

THE BROADCAST ENGINEERS' JOURNAL  
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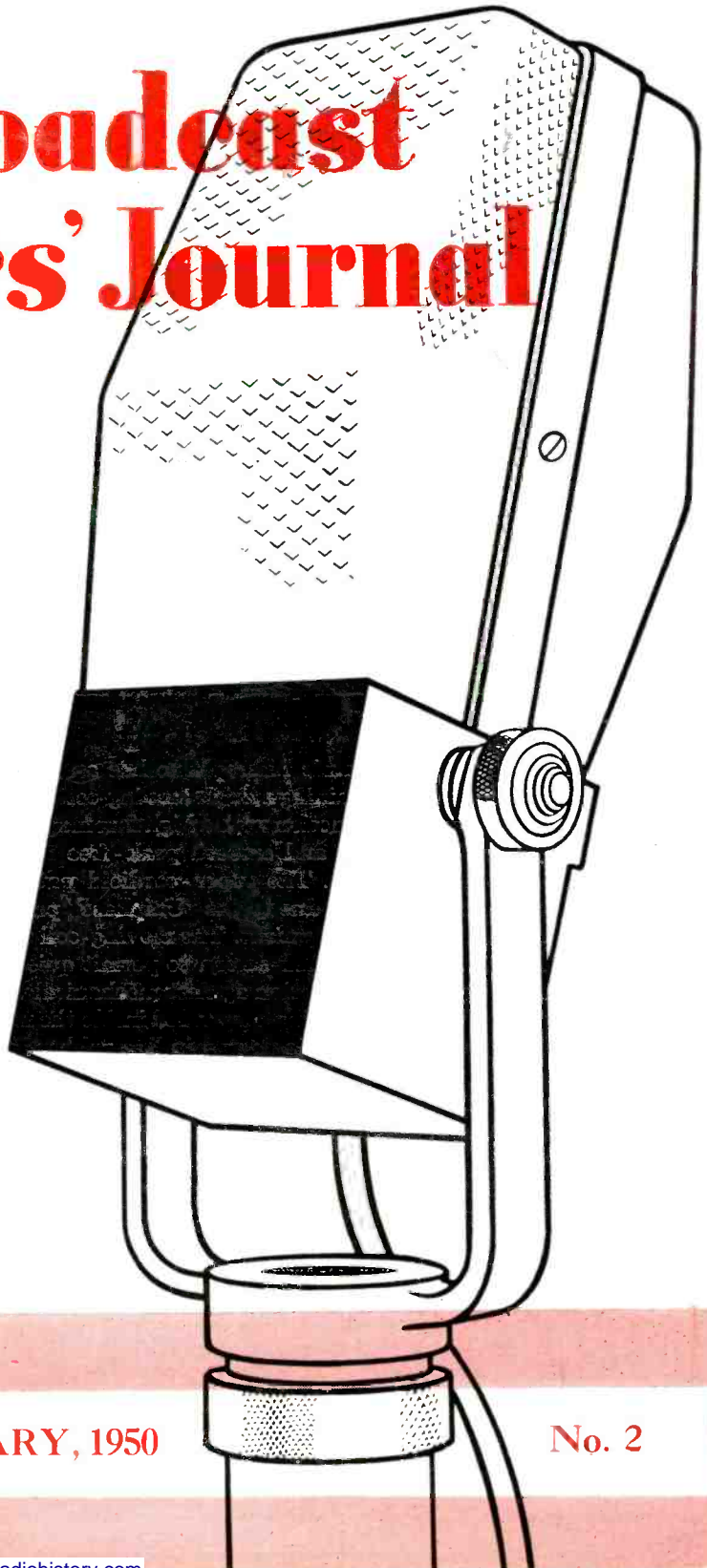
OFFICIAL PUBLICATION OF THE NATIONAL ASSOCIATION OF BROADCAST ENGINEERS AND TECHNICIANS

SINCE 1934—OF, BY, AND FOR THE BROADCAST ENGINEER

# The Broadcast Engineers' Journal

*F. A. Gehres*  
*Editor*  
Featuring ---

- There is no Permanent Phonograph Needle
- Television Studio Illumination
- The Video Reflectar
- TV Color Comparison Tests



VOL. 17

FEBRUARY, 1950

No. 2

# Broadcast Radio Engineers

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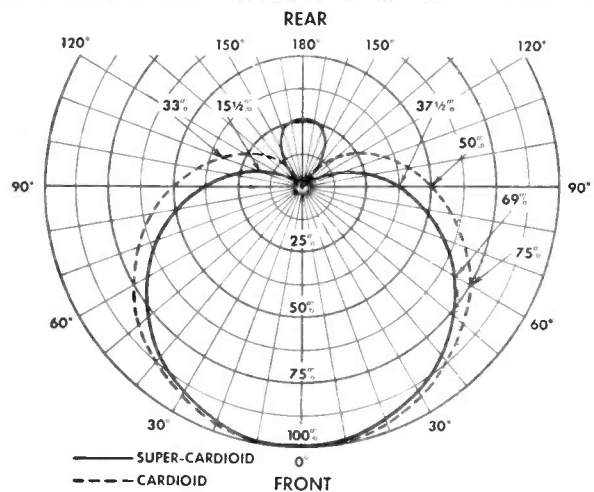
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## A Message to the Members of NABET

from

JOHN R. McDONNELL  
President, NABET

As this is written the NABET Affiliation Committee seems to have acquired sufficient information to be nearly ready to release its final report to the membership. By the time this reaches print, you, the NABET members, may have voted upon and decided the question of affiliation. If such be the case I sincerely trust your decision has been wise and that you are all resolved to make the most of it. Let us forget such differences as we may have had and proceed on a unified course toward the goals which ultimately are the sole reasons for the existence of a Union: the improvement of our respective wages, hours and working conditions.

If you have decided against affiliation, every member and officer of the Union must conduct himself, at all times, in keeping with sound Union principles adhering resolutely to policies set forth by the National Council and the Executive Board. NABET can survive and can do the job for which it was intended only with a high degree of cooperation and understanding on the part of us all.

If you have voted to affiliate with one of the several Unions, you have not solved all of your problems. Along with such possible benefits as may have accrued by affiliation you have acquired added responsibilities and obligations. Everything I have said above, in respect to NABET, as an independent, is equally true if we become affiliated or part of another Union. If the Radio and Television men are to acquire the stature they should have in the industry it will come about as the result of years of continued, determined and intelligent cooperation and understanding.

Sincerely,

JOHN R. McDONNELL,  
President—NABET

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GEORGE MAHER, *Executive Secretary*

Room 543 80 E. Jackson Blvd., Chicago 4, Illinois

Telephone: Wabash 2-2462

**WATCH FOR THE RECOMMENDATION  
OF THE  
NABET AFFILIATION COMMITTEE**

## The Secretary Says:

The President has signed the bill amending the Fair Labor Standards Act, which will provide a new minimum wage rate of 75 cents an hour. The new law is an achievement which will go far in insuring stability for our whole economy.

It will have the immediate and beneficial effect of raising the wages of some million and one-half workers. The new act will benefit all American workers since it will greatly aid in maintaining the individual worker's income and consumer purchasing power.

It will benefit employers by clarifying provisions of the old law. Employers who pay decent wages will derive added protection from unfair competition by those who pay sub-standard wages. By providing a broad base for the Nation's purchasing power, the higher minimum-wage rate should provide new markets for the products of industry.

The people as a whole will benefit from raising the minimum wage because higher minimum wages are a necessity for the general improvement of American living standards. Higher minimum wages will not only assist in increasing purchasing power but will help to maintain the increase. Increased purchasing power will aid in promoting high levels of production and employment. Increased purchasing power, productivity, and full employment mean economic stability for the country as a whole.

