functional disturbances as will be shown in future articles.

A few less speeches about general conditions, a little more attention to the job in hand will accomplish the same turn to better conditions.
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THE OTHER FELLOW'S NUMBER
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WAVE CHART

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Introduction of Vacuum Tubes To Theatre Lighting Control

By E. W. ANDERSON, A. P. S.

The opening of the Los Angeles Theatre, independently owned and operated by Mr. H. L. Gumbiner, put into service the first installation of the most modern type of control for theatre lighting in the world. This newly developed Westinghouse Thermionic Tube Controlled Theatre Dimming Switchboard harmonizes with the other efforts of the owner to provide comfort and pleasure for his audience. By means of the smoothness of control obtainable in this switchboard, the moods and emotions of the audience may be varied in such a manner that although they are entirely unaware of the effects upon themselves, so smoothly are they varied and controlled the audience is unconsciously put in the proper mood for the reception of the feature or stage show being presented.

The switchboard is of such a type that it is possible to set up in advance five effects in which the lights will come to a predetermined intensity for each of the effects. The control is divided so that the auditorium lighting is controlled by a switchboard located in the projection room and the stage lighting from a board located on the stage floor. In addition to the two switchboards, a remote control panel (Figure 1) for the house lighting is also provided on the stage so that it is possible for the stage electrician to govern five complete preset effects, in addition to retaining manual control of all the lights on both stage and auditorium as well.

A photograph of the projection room switchboard is shown on the front cover to which the following description applies. The controls are arranged in a manner similar to the standard type of board, each of the three horizontal rows of controls is
used to operate the circuits of one color, the top, amber; the middle row for red and the bottom row for the blue.

Each individual control circuit consists of two telephone switch keys, an indicating lamp, five pre-set potentiometers and an individual control potentiometer. The switch key located at the top of each control section connects the circuit directly to a hot bus on one throw, the other throw connects to a color master control. The middle position is the off position.

The individual potentiometer control corresponds very closely to the standard dimmer control in that by means of it the intensity of the lights may be varied from full bright to blackout or set at any intermediate position desired. However, in addition to this it is possible through the color master control to bring an entire group of lights from blackout to any desired pre-set intensity by merely operating the color master associated with this group of lights for the circuit. The switch key immediately below this is used, on one throw, to connect the circuit through an individual control potentiometer so that the lights may be varied independent of any pre-set position and the other throw of this key connects the circuit through the pre-set potentiometer so that the lights may be varied automatically by means of a master control either motor driven or manually operated.

Eight from the blackout to the full bright position (Figure 3). By the above it is meant that, for instance, the main red ceiling lights might be set for full brilliancy, the front ceiling lights for half intensity, the rear ceiling lights for three-quarter intensity and so on through the balance of the auditorium lights and these circuits brought to their respective predetermined intensities by means of the color master. This was not possible
in the old type of control due to the fact that when the individual dimmers were interlocked on the color master control it was only possible to bring the circuits to some desired intensity as a group, unless the individual dimmer controls were disengaged from the master control at different points, a slow, inefficient operation. Due to the fact that the tube type of control uses an electrical master instead of a mechanical master, it is possible to obtain the above mentioned flexibility of control which was heretofore impossible.

The operation of the pre-set feature of intensity control is as follows: Each circuit is provided with five small potentiometers which may be set up before a performance for any desired intensity. These potentiometers are then operated through a master control which may either be run by means of the motor drive provided or by means of a hand wheel so that the effects may be changed from one to another at any desired speed. This control is so simple that by the operation of a single telephone key which controls the motor drive the entire lights for stage or auditorium may be changed from one effect to another. Furthermore, this change is made in a proportional manner since the intensities of all the circuits which are to be changed commence to vary at the same time and the period of transition is ended when the motor drive reaches the next succeeding effect.

A color master control is obtainable by means of the larger potentiometers which may be noticed on either side of the master control section. These color masters allow complete color control of the group of lights with which they are associated. In addition, a grand master is also provided for the auditorium lights so that the entire house may be darkened by means of a single potentiometer or may be thrown off or on by the operation of the single telephone key located near the top of the master control section. In both of the above operations these lights are

Fig. 3
Tube Control Equipment

Nine
automatically brought to the pre-set position, previously determined by the operator so that it is unnecessary for him to manipulate any of the individual controls in order to reach the effect which he desires.

In addition to the auditorium controls, the projection room control board is provided with four controls, at the right hand section, which take care of the lighting for the footlights, the first border, the orchestra floods and the stage floods. These lights were put on dual control so that they may be operated either from the projection room or the stage. The control for each of these circuits and for those of the stage board is similar to that previously described for the auditorium circuits.

In addition to the above mentioned preset control, the switchboards are also provided with five pushbuttons, located in the center section, by means of which it is possible for the operator to flash from one effect to another should he desire to do so. Thus by operation of a small pushbutton it is possible for the operator to change the entire lighting of either auditorium or stage and have all the circuits come to a predetermined intensity.

This marvel of lighting control has been made possible through the broadening of the field opened by the use of the radio tube. The various controls above operate on a vacuum tube control set so as to change the output of this set from a minimum to maximum or any desired intermediate point. A photograph of the tube control equipment is shown in Figure 3. The reactance type dimmers which are used in conjunction with this equipment are shown in Figure 4. Their action is as follows: The load circuit from the lights is taken through a reactance type dimmer which operates similar to the standard reactance dimmer. That is, the reactance in the lighting circuit is varied by changing the saturation of a reactance coil. This saturation is changed by varying the amount of direct current through a coil located on the reactance dimmer. The vacuum tube control equipment enters into the picture by supplying the direct current to this third coil. This is accomplished as follows: A 115-volt, 60-cycle supply is fed to a transformer in the tube control set, the output of this transformer is rectified by means of two of the tubes in the set and from this point is impressed

(Continued on Page 33)
A Reply to Mr. J. B. G.

By GERTRUDE MUNTER
Local 6, A. F. of M.

I read with great interest the cleverly written article in the March issue of the LOUDSPEAKER by J. B. G., "Give the Musicians a Break." Before I comment on the many interesting remarks, may I compliment Mr. J. B. G.? He is some "ink slinger."

Having been an organist for many years (if I told you how many, you would know how old I am), I have had the pleasure of working with many projectionists, and have found them a courteous, studious and kindly bunch of fellows. Many times as I have sat at the organ receiving the plaudits of the audience, I have thought how little the people realized how futile would have been my efforts were it not for the ever-watchful man up there under the roof who helped to pull me over, and how little credit has ever been given you boys for the success of the show. Without you, it could never go on, and still no one ever sees you, nor even thinks of you, unless you happen to have a film break, when they greet you with loud jeers and stomps. Lucky for you that you could not hear them, or were too busy to be bothered.

Now that the talkies have descended upon us musicians like an avalanche and literally swept us off our feet, the blow to myself was a severe one, not so much from a financial standpoint as for some of our members, for I have my husband to fall back on, and have a roof over my head and three squares a day, but because I had spent years of study in an endeavor to perfect myself on the theatre organ; and to have it taken away over night, well—I just can't tell you what a shock it has been. But think of those clever and able organists with wives and children dependent upon them, men who know no other line of work but music, who have found themselves "out cold" nowhere to go, nothing to do—it is absolutely appalling.

And this goes for the orchestra men as well. Some of our best musicians are driving taxis, but many of them are living from hand to mouth, just managing to get by. Pathetic is not the word for their condition. The average musician is a sentimental, temperamental person, wrapped in his work, taking no thought of the morrow, and now his work, his very life has been taken away from him. What worse could happen?

The main point of this article is to thank Mr. J. B. G. for his wonderful thought expressed wherein he says: "If the organist or orchestra is to play the titles of the news or the main title of the feature, show them the courtesy of hanging onto the fader like the proverbial leech until the correct split second. Don't break into their only too few minutes of effort without warning, without allowing them to diminish to a suitable close." I am frank to say it brought tears to my eyes when I read the tender thought for us. I shall pass this article of yours along, with the request that a more capable pen than mine answer it in the way it deserves.

But for myself, I cannot begin to express my deep appreciation of your article and the sympathy you extend. All hail, Projectionists, I salute you!
HELPFUL DATA
Secured by Frank Wood, A. P. S.

The mysteries surrounding voice amplification are manifold; in fact electricity in its various forms is mysterious to most people. The secret of voice amplification lies mainly in the vacuum tube, containing the three elements, namely, filament, plate and grid. We are told that electrons (negative part of electricity), are emitted from the heated filament and are attracted to the plate which is charged positive. The grid is charged negative, the degree depending on the incoming signal, which would make it vary from a low to a high negative and vice versa, so naturally as unlikes attract and likes repel, some of the electrons never reach the plate, instead come in contact with the grid and are repelled back into the filament. The grid will always remain negative providing the incoming signal is somewhat lower than the grid bias. The voltage of incoming signal as read on a volt meter is the effective voltage, but it is the maximum voltage which we must consider in order to use the proper grid bias, so, for an expectant signal say of 12 volts, to obtain best results, we should use a grid bias of 12x1.4142 or 16.97 volts or approximately 17 volts. Dividing 12 by .7071, which is the sine of 45 degrees, will give the same result. However, if the signal should exceed the grid bias, the grid will become positive and attract electrons. This flow of electrons in the grid circuit would produce a grid current causing distortion, so it is absolutely necessary at all times to keep grid bias more negative than any expectant signal. The grid acts as a valve to control the flow of electrons to the plate, thereby governing the amplitude of signal.

All this sounds like so much Greek to most people who are not interested in amplifiers, yet a graphical demonstration will bring a little more enlightenment. Such a demonstration we had the pleasure of witnessing last week. Brother Woods, who is Chief of Projection for the San Francisco public schools obtained and projected for our benefit two reels of motion picture produced by General Electric Company, which explains graphically the action of vacuum tubes. With the circuit completed, showing the wires running from the "A" battery to the filament, also the wires from the "B" supply feeding plate through primary of transformer, grid return going to negative "C" battery, thence to negative or ground, input signal through microphone, and then in order to visualize more clearly through motion pictures, we have the apparition of the electrons fulfilling their duties of amplifying and carrying signal from vacuum tube to transformer, where again we see the magnetic lines of force in actual motion, as the "A. C." voice current is amplified and sent on to the following tube, electrons increasing in size denoting an increase in amplification. While it may not be necessary for us to rely on motion pictures to explain all of the intricate problems which will confront us, still we must admit they will be a big help and some of our subjects through the use of motion pictures will be self explanatory.

**MACHINE SPLICING TIP**

The following timely suggestion was submitted by Bro. E. B. Winn, Jr., of Chapter 19, A. P. S.:

"Projectionists using the Griswold Film Splicer will find that if cement be applied to the under side of the top or right hand piece of film right after the brush is drawn over the scraped end, the splice will hold much more firmly and cannot be pulled or picked apart after it has dried. I have found that splices made on tinted stock would pull apart especially easily unless done the above way."

Twelve
The Other Fellows Number

By J. B. G.

The well-known twin enemies, Suspicion and Scepticism, have a more obverse edge on the A. P. S. movement than most of us deign to admit. When these gladiators are in the ring they are favored by a Chicago "count." And if frankness is not out of place, let us stumble into their respective training camps and study their form. If they prove as formidable as we now think they are we should be wary of them in future meetings.

The reason Suspicion and Scepticism still exist to gnaw at us, undermine our foundation and slow up the growth of our Chapters, is simple. And to allow their continuance in our midst brands us the same. We have each other's number!

This may sound like levity. It is not. Often we do not respect those whom we know too well. It is a natural law, a frailty, a weakness of mankind most difficult to overcome. In our profession we avidly accept advice from strangers which we would scorn from friends.

Assuredly we are brothers; and there are none of us who would not go through the fabled brimstone for the other. But notwithstanding, we have each other's number. And the possession of the numeral makes us bury our heads in the childish sands of cynicism even though our brothers have something worthwhile to offer.

Brother Joe Zuke, of Pottsville Chapter, (where they have Brother Joe Zuke's number), can visit Kettle-town Chapter (where Joe's number is only conjectured), and deliver an address on keeping the equipment clean which will be wowingly received. The points brought out by Brother Zuke are worthwhile, logical, and adherence to them mighty beneficial.

Allow Joe, however, to release the same logic before his own chapter, and what will be the reaction? Joe is blushing before he has uttered fifty syllables. And before he has mouthed a hundred he would trade his two-man shift position for a one-man brush job if he could be home in his little white bed. Why? Why, because Joe is hearing the mental "asides" of his listeners who have his number. Joe, it seems, before the war, was discharged for maintaining a dirty projection room . . . Joe, it seems, was once under charges for damaging a print on a Turpin-eyed rewind . . . etc., etc. Is Joe a hypocrite? Unless we are unfair enough to use the word in the widest connotation—no!

He is like the minister who avoids his wife's eyes while delivering a sermon. His words are helpful, good and true. But he realizes during the flow of his august words that his mate may be reminiscing over their years of connubial association and possibly is reviewing certain sequences that he would cheerfully forget. She has his number. So he would prefer that she sat in a more distant pew so that he couldn't see the half-smile that verticals the corners of her mouth. Is this minister a hypocrite? Not this one.