The amendments become effective on January 25, 1950. In the interim I offer the assistance of the Department of Labor to employees and employers alike in ascertaining their rights and responsibilities under provisions of the act.

## Union Attack on Profit-Sharing

CIO's Auto Workers think that declining profits will bring out a rash of profit-sharing proposals from employers in the near future. So the union devotes considerable space in its magazine, *Ammunition*, to making its disapproval very clear. These are the arguments UAW makes against profit-sharing:

*It's too flexible.* While profit-sharing sends wages up in good times, it makes it too easy to bring them down in bad. UAW-CIO prefers fixed wage rates in a period of recession.

*It's economically unsound,* the union says, to reduce workers' earnings when profits are falling; it is important for the economy as a whole to sustain purchasing power at such times.

*Wages bear the cost of competition* under profit-sharing, the union argues. Reasoning here is that most plans share only those profits in excess of a fixed level. According to the UAW, this means that price cuts would hit profit shares first, the bulk of company profits later.

*Workers can't control profits.* Management determines profits through pricing, selling, inventory practices, accounting "hocuspocus," etc., so the union objects to making wages dependent on profits to a greater extent than ordinarily.

*Higher production standards* may well be achieved under the incentive of profit-sharing, but then, the union fears, workers would be stuck with them after profits fall off.

*Wage standards* (local, regional, industry-wide) disappear under profit-sharing because of the wide differences in company profit positions.

*Profit shares aren't fairly keyed to extra output* under many plans, UAW says. Therefore, the plans are inferior to "good" incentive plans which reward a percentage gain in output with the same percentage gain in wages.

*Lastly, collective bargaining suffers* because, in the union's view, employees and union representatives are diverted by the complexity and uncertainty of profit-sharing.

# There Is No Permanent Phonograph Needle

By ARTHUR J. OLSEN

President, Permo, Incorporated

Data for these bulletins will be written for all segments of the industry—engineers, manufacturers, executives, distributors, dealers and sales personnel. The bulletins will remove the iron curtain of secrecy and mystery which has heretofore existed regarding the relation of the phonograph needle to record players, records, pickups and other components. The single purpose of The Permo Reporter is educational; it is not a house organ, a sales promotional campaign or an advertising medium. It should be of interest to every segment of the industry and serve useful purpose for all concerned.

## Subjects of Future Bulletins

This, the first of The Permo Reporter bulletins, frankly presents the facts regarding the erroneous claims that there is such a thing as a permanent phonograph needle. No one has yet claimed that phonograph players and records are permanent and, in face of the cold facts, no one should ever have claimed that a phonograph needle is permanent. The abstract, straight-forward method of statement used in Bulletin No. 1 sets the pattern for the entire series. Subjects of some of the bulletins to be issued in the future are:

The Elements, Natural and Synthetic Materials, Alloys and Composites That Have Been Investigated and Used for Phonograph Needle Points. The Characteristics of Shellac-type and Plastic Records and Their Effect on the Phonograph Needle. Needle Problems and Solutions Incident to the Introduction of the Micro-Groove and 33 1/3 and 45 r.p.m. Turntable Speeds. Vertical and Lateral Compliance of Phonograph Needles. The Initial Polish and "Wear Out" of Needles of Various Radii Under Various Pressures. The Effect of Various Pickups, Tone Arms and Players Upon Needle Performance. Needle Testing Techniques and the Results Obtained from Their Application. Needle Shank Material and Its Effect Upon Needle Compliance and Life.

## There Is No Permanent Phonograph Needle

There has been a lot of talk and advertising about permanent phonograph needles. Many people are firmly convinced that the phonograph needle in the record player they have recently purchased will never wear out. They are in for a rude awakening when impaired reproduction becomes apparent; then, too late, they will discover the damage to their records as a result of a WORN OUT or fractured needle.

The positive fact is that THERE IS NO PERMANENT PHONOGRAPH NEEDLE! Let's "look at the record," as the late Al Smith so well put it. When two materials rub together, particularly in dry friction, one or both *must* wear. This is particularly true in the case of the point of a phonograph needle in contact with a record groove when the average playing area of contact of the needle point is actually under pressures of from 25,000 to 6,000 pounds per square inch (assuming a flat of .0015" to .003" on both sides of the point and pickup pressure of 1½ ounces). This area is actually subject to friction-generated temperatures in the order of 2000° F. to 1000° F. Wear of the record and the needle must take place!

Wear of the needle and record is merely the displacement and loss of the material from which they are made. When the delicate, lateral modulations (sound wave forms) in a record groove are worn or displaced, distorted reproduction occurs. When the needle point is excessively worn the portion of the point in contact with the groove will not only fail to follow the fine modulations of the grooves, but will actually further the displacement or wear of the modulations. Thus accumulative bad results occur: distorted reproduction and excessive record wear.

PERMANENT is defined in the dictionary as: "fixed" . . . "continuing in the same state or without essential change" . . . "perpetual" . . . "resisting both time and change" . . . and "constant."

The fact is that all phonograph needles

are subject to immediate change when used on the phonograph record. Just consider the exaggerated results if a standard phonograph needle were held in contact with a running grindstone for an hour or so and you will better understand what happens to the needle point after the play of a dozen 12-inch records.

The largest percentage of wear of a phonograph record and needle during their normal life occurs during their earliest usage for the simple reason that the area of the radius of the needle in contact with the groove is the smallest, and hence subject to the highest pressure and highest temperature. As the needle wears, as it must, a *larger area* of the point contacts the groove and there is a corresponding reduction in unit pressure and temperature, which obviously retards the wear of both the record and the needle.

The irrefutable evidence, proving the point that there is no permanent phonograph needle, lies in the fact that the so-called "closed chuck" or "irremovable needle" era that was ushered in immediately after the close of World War II has already run its course. Most manufacturers of pickups (cartridges and tone arms containing needles which were permanently fixed and could not be removed by the individual user, have redesigned their units to make the special type needles replaceable. The reason is a simple one—the needle simply wore out although the pickup did not, and the public resented and resisted the idea of buying an expensive replacement cartridge and paying a serviceman several dollars for removal of the old and installation of the new unit in order to get a new phonograph needle. There are those who have played up to the strong appeal of the idea of not having to make needle changes. Engineers and manufacturers, on the other hand, have always known that the very nature of the needle and the record surface contact, and their inevitable reaction one upon the other, *creates a fixed condition that wears out both the record and the needle.* The simple reasoning that results in public acceptance that shoes, clothing, radio sets and record players are not permanent should and does apply to life expectancy of the phonograph record and needle.



There is unlimited evidence to substantiate the statement that "phonograph records and needles wear out as the direct result of dry friction surface contact of the needle in the revolving spiral groove of the record." Future bulletins of the series will frankly and completely discuss the entire subject and present data regarding ways and means to keep that wear at a minimum and still give the public the performance they have every right to expect from the records and the needles.

Cartridges with permanently fixed needles (usually diamonds) can be and are being manufactured today for the professional user who knows the importance of proper care of his equipment and when needle replacement should be made. Such a user does not throw away a cartridge that is as good as new in order to replace the needle. Professional technicians cannot be classed with public users, who range from the very youngest to the very oldest, from the uninformed to the most intelligent, and from the most careless to the most careful.

Equipment of any kind, and particularly phonograph recording and reproduction units, must be manufactured to fit the two distinct classes of users. The quick demise of the "closed chuck" or "irremovable needle" cartridge for general public use strongly emphasizes that truism.

The phonograph needle and the phonograph record are only two links in a chain of components that perform under a variety of conditions and combinations. Each part and each combination of parts introduces variables that contribute to the declaration that there is not, and could not be, a permanent needle. Some of these variables are:

1. The inevitable result of two moving materials in frictional contact.
2. The purport of the needle development. The intent may be to accent record preservation or needle life, or vice versa.
3. The dimensional and metallurgical quality control of needle production.
4. The abrasive nature of records and the quality control exercised in record manufacture.
5. The mating characteristics of varying record compositions with varying needle point materials.
6. The wear variations that develop in initial plays.
7. The loose materials in the groove of a new record and the accumulation

of material resulting from wear.

8. The extent to which the accumulated material in the sound groove is augmented by dust laden atmosphere.
9. The effect of weather conditions, such as temperatures and humidity, upon the abrasive, plastic and chemical properties of the record.
10. The vertical pressure and tracking characteristics of the tone arm and pickup.
11. The mechanical functioning of various changers and between identical changers, such as vertical needle pressure, turntable eccentricity, trip load and tone arm pivot friction.

The greatest of these causes of wear is the natural one. It is the result of the dry friction contact of the needle in the revolving spiral groove of the record. Let us look around for other dry friction contacts with which you are familiar:

- 1st —The most extensively used dry friction is that of shoe leather on the world's floors and sidewalks. Shoes are long lived, but not permanent. To put the same load on shoes that a phonograph needle carries, a man would have to weigh several tons.
- 2nd —When air brakes lock on the freight train you have dry friction and very quickly you have flats on the wheels.
- 3rd —When you pull a sled over snow and ice you have water lubrication. When you pull it on dry land you have dry friction, flat runners and hard work.
- 4th —When you make a piece of furniture you sandpaper off the surface to make it smooth. That is dry friction. After you varnish the furniture you put on wax or furniture polish so that the wiping off of dust will not sandpaper it.

Why have this dry friction? Why not lubricate the needle like an automobile crankshaft. Let us see: When lubricated bearings carry a load over 500 pounds per square inch, forced lubrication becomes impractical. Many phonograph needle points under light weight tone arm conditions carry in the order of 6000 pounds per square inch. Were there no other objectionable factors in the use of a lubricant, it would be impossible to get the lubricant where it would do any good. The dry friction of the phonograph needle and record is a fixed condition, which means that the record and needle will wear out.

Engineers and manufacturers of high grade phonograph needles, taking into consideration the variables and dry friction reaction referred to in the foregoing, must keep constantly in mind that a good phonograph needle must possess the following qualities:

1. It must be kind to the ear. It must have a satisfactory and consistent response.
2. It must be kind to the record. It must, when used, effect a low rate of wear on the record.
3. It must be kind to the purchaser. It must have a long-playing life.

Future bulletins of The Permo Reporter series will frankly and abstractly present the factors that assist and retard the accomplishment of these qualities in the phonograph needle. The modest little needle, essential component of the phonograph, cannot do the job of the player, nor can the player do the job of the needle.

The listening result is dependent upon all the components involved, which are (1) the record, (2) pickup cartridge and tone arm, (3) the needle, (4) audio system, (5) manual control for tone and volume, (6) speaker, and (7) mechanism which revolves the record.

## Foreign Cosmic Ray

Reporting a healthy outlook on foreign cosmic ray research, Dr. Serge A. Korff, physicist at the New York University College of Engineering, revealed that the contributions of European laboratories "make earlier theories inadequate" and "that some of the pet theories of yesterday will have to be re-examined."

Dr. Korff, who recently returned from a seven month's trip through Europe and the Middle East where he conferred with scientists of 50 cosmic ray laboratories, said that the majority of new developments which have come from high-altitude experiments conducted in Europe and in the United States during the past year has complicated the whole concept of the cosmic ray situation.

Although the Europeans are hindered by lack of money and equipment, Dr. Korff said that they were far ahead of this country in research conducted in high-altitude cosmic ray study. On the continent there are five high-altitude cosmic ray laboratories supported by funds supplied by various governments as well as several others established by private industries, while in America, only the Mount Evans high-altitude laboratory exists.

# Television Studio Illumination

By DR. FRANK G. BACK

Television Zoomar Corporation

Television has inherited a good many of its present-day woes from its famous grandparents—Broadway and Hollywood. Confronted with a fast-growing new form of entertainment, TV directors have attempted to borrow from the equipment tricks, and techniques of the stage and screen in the production of video shows. For the most part, the adaptation has not been too satisfactory.

In so far as lighting is concerned, the results have been far from good. The well-tried lighting methods of the theater and the movie set just cannot be applied effectively to television. New and different standards must be met. New and special equipment and techniques must be developed and used.

When a stage director looks at a lighted stage, he sees it just as the audience will see it. Similarly, when a motion picture director views a lighted sound stage, he sees it—thanks to the faithfulness of modern panchromatic film emulsions and well-controlled film processing—just about as the moviegoer eventually will view it. What's more, both stage and movie directors have ample time to make changes if the final effect is not what they want. Corrections can be made long before a scene is offered to an audience.

Not so with television. First of all, the image orthicon tube, which is television's eye, does not see things as the human eye sees them. A TV director cannot judge the effectiveness of a lighted set merely by looking at it. To see it as a viewer will see it, he must study the image on the screen of a monitor. Second, a TV show is a one-shot performance generally preceded by too few rehearsals. There is no time for experimenting. There are no opportunities for re-takes and no chances for wholesale editing once the program is on the air.

On the stage and in the movie studio, a director can create any number of dramatic effects by varying the lighting. He can mix different types of light

sources. He can underlight to produce dramatic shadows and introduce high-lights to bring out points of interest and action. He can use all types of light sources to obtain his effect. But he is dealing with a recording medium—the human eye or motion-picture film—whose characteristics are completely predictable and standardized.

On the TV stage these tricks of lighting just won't work. As viewed by the image orthicon, dramatic shadows show up on the viewer's screen not as artistic dark areas but as washed-out grays. Intense highlight on a scene may cause "blooming" or may even cause negative effects by solarization. Unfortunately, the image orthicon, unlike the human eye or film, is unpredictable when conventional lighting techniques for stage or film are used.

In stage lighting and in studio lighting we have four basic types of illumination:

- Key Lighting,
- Fill Lighting,
- Back Lighting and
- Modeling Lighting.

Key lighting is the over-all illumination which falls on the subject. It determines the stop setting of the lens for a given film and camera speed. It determines actually the proper film exposure.

The fill light is some additional light which only softens harsh contrasts caused by the key illumination and makes shadow details visible which would otherwise be in unilluminated areas. These fill lights are always placed in camera level or below camera level, and most of the time opposite the key light source.

Back light creates separation between fore and background, and certain artistic effects to make dull objects lively and outstanding.

Modeling lights are used to cover certain imperfections on the subject, and many times emphasize or create certain desirable effects which are not present in natural lighting.

These four basic types of illumination are commonly used and have been tested over decades in motion-picture work and modern stage work. But they don't work the same way on television. The reason is that film and stage have a wide gray scale range, whereas television has only a very short one. The light scale range used in motion picture work goes from 1 to 500. On the television pick-up it seldom goes higher than 1 to 20.

Key lights for television must provide uniform, shadowless, glareless illumination. They must provide good overall illumination from any camera angle and to obtain this they should be placed in front of the set at camera level.

They must also provide the same kind of illumination. There can be no mixing of "hot" and "cold" light in key illumination. Since the color response of the human eye and the camera will differ, mixtures of "hot" and "cold" light that look good to the human eye seldom look good to the TV camera. Furthermore, if the image orthicons being used are sensitive to infra-red, a double focus will be formed—one for the infra-red and one for the visible light—and the best image obtainable will be a compromise between the two. In addition to this, infra-red which is invisible to the human eye will create unnatural effects on the TV screen. If the image orthicons being used are not responsive to infra-red, the value of the infra-red light in terms of effective usable illumination is wasted and evidence itself only in terms of heat to broil the actors.