For another hypothetical example consider a projectionist administering a protest against change-over film mutilation. He has, to cheer him up, the knowledge that his own theatre formerly displayed so many change-over scratches that it resembled a racing turf bulletin board on a rainy day. Still the brother is not trying to put anything over. What he says is trenchant and the saying of it helpful. Couldn't the projectionists who had his number have given him the benefit of the doubt? Couldn't they have kept their poker-faces with less visible effort—allowed
Toronto, Canada, Holds Examination
Chapter No. 9 Members Make High Ratings

According to examinations so far held under the Provincial Treasurer’s Department, the standard of efficiency of motion picture operators is very high. The operators have been under examination for some time past, and nearly all of them have passed the practical tests in the operation of sound and silent projection machines. Over most of the Province, the written examinations for operators have also been held.

At the Parliament Buildings, the written examinations for Toronto operators was held. Nearly a score of candidates took part in the examinations, which included difficult tests about the theoretic and practical phases of projection for both speaking and silent pictures.

The advent of sound pictures originally inspired these examinations for motion picture operators. The technique which the “talkies” require for projection is far more complicated than that which the old silent pictures demanded, it is said. Hence the necessity for the examinations on physics, optics, chemistry, acoustics, etc., which made a score of young men chew ends of pencils recently from 9 o’clock in the morning till around 4 o’clock in the afternoon.

Maybe it wasn’t a matter of optics, acoustics, physics, etc. The contents of the examination paper were not divulged. But he did get this assurance from an official of the department: “The moving and talking picture operators of the Province have already shown a very high standard of efficiency.” The same official was quoted as saying that most operators have been studying the theoretic and technical factors in their work very intensively these many months. They have even formed study groups and met together at regular intervals to wrestle with the intricacies of problems which might be presented at examination.

The examination consisted of 542 questions, covering all branches of the industry. In its entirety it comprised the most complete set of technical questions ever presented at a similar occasion. The Toronto men are to be congratulated upon their remarkable record.

Fourteen

him to regain his seat feeling at least fairly comfortable? Make the test on your chapter some time when things are dull. But don’t expect too much. When you have a fellow’s number the tendency is to prove the possession. Especially when a little thing like a chuckle will cinch the point.

Doubtless there isn’t a potential mistake which hasn’t been made by each of us at one time or another. If a brother has the courage to talk constructively let us not drag his family skeleton from the obsolete rectifier room. Give him credit and encouragement. Even though his verbalism is tinted with a sauce made of apples, his is still a noble gesture.

Many a policeman if stripped of his brass-buttoned uniform would not be a sensationally virile specimen; but in his uniform he commands respect. Let us wear our uniforms to hide our bow legs and sunken chests. It is not hypocritical. It is showmanship. And by so doing we’ll become more original in allowing our familiarity to breed something besides contempt.

(FINIS)
Photoelectric Cells In Sound Projection
By A. J. McMaster, G. M. Laboratory

Not unlike other modern engineering developments, the art of synchronized sound pictures has been made possible by the perfection of accessory apparatus first developed for use in other fields. Although the original concepts of synchronizing sound with motion pictures using both the phonograph disc attachment and the sound track on film are many years old, the present status of this new industry is due principally to the availability of the modern radio tube, loud speakers, and other electrical, optical, and mechanical apparatus. Among the devices that have contributed in a large measure to the success of the sound moving picture development is the alkali metal photoelectric cell.

For many years the selenium cell was practically the only light sensitive device available for experimental work in reproducing sound from film. During the last decade, however, many important developments have been made in light sensitive tubes. The particular requirements of such a tube for use in sound picture equipment are many and varied and today have been met with a certain degree of success. For greatest sensitivity, noiseless operation, speed of response, and consistent performance, the alkali metal photoelectric cell has replaced practically all other forms of light sensitive devices in sound picture work.

Photoelectric Cell Action

Whereas the selenium and similar actino-electric cells depend for their operation upon the variation of electrical resistance of a metallic compound, the action of the photoelectric cell is quite different. In Figure 1 a schematic illustration of the action of a modern type of cell is shown. If light is allowed to fall upon the sensitive surface, electrons—i.e., unit particles of negative electricity—are emitted from the surface and are attracted to the anode due to the polarizing action of the battery in the external circuit. This flow of electrons from the sensitive surface to the anode and continuing through the external circuit comprises the photoelectric current.

There are two general classes of alkali metal photoelectric cells. The vacuum type, as the name implies, contains no gas. The gas-filled cell, however, is filled at a low pressure with inert gas such as helium, argon, or neon. In this type of cell, the photoelectrons ionize the inert gas in their passage from the sensitive surface to the anode. The resulting ionization current is added to the electron current, giving a larger total photoelectric current than in the vacuum type of cell. Photoelectric cells of maximum sensitivity are therefore of the gas-filled type.

The magnitude of the photoelectric current in the gas-filled cell depends upon the specific surface sensitivity, color of light, the volume, pressure and nature of the inert gas, cell voltage, and the total light flux entering the cell. In the vacuum cell the current depends only upon the surface sensitivity, color and amount of light, and to a certain extent upon the cell voltage. As there is no ionization in the vacuum cell, the sensitivity does not materially increase after the saturation voltage is reached, and the cell is not critical with respect to op-
erating voltage. This characteristic is illustrated in Figure 2 (Type AV). Where high sensitivity is not important the vacuum cell can, therefore, be conveniently used. However, the sensitivity of modern vacuum cells is but approximately one-fifth of that of gas-filled cells and the latter are used in most sound on film equipment.

New Visitron Types

To meet the optical and mechanical requirements of various sound head attachments for standard projectors, a number of new types of Visitron cells have been developed, some of which are shown in the accompanying Figure 3.

These cells, known as Visitron type “A” (gas-filled) and type “AV” (vacuum), represent the most recent developments in alkali metal photoelectric cells. They are the result of several years of intensive research work, and have a number of points of superiority over previous types. The inserted metal plate construction as contrasted with previous forms in which the sensitive material was placed on the inner surface of the glass bulb, permits greater uniformity in the physical assembly, and a cell of very much greater sensitivity to the small changes in light intensity produced by the sound on film record. Furthermore, the new type “A” and “AV” cells have much longer life (a life expectancy of well over a year) and require lower operating voltages than the cells previously supplied for sound equipment. Of particular interest to the exhibitor is the fact that there is practically no deterioration of the new cells when they are stored as “spares” or emergency parts—that is, they have extremely long shelf life.

In selecting a cell most suitable for a particular projector, the optical system and cell must be so selected as to permit the greatest transfer of light energy from the exciter lamp through the sound track on the film to the sensitive surface of the cell. There are several types of exciter lamps available having different current and voltage ratings, as well as over-all dimensions of filaments. The lamp, optical system and cell should be co-ordinated to obtain the sharpest and strongest light signal from the sound track. The cross-sectional area of the beam of light from the film to the cell is not important, but due to the fact that no part of the film is perfectly transparent but does have a diffusing action on the beam, the cell should be situated as close to the film as is convenient. In other words, it is of cardinal importance that the maximum light passing
through the film should reach the sensitive surface of the cell.

**Electrical Characteristics**

In Figures 2, 4 and 5, the principal electrical characteristics of Visitron type "A" and "AV" cells are shown. In Figure 2 the specific cell sensitivity in micro-amperes per lumen is plotted against cell voltage. As the voltage is raised the sensitivity of the gas-filled cell increases rapidly until the curve rises almost vertically. If the voltage is raised above this critical point, the cell "spills over" into a state of cumulative ionization or glowing. In this condition the cell is inoperative and is subject to serious damage.

The maximum safe operating voltage of the gas-filled cell depends upon the amount of light energy entering the cell. With greater light intensity the operating voltage must necessarily be lower to prevent cumulative ionization. All Visitron type "A" (gas-filled) cells are intended to be operated at 90 volts or less. In applications where the light flux exceeds 0.2 lumens, the voltage applied to the cell should be less than ninety. In all present types of sound equipment the light intensity is such that it is possible to use 90 volts on type "A" cells. Due to the fact that their sensitivity at this voltage is from two to five times that of older types, it is generally found that ample volume is obtained with considerably lower voltage. In many theatre installations using the new cells, the voltage required is not more than 25 or 50 volts. This permits raising the cell voltage in the later stages of the cell's life, thereby maintaining uniform cell output throughout the entire useful life of the cell.

To obtain the maximum benefits from type "A" cells, it is advantageous to be able to independently adjust the cell voltage on each projector. Many types of equipment provide such cell voltage control. Where this adjustment is not available, a simple cell voltage potentiometer can be easily installed at very little cost. Such provision makes it possible to match the volume from each machine and to bring the fader setting to the middle of the dial.

The use of too high cell voltage results in lower volume, poor frequency response (loss of the high frequencies), background noise, and cell noises in the form of a hissing or rushing sound. Moreover, the use of excessive voltage on the cell greatly shortens its life, resulting in the necessity for early replacement.

**Manufacturing Process**

Barring such misuse, however, properly pumped and prepared gas-filled cells should give hundreds and even thousands of hours of consistent service without perceptible depreciation.
Camera Silencing Steps Taken

The Producers-Technicians Committee of the Academy at its regular quarterly meeting heard reports on camera silencing, the standard release print survey, cue sheets, film processing, supersensitive film, and other technical developments in the industry. N. C. Levee presided.

At the meeting it was reported that sixty first cameramen, representing all Hollywood studios, had replied to the questionnaire sent out in March by the Camera Silencing Subcommittee. 91% of the replies advocate strong efforts toward the development of cameras which would not require blimps or covers of any sort. 52% of these replies urged such efforts in strong terms.

The weight of the blimps in use was condemned by 90% of the replies; the bulk by 87%. 55% said the blimps made focussing difficult, and 73% said they crowded the sets uncomfortably on close-ups. Practically every type of camera cover in use in Hollywood was criticized for one or more of these reasons.

At the meeting it was resolved to bring this situation to the attention of the camera manufacturers and inquire what efforts are being made toward the production of a silent camera. The committee will offer to have studio experts confer with the manufacturers in an endeavor to advance such efforts.

The committee expressed its appreciation of the co-operation of the American Society of Cinematographers, and of the International Photographers of the Motion Picture Industries (Local 659 of the I. A. T. S. E. and M. P. M. O.)

In Figure 4 are shown the linear light flux cell current characteristics for different operating voltages. Here again the increase of cell sensitivity with cell voltage is indicated. The ratio of the micro-ampere output per lumen of light flux at a definite cell voltage is a measure of cell sensitivity at that voltage. The linear response shown between light flux and cell current in the alkali metal photoelectric cell is of course an important factor in the undistorted reproduction of sound from film.

In Figure 5 the color sensitivity of Visitron type "A" cells are shown and compared with that of the average human eye. The wave length of light corresponds to color, blue being at about 4700 angstrom units; yellow, 5800, and red, 6500. Type "A" cells are very much more sensitive in the red end of the spectrum than previous photoelectric cells. This fact is of considerable advantage in reproducing sound from film, since the tungsten filament exciter lamp emits a large portion of its light energy in the red portion of the spectrum.
Delegation from San Francisco Chapter No. 16
Visits Oakland Chapter No. 12
By Frank W. Costello, A. P. S.

In recent months the need for closer relationship amongst our A. P. S. Chapters in the West has become apparent. The voice of LOUDSPEAKER has reiterated and stressed this fact on numerous occasions, realizing that this close co-operation together with the facilities that we have at our disposal on the Pacific Coast, will give the Western Projectionists the recognition that is due them.

An example of this hearty friendship was manifested last evening when San Francisco Chapter No. 16 became guests of Oakland Chapter No. 12 at their initiation ceremonies. To go one better, Bro. W. E. (Bill) Horton, Business Manager of Richmond Local, who is also a member of Oakland Chapter, No. 12, invited the assembly to hold the meeting at his Berkeley residence. Our President, Frank L. Seavier, who has been through a long siege of sickness, was unable to accompany us, much to our sorrow, for his whole heart and soul is wrapped up in the A. P. S.; his great ambition is for the success and prosperity of our organization. He sent his regrets and wished us a good time. The delegation from San Francisco was headed by Vice President Harry Everett (250 pounds of jocularity), and a Stutz car that can climb the side of a building. Arriving a little early in Oakland, we parked on the road at an appointed spot at the intersection of Oakland and Berkeley and waited for the rest of the caravan and a guide to take us through the foreign territory. Then began the climb up over the winding hills which became steeper with each mile. Fortunately, the two heavyweights—Everett and Heinhardt—were in the front seat, which lessened the danger of a back somersault. A look of consternation appeared on Everett's face when an Austin passed us gracefully—saluting by throwing the spotlight on his face. We finally arrived at Brother Horton's picturesque home on top of the hill, and after maneuvering around considerably, managed to park the twenty cars on the narrow road. After the parking problem was solved, we entered the house and everyone was made comfortable while Brother Lloyd Litton, President of the Oakland Chapter, completed the final arrangements prior to opening the meeting. The gathering was seated in a semi-circle in the spacious reception room when Brother Litton mounted the rostrum and called the meeting to order. With his opening remarks he laid great stress on the importance of holding joint meetings and social gatherings in the future, whereby the members of various Chapters may exchange ideas and talk over local problems. In this way, the Pacific Coast Chapters will ameliorate into a strong organization. A few remarks from Brother Heinhardt had a tendency to strengthen this feeling. Dan O'Brien, service engineer from E. R. P. I., gave a very instructive talk on the care and maintenance of motor generators. Dan not only has a beautiful flow of oratory, but is one jump ahead of any dear brother who tries to tangle him. It was very noticeable at this meeting that, although the members were eager to obtain knowledge and paid strict attention to the speaker—in order not to miss any part of his lecture, the spirit of fun entered into the occasion which was permissible at this sort of gathering and was a relaxation from the boredom of excess schooling. A few questions were thrown at Dan in rapid succession—both of a practical and a joking nature, and were answered alertly in a like wise manner. Brother Everett let loose of a few witty remarks per-
JUST HOW CLEVER ARE YOU?

This interesting series of puzzle diagrams has drawn to a close. It has created widespread interest and has no doubt benefited hundreds of projectionists in all parts of the country. Because it either refreshed their minds concerning the various circuits presented or caused them to do some real research work which would, of course, increase their knowledge generally. You will all be interested to know the name of the projectionist who sent in the greatest percentage of correct answers. The clever brother is P. C. Young, who is a member of the projection staff of the Metro-Goldwyn-Mayer Studio at Culver City, California. The award attesting his victory will be forwarded to him at once.

Did you enjoy the puzzle series which were prepared by Bro. R. E. Clark? If so, write the Editor and perhaps we can persuade Bro. Clark to prepare another series. This sort of material helps to promote friendly competition between the various projectionists in the West.

LET'S GET TOGETHER AND URGE BRO. CLARK TO TWIST UP A FEW MORE DIAGRAMS FOR US TO DECIPHER!

taining to Dan's early life history, including his entry into sound engineering, and Dan retaliated with a long list of denunciative adjectives describing a certain "bootleg" set manufactured by a projectionist who seemed to have the confidence and exalted desires greater than the combined intelligentsia of R. C. A. and Western Electric, but the set finally passed into oblivion, dying a miserable death. The stage was then set for the initiation of Brother Anderson from Richmond. A description of this beautiful and touching ceremony cannot be related. You must pass through this ordeal to become enlightened. Brother Anderson went through with flying colors and is now a full-fledged member of Chapter No. 12, A. P. S.

After the initiation, a long table was brought into the room and spread with a large assortment of eatables under the supervision of Mrs. Horton, who is a charming hostess. The feminine touch certainly adds quality and refinement to an occasion like this. Brother Horton, our host, took his place at the head of the table and proceeded to cut the sandwich loaf, but for some unknown reason it would not respond to the sharpest knife that he could find. When three of the boys each handed him a saw, it finally dawned on Bill that someone was playing a practical joke on him, and about this time Mrs. Horton came in with an exact replica of the sandwich loaf minus the log of wood. The boys were hungry and did justice to the food, together with Litton's amber fluid. The roosters were announcing the break of day when we took our departure, Brother Litton escorting us to the ferry. A very pleasant evening was enjoyed by all, and we are looking forward to a visit from the Oakland Chapter in the near future.
Locating grounds in transformers is done about the same as it is done in other apparatus. Testing low resistance windings such as the secondaries of filament transformers calls for no explanation. A buzzer rings through such a winding and can be used for finding a ground in it. When the test is to be made on an audio transformer we have the same problem that we had when testing for continuity; high resistance windings. Even here a buzzer can sometimes be used. If the ground is at one of the terminals there is no high resistance to be buzzed through and the buzzer will show the ground. One lead of the test circuit is placed on the transformer terminal and the other test lead is placed on the core. A buzz shows this terminal to be grounded.

When the test lead is placed on the terminal at the other end of the grounded winding no buzz will be obtained. The resistance of the winding is so great that enough current cannot flow to operate the buzzer. If the buzzer is now removed and a sensitive voltmeter or a milliammeter with a resistance in series is hooked into the test circuit the ground will show up. It is understood, of course, that a battery is used in connection with the buzzer and with the meters. The meters will show that there is a ground even if it is in the interior of the winding.

When the inside of the winding is grounded it usually is a hopeless case as far as repairing the transformer is concerned. It is possible, however, to get by until another one can be obtained. A piece of insulating material is placed between the transformer and the panel on which it is mounted. The fastening screws or bolts must also be insulated, either from the transformer or from the mounting panel. In cases where the transformer is mounted on a bakelite panel or on a wooden baseboard it is only necessary to remove the grounding wire from the core.

When a pair of headphones and a battery are used for finding grounds a click is obtained when the connection is made and when it is broken if the circuit is grounded. A very faint click is often obtained when the leads are placed on the terminal of a circuit even when it is not grounded. This is easily distinguished from the click produced by a ground. Of course clicks produced by a grounded circuit do not all sound alike. When the test leads are placed on a terminal that is itself directly grounded the click will be louder than it would be if the ground is in the inside of the winding, and the resistance of the winding being around 20,000 ohms or more, but these can all be distinguished from the slight click mentioned above that was had when the
leads are placed on the terminal of an ungrounded winding.

Care must be taken to keep the hands or anything else that may be a slight conductor of current from getting across the test leads, as enough current may flow through this external circuit to give an indication on a sensitive meter or in the phones. Another point to watch is to be sure that the transformer is not grounded through some circuit to which it is wired. It is best to disconnect the circuit before starting to test for the ground.

When testing transformers having a permalloy core the test current should be kept at a very low value. This applies mainly to the transformers in the 49-A amplifier, the three tube Pec amplifier used with the older ERPI sets and the input transformer in the 41-A amplifier. This point really should have been mentioned in connection with the tests for continuity. Testing for grounds with a high value of current does not make so much difference, as no current will flow if no ground is present, and if the winding is grounded the transformer is NG anyway, so there is not much to worry about. The reason for the low current is that DC in any amount will ruin the magnetic properties of the core, it is then of less value than if it were made of ordinary core material.

Two grounds in a transformer are not very likely to occur, but it is possible for such a thing to happen. Merely insulating the transformer will not allow it to be used again, even for a short time, since the plate voltage is hooked into the grid circuit through the two grounds. The wiring can be changed so as to use parallel plate feed. To do this hook a resistance from the plate to plus B, then hook a condenser from the plate to the P terminal on the transformer. Disconnect the B terminal on the transformer and connect it to the filament or to the cathode of the tube. Mount the transformer on a piece of insulating material and then it will probably work. It will depend upon the position of the two grounds in the windings.

If the thing won't work hook the condenser to the G terminal instead of the P terminal. It should work now, although there will be a drop in volume since there is no step-up in the transformer, the primary not being used and the secondary being used only as a grid choke.

If it happens to be a push-pull input transformer the above still holds good. Should it be necessary to hook the coupling condenser to the grid it can be connected to either of the push-pull tubes, although one way might work better than the other.

When the grounded transformer is one coupling a single tube to a line, or if it is a push-pull transformer in a similar position, and two grounds are present, parallel plate feed to the tube will remedy the condition when the transformer is insulated from the panel. It is usually necessary to remove the ground connection in the low impedance line, if there happens to be one. I do not remember whether the line running from the 42 to the 43 is grounded or not, but the line from the 43 to the 200-A output panel is.

When the ground connection cannot be found readily a 2 mike condenser can be hooked into each side of the line where it leaves the transformer. This is not the best practice as it does upset things somewhat, but it will enable the show to go on.

Sometimes this trouble can be overcome by just reversing the leads to transformer. Take, for instance, a case where the transformer secondary is connected to the grid of a tube and the other end goes right to ground. If the grid end should become grounded reversing the leads will place the grounded end of the winding where no harm will be done, that is, it will work. It is best not to leave it this way any longer than necessary, as a greater capacity exists.
**SPASMS** By J. B. G.

Managers who took up golf to relax their minds from business now continue the game because there isn’t any.

Doorboy (to singing assistant manager): “Why don’t you change that tune you’re singing to ‘The Volga Boat Song?’”

Assistant Manager: “And why should I, my lad?”

Doorboy: “Well—you’re always working your drag?”

Cross marks the spot where the body was found:

“I just read a great technical article.”

“Yes? What was it about?”

“Huh? That’s funny—I can’t think just now what it was about.”

“I see. Who wrote it?”

“Huh? Gee—I can’t think of his name now. But it was a pip.”

“It must have been fine. I’m sorry I didn’t see it.”

“Yeah. You ought to keep your eye out for his articles.”

“Whose articles?”

“Huh? Don’t be so stupid!—this fellow whose name I can’t think of.”

Simile: As public as the contents of a service man’s brief case when he steps out to listen to the show.

Brother Huston: “Are you getting many of these Gilded Horse films?”

Brother Friedman: “What-d’-yuh-mean: ‘Gilded Horse films?’”

Brother Huston: “You know—Metro’s Golden Mare.”

Brother Miller: “The end of the comedy is full of punch marks—so just change over on the last one.”

A good five-cent cigar would probably do the country a lot of good; but a manager who will buzz the fader down instead of up—if only for the sheer novelty of the thing—won’t do the country a bit of harm.

Pointed Questions: “There’s thirty feet to go—do you think you’ve got time to put in the right reel?”

“And furthermore—if you eggs can’t keep your shirts on we’ll install Cue-Meters and keep the observation ports closed!”

“But it didn’t say ‘The End’ boss, it only said ‘Finis.’”

from the grid of the tube when this connection is used than when the hook-up is normal.

Should you have occasion to reverse the wires, say for instance on the output transformer of a 43 amplifier, if you have only one 43 everything will be fine, but remember if you are using two of them that you must also reverse the wires on the other output transformer, otherwise there will be no sound. If you only reverse the leads to one of the amplifiers the currents from the two amplifiers will be 180 degrees out of phase.

These currents will circulate through the secondaries of the two transformers but none of it will get up to the output panel.

Possibly another point should be mentioned in connection with push-pull transformers when parallel feed is used. Each tube is hooked to its own P terminal on the transformer through a separate condenser, and separate resistances are used from the plate of each tube to the plus B wire. The B terminal on the transformer is connected back to the center point of the filament transformer.
THINGS IN GENERAL
By THE EDITOR

All knowledge is lost that ends in the mere knowing; for every truth is a light given us to work by. Gain all the knowledge you can, and then be sure to use it to good purpose.—Ruskin.

The foregoing quotation is one that should be filled with meaning to every thinking projectionist. Its truth is fundamental and is applicable to our profession just as much as it is to any other craft or individual. It states in a masterful way, which we could never hope to creditably emulate, what this publication stands for. An exchange of ideas among projectionists is beneficial to the contributor and reader alike. A movement of this kind is cumulative and will in time exert a powerful influence for good among the several chapters of our Society. I suggest that each member pass along through the medium of his publication any specialized knowledge that would aid his fellow craftsmen. It is the mission of this publication to aid western projectionists to gain a better understanding of their profession. There are no private motives in promotion and no other objectives whatsoever, other than that of carrying out that mission fully. On this basis we claim your full co-operation, and knowing the western projectionists as we do, we know that it will be forthcoming.

* * *

A convention of A. P. S. projectionists from western chapters in Hollywood. This is not only a possibility but a probability. Many prominent men in Hollywood film circles have offered the co-operation of their organizations to us in our effort to bring about a projectionists academic convention. After consultation with President Frank L. Seavier of San Francisco Chapter No. 16, and President Sidney Burton of Los Angeles Chapter No. 7, it was decided that the logical solution is to invite the projectionists from the various western A. P. S. chapters to come to Hollywood and spend a few days in the center of production. A lecture tour through the large studios would be an education to any projectionists in the country. A day’s trip through one studio would be well worth the cost of the trip.

We feel that the objective of all western chapters should be that of having a well informed membership. By fully informed I mean that each chapter wishes its membership to know every branch of the technical phases of the industry. A short sojourn in Hollywood would help materially in that direction.

Chapter presidents please write in what you think of this idea. Let’s all get together and have an educational conclave that will make history.

* * *

The establishment of the Standard Release Print has made possible the abandonment of cue sheets for the projection of sound pictures, according to announcement of the Technical Bureau of the Academy of Motion Picture Arts and Sciences.

Studios and exchanges have been notified by Lester Cowan, manager of the Bureau, that the distribution of cue sheets with prints may be safely discontinued. Spaces left for the purpose in the Standard Release Print will be used by the studios for any special information or statement of fader settings which the projectionist should have to run the show. Approval of this change in practice has been given by the Producers-Technicians Committee of the Academy.

The abandonment of cue sheets will mean a saving of several thousand dollars a year to each of the companies which have been sending them out with prints since the introduction of sound.
The famous emporium of long runs, Grauman's Chinese Theatre, was closed for three weeks this month. The brothers who enjoyed the forced vacation are Fred Weaver, Bob Babcock, Dave Koskoff and Rex Brown.

Bro. H. C. St. Clair is busily engaged in watching building operations on his new home. He informed us that the house warming will take place in about 60 days.

Bro. J. O. Ellery, Secretary of San Bernardino Chapter No. 19, writes that they are always happy to have visiting brothers at their meetings. Any members of the A. P. S. who can do so will find their time well spent.

Bro. M. H. Thoreau, President of Vancouver Chapter No. 11, A. P. S., visited in Los Angeles last month, together with a party which consisted of four. At going to press, Bro. Thoreau had not been interviewed. We are sure, however, that he will make statements for publication in our next issue.

Brother Wallace J. Maxon is now home from the hospital, where he is fast recovering from his illness.

Stop the presses! Last minute news tells us that Brother Harold Swanson is the proud Daddy of a boy born Sunday, May 24th. Cigars!