Since these key lights must be at camera level to provide the same even distribution of light from any camera angle on a multiple camera chain, they must necessarily be of the floor light type. They should be compact to conserve valuable floor space in the studio, non-directional to eliminate shadows, easily moved, dependable for long and up-to-standard service, and be so wired that the number of



power cables necessary on the set can be kept to the barest minimum. They should be high-quality cold lights, chosen for spectral characteristics that will give, as nearly as possible, the same impression to the image orthicon that they give to the human eye. To obtain an even distribution of illumination from every camera angle multiple key lights must be used.

With the key lights at camera level, the fill lights then necessarily will have to be overhead lights, since only overhead lighting will give the proper fill-in effects regardless of the camera position.

To get proper separation between foreground and background without relying on large lens openings for separation effects, back lighting must be used. These back lights should be placed in such a way that the angle between the back lights, the subject, and the camera should never be less than 135°. The intensity of this back light should never be more than three times the value of the key light illumination to avoid "blooming" effects.

To allow ample room for the 135° minimum back lighting angle, the objects cannot be placed too close to the background. Also, the back light should be properly set to avoid direct glare into the camera lenses. These back lights do not have to be the same type of lights as the key lights. A very good source for back lights are studio spots.

An intensive survey during the past year covering about fifty television stations throughout the country revealed that the studio pick-up technique used in most of them ranged from bad to fair. The great lack, for the most part, was two-fold—the need for some standard method of camera adjustment and calibration, and the need for key lights designed to meet television's unique requirements.

A few months ago, the availability of the Video Analyzer was announced. With it, a TV cameraman now can check and adjust his camera thoroughly and accurately in a few minutes time. The Analyzer also gives him a standard method for determining an image orthicon's color response, its contrast range, and an

indication of the F stop to be used for his key light level.

Now special television lights are also available. Designed to fit the requirements of the image orthicon, they consist of a special type of cold cathode lamp mounted in front of a diffuse reflector in a close-space arrangement that provides a large area, non-directional light source 15 inches wide and 40 inches high at camera level. Completely self-contained and easily portable, each light housing contains the necessary power transformer, has a low center of gravity to eliminate accidental tipping, and is equipped with casters for easy moving. A single light unit requires only about one square foot of studio floor space.

The new lights were designed to meet all of television's key lighting requirements. Balanced to match the color-response characteristics of the 5820 and 5826 image orthicon tubes, they provide non-directional, non-glaring, uniform, and completely shadowless illumination. Being gas-discharge tubes, they generate practically no heat and require only 800 watts of power.

For ease in use, each light is provided with two plug-in connections and a switch so that as many lights as are desired can be connected together by short jumpers to form a bank that can be powered through a single cable plugged into any 110 volt A.C. line. In this arrangement, any or all of the lights can be used merely by operating the individual light switches. They start instantaneously.

Covered by a solid sheet of clear Lucite, the close-spaced lamps and their reflectors are protected from dust and damage. When cleaning is necessary, which is infrequent, the plastic panel can be easily removed.

In studio tests, it has been shown that two or three of the new lighting units will provide excellent key light illumination for small sets, while six will serve on medium sets. One unit at five feet distance provides 100 foot candles of illumination; four at ten feet provides 100 foot candles which is the illumination required by a 5820 image orthicon when the lens is stopped down to F/16.

The angle of even light distribution is approximately 70°.

*Specifications per Unit*

- 110 Volt A. C.—800 watt.
- 100 Foot candle at 5 feet.
- Height—68½ in.
- Width—16¼ in.
- Depth—8¾ in.
- Weight—approx. 150 lbs.
- Light emitting area—14½ x 37¼ in.
- Life of tube—3000 hours.
- Finish—gray crackle.
- Plastic front cover.

*Number of units required*

- for small puppet stage ..... 2 units
- for small sets up to 7 feet width... 3 units
- for small sets up to 10 feet width... 5 units
- for small sets up to 12 feet width... 6 units
- for sets up to 15 feet width..... 8 units

---

**If it concerns the  
RADIO-TV MAN  
he will read it in  
THE BROADCAST  
ENGINEERS'  
JOURNAL**

---

**General Electric Announces New Electronic Viewfinder For TV Cameras**

A new electronic viewfinder for General Electric's television studio cameras has been announced by the company. It gives the operator a brighter image as well as an exact reproduction of the scene being televised, according to Paul L. Chamberlain, Manager of Sales for the Transmitter Division here. The circuits are newly developed and show improved performance in eliminating distortion, he said.

The new viewfinder is capable of giving 500 lines definition. Video response is uniform to 7.0 mc within ± 0.5 db. As normally used with mixed blanking, there is no observable tilt in a 60 cycle square wave.

In addition to these advantages, the viewfinder is easily serviced. It has a focus coil which is adjustable in all directions. An adjustable eyeshade, easily removable, is included with the unit. A new camera tilt head also is used with the new viewfinder to provide improved balancing throughout the camera movement. Further information on the new G. E. electronic viewfinder may be obtained from the Transmitter Division at Electronics Park, Syracuse, N. Y.



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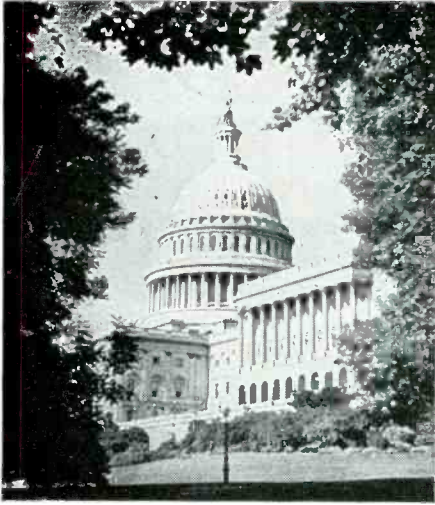


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## WASHINGTON

By W. D. DEEM

A remote pickup television crew from NBC television station WNBW last December demonstrated the special events possibilities of video by telecasting on-the-spot pictures and sound of rescue operations connected with the crash of a Capital Airlines DC-3 in which four persons were killed.

The WNBW crew was busy with maintenance work a short time after meal hour about 9:30 at night. The last studio show for the night was finished when DODD BOYD came down to the field shop and announced that a Capital Airlines plane had just crashed over near Bolling Field and to stand by to go on a field job. JOE DONAHOE picked up the crash report on the teletype and just a few minutes after the crew had received the report the phone rang and SHERMAN HILDRETH, TD, in charge of the crew received instructions from CHARLES COLLEDGE, Supervisor, to complete loading the mobile unit, test out the portable 10KW power plant and to head for the scene of the crash. The microwave receiver head was on the work bench of the field shop and thanks to the quick action of LEON CHROMAK the microwave unit was put in working condition and ready for the crew when we arrived at the airport. ARCHIE DEVEAU pulled the receiver head up the tower in the dark and waited for us to send pictures to him from the scene of the crash. "JOE" COLLEDGE met us at the service station where we were making last preparations and designated our jobs and instructed those of us going in the field limousine to pick up an announcer at the downtown studios