IDIO(NON)SINCRASIES
FROM SAN FRANCISCO

Harry Everett found out that the liquid in a Pyrene is not a good eye wash.

“Dimmit” says Ericsson. “Vy don't pictures go through the card board?”

“When I was on the road,” said Knobloch, “we found it necessary to remove the card board.”

Bro. Barnett appeared on Market Street the first day of April with a new straw hat, but the rain sent him home in a hurry to exchange it for the old reliable felt.

Was it Will Rogers or Poe that said, “In the Spring a young man's fancy turns to thoughts of love?” Brother John Ford, Jr., our Secretary, is showering attentions on a fair young lady.

Bro. Triplett has been working strenuously in the last year at the Fox Theatre and decided to take a week off to regain his health and strength.

Bro. Frank Seavier, president of Chapter 16, is continuing to improve. Although not fully himself as yet, he will doubtless be back to normal in the near future.

Twenty-five
Chapter Doings

California Chapter Number Seven

The first meeting in June will be held Friday night, June 2nd, at Dinah's Shack, at the intersection of Washington and Adams Boulevards. The meeting starts promptly at 12:00 midnight with a chicken dinner, followed by a business meeting.

The second meeting will be an Initiation meeting at the T. V. G. Building, at Washington and Toberman Streets, at 12:00 midnight, Tuesday, June 16.

A. P. S. men from all Chapters are cordially invited to attend.

San Bernardino Chapter Number Nineteen

San Bernardino Chapter Number 19 meets at the American Legion Club House, 113 West E Street, Ontario, Calif., on the fourth Tuesday of each month at 12:00 midnight. Dinner is served after which a short business session and educational lecture are provided. A real worthwhile evening is always provided for our members.

Visitors from other Chapters are cordially invited to join us at our meetings.
CALIFORNIA CHAPTER NO. 7

At the meeting of the Board of Governors, Chapter No. 7, of May 1st, it was decided that for the next few weeks lectures would be dispensed with, being replaced by business meetings, and social gatherings. The first of these was held Tuesday, May 4th, in the Orange Room of the Hotel Hayward. The program, consisting of a “Variety” show, featuring several high class acts, the showing of educational films, which we trust were of benefit to all, closing with an excellent buffet lunch with all the trimmings.

It has been proposed that meetings of this nature be held more frequently, the decision of which depends upon you. Let’s hear your ideas on the subject.

The second meeting in June is to be another event in Chapter history long to be remembered. We are again to have the initiation of candidates, which, under the supervision of the “Doctors,” should prove a huge success, and a real treat to all. Anyone having any “unique” ideas as to new methods of torture to inflict upon the victims kindly communicate with members of the committee.

Invitation is hereby extended brothers of neighboring Chapters to attend this initiation meeting to be held Tuesday, June 16th, 12:00 midnight, in the T. V. G. building on Washington Boulevard, in Los Angeles. You are assured of a most enjoyable evening at the expense of our “victims.” The last of these “functions” was held during the International Convention held in Los Angeles in June, 1930, and proved a delight to our out of town guests, many of whom wrote, and wired us for the use of initiation paraphernalia, although we promise something entirely new this time.

May we again extend a cordial invitation to all out of town brothers to attend our meetings, which are held the first and third Tuesday of each month, at 12:00 midnight.

FRED L. BORCH,
Secretary Chapter No. 7.
Twenty-seven
THOUGHTS WHILE STALLING » » »

Bro. Bridges, Chief of United Artists Studio, is the most calm and collected guy in the biz . . . . how can such a thorough gentleman keep a herd of twenty projectionists in line . . . . the world’s worst projection position the 12:00 midnight to 8:00 A. M. trick in the laboratory . . . . Bros. Chuck Fowler and Louie Wutke’s shop . . . . I wonder if they would let me play with their equipment awhile . . . . I still have the small boy’s yen to play with the nice shiny gimmicks . . . . Chuck is developing a mercenary merchandising mental medaphorise that is marvellius . . . . that ought to assure success . . . . or something . . . . I expect him to start talking with his hands any time now . . . . a crying need for projectionists is a better smelling film cement . . . . and a black lacquer that won’t dry out just in time to let you down when you need it most . . . . there seems to be no limit to the lengths that printers will go to—to dumbfound a novice . . . . their terms, such as Bold Face, Caps, Benday, 100 screen, Esterisses, etc., etc., has developed into a chargoon that rivals Australian slang for complexity . . . . what chance has a dumb guy got to follow a conversation wherein these terms and dozens of others are liberally sprinkled in for no apparent reason . . . . the overworked wise crack to our Supervising Editor: “Hello Bacon, where’s the eggs?” . . . . getting on the carpet on account of the canvas . . . . the chap who put in a vitaphone subject backwards by mistake, no titles made detection by the audience next to impossible . . . . what a break! . . . . with luck like that Jack Dempsey would be elected president . . . . or I might get a job in a Class A theatre . . . . Brother Pointner’s proclivity for smokers.

What a different spectacle the modern projectionist presents over the men of the old school. I refer to the Los Angeles variety. Twelve to fifteen years ago the up to the minute projectionist of these here parts was clad in riding breeches (more or less clean), sweater and cap. His means of locomotion was a motorcycle (which was always spotlessly clean), which he used for every transportation purpose. His lady friend, if he had one, which he rarely did, was transported on a tandem seat. It required real courage to be a projectionist sweetie in those days. His chief amusement was to attend motorcycle hill climbs. Several of my acquaintances participated with very creditable, and thrilling results. These same dare-devils of the pioneer days are now clean-cut chaps—neat—well dressed and thoroughly proficient craftsmen.

* * *

I almost forgot to mention the old-timers’ greatest accomplishment. They were extremely adroit at balancing a ten-reel can on the handlebars. Some feat—try it on your youngster’s kiddy car.

* * *

One of the two wheel artists had become practically remodeled into a modern when he broke out again in a motorcycle rash—he became a motor cop.

* * *

Some ships sail East and some sail West
While the selfsame breezes blow.
It’s the set of the sail and not the gale,
That bids them where they go.
As the winds of the sea are the ways of men
As we slowly plod through life.
’Tis the set of the soul decides the goal
And not the storm and strife.
Alternating Current—An electric current that reverses in direction at regular intervals of time.

Ammeter—A meter that measures the strength of electric current in amperes.

Antenna—A single wire or system of wires for radiating or intercepting radio waves.

Atmospherics—Noises produced by stray waves of natural origin, causing clicks, rattles or hissing sounds in radio receivers; also called “static.”

Audio Frequency—A frequency vibration that is within the normal audible range; usually taken between 16 and 16,000 cycles per second.

During the past few years of sound application to projection equipment more and more thought has been given to the projection of the picture to maintain a standard set previous to the coming of sound.

Many changes were necessary to accomplish this result, and one of the most important of these was to obtain the proper illumination, and to do so greater amperage was needed and the construction of different type lamps necessary. These improvements also presented complications, namely, intense heat on the film which in turn gave us considerable tension trouble, in and out focus effect and others to numerous at this time to mention.

With this point in mind, the Rear Shutter, together with the side framing device, was developed, and its practical application to the Powers projector was made possible after months of experimentation on the part of Al. Bulgier and Earl Jacobs, co-designers.

In designing the rear shutter every effort was made to simplify its construction and consists of main shutter casting complete with shutter housing, shutter and shaft in one unit, and can be installed by any projectionist.

The shutter has been given a thorough test and we believe has now received the approval of all those who have had the occasion to see it in operation, and while we are aware that this new type of shutter will at first cause some inconvenience to those accustomed to the old type, we feel confident that the advantages of the new type will soon become apparent to all projectionists using it.

The Shrine Auditorium is now equipped with a two machine installation and we might add, ask Huff about them.

To Improve Your Projection Use

The Rear Shutter Adaptable to Powers Projectors

For Information, Write

Jacobs-Bulgier Rear Shutter Co.
Box 5198B     Gardena, Calif.
### TABULATION OF ETHERIAL WAVES

By HARRY C. EVERETT, A. P. S., Chap. 16

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<tr>
<td>9</td>
<td>Meters (M)</td>
<td>Trans-ocean radio</td>
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<td></td>
<td>25600</td>
<td>Used by large ships</td>
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<tr>
<td></td>
<td>24000</td>
<td>Used by small ships</td>
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<td></td>
<td>10000</td>
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<td>Broadcasting, amateur and commercial</td>
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<tr>
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<td>2200</td>
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<tr>
<td></td>
<td>600</td>
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<td>400</td>
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<td></td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200-12.5</td>
<td></td>
</tr>
</tbody>
</table>

| 13      | Meters (M)  |  |
|         | 12.5        | Chiefly used by Hertz |
|         | 1.5         | Now being invaded by amateurs |
|         | Millimeters (MM) |  |
|         | 780         | Shortest Hertzian wave produced by Lampa (1897) |
|         | 6.5         | Shortest Hertzian wave measured by Rhigi |
|         | 4           |  |
|         | 3.25        |  |
|         | 3           |  |

### Hertzian Waves

**Slightly Explored Region**

<table>
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<tr>
<th>3</th>
<th>Microns</th>
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<tr>
<td></td>
<td>1625</td>
<td>Long heat waves in this region received on radio receivers</td>
</tr>
<tr>
<td></td>
<td>812.5</td>
<td>No practical use has been found for this region</td>
</tr>
<tr>
<td></td>
<td>406.25</td>
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</table>

### Infra-Red or Dark Heat Waves

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<th>Microns</th>
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<td>343</td>
<td>Limit of heat rays measured by Rubens and Bazzone (1911)</td>
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<td></td>
<td>67</td>
<td>Limit reached by Rubens and Nichols in 1897-1898</td>
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<td></td>
<td>25</td>
<td>Sylvine in their plates becomes opaque</td>
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<td></td>
<td>20</td>
<td>Rock salt begins to transmit</td>
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<td></td>
<td>15</td>
<td>Langley’s longest measured heat waves</td>
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<td></td>
<td>11</td>
<td>Flour spar in thin plates becomes opaque</td>
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<td></td>
<td>5.5</td>
<td>Limit of heat waves mapped by Langley</td>
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<td></td>
<td>2.7</td>
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<td></td>
<td>.8</td>
<td>Extreme red sometimes visible to acute vision</td>
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<td>--------------</td>
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<td></td>
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<tr>
<td>6700</td>
<td>Limit of perception of red to average eye</td>
<td></td>
</tr>
<tr>
<td>6500</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>5830</td>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>5510</td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>5120</td>
<td>Green</td>
<td></td>
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<td>4750</td>
<td>Peacock</td>
<td></td>
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<tr>
<td>4490</td>
<td>Blue</td>
<td></td>
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<td>4004</td>
<td>Violet</td>
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<td>3900</td>
<td>Limit of perception of violet to the average eye</td>
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<td>3600</td>
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<td>Stoke’s limit of phosphorescence</td>
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<tr>
<td>2020</td>
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<td>1850</td>
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<td>Limit of transparency of crystal quartz 2 m.m. thick</td>
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<td>1450</td>
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<td>1350</td>
<td>Limit of transmission of superfine flourite</td>
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<tr>
<td>1250</td>
<td>Saunder’s limit in spectra of Calcium in 1914. Also Schuman derived from hydrogen spectrum.</td>
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<td>Observed in spectrum of helium at 2 to 3 m.m. pressure by Lyman in 1917</td>
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<td>372.2</td>
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<td>144.3</td>
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<td>130</td>
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</tbody>
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Ordinary clear quartz begins to absorb

Miller’s photographic limit

Stoke’s limit of phosphorescence

Ozone producing power begins

Shortest wave length transmitted by a mercury lamp of clear glass.

Rock salt ceases to transmit

Limit of transparency of crystal quartz 2 m.m. thick

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Observed by Milliken in the spectra of aluminum, magnesium and sodium (1921)
<table>
<thead>
<tr>
<th>Octaves</th>
<th>Wave lengths used in radio</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hertzian (very short radio)</td>
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<tr>
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<td></td>
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<td>1</td>
</tr>
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<td></td>
<td>Ultra violet</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Long X-rays, X-rays and Gamma rays</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>51</td>
</tr>
</tbody>
</table>

**Explanation of Units of Length Involved**

- 10 Angstrom (Å) = 1 millimicron = 10⁻⁷ cm.
- 1000 Millimicrons = 1 micron = 10⁻⁶ cm.
- 1000 Microns = 1 millimeter = 10⁻³ cm.
- 10 Millimeters (m.m.) = 1 centimeter.
- 100 Centimeters (c.m.) = 1 meter.

The above data on Ethereal Waves should be studied carefully by every projectionist. It will impart to you a thorough working knowledge of this important phase of your work. We do not often have the privilege of printing such a completely comprehensive study of any subject. We, therefore, urge you to take full advantage of its value.—**EDITOR.**

_Twenty-Two_
on the direct current coil of the reactance dimmer. The output of the tube control set is varied by means of a third (226) tube. The control of this tube is accomplished by means of the potentiometer located on the stage or auditorium switchboard as described above. A 30-volt D. C. source of potential is impressed on the potentiometers. The sliding arm of these potentiometers is connected to the grid of the control tube for this circuit. Thus by varying the potential on the grid from 0 to 30 volts the output of the tube is varied from maximum to minimum, which in turn through the reactance dimmer changes the intensity of the lights from full brilliancy to blackout, or to any intermediate position the operator desires.

Due to the fact that this grid control is purely a potential control and that no current is required for same, it is possible to use telephone type wiring for the connections between switchboard and tube control board, thus cutting down the installation cost of the same. Furthermore, due to this feature whereby no current is used in the control circuit it is possible to obtain a pre-set dimming and also a proportional dimming by means of which combination of colors may be brought up from blackout to any desired intensity obtaining approximately the same hue throughout. This process may, of course, be reversed. This was not possible with the old type of control due to the fact that intensities could not be pre-set and therefore could not be varied as a group.

The fellow who talked about the "silent night" lived before the age of the loud speaker.
LOUDSPEAKER
FOR WESTERN PROJECTIONISTS
Sponsored by CALIFORNIA CHAPTER NO. 7, A. P. S.

A. L. FEINSTEIN,
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Reorganization Movement Gaining Impetus

Academy Dinner at Paramount Studio

Photo Electric Cells By Richard Van Slyker

Bay Cities Chapters Pass Resolution

Anthony and Cleopatra—A Modern Version
   By Frank W. Costello, A. P. S.

Dowser Switch Developed

Things in General By the Editor

Spasms By J. B. G.

Secretarial Comments on Business and Pleasure

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Reorganization Movement
Gaining Impetus

A. P. S. LEADERS FAVOR HOLLYWOOD

Progress is being made in the right direction in spite of many misinterpretations concerning the purposes of the impromptu committee that met in Hollywood to discuss ways and means of promoting academic and fraternal endeavor within the society. It was the intention of this group that represented five of the largest A. P. S. Chapters in existence to stir the long sleeping national organization into wakefulness. This attempt has not yet been wholly successful. There are however faint rumblings of the awakening giant.

Crossing and re-crossing of opinions have proven a national interest in the movement. Thinking projectionists all over the country have expressed themselves as being heartily in favor of reorganization. Many easterners have frankly stated that they believed that the headquarters of the society should be in the West. This is a very logical solution to the problem.

Welman Favors Coast

The following statement was made by Victor A. Welman of Cleveland, Ohio, Chapter 18, in a letter to THE LOUDSPEAKER. Bro. Welman said in part:

"Secession is usually the first thing thought of in such situations, but time has proven that it should not be resorted to until all other possible remedies have been tried. There is no use trying to hide the fact that the A. P. S. as a whole is not functioning satisfactorily, and it is apparent that many members are disgruntled and ready to throw up the sponge. However, I am confident that a good job of reorganization will answer the needs of the situation. I favor the headquarters being on the Coast; and I do not think the present national officers will oppose a reorganization."

Numerous other letters, each expressing a very similar line of thought, have been received.

Burton Interviewed

Bro. Sidney Burton, who is president of California Chapter No. 7, A. P. S., was interviewed by THE LOUDSPEAKER in regard to the reorganization movement and gave the following statement: "Chapter No. 7 has sought constantly since its organization three years ago to promote the interests of the American Projection Society in every way possible. Our scope was limited by two things, namely, lack of jurisdiction and limited finances. The chapters organized by us in the West contributed nothing to our attempts to further the cause in other locations. These chapters sent their financial assistance to the Supreme Chapter in New York. The Supreme Chapter was content to devote these funds to some purpose other than assisting our Chapter or (to our knowledge) any other Chapter to promote academic or fraternal endeavor. It is my hope that this reorganization a plan will be perfected that will make possible an organization campaign that will unite the entire projection craft on this continent into one organization devoted to academic and fraternal endeavor. Bro. Seavier in starting this movement has, in my opinion, created the proper opening for just such an accomplishment."

Georgia Man Sends Views

One of the outstanding figures of the projection craft in the South who has been in close communication with this paper for many months is Bro. P. Dozier Colson of Clayton, Georgia.
Bro. Colson is very active in the South and is affiliated with the A. P. S., P. A. C. and S. M. P. E. The cause of academic and fraternalization is very dear to Bro. Colson. A letter just received states as follows:

"I was very much surprised when I learned of the proposed secession of the West Coast chapters of the American Projection Society.

"Getting my information from the July issue of the 'Motion Picture Projectionist,' I was more than surprised at the quoted statement of 'a prominent A. P. S. man' that characterized such action as lacking in 'a broad national outlook.' I can hardly understand how this could be true in view of your desire to co-operate with me and any other Southern projectionist, and this is a great deal more than the New York chapter has ever offered to do.

"I am whole-heartedly in sympathy with this movement, but I trust that the West Coast chapters get control of the American Projection Society instead of resorting to secession to improve very disgraceful conditions now existing at the Supreme Chapter. Because the Society and the entire craft need the West Coast projectionists.

"I do not have the time to fully express my views, but if you wish I will be more than glad to send an open letter to the "Motion Picture Projectionist' and will set forth my views fully."

National Scope

I believe the foregoing sets forth clearly the trend of views all over the country. These statements came from widely separated sections of the country, but they all carry the same thought. The present administration and location of the Supreme Chapter is not best suited to the needs of the organization. The strategic location for the headquarters of a national academic and fraternal organization is HOLLYWOOD, CALIFORNIA, the Capital of the Motion Picture World.

LESTER COWAN ADVANCED TO IMPORTANT POSITION

The designation of Lester Cowan as executive secretary of the Academy of Motion Picture Arts and Sciences is announced.

Mr. Cowan has served as assistant secretary of the Academy since he became associated with the motion picture industry in 1928 after previous experience in the field of business research. Increased responsibilities devolved upon him following the recent resignation of former Secretary Frank Woods to accept a studio position.

Many matters of importance to projectionists have been sponsored by Mr. Cowan in the past. The most recent of these was the canvass of projectionists' opinions on the Standard Release Print.

Mr. Cowan is receiving the sincere congratulations of the projectionists all over the country. It is generally predicted that long, harmonious contact with the Academy is assured by Mr. Cowan's appointment to this high post.
Academy Dinner at Paramount Studio

Mr. B. P. Schulberg and the officers of the Academy were hosts to a dinner in Paramount’s studio dining room Wednesday night, May 6th. Over a hundred invitees, prospective members of the Academy, were present and in addition the members of all the branch executive committees of the Academy. President Wm. C. deMille of the Academy presided.

Mr. deMille said:

"History is repeating itself tonight. Four years ago this month a similar group of noted men and women chosen from the five major branches of motion picture production met to found the Academy of Motion Picture Arts and Sciences. Douglas Fairbanks became our first president.

"In four years the Academy has grown to be the ‘house of representatives’ of the motion picture industry. Six hundred members—actors, writers, directors, technicians and producers—are now banded together in an established program of conciliation, artistic and technical development and in creating good will and understanding between the public which sees and hears us and ourselves who entertain them.

"Among the significant accomplishments of the Academy have been the adoption of the basic agreement between the actors and the producers, the arbitration of many cases requiring adjustment, the solution of technical problems common to all studios when sound came in, the initiation of courses in the cultural appreciation of our art in colleges and universities, the publishing of bulletins, reports and books as aids to artist, the producer and the technician; the circulation of information to the thousands of inquirers who address our office from all over the world, the entertainment of distinguished visitors to Hollywood. Notable among the latter were dinners the Academy gave to visiting British journalists and to a delegation of foreign journalists representing seventeen different nations.

Not the least of our activities has taken the form of numerous addresses by our members and by our staff throughout the United States interpreting the ideals of the Academy and of modern motion picture production to clubs, conventions and educational institutions. Some call this ‘public relations,’ which, after all, is a proper term, for the 100,000,000 Americans who witness our shadows work on the screen are indeed our public relatives who have adopted us into their homes and their lives. Not a little of the good cheer required in these days has been supplied by those who make possible the motion picture and its power to make the individual forget the cares, the worries and the discouragements of the day. Those who do not know us are those who misunderstand us. The cardinal principle of the Academy is therefore conciliation, whether between branches, between individuals or between us all and the public.

The Board of Directors has authorized me to say tonight that by their unanimous vote the dues of Academy members have been reduced from $60 to $30 a year immediately effective and that the initiation fee formerly $100 will in the future be $25. This action represents the Board’s faith in our rapidly growing democracy, electing annually a Board of Directors with three representatives from each branch. The reduction in dues is made possible through our growth over four years and evidences the Academy’s desire to make it possible for every invitee to join our ranks.

With the exception of the Assistant Directors’ Section of the Academy the Board has voted not to elect further associate members and has asked me to express the hope that the reduction
in the dues of Academy members will cause most of our present associate members to request transfer to the full privileges of Academy membership.

A review of Academy functions would be incomplete without reminding you of the national and international interest that has been aroused by the bestowal of the annual Academy award in the form of the gold statuette of merit. Ten awards will be voted by the Academy membership this fall, registering the judgment of the crafts upon the distinguished work of individual members of our profession. These awards are a coveted emblem of personal achievement, the highest honor the industry can pay a member. Mr. Louis B. Mayer, chairman of the Awards Committee, has in process plans whereby the annual awards dinner of the Academy, to be held the first week in November, will bring together in Hollywood the notables of the industry from all parts of the United States. This event promises to be the greatest in size and in importance in the thirty years of the history of motion picture making.

It is to such an institution that the Board of Directors have invited you to membership. The Academy needs you and you need the collective spirit and benefits of the Academy. Scores of our members serving on Academy boards and committees can testify to the pleasure they derive from this fellowship of service which has become an integral and vital part of this great business."

Mr. deMille introduced the following who spoke of the branch activities of the Academy: Conrad Nagel and Sam Hardy, who spoke for the actors; Al Cohn and Waldemar Young for the writers, Frank Lloyd for the directors, Col. Nugent H. Slaughter and J. T. Reed for the technicians and M. C. Levee for the producers. Mr. B. P. Schulberg, chief executive of Paramount’s West Coast studio as part host of the dinner, presented a picture program in the theatre of the studio following the dinner which was attended by 150 members and invitees to membership.

**Little Willies’ Definitions**

Water is composed of two gins—Oxygin and Hydrogin. Oxygin is pure gin, Hydrogin is gin and water.

A magnet is a thing that you find in a bad apple.

The tides are a fight between the earth and the moon. All water tends towards the moon because there is no water on the moon and nature abhors a vacuum. Gravitation at the earth keeps the water rising all the way to the moon. I forget where the sun joins in this fight.

Three states of water are high water, low water and breakwater.

**USE OF RESISTORS IN ATTENUATION DEVICES**

Attenuators or 'pads' as they are sometimes called, are employed for the purpose of introducing into the amplifying system a definite amount of loss. Such devices consist essentially of a network of series and shunt resistors whose values determine the amount of loss introduced. Accuracy of the resistor units is absolutely essential if the calibration of the attenuator is to be reliable, and permanence of value of these resistors is essential if the attenuator is to maintain this calibration. Since these attenuation devices are employed in audio frequency work, the calibration must be accurate over wide bands of frequencies. Therefore, the resistors must be free of inductance and capacity effects.

Confronted with such rigid specifications, the engineers of the International Resistance Company set to work some time ago developing special units to meet the requirements.

—Reprinted from Projection Engineering.
The surprising growth in recent years of photo-electric cells (photo-tubes), as applied in the industrial field may be easily understood when the versatility of the photo-tube is known, when seen in the countless uses to which it has been applied. A review of its multifold uses show that it ranges from automatic counting and sorting of various sized objects to the most delicate comparisons of colors and measurements of densities and of semi-transparent objects with an almost unbelievable degree of accuracy and fidelity.

As mentioned in a previous chapter, photo-tubes when used in an amplifying circuit require two types of amplifiers, the static and dynamic. Where we deal with slow gradual or abrupt changes of light intensity the static type of amplifier is desirable in one or more modified forms because of its easily controlled range of action and simplicity of construction. However, in some cases it is desirable to incorporate in the amplifier design an oscillating circuit so as smaller light intensities of a pulsating nature may be handled with a greater degree of sensitivity. This addition of an oscillating circuit permits a conventional design of dynamic amplifier to be used in gaining additional volume.

Again in the classification of photo-tubes the uses of the photo-tube is divided into several classifications irrespective of whether the tube is photo-electric, actino, or photo voltic.

The divisions are:

(A)—Where the subject is interposed between the light rays and the photo-tube. (Fig. 1).

(B)—Where the reflected rays of the subject are directed to the photo-tube (Fig. 2).

(C)—Where the measurement of light intensity is such as to permit direct exposure to the photo-tube (Fig. 3).

It is the intention of this article to try and present to the projectionists some representative uses of the photo-tube as shown in the above classifications, outside of the immediate use of the motion picture industry.

In the accompanying photograph (Fig. 4) a means of automatic control of the mixing, or, titration of...
chemical mixtures is shown. The manner in which this system operates is as follows: In reverting to the first classification of photo-tube uses (A) in which the light ray penetrates the subject. We have in this system the light source (A) which directs the light ray through the liquid solution (B) which upon increasing in density due to the addition of chemicals, permits less light to pass to photo-tube (C) that due to its directly proportionate output causes a correspondingly less current to flow to amplifier (D) which in turn permits relay (E) to work, passing power to valve (F) stopping the flow of chemicals to the beaker. This is representative of the daily use in chemical and pharmaceutical laboratories of the photo-tube.