We got through all police lines with ease and arrived at the scene of the crash about an hour and one-half after the accident. JIM MELINE, an ex-fireman, was very helpful in getting us through the police lines so easy. DODD drove the van right up to the waters' edge next to the fence and immediately the crew started to set up the cameras and microwave transmitters and to unhitch the power plant from the back of the van. SHERMAN HILDRETH and JOE KRISS set up the video and audio equipment in the van enroute to the airport. AL ARGENTIERI and FRANK SPAIN, who accompanied us from color, set up the microwave transmitter. The night was jet black from fog and rain so we had no idea where to aim the parabolic reflector. DODD hollered down to a group of soldiers who were spectators and asked "which way is Washington." They responded by pointing in the general direction and luck was with us, we hit over 50 microamps right at the start. I was the camera operator and BOB HAINES manned the 2000 watt spotlight on top of the van beside me. DODD BOYD and AL ARGENTIERI went to hunt some phone lines. They found phones in a waiting house used for boat passengers enroute from Bolling to the Pentagon and also found a flock of news reporters at the phones. FRANK SPAIN, DODD AND AL confiscated one and proceeded to hook up the Mobile Units lines to the phone circuit. JIM MELINE and the rest of them had to keep feeding nickles into the coin box on the phone to keep the program on the air. SPEED CLARK and FRANK FUGAZZI downtown patched the loop over to the Wardman Park master control board and about 25 minutes after we had the picture available to the TV viewers we had audio over unequalized lines also. JOHN PLATT, LEON CHROMAK AND FONSO MORGAN were at the transmitter relaying the program over to Paul Anderson at Master Control.

The plane had crashed after trying to make an instrument landing. It had crashed in shallow water and due to the dense fog it was impossible to catch a glimpse of it. We covered the rescue operations and followed the rescue boats to and from the scene of the crash as far as we could. RALPH BURGIN was the announcer, ordinarily his job is that of program manager. "JOE" COLLEDGE rounded up some people to interview.

This was the first time in Washington that a remote of this type was attempted. It was successful and the whole eastern network carried the news event.

After the activity had died down and the rescue work was near completion, the crew collected the muddy cables, turned off the power plant and started for a restaurant where "JOE" treated all the crew to hamburgers and coffee. The whole adventure left the crew with the feeling that future news events could be covered in half the time.

\* \* \*

WOIC had a Christmas Party, the 23rd of December at the station. A caterer was called in to handle the refreshments, both liquid and solid. Was a bang-up success.

TOM FANNING of WOIC was recently married. JACK WALDRON, also of WOIC is now the proud pa of DIANA KAY, wt. 9½ lbs. born Oct. 25th.

\* \* \*

MEL WARD of WOL walked in on a Monday morning in December and calmly announced that he had been married the Saturday before. More surprises on a Monday morning. Two new men at WOL are PAUL MCKENZIE, formerly of WINX and an IBEW member, and now is a strong member of NABET. BOB REYNOLDS is the other new man at WOL. He is also formerly of WINX and of WTTG is a holder of three union cards, IATSE, IBEW and good old NABET. BING BALLINGER, another WOL engineer got the marrying bug and got hitched up recently.

\* \* \*

At the December NABET meeting an entertainment committee was chosen to revive the social get-togethers that were so popular before the war. Heading the committee is SAM NEWMAN who will represent the Wardman Park Transmitter Group. DODD BOYD represents the Field, Studio and MC at WNBW, STEVE SHUBIN, represents WOIC, BELLUM MILLER represents WOL, and JOHN HOGAN, represents the ABC and NBC men.

—73's

—W. D. DEEM.

If It Concerns  
The Broadcast  
Engineer



—he will read it in the

BROADCAST

ENGINEERS'

JOURNAL



## CHICAGO —By DICK DAVIS

With the holiday season under our belts, most of us here in Chicago seem to be more the worse for wear. Although there were a few times at some of the numerous parties when the outcome seemed doubtful. I understand that one of the larger aspirin companies had all its previous sales records shattered and I largely suspect that the ABC engineers in Chicago had a lot to do with it.

Since Chicago's last writing, three of the gang have become proud fathers, namely: Jim Krejcir and Gene Tester of the Civic Studio-TV Group and George Smith, our Chapter Secretary and engineer in charge of "The Breakfast Club." Congratulations! It was the first time for Jim and Gene, but George had been through it all before.

By the way, there's just a bit of a story in George's case. Besides "Breakfast Club," he also does "Listen to This." Right in the middle of a rehearsal one afternoon, he received a telephone call from the hospital notifying him that "this was it." George grabbed the first engineer he saw, who was Jim Lato and asked him to take over. Jim literally and figuratively did the show one handed. The previous morning he was doing a carving job on a grapefruit when he got tangled up with the knife. The knife wasn't damaged, but it required a few well placed stitches to put the hand back in shape. Jim's okay again and I understand he is now doing two shows simultaneously—one with each hand. It just goes to show you!

A. J. Forgach, WENR-WLS Transmitter Group Councilman missed the October Council Meeting. After reading the following letter, which was submitted to George Smith, I believe everyone will agree that he should receive the award for the most original and interesting excuse of the year.

\* \* \*

October 30, 1949.

G. W. Smith  
Sec. Treas. of NABET—Chicago Chapter  
Dear George:

This is a letter of explanation of my non-attendance at the regular monthly council meeting. I received your notice and posted it so that all members could contact me before the deadline. Somehow I got the dates mixed up thinking it was the 28th instead of the 26th.

I left work at 5:30 p.m. and drove in directly to the supposed meeting. When I arrived at Riccardo's I asked the bartender if a meeting were to be held and he informed me that a radio meeting was scheduled around 7:00 p.m. I stuck around and had a few drinks and finally meandered upstairs. When I entered the room, there were a few gentlemen there

To Page 11

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## A CHALLENGE . . .

A great newspaper has just "folded up," through the process of being sold. The New York Sun is no more, as an individual newspaper. It has been sold to the New York World Telegram, which, having swallowed the old New York World by purchase, now swallows another through the same method.

The Sun publisher gave as his reason rising costs, due to rising wages and newsprint costs.

Both the old World and the Sun were founded in the days of the newspaper giants, Greely, Dana and Pulitzer. By comparison the Telegram was an upstart.

The final statement by the Sun management was without rancor—just a statement of finality, ending the career of a newspaper 116 years old.

ALL who work on newspapers, or who ever had, regardless of their nature, must feel something of regret at the passing of such a veteran.

\* \* \*

But there may be some factors in the picture not given in that fateful final statement.

Our daily newspapers have grown up on the theory that the main costs must be borne by the advertisers. The price of the paper to the customer, whether it be two cents or a nickle, doesn't begin to cover production costs.

So, we have grown accustomed to buying newspapers whose heavy production costs have been paid for by advertisers. The plain truth is that we want to read the news, but we want someone else to pay the bill for its preparation and delivery to our door.

There is no point in yammering that advertisers, paying the bill, control news policies. There is far less of that than most people believe.

If there is a point it is, well, perhaps a double point.

First, we should be willing to pay for what we want;

Second, there is more danger in newspaper monopoly than in advertising control.

\* \* \*

For years newspaper consolidation has been the order of the day.

It takes a barrel of money to start a daily newspaper and bring it to the stage of self-support, to say nothing of keeping it there.

Consolidation has resulted in monopoly in many cities—one morning paper and one evening paper. Competition goes pretty much out of the window. That is not healthy.

However much the passing of the veteran New York Sun may be a source of regret, there is in it no more than another sign of the times.

But perhaps we look in the wrong direction for relief — and for safeguarding the flow of information, or news.

Those who are old enough, or who know their history, will be able to hark back to the days of "The Shame of the Cities" and that heroic little band who came to be labelled "muck rakers," because they found a story of shame and could prove it and write it.

\* \* \*

It was not the daily newspapers that printed the stories of terrific city corruption. It was not the newspapers that printed the scandals dug up by such men as Lincoln Steffens, Ray Stannard Baker, Upton Sinclair and Charles Edward Russell

They turned to the monthly magazine and to books to reach the public. No daily newspaper could have done more to clean

up the stockyards than was done in a book called "The Jungle," by Upton Sinclair.

I think we now have a challenge to labor weeklies and monthlies—to the publishers and the readers.

In the labor publications we have a free forum and as reader support grows that forum will gain in power for good.

But such publications must reach beyond the borders of their own trade or calling and realize that they have a function in and for the community at large.

An old city editor once said to me that "news is news until it is printed and read." It is a truism and it is important.

Remember it, you who edit and you who read, labor publications. Remember, too, that truth is truth, regardless of where it is found.—CMW.

—o—

## CHICAGO—from Page 10

and they immediately introduced themselves, mostly newspaper men. I said I think I am in the wrong place and they said "hell no" this is the place, have a drink, which I did. After a few more drinks and a buffet supper, I still thought it was peculiar that none of the faces looked familiar. I thought possibly something big was coming off, maybe IBEW was taken over and throwing a party. I excused myself for a minute and went down to the bar-room and explained to one of the waiters, and tried to get some information as to what was going on. He said in "broken Italian" Raddio Meaten, IT'S OK. So I went upstairs again and by that time things were really going on. Plenty of food and free drinks, poker game and all. After a few more drinks I contacted a man from CBS and got the whole thing straightened out. He said they were having a wake for a former employee or something and were going to bury him tonight. Well, that was enough for me and I got the hell out of there before someone recognized that I didn't belong there and might decide to put me away.

Well, I did have a nice evening and to verify what I have told you I stopped in at WENR-TV and explained to Wrablik of what happened.

Hoping the above letter straightens things out, I am as ever,  
Sincerely yours,

A. J. FORGACH,  
WLS-WENR Councilman.

\* \* \*

See what I mean. Well, I suppose it could have been worse.

The ABC Penthouse Gang asked me to mention the fact that the Studio A engineers very sarcastically challenged them to a bowling duel and then unceremoniously got the pants beat off them after bragging all over the place Studio A has challenged the Civic Studio and the Remote Crew, but have been told to get a team that can provide a little competition first.

Quite a few issues of the BEJ have come out since Chicago last had a column. Consequently, I've only tried to cover a few of the highlights. My apologies for anything that was left out. Next month we'll catch up.

See you then.

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## DO WE HAVE YOUR ZONE NUMBER?

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DEADLINE is 2nd OF EVERY MONTH. EXAMPLE: COPY RECEIVED MARCH 2nd APPEARS IN THE APRIL ISSUE, IN THE MAIL APRIL 1st.

# THE LENSLESS LENS - - - THE VIDEO REFLECTAR

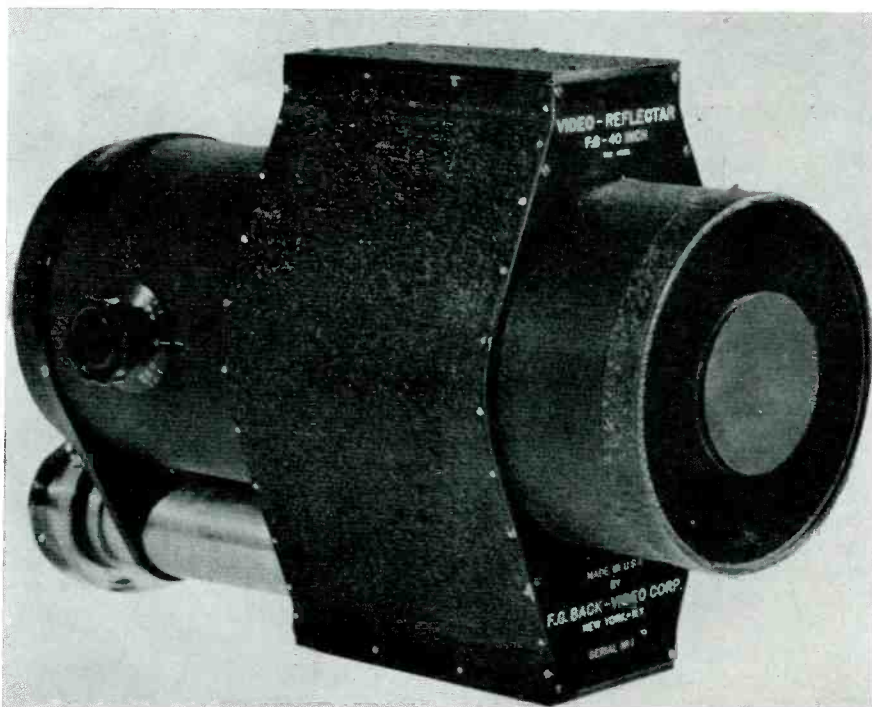
By DR. FRANK G. BACK  
Television Zoomar Corporation

A revolutionary new lens is making its television debut. It is a lens without any lenses—a unique telephoto unit designed by Dr. Frank G. Back, creator of the now famous Zoomar lens, to bring sharp, ultra-ultra close-ups of sports and news events to the nation's home TV screens. With it on a camera, every televiewer has a better than front row seat.

In magic, tricks often are accomplished with the aid of mirrors. In the new Video-Reflectar, as Dr. Back calls his new 40-inch lensless lens, the optical trick also is accomplished with mirrors. There is not a lens element in the entire system. Four special reflectors bounce the light beams back and forth to obtain magnification that is so high that the figure of a man more than a block away from a TV camera completely fills the screen of a TV receiver.

Up until now, extra long-focus telephoto lenses were out of the question as far as TV pick-ups were concerned. A lens with a focal length of 25 inches which by old standards meant that it had to be at least 25 inches long) were about the longest that could be used. Longer focal-length lenses, because of their multiple lens elements, were too heavy; they were too long, which meant that they were not only shaky but projected into the fields of other lenses used on a camera's turret; and their resolution, and thus their picture clarity and quality, was poor.

Dr. Back's new Video-Reflectar overcomes all of these objections. First of all, it is only 16 inches long in spite of its 40-inch focal length. Second, it weighs only six pounds, no more than many other TV lenses. And finally, it provides perfect resolution and picture quality. It can be mounted directly on a TV camera turret with other lenses without interfering with their operation,



The Forty-inch focal-length Video-Reflectar, Weighs Only Six Pounds, is 16 Inches Long!

and its amazing light weight creates no problems of shakiness or the need of additional lens or tripod supports.

Looking more like a stereoptican in shape than a camera eyepiece, the new long-focus lens consists of a correction plate which in position corresponds to the front element on a conventional lens), an aspherical reflector (a mirror shaped like a segment of a large sphere), and three aluminized flat mirrors. The light enters the lens through the correction plate, is picked up by the aspherical reflector, and then is zig-zagged back and forth by the three flat reflectors to the target of the camera's image orthicon.

Lens control (F stop opening) is obtained, not through the use of a conventional iris, but by the adjustment of the position of a rotatable "damper" (similar to the simple damper used in a chimney

flue) which is placed directly in front of the aspherical reflector. Depending on the damper's position, it cuts off more or less light to provide F stops ranging from F/8 to F/22.

The Video-Reflectar marks Dr. Back's fourth important television first in three years. In April 1947, the first of his Zoomar lenses went into use and gave TV cameramen the seven-league boots of focus that made it possible for them to shift smoothly from general overall shots to close-ups with the flick of a convenient hand lever. Late in 1948, he gave TV the Video-Balowstar—a high speed lens fast enough to give good picture quality with illumination as low as one foot-candle. Then, last Spring, he announced his Video Analyzer, the first standard TV camera tester that made it

To Page 13



## 10-15KV Power Supply Announced by RCA For Nucleonics and Other Scientific Work

A highly regulated d-c power supply, designed for any application requiring a voltage between 10 and 50 kilovolts with a maximum current requirement of two milliamperes, was announced this week by the Scientific Instrument Section of the RCA Engineering Products Department.