In the next example which is representative of classification (B) we have a circuit shown in Fig. 5 where a reflecting mirror is used to direct more or less light to the photo-tube. In this particular case a thermo-couple is suspended in a hot bath or place where the accurate control of heat is necessitated to a microscopically small degree as in retorts, blast furnaces, plating baths, etc. The output of the thermo-couple is connected to a sensitive galvanometer which carries a small reflecting mirror (M). The light ray (L2) is then directed to the stationary mirror (M1) thence, to photo-tube. From the photo-tube the current goes to the amplifier circuit shown, and then to relay (R) from the relay the controlling current permits the addition of more or less heat to the subject under control. The light source (L) is concentrated by lens (L1) upon the galvanometer mirror.

Other uses of the reflecting system with the same circuit, with the exception of the galvanometer is that of grading and sorting of various objects and color comparison by placing the subject to be scanned. Where the rays from the light source reflect from the subject to the photo-tube, the relay either stops the operation of the machinery or sounds a warning, notifying the attendant in charge that something is amiss. In this manner exceedingly accurate comparisons of various subjects may be had.

In the last classification (C) where the direct light rays from a source are permitted to impinge upon a photo-tube, we have a means of measuring light intensity and (depending upon the photo-tube composition) the various light spectrum that are present. In this manner some of the main uses are in stella photometry, light photometry and spectral photometry. One of the latest uses is that of an exposure meter mounted in a camera to give an instantaneous means of measuring the intensity of illumination on the set as picked up in the
camera. In stella photometry the photo-tube is accurate in the measurement of distant stars brilliances. In lamp photometry it gives a nearly instantaneous means of measuring light brilliances of a room or a moving picture screen, or of a light source. In some cases the use of color filters, which are composed of specially tinted glasses, is an advantage to eliminate undesirable light rays, which if permitted to remain would confuse the issue.

In again reverting to the first classification (A) in which the light ray passes through the subject, we have in a special case where a means of density control is necessitated by a photo-tube. A photo-tube of a special nature is required, this photo-tube was evolved because of the necessity for a tube of linear or straight line characteristics and stability which was unattainable in the present day form of manufactured tube. The sensitive area in this type of tube is composed of (if I remember correctly) nickel-chrome wire coiled in a form of a cone (Fig. 6). Two such cones being joined at their apexes, a small voltage is then applied which causes them to glow faintly (about a dull red). This tube is one of the "actino" family, as it is resistive in action. At the moment this tube is being used in reclamation of silver from "hypo" in a large film laboratory. At a particular point in the equipment used for reclamation, a photo-tube is needed to determine the specific density of the hypo-solution within extremely narrow limits of "density," which necessitates a photo-tube of these characteristics.

The use of photo-tube in the reading of light vibrations or fluctuations in conjunction with an oscilloscope, gives an accurate means of studying the wave form of any unknown light source of either near or distant origin.

A photo-tube, when used in conjunction with an oscilloscope, is connected in such a manner as to pick
up the light rays under test and is then connected to an amplifying circuit and then fed to the anode of the oscilloscope screen tube, which carries a fluorescent screen on one end where the electron stream in reality paints a picture of the wave form or of the vibration of the light rays.

In these examples as given, showing some of the representative uses where the needs of extreme accuracy could in no way be satisfied without the use of a photo-tube, a device which plays a part in attaining these results in no small degree, is the relay.

The use of the relay in various circuits plays no small part in the performance of industrial needs. The type of relay used in photo-tube control circuits is of necessity one which will respond to the minute flow of currents as had in the plate or output circuits of a small vacuum tube. A prime factor of relays used in these circuits is that of having an instantaneous response to the amount of current to which they are set. As the currents are very small, measured in micro-amperes, it is generally desirable to include in the relay circuit an extraneous impelling current working upon an additional solenoid to close the contacts carrying the current to the circuit which controls the operations of anything for which it is intended. This type of relay is known as the double action relay and is in general more sensitive than the single action relay which has only one solenoid dependent upon a few micro-amperes that the amplifying circuit is able to deliver to swing the armature. These extremely sensitive instruments are usually known as galvonometer relays and use currents in some cases as small as 0.000015 amperes which gives rise to the fact that the accuracy of the relay is dependent upon its range (micro-amperere rating) and on its torque (armature swing). The approximate limits may be found in the following formula as given by “Weston”:

Examples—

<table>
<thead>
<tr>
<th>High Value [of Adjustment]</th>
<th>Low Value [of Adjustment]</th>
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<tbody>
<tr>
<td>10.5 ma.</td>
<td>9.5 ma.</td>
</tr>
<tr>
<td>10</td>
<td>9.1 ma. or 1% of mean value, (10ma)</td>
</tr>
<tr>
<td>72 volts</td>
<td>55 volts</td>
</tr>
<tr>
<td>10</td>
<td>1.7 volts or 2.7% of mean value (63.5v.)</td>
</tr>
</tbody>
</table>

This formula does not apply if the high value minus the low value is less than 10 per cent of the mean value (in this case 10.5mA). The above formula is given with the purpose in mind showing that the accuracy attainable depends upon the range of the instruments and is of no fixed value. It might in some cases be as close as \( \pm \frac{1}{2} \) of 1% and in other cases as wide as \( \pm 10\% \) of the mean.

However, any standard micro-relay with its limits determined by the amplifier output in milliamperes may be used if the current rating of the contacts used to accentuate the controlling source, i.e., motor, heater, etc., is of sufficient capacity.

Bear in mind that the uses of the photo-tubes in the industrial field are by no means limited by the needs of the engineer. The next chapter on photo-tubes will go into the field of television, where the photo-tube takes the predominating part of the apparatus used in the obtaining of television images.

A polygon with seven sides is called a hooligan.

Queen Elizabeth was the “Virgin Queen.” As a queen she was a success.
Bay Cities Chapters Pass Resolution

San Francisco Chapter No. 16 held its regular meeting Tuesday, June 9th, with an unusually large attendance. After consuming the midnight luncheon which is now a regular affair at our meetings, the boys listened attentively to Professor Reukema give a brief resume of the incidents that transpired at the S. M. P. E. convention the week previous at Hollywood. The professor with his keen mind grasped some innovations which are about to be utilized in the near future in conjunction with sound pictures, but which at the present time are in an experimental stage. The ultimate use in which he will apply these new discoveries in our forthcoming lectures, should make it imperative, or rather highly essential that all members attend these lectures that they may be prepared to handle efficiently these new appliances which will be part of our working equipment.

President Frank Seavier read off the minutes of the A. P. S. meetings held in Hollywood, also the resolution enacted by the delegates present there from the various chapters. After a short discussion Chapter No. 16 voted unanimously to adopt them.

On June 22nd Oakland Chapter No. 12 brought the resolutions before their members with the same results. Apparently there is no opposition in the Bay cities to this proposition which was drawn up carefully with NO SELFISH motives, but merely to promote the general welfare of the projectionists and enable them to take advantage of the educational opportunities that are open to them. We believe, as do others throughout the United States that the headquarters of our society should be in the heart of the industry, and what more logical place could we select than Hollywood.

It has become a customary practice lately for Oakland and San Francisco members to attend each others’ meetings, meanwhile a very strong friendship has developed between the two chapters. Several of the San Francisco boys visited Oakland chapter the night that the resolution was brought up for discussion. The Oakland boys always receive us cordially and manage to make our short visit with them as interesting as possible. The meeting was very brief this particular evening, the resolution having passed without one dissenting vote. President Lloyd Litton invited us to his home to tarry a while before embarking for the other side of the Bay. The boats were running irregularly, owing to the heavy fog on the Bay and the prospect of lying up on the Mole waiting for favorable weather conditions did not sound very pleasing nor nearly so attractive as reclining in an easy chair among pleasant surroundings, besides there were a few important subjects to be discussed which were overlooked earlier in the evening.

Brothers Seavier and Litton held a long distance telephone conversation with Los Angeles relative to A. P. S. doings, while Brothers Reinhardt, Munter and Gaffney held short distance conversations checking alibis which each would vouch for in case of an emergency. Bro. Everett said he had a note book full of alibis, given to him by an expert which were O. K. if not used more than once. We arrived home in San Francisco about 5 a. m., after having spent a very enjoyable evening.

Thirteen
Anthony and Cleo—
A Modern Version
By Frank W. Costello, A.P.S.

“The life of a Roman general at times becomes irksome,” said Antony as he heaved his helmet at the cat which was stalking a mouse under the cupboard where Mark stored his limburger. How lonesome it must be for Cleopatra sitting alone at home with only the radio and her pet asp to amuse her! Forsooth, this very night I must call her after I reserve two seats at the ‘King Tut Cinema Theatre’—and three hours later Antony and Cleopatra were snuggled comfortably in their loge seats enjoying the Egyptian News Weekly showing the out-board motor races on the River Nile, the parade of the beauty prize winners and the Children of Israel crossing the Red Sea, but, as Moses regained command of his scattered followers the punch marks started to appear in the celluloid, causing much uneasiness to Cleo.

“Why,” said she, “is it necessary to spoil a perfectly good picture with all those perforations? Are they to let in ventilation, or, possibly they may be film trade marks.”

“My dear Cleopatra,” said Antony, stroking her hand with a tenderness that only a great lover could manifest, “the holes in the picture are merely to notify us that it is about to terminate, thereby giving us ample time to adjust ourselves for the next episode.”

During the following picture Antony was more engrossed in amorous attentions to his fair lady than he was to the substance of the play, and Cleopatra, although in a receptive mood, managed to glance at the screen occasionally to draw a comparison between John Gilbert and her Mark Antony, also to envy some of the modern accomplishments and sex animation of Greta Garbo.

Then, to spoil this exhilaration, a series of punch marks in various shapes and sizes appeared all over the screen just as the characters were demonstrating with realistic effectiveness one of their 90-foot embraces. “What was the meaning of those unsightly marks, Tony?” said Cleo as she began to twitch nervously in her seat. “Don’t tell me this time that the play is over,” for knowing something of the art of necking she could readily perceive that the lovers hadn’t reached second base, and there would be more preliminaries before the final clinch. Tony had to admit that there were a superabundance of perforations, but was at a loss to understand why any projectionist would have the audacity to mutilate film in such a reckless manner. Only three weeks previous at the “Roman Tribunal” he had meted out death sentences for lesser atrocities. Offering excuses to pacify Cleo, he suggested that one of the largest holes in the center of the picture which had a peculiar flourish at the bottom may have been a signal to the projectionist’s girl friend, warning her to “beat it” after the show as his wife was checking up on him. The miscellaneous assortment of punch marks, scratches and corn plasters which followed throughout the feature picture were more than their sensitive nerves could endure and before the finish Antony and Cleopatra arose and followed the other disgruntled customers out of the theatre.

Being queen and so having a domineering influence over her subjects, Cleopatra decided to exercise her royal power in forcing a discontinuation of film mutilation which detracted the attention of the cinema patrons and would eventually ruin this thriving industry, but, first she must appeal to Tony for advice in selecting a substitute for making change-overs which could be used universally by
all projectionists. Tony, let it be known, was a soldier, statesman, diplomat and history tells us also that he had sex appeal, although the description of “why” is very vague. Some of the would-be Beau Brummels of today who have attempted to duplicate his personality, have been repulsed vigorously by the vivacious modern girls who lose no time in choosing between domestic sublimity and Reno reconstructiveness, leaving the pretender in a non-plussed condition, unable to penetrate the seemingly undefendable approaches to a woman’s acquiescences. But Tony didn’t spend all of his valuable time trifling with a woman’s affections. His ability to handle matters of grave importance to his state was recognized by the leading philosophers and technical bureaus of the day—including the Academy of Motion Picture Arts and Sciences.

When Cleo appealed to Tony for help in putting her cinema industry on a solid foundation Tony firmly but gently removed her arms from around his neck, that he might concentrate without interference on a plan already formulating in his mind. After a brief silence he bid a hasty adieu, explaining that he had an important engagement in Sacramento. Mounting his horse he headed for the nearest “speak-easy,” where he could map out his itinerary for the following week free from feminine disturbances.

Then Mark Antony studied the situation carefully for the new standard release print — identification marks—surely he would use his surname, but what would be an appropriate mark! The vision of past battles loomed up before him—bullet holes would be too common; blanks would have the appearance of unfruitful endeavor—one more drink and he would call on Octavius and settle an old political grievance before putting the finishing touches to the S. R. P. But, evidently Octavius was prepared for Tony, the tables were turned, the ballot box stuffed and Tony was defeated by his arch enemy. As the mist appeared over his eyes and he realized that he had failed to satisfy Cleo’s last wish the semblance of the black ball which Octavius used to dethrone him appeared in the upper right hand corner of his vision. Reaching for his questionnaire, Tony attempted to register this apparition in the S. R. P., but he passed out before he could locate the dotted line and it remained for Lester Cowan, 2000 years later to finish the job—and so we bring this nonsense to an end.

Refresh Your Memory

» » » a little each month

Circuit—The path in which electric current will flow.

Coil Antenna—An antenna in coil form, both ends of the coil being connected to opposite terminals of the receiver.

Condenser—An instrument possessing substantial and useful capacitance.

Continuous Waves — Successive waves having, at any given point in space, uniform intensity.

Coupler—An apparatus used to transfer electric energy between two circuits.

Detector—An instrument or audion that rectifies radio-frequency energy of received waves into audible form.

Dielectric—The insulating medium separating the plates of a condenser usually air or mica.

Direct Current—An electric current that does not change in direction of flow.

Electrolyte—A conductive liquid, such as the sulphuric acid solution in a storage battery cell.

Electron — The Smallest electric charges, and negative in potential. A drift of electrons proceeds from negative to positive parts of a circuit.
Dowser Switch Developed
Selective for any number of dowsers

The automatic dowser has been in use for several years and has grown into one of the most indispensable articles of equipment in the modern projection room. Through its use one of the most critical periods of motion picture presentation, the changeover, has been simplified to the point of rendering this operation totally secure. The automatic dowser shuts the light from one machine and opens it on the other simultaneously, thus completing the illusion of a continuous film presentation.

Limited Flexibility

There has been in the past one serious objection, however, to the method of controlling the dowsers. There has been no way devised to use more than three sets of dowsers with the same set of switches. That is, if the designer of the projection room desired to use more than three sets of dowsers, it was impossible to close all the dowsers except the one selected for opening with one operation. This fault was a serious handicap to projection engineers who desired complete dowser installation on all pieces of apparatus. For example, suppose a condition of this kind: Three projectors for use on standard picture size, one projector for magnascope, one high intensity flood, effect, stereo and two spot lamps are needed for projection equipment. You will note that there are nine dowsers necessary to allow the projectionist full control. One for each of the projectors, spotlights, high intensity flood and two for the effect stereo. With the mode of dowser control in use in the past it would be utterly impossible to so arrange the switching of these nine dowsers so that they all would be closed except the one selected upon closing one switch.

Serious Fault Rectified

Bro. R. E. Clark of California Chapter No. 7, A. P. S., developed a switch which can be used with any number of dowsers and any number of control stations. The switch has been named "The Clark Multi-Dowser Switch," and is well named since it has proven in tests that it actually can control twenty dowsers with perfect selectivity. It is of the remote contactor type and is simplicity itself. The job it is designed to do is easily and thoroughly accomplished. It can be used on either A. C. or D. C. of any commercial voltage as found in projection rooms. No limit is placed on the types of dowsers with which this switch can be used. Although it has only been tested on the two most used types now in use in this country, there is little difference between the electrical principles upon which all dowsers work. Therefore it is assured that this switch would be equally efficient on any dowser using the solenoid principle.

Bro. Clark informed us that particular care has been exercised in the mechanical construction of the switch in an effort to make it extremely durable and wear resisting. It will be small enough to fit into the regular switch boxes now in use. The contacts are of silver composition to prevent burning and are of the wipe-break variety.

Acclaimed by Experts

Many Los Angeles projectionists have inspected the Clark Multi-Dowser Switch, and have been unanimous in their praise. Several declared it to be the most necessary part of the really modern projection room. It was freely predicted that theatres both old and new will be quick to adopt this truly marvelous development.
THINGS IN GENERAL

By THE EDITOR

The strength of any organization depends upon two things. The number and calibre of its members. The American Projection Society is particularly subject to this unbending rule. In reviewing the progress of the Society in the West the observer can find much to evoke praise for the pioneers who have builted in this fertile field a strong branch of the Society. The fact that the movement gained a secure foothold in the West in such a short time is particularly significant since it is the first academic organization to attract and hold any sizable number of projectionists in this section of the country. The chief function of the various Chapters of the Society is to bring before its members such material of an educational nature that may seem to be directly connected with the craft. Many diversified methods have been employed by enterprising officers to present to the Chapter members information about their work. The keynote of this message is: “We have done well—let us do better.” There are at the present time on the Pacific slope seven chapters, namely: Vancouver Chapter No. 11, Seattle Chapter No. 17, Portland Chapter No. 20, San Francisco Chapter No. 16, Oakland Chapter No. 12, California Chapter No. 7, and San Bernardino No. 19. Only seven when there should be seventeen at least, considering the amount of suitable material available in the numerous sizable cities that have no academic organization. Examples of this class of cities are: Sacramento, Fresno, San Jose, Santa Barbara, Ventura, San Diego, etc. These are only a few of the best possibilities in California alone.

Extending eastward there are unlimited possibilities. Consider such cities as Phoenix and Tucson, Ariz.; Salt Lake City and Ogden, Utah, and Denver, Colo. In the South there also are great possibilities such as New Orleans, La.; Atlanta, Ga.; Richmond, Va.; Jacksonville, Fla.; Fort Worth and Houston, Tex.; Birmingham, Ala.; Memphis, Tenn.; Columbia, S. C. These are only a few of the cities that should be organized at once as key chapters that would serve to completely merge the country into one society. Their example would naturally cause other cities to follow suit.

There are many others in the United States and Canada. These cities should hasten to affiliate with the American Projection Society and take part in the splendid work being done by the Society. Get behind this worthy cause, push it—think it—talk it—live it. Your interests are the Societies’ interests, reciprocate by making the Societies’ interests your interest.

Write for information about forming a chapter in your town at once. You will earn and receive the gratitude of your local co-workers by so doing.

Editor Finn Congratulated

It is not often that a projectionist has the opportunity of writing an open letter to an editor and be absolutely sure that it will be published. I feel therefore that I am particularly favored as I write this.

There is a man in New York who edits a first class projectionist magazine which has been fittingly named “The Motion Picture Projectionist” and is devoted to the craft wholeheartedly. This man’s name is James Finn. Most of you have heard of him. Whether or not you know him you are invited to read this letter to him. He will read it the same as you. He hasn’t the slightest idea that it is coming. So here goes:

Seventeen
Western Electric's New Tube

A forward step was taken by "Western Electric," when they found that the present 211E tube needed replacing. This fact was known to several thousands of projectionists throughout the country for some time. In fact, if the 211E had one-fourth of the usual life of a 205D, we would all be gray headed before needing to replace them. The principal fault of the 211E tubes were their short life due no doubt to their old-fashioned oxide-coated filament with its low temperature, fairly high emission filament.

In the new "Western Electric" tube, the 242, ERPI certainly made an improvement over the '11 in designing the new 242, with a sturdier and more rigid means of element suspension and construction of the plate. They also boosted up the price to where the tube costs from $8 to $10 more than any other tube of similar nature on the market, and about double the price of a 211E. This tube is to have an expectant life of about 2000 hours. Well, there shouldn't be any real trouble in attaining this long life at 36 smackers per bottle. No, sir. Others come pretty close to that long a life at a lot less dough. Please don't misunderstand me. "Western Electric" does make a good tube, witness their big baby, the 228. This one only costs about 225 bucks with a socket to mount the tube coming about 90 slugs extra. This tube lasts around 10,000 hours if all goes well and is water cooled. Maybe ERPI will water cool the new 242s. Anyway, the operator could stand water cooling when he has to change them in the middle of a show.

In getting down to brass tacks the (Continued on Page 26)

Dear Mr. Finn: You certainly made a scoop (as the newspaper fellows call it) when you printed the story about the A. P. S. reorganization movement. It was both timely and effective. I congratulate you and your organization—and your contacts on their perfect co-ordination. Your article did everything necessary to create a national interest in the movement. May I presume for a second to be the mouthpiece of the Western Projectionists and thank you for them? As you know the society has prospered in the West and has grown rapidly under the able guidance of such men as Frank Seavier, Sidney Burton, H. E. Reynolds, Lloyd Litton, Richard Crist, J. T. Moore and Marvin Thoreau. These men know how to conduct a society. They have proven that fact beyond all shadow of a doubt. And you may depend upon it, Mr. Finn, that if they are given the opportunity to make their activities national in scope they will make the now congealed wheels of the Society turn as they have never turned before. These fellows are hustlers who have the profession at heart. Their earnestness and sincerity are undeniable. Their ability is proven. Where can a better, more capable group be found to bring the ship of concerted academic effort safely into the port of progress?

You have been fair in representing all sides in projectionists' controversies. So fair, in fact, that I for one believe that fairness with you is not an effort at all, it is just a part of your make up. Every projectionist in the country should know how fortunate they are in having your type of man in your important position.

Sincerely yours,

WALLACE G. CROWLEY.
Simile: As welcome as an armful of solo slides on opening night.

The height of being behind the times: The manager who still blames "pee-wee" golf for poor business.

First Projectionist: "I wish I had a thousand bucks."

Second Projectionist: "I'll just 'scab' on you by wishing for five hundred."

They all laughed when I sat down at the piano for they were deaf and had nothing to fear.

But, boss, with business so bad the wrong reel shouldn't matter!

The beginning of the main title is silent so just keep the fader down until the music starts."

Dr. Swab says: "The only cure for usheritis is to marry the gorl."

Shades of the past: (Overheard) "Everything that happened on that deck had to happen in 'one' because that was all the deck they had. There was a dizzy drop painted with water colors that these broads could just squeeze in front of if they held their arms to their sides and came out sideways. They cared for them big in those days. Two hundred pounds was the absolute minimum. The boss was too hide-bound to buy them real outfits so they made their own. And were they darbs? Cheese cloth sewed to the top of their stockings constituted the tights, while they decorated their beef with big tissue paper bows around their hips and over their lungs. Every time they got in front of the footlights they became paralyzed and didn't know what to do until the 'orchestra'—a piano player with a green eye shade pulled over his eyes and a pill hanging from his mouth—would squint up at them and holler: "Come on! Start steppin'." Then they'd get going. First one and then the other would lift a leg and start to sing—with every lift a grunt and every note a groan. I remember one night they were doing their stuff when the tissue paper works went haywire on one of them, falling down and showing everything. Zing went the old spot right down on the main event with the customers giving the circus a big cheer in fifteen languages. Up clumps the boss' dogs on the ladder rungs, all flustered and excited as he poked his knob into the can and shouted: "That's great! We'll pull it every show!"

He was a big man in a business way, this little runt with the rusty hair and fawn-colored spats, and the personnel of the El Drumburst Theatre realized the fact. So as he stood in the lobby refusing a seat and staring at the doorman as that worthy tore the tickets the staff became first curious, then slightly frightened, then genuinely scared. The "grapevine" became active. The manager was notified; the assistant manager awakened, and these two rubbed apprehensive shoulders in emergency formation.

"That's funny," said the manager.
"Sure is funny," agreed the assistant.
"He seems to be staring right through the doorboy, doesn't he?" added the manager.
"Doesn't he seem to be staring right through the doorboy?" amended the assistant.
"Shut up," whispered the manager, "here he comes." Then, in the accepted managerial tone: "And (Continued on Page 22)"
BUSINESS AND PLEASURE

The action of Western A. P. S. Chapters, using the phrase of Mr. James J. Finn of the Motion Picture Projectionist, "Favoring Secession From the Supreme Chapter," has apparently been responsible for much comment both pro and con by those of Eastern Chapters, as well as others in immediate contact with the profession. Secession from the parent body is farthest from the thoughts of those on the Pacific Coast. May some other just and equitable solution be reached? The Supreme Chapter is deserving of much credit for its past activities in the formation of an organization which has gained the respect and prestige of which we may be proud.

Further quoting Mr. Finn, "A prominent A. P. S. man opined that he had no objection to the transfer of the General Offices of the Society to the Coast, but that he was a bit suspicious of the very evident desire for power manifested by the Coast Chapters."

The Ways and Means Committee, comprised of representatives of Los Angeles Chapter No. 7, San Bernadino No. 19, Vancouver No. 11, San Francisco No. 16, Oakland No. 12, and the yet un-numbered chapter in San Diego, under the chairmanship of Sidney Burton, President Chapter No. 7, is striving only for the formulation of some plan under which all Chapters may share in the knowledge, and benefits derived by those in the heart of the industry.

The regular meeting of July 7th, at which we were favored with members of "the fair sex," wives and sweethearts of the Brothers and in the form of a "weinie bake" on the beach at Santa Monica was a huge success. The food, consisting of "dogs" with the usual trimmings, watermelon, etc., etc., was exceptionally well received. Bro. Dave Koskoff officiating at the roasting oven proved conclusively that he sure knows his "hot dogs." Bro. George Young was bemoaning the fact next day that he had only eaten twelve when the "boss" of the family concluded it was time to depart for home. Bro. Frank McBryde was quite in evidence "rushing the can" (not the kind of "ye olden days"). After partaking in huge quantities of everything leading to a sleepless night many of our guests who had come prepared for the occasion threw aside the "old Spanish custom" of the Saturday night bath and bathed in the waters of the broad Pacific under a California moon. The meeting was adjourned with due formality about 4 a.m., everyone feeling that it was an evening well spent, and with the hope that another such gathering was not too far in the offering. Much credit for the success of this meeting is due Mrs. Rex Brown and Mrs. Frank McBryde, who so capably prepared and served the food. May we offer our sincerest thanks.
THOUGHTS WHILE STALLING » » »

Jerry's crack about there being four dummies in one projection room now—two mechanical and two running them.... Those midnight bathers at Chapter Seven's weiner bake—I got the shivers just watching them.... Bro. Lucas, who is president of the scar-belly club, was among those present.... There is a boy who has had some operations.... They must have cut the right thing out the last trip—he looks great.... Bro. Victor A. Welman of Cleveland is a real live wire, you know the type.... Gets things done and all that sort of thing. .... Waiting at the Grand Central Air Terminal for visiting delegates who didn't visit.... Bro. Clyde Shuey, the radiator plaque magnate, has returned from an extended trip East.... One might say, "the trip that plaque bought".... Hope Bro. James J. Graham will conduct the initiation of the candidates recently accepted by Chapter 7.... If he does we'll have a lot of fun—even if the candidates don't.... It's marvelous what Jim can do to 'em and have 'em still live.... Spring or summer fever has sure got me going—I've been wishing the society would hold an extended convention in Hawaii—and send me as a delegate.... I'm sure I'd lose my return ticket.... and become a beach comber or something else equally shiftless.... Which reminds me of the projection-ist who declared that he was so dumb he thought Manual Labor was a Mexican.... Please excuse the yawn.... Ho hum.... I might as well go on back to sleep.... So long.