The new power supply, RCA Type EME-2, makes an ideal accelerating supply for cathode-ray tubes in experimental equipment or as a permanent set-up for the testing of these tubes, the company stated. It is also designed for use in nucleonics and the operation of laboratory test equipment for general use.

The complete power supply consists of

a driver unit and a rectifier unit, and is available with either positive or negative ground. Four six-foot cables between the units permit mounting of the driver on a table-top or shelf where it may be convenient to operating personnel, and installation of the rectifier on the floor, or in another out-of-the-way location.

The final output voltage is taken from the rectifier unit and can be continuously varied, by means of the controls on the driver unit, between 10 and 50 kilovolts. A meter on the front panel of the driver unit indicates the output voltage for any particular setting. Ripple voltage is held to a maximum of five volts.

The unusually high degree of regulation which characterizes the performance of the new RCA power supply is accomplished by feeding back a portion of the output voltage potential to the driver unit through a high-value resistor. This is amplified to control the grid potential on a regular tube, which in turn controls

the plate voltage of the r-f oscillator in the driver unit. Varying the voltage on the plate of the r-f oscillator controls the d-c output voltage from the rectifier unit. By this means, the output voltage is automatically maintained at the level chosen by the operator.

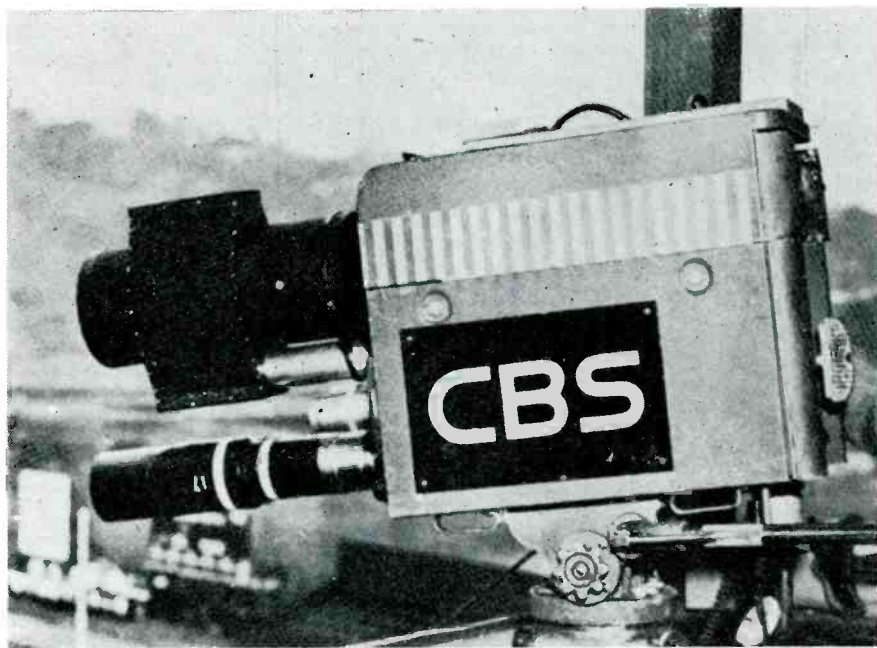
The driver unit of the equipment contains a regulated d-c power supply, r-f oscillator, the control panel, metering circuits, overload protection, and interlock circuits. The rectifier unit contains an r-f oscillator for heating the rectifier filaments, the r-f tank circuits and voltage-tripling rectifier tubes, a series-resonant ripple trap, and a reference voltage divider. Each unit weighs 75 pounds, and the rectifier unit is 25 inches high, 20 inches wide, and 28 inches deep.

## REFLECTAR—from Page 12

possible for cameramen to adjust, align, and match their cameras easily, quickly, and accurately. Now comes the Video-Reflectar, a long-focus TV lens that can provide close-ups of football and baseball games, boxing matches, horse races, and news events without any decrease in

picture quality and without any problems of weight or length at the camera.

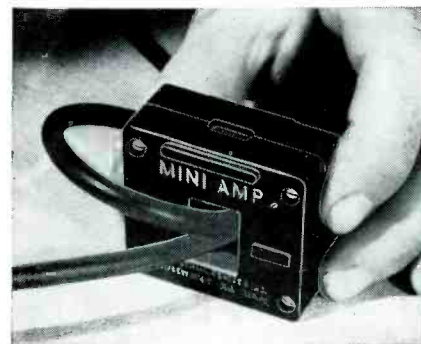
On November 19th, televiewers watched their first football game through the eyes of the Video-Reflectar. The Columbia Broadcasting Company used it in the telecast of the game between Columbia University and Brown University at New York's Baker Field.



The Video Reflectar in Action at a CBS Television Field Pickup.

## BURN-OUT PROOF

Designed to meet the needs of the electrical serviceman, the Mini-Amp announced by Industrial Devices, Inc., Edgewater, N. J., indicates load current of motors and other A. C. operated electrical devices. The Mini-Amp is less than 2"x2"x1" thick with an opening in the



center through which is passed the line carrying the current. Depending upon the number of turns through the center, a neon indicator lamp glows at minimum amperage flow. Available in different ampere ratings, these devices can serve to check motors, etc., for overloads. Accuracy of the Mini-Amp does not depend upon the kind of insulation, line voltage or the manner in which the wire turns are made. Accuracy is held within 5%. For use by electricians, maintenance men and servicemen, the Mini-Amp will withstand the roughest usage. May be dropped, thrown into toolbox, or indefinitely associated with any circuit as a current indicator. Neon indicator is guaranteed for a service life of at least 25,000 hours.

# LABOR - MANAGEMENT NEWS

## EMPLOYEE BENEFIT PLAN REVIEW

A NEW NON-CONTRIBUTORY PENSION plan for its 27,000 salaried employees has been announced by *Ford Motor Co.* It will provide a \$100 a month retirement income, including social security starting at 65 after 30 years of service. It will be similar to the hourly worker plan and benefits are scheduled to start April 1.

In addition workers earning more than \$3,600 a year can contribute to a voluntary supplementary plan with the company matching worker payments. It is interesting to note that the plan is based on the proposed social security base of \$300 a month under HR 6000, as most combination plans now in effect are on the present \$250 social security base.

BOTH THE STEEL COMPANIES (including the U. S. Steel Corp.) and the United Steel Workers—CIO were able to save face in their settlements by agreeing on a *non-contributory pension* plan and a *contributory group* insurance program under the Bethlehem formula.

Most of the settlements with the *United Steel Workers—CIO* are on the basis of the *Bethlehem Steel Corp.* five year contract agreement with some variations. Bethlehem's *non-contributory* pension plan provides a \$100 a month minimum, including social security, starting at 65 after 25 years' service. Retirement income will be 1% of average earnings during the last 10 years of service multiplied by the number of years of service. It is predicted that average Bethlehem pension will be \$110, including social security. There is no maximum limit. Employees with 15 or more years of service will be eligible for minimum pensions which are estimated at \$4 per month per year.

The Bethlehem plan provides for *minimum permanent disability* benefit of \$50 after 15 years service, increasing to \$100 minimum at 65 with a \$4 a month allowance for each year of service.

The cost of the plan will vary according to the company adopting it but the cost to Bethlehem is reported to be from 10c to as high as 14c per hour. The Bethlehem plan replaces a non-contributory plan which had been in effect for 26 years with a \$50 minimum. It is reported that the pension increase will apply to 3,500 now receiving payments under the former plan and to 1,500 other retired employees who have not been eligible for pension benefits under the old system. The plan is scheduled to go into effect not later than March 1.