(Continued From Page 17)

furthermore, Jones, I want you to pay especial heed to this matter in the future. Er, good evening, sir. How are you this evening, sir?" "Tut!" interrupted the man of eminence, jerking his thumb in the direction of the ticket-tearing employee, "May I for a few minutes replace that man at the door?"

The manager gasped. The assistant gasped.

"Er-er, certainly," finally replied the manager.

"Er-er, certainly," instantly echoed the assistant.

"Thank you," snapped the big little man, turning upon his heel and heading for the doorboy.

"Can you beat it?" breathed the manager as the new doorboy avidly reached for a couple of tickets.

"Can you beat it?" double-checked the assistant as the new doorboy deftly tore the pastebords apart and returned the stubs.

Many patrons entered, tendered their tickets to the big little man and received their stubs. Fifteen minutes passed; twenty minutes; a half hour. Then, as though suddenly satiated of his desire, the big little man motioned the doorboy to resume his position and trundled his one hundred and ten pounds of business sagacity to the gaping manager and also gaping assistant.

"That, sirs," said he, "was a pleasure. I thank you." He started to leave when a choking sound from the manager halted him.

"Please, sir, if-er-" stuttered the manager. "That is—what I am attempting to say is—"

Suddenly the big little man understood. He laughed, the muscles of his face making crackling sounds of protest at being forced into exertion after years of leisure. "Gentlemen," he said, "those minutes at the door were the happiest ones I've had since the stock crash in '29. If there is no objection I will indulge again tomorrow evening. Being an optimist, sirs, I desire to keep in trim. Clipping coupons is not—must not be—a lost art!"

Twenty-one
Health Talks for Projectionists
BY AN ANATOMIST

Fatigue—

Is a condition of lowered vitality, with an accumulation of waste products in the body, and formation of special toxins, due to faulty metabolism, lack of vital resistance, overwork, violent exercise, tension strain, etc. And frequently found in all workers who have to undergo arduous labor, physical or mental strain.

Fatigue is a purely personal factor, and depends on individual idiosyncrasy and susceptibility. A work that may cause fatigue symptoms in one worker may not produce it in another, and the same individual is more subject to it at one time than another.

Fatigue is also influenced by environmental factors, or the various conditions by which the work is attended; but as a rule the more prolonged the work, the greater the strain, and the sooner and greater the fatigue. General fatigue manifests itself in a diminished vitality, in a lessened resistance, in a disability to perform the amount and character, a predisposition to succumb to any detrimental influence and disease. The over-working, or too prolonged use of one part of the body, or one set of muscles, or organ, is often followed by “Fatigue Neurosis,” which manifest themselves in loss of motion, sometimes sensory function of the particular organ, or set of muscles. The most common example of such Neuroses, is seen in the so-called Writers’ Cramp, Telephone and Wireless Operators, Projectionists, Copyists, and others. A similar affection is met among Typesetters, Telegraphers, Violinists. The effect of duration of work will partly depend upon the tension with which it is carried on. When work is performed under great stress, tension, artificial stimulus, etc., the point of fatigue arrives sooner, and its ill effects are more marked.

Normally the eyes use 1/10% of the entire nerve supply of the body, and it has been found that 50% of all nervous diseases, and many others, have their primary origin in “Eye Strain.” One of the important work of the eyes of the projectionist, is constantly gazing from the projector, while in operation, surrounded by its flood of bright light, then suddenly through a space of semi-darkness to the picture on the screen. This causes a continual contraction and dilation of the pupils or (Iris) which could be termed an exercise, and quite beneficial for a certain period of time, but after long hours the point of fatigue is reached, and the so-called “Eye Strain,” with lowered resistance begins. Which merely means, the tiring of the muscles of the eyes, caused by “Neurosis, a functional disturbance of the nerves, to the eyes.”

The muscles and nerves that control the organ of hearing come in for their share of strain, beyond the point of fatigue, resulting in a general physical tiresome condition, that requires a prolonged rest and relaxation to rejuvenate.

The time for rebuilding cell energy varies greatly in different individuals, according to his mode of living. But it can be safely said that proper food, outdoor life, as much as possible, and the art to attain proper relaxation, is among the most beneficial factors in renewing deteriorated tissues, caused from bodily fatigue.

BADLY PUT OUT

Bro. Ball recently lost his bearings. After listening in with the head-set to a talking dog comedy his nose flattened against the port glass, his orbs glued to the screen, he remarked with disgusted conviction: “Those animals can’t talk! Their voices are faked!”

And he can’t be convinced otherwise.
Electro Dynamic Transmitter Developed By W. E.

A new Western Electric microphone operating on a principle similar to that of the first telephone transmitter used by Alexander Graham Bell will be marketed by Electrical Research Products for use in recording talking pictures. The microphone, already in use in a number of studios for testing, and known as the Western Electric electrodynamic transmitter, possesses many improvements over the condenser type microphone generally used in recording until now. The new transmitter is a development of Bell Laboratories.

Less Affected by Moisture

Its use is said to eliminate several recording problems, one of which has been the difficulty in hiding the microphone from the view of the camera. The new microphone is smaller and its associated amplifier may be located as far as 200 feet from the microphone, making it much easier to hide from the view of the camera. The amplifier for the condenser microphone was built as an integral part of the microphone housing and made it extremely difficult to camouflage in many sets.

Other advantages claimed are that it is less affected by dust and moisture and need not be kept in a desiccator. It is unaffected by changes in temperature and barometric pressure. It is a further contribution in noiseless recording since its associated amplifier is quieter in operation. The transmission characteristics of the transmitter are superior and distortion caused by cavity resonance has been practically eliminated, thus increasing quality and reality in recording. Increased volume is obtained since the transmitter and associated amplifier give from 10 to 15 decibels more overall gain than the condenser transmitter and amplifier.

The principle on which the transmitter operates is the inverse of that employed in the Western Electric 555-W receiver used in the Western Electric sound system. In this receiver or any dynamic loud speaker the magnet system is so constructed as to produce a circular air gap, across which extends a radial magnetic field, between the inner pole and the surrounding outer pole. In this air gap is situated a thin circular coil which is attached to the diaphragm. If a sound current is passed through this coil, the electrodynamic reaction between the current and the field will cause the coil to execute axial vibrations corresponding to the modulations of the sound current.

Permanent Magnet Used

Through the medium of the diaphragm and horn, or baffle, these vibrations reproduce the original sound. This action can be readily reversed; if a sound falls on the diaphragm, causing the diaphragm and coil to vibrate, there will be generated in the coil a small alternating voltage which corresponds to the impinging sound waves. This is the way in which the electro-dynamic transmitter operates and indicates the origin of its name.

The construction of the new transmitter is very similar to that of the 555-W receiver, except that instead of an electromagnet a permanent magnet of cobalt steel is used. There is, of course, no horn or baffle. The diaphragm is of thin duralumin. The coil is of edge-wound aluminum ribbon. The diaphragm is protected by means of a disc of perforated sheet metal mounted in front of it and this in turn is covered by a thin piece of black silk.

So far as is known this is the first time that the electro-dynamic principle has been used commercially in a transmitter.
Bro. Hermance, who took the picture of Bro. James Pointner that was used on the cover last month, wishes to rectify the error printed under it. He says that Jim did not sink that putt.

Bro. Stanley Gray of the staff of the Breck Photoplay Supply Co. on Vermont just south of Washington Boulevard, is celebrating his seventh year of pleasant contact with that firm. He has called our attention to the fact that he has one of the new Knowles Rear Shutters on display and invites all the brothers to drop in and inspect it.

John Finn has been seriously ill for the last few weeks, and it may be several more before he will again be with us. A complete rest has been ordered for him, but we trust that at the end of the prescribed period he will be stronger than ever.

Bro. Al Feinstein, our very capable circulation manager, has just returned from an extended tour a la motor car. On his trip he stopped in Sacramento, Oakland, San Francisco and San Jose. In all of these towns he was received with open arms by the projectionists. He also observed a marked trend toward real fraternity and an almost universal interest in academic work. Bro. Feinstein predicts great things for the Society in the West.

Mel Butler, maintenance man at the United Artists Theatre, San Francisco, had a tough time wiring a buzzer to the projection room door to act as a “boss alarm.” He said the work wasn’t so hard, but he had mislaid his wiring diagram and had to study it all out.

Chapter officers, take note. One of Chapter Seven’s most enjoyable meetings took place recently on the sands of the beach of the old Pacific. The wives were along and the order of business was hot dogs and coffee. A few of the most venturesome members took a plunge in the surf. But swimming at midnight never did appeal to me, besides it wasn’t Saturday night.

The popular member of Oakland Chapter No. 12, A. P. S., has become a Hollywood resident. His name is Geo. J. Lancaster. Bro. Lancaster is a cameraman and a member of Local No. 659. He is now engaged in shooting travel pictures with Tom Terris, the famous director. Every member of the Society joins in wishing him luck. When he becomes rich and famous we can say we knew him when . . .

Bro. Hermance has accepted a position at the United Artists studio. He is better known, however, as the staff photographer of this publication.
Radio Advertising By Projectionists
Address Given Over National Broadcast Hookup

A noted star of a motion picture now showing on Broadway said some years ago “the projectionist is largely the master of our photographic destinies.” More recently one of the world’s largest manufacturers of electrical equipment used in their advertising the phrase “Projection, a Specialized Art.” The skilled motion picture operator with a technical training and an art acquired under practical conditions in the motion picture theatre is now very properly called a projectionist and his work visual and sound projection.

The motion picture operator was a pioneer in the use and development of the motion picture machine, a new mechanism, made with scientific accuracy to handle the extremely fragile motion picture film. His job was to keep the show going under many difficult conditions and to carefully guard the safety of his audience, often at the risk of his own life. The motion picture operator in the early days of the industry had to solve many mechanical and electrical problems and made many important contributions to the highly specialized field of practical and theoretical motion picture optics.

Sound pictures, when introduced a few years ago, were far from perfect and the installations of sound equipment were literally made over night. The motion picture projectionist solved many difficult problems which came with the introduction of sound and has been highly commended by the manufacturers of sound equipment for his practical knowledge and co-operation. Without the specialized knowledge of the projectionist, the introduction of sound would have been a far more serious problem and would be far less satisfactory at the present time.

Projection is very definitely an art today and the mere fact that an individual may have learned how to run a motion picture projector does not make him a projectionist. He may even get a license to operate a motion picture machine and yet entirely fail to meet the requirements of I. A. Local 306. After a man has secured a good working knowledge of mechanics, electricity and optics, he must also learn the show business. After a thorough technical knowledge has been secured, the projectionist must learn about time, color and sound, and this training can only be acquired through working under theatrical conditions. The projectionist learns to be a showman, and as the showman must be an artist, so must the projectionist be an artist. This is a unique combination of mechanical and artistic skill and the work of the projectionist is therefore very properly referred to as “Projection, a Specialized Art.”

Twenty-five
E. R. P. I.'s NEW PHOTO CELL

ERPI recently announced and installed the new 3-A photo-electric cell. This new cell has a number of improvements over the 1-A and 2-A both physically and electrically.

The greatest difference lies in the use of caesium compound as the photo-active element instead of a preparation of potassium as used in the 1-A and 2-A. The caesium oxide is coated on a half cylindrical electrode and a small vertical rod forms the positive electrode. No. 1-A and 2-A employed as the photo-active element a potassium preparation coated on the inside of the bulb with a ring-shaped member forming the positive electrode.

The advantage gained by this new cell is the reduction of system noise which accompanies its use. The response from the cell being greater, the amplifiers can be operated at a reduced gain, thus reducing the volume of any noise producing element within the system. This makes the new cell an important factor in enabling sound reproducing equipments to do full justice to recordings made by the new noiseless process. Beside output efficiency such as the ability to produce a more faithful electrical copy or translation of the sound track its ability to maintain its electrical and circuit characteristics unchanged and its immunity from rapid deterioration and loss of its sensitiveness in storage or use.

The sensitiveness of a photo-electric cell is the current it will pass for a given amount of illumination, usually varies with the color of the illumination. The cell is more sensitive to some parts of the spectrum than others. In the potassium cell the sensitiveness was greater for blue and violet radiation. Greater part of the light produced by the exciting lamp was therefore not utilized. The caesium cell, however, is highly sensitiveness to radiation within the range produced most abundantly by the exciting lamp, the yellow, red and infra-red, there being comparatively little blue or violet radiation.

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(Continued From Page 18)
differences as noted between the 242 and the 211E tubes are as follows:

The new 242 has an impedance of 2500 to 4000 ohms, which is 500 ohms less than the 211E tube.

The new tube uses 3 1/4 amperes against 3.0 amperes of the 211E tube. A new feature of the new tube which will be greeted with loud hosannas by the radio hams is the fact that ERPI omitted the radio frequency choke on the 242.

The grid bias runs from minus 30 to minus 60 the same as the 211E. The filament appears to be “Thoriated,” which would account for its greater brilliancy when burning.
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