INLAND STEEL CO. signed a contract on the Bethlehem pension formula with the provision that its workers can decide whether they wish to continue under its present 1/2% of earnings contributory pension plan (company pays 1% in addition) with minimums no less than those offered by Bethlehem or under a new non-contributory Bethlehem type plan. A decision is expected about Jan. 1.

MOST OF THE STEEL COMPANIES are following the *Bethlehem 50-50 group insurance plan*, the workers and the company each paying 2 1/2c per hour. *Republic Steel Corp.* employees will continue to pay 3 1/2 while the company will pay 2 1/2c. *Inland Steel Co.* is the only one to agree on group benefits rather than contributions. Its plan will cost 7.3c per hour with employees paying 2 1/2c.

## Aluminum Company and AFL Agree On Pensions and Group Program

Under its contract with Aluminum Workers—CIO, Aluminum Company of America has agreed to a non-contributory \$100 a month, including social security, pension starting at 65 after 25 years' service. A disability pension for employees after 25 years of service and 55 years of age is provided. Group provisions are: \$2,000 life, \$1,500 paid-up life at retirement, \$26 a week for 26 weeks accident and health, \$8.50 a day hospitalization, \$85 for hospital fees and \$225 surgical. The plan covers 10,000 workers in East St. Louis, Lafayette, Ind., Massena, N. Y., Cressona, Pa., and Chillicothe, O.

## Must Be Reasonable

The U. S. Circuit Court of Appeals has sent the Lincoln Electric Co. profit-sharing case back to the U. S. Tax Court. The higher court held that the Lincoln Electric Company's profit-sharing contributions to an employees' trust are tax deductible but that it was up to the Tax Court to determine whether or not they are reasonable.

## Pension Pool Proposed

United Auto Workers—CIO demands for a pension pool in the Toledo area are raising considerable controversy. Richard Gosser, UAW vice-president, seeks to include 125 automotive part and accessory plants under the plan. If a worker changed jobs, his pension credits would go with him.

## New UAW Pension Limit

In its pension demands in negotiations with both Chrysler Corp. and International Harvester Co., United Automobile Workers—CIO is asking for \$68 a month plus social security or a \$100 a month minimum. Cost to Chrysler is estimated at 7c per hour and to International Harvester at 6.35c per hour by UAW.

## Kaiser-Frazer Pension

Kaiser-Frazer Corp., Detroit, and United Automobile Workers—CIO have agreed on a 6c an hour non-contributory pension fund. It will be jointly administered as is the present group insurance fund which has been extended.

## Bethlehem Pension Plan Not Funded

The new Bethlehem Steel Corp. pension plan is not funded. Bethlehem guarantees lifetime income for any worker retiring while the plan is in operation. There is no obligation to set aside any funds even for past service in advance of retirement.

Critics of the Bethlehem formula point out that such an unfunded plan is no better than the company which is financing it. Some of the companies may not be able to afford it. Philip Murray, United Steel Workers—CIO president, is said to consider the pension agreement a first step and that later, he may insist that the plan be funded. He has sought no part in the administration of the plan on the grounds that if it isn't successful he wants no doubt as to where the blame lies. This is in direct contrast to the United Automobile Workers—CIO principle of joint administration.

It is estimated by "Steel" that the new pension and insurance plans will add about \$4 a ton to the cost of finished steel, less any contributions previously made.

## Steel Companies Agree on Bethlehem Formula

Steel companies which are reported to have agreed upon the Bethlehem pension-insurance formula with the United Steel



Workers—CIO are: Armco Steel Corp., Atlantic Steel Co., Atlanta, Ga., Jones & Laughlin, Mullins Manufacturing Corp., Salem, Ore., Northwestern Steel & Wire Co., Sterling, Ill., Oliver Iron & Steel Corp., Pittsburgh, Republic Steel Corp., United States Steel Corp., Wheeling Steel Corp., Wheeling, Va., Youngstown Steel & Tube Co.

### Steel Group Insurance Provisions Reported

Under the Bethlehem Steel Corporations-United Steel Workers—CIO group insurance agreement the company and the employee will each pay 2½¢ per hour. It is expected that this will provide \$2,100 to \$4,500 life insurance on an earnings schedule basis with an average of \$3,000. Employees will receive \$1,250 to \$1,500 paid up life insurance at retirement. Accident and sickness benefits will be \$26 a week for 26 weeks. Hospitalization for employees and dependents is provided for 70 days under a Blue Cross plan. Employees have been contributing from 3 to 4% under the old plan.

Under the Inland Steel Co. group plan, the only new steel plant to be on a benefit basis, employees will pay 2½¢ toward a program which is estimated to cost 7.3¢ per hour. Life insurance benefits equal to 1½ times annual earnings, accidental death and dismemberment equal to annual earnings, \$35 a week accident and sickness for 26 weeks, 70 days at \$8 on hospitalization for both employees and dependents—\$120 hospital extras and \$200 surgical for both employees and dependents. Life insurance after 65 is reduced by 20% a year until it reaches 20% net with a \$1,200 minimum.

\* \* \* \*

Members of the Longshoremen's & Warehousemen's Union—CIO will contribute 1% of pay to a new group insurance plan under its contract with the Pacific Maritime Association. Employers will pay 55% of the cost, estimated at 3¢ an hour.

\* \* \* \*

### VOICE OF MANAGEMENT

#### Swing to Pensions Is Predicted by Roth

The swing is to pensions, Almon E. Roth, president San Francisco Employers' Council, declared before an industrial relations conference in Chicago sponsored by the U. S. Chamber of Commerce and the Chicago Association of Commerce & Industry. He predicted an all-out union drive for employer financed pensions. The standardized demands of the CIO have a serious implication as they are being applied to all firms irrespective of needs and ability to pay. He warned employers that "if you say you can't afford to pay" for pensions they may be compelled by the NLRB to open their books to the union.

Mr. Roth told employers to watch accrued liability for past service in considering pension demands. An employer has a good argument for a sound plan if he emphasizes it is the only type that will benefit the employee. "Before you go into any plan, employ the best brains you can get as there are many, many questions," he warned. It is advisable to get a complete picture before making any commitment.

In considering pensions, Fred W. Climber, vice-president Goodyear Tire & Rubber Co., Akron, urged a detailed joint study. A proper, logical consideration of the problem is needed rather than hasty emotionalism.

The pension issue is extremely complicated, Herman W. Steinkraus, U. S. Chamber of Commerce president, stated. He suggested that the chamber might hold a special pension conference in Washington.

\* \* \* \*

#### Agree to 6c-4c Plan

Lovell Manufacturing Co., Erie, Pa. with 500 employees

has agreed to a 6c pension, 4c insurance non-contributory plan with United Rubber Workers—CIO.

\* \* \* \*

Company paid group life, accident and sickness, hospitalization and surgical, including dependents' coverage, is provided under the woodworkers—CIO new contract with Atlas Plywood Corp., Newberry, Mich.

\* \* \* \*

Hygrade Food Products Corp., Hoboken, N. J. has signed a contract with the Meat Cutters & Butchers—AFL to contribute to a new retirement fund under the exclusive management of the union.

\* \* \* \*

### AFL'S ATTITUDE IN REGARD TO PENSIONS

So much publicity has been given the pension demands of CIO unions that it is natural to ask "What does the AFL think about pensions?" In a series of recent research reports the American Federation of Labor covered retirement plans in collective bargaining. Most of the material was devoted to factual explanations of various types of plans. The following excerpts indicate the general attitude in regard to basic principles:

#### Retirement Plans Are Tailor-Made

Retirement plans are tailor-made to conform to the needs and characteristics of the particular groups covered by them. Such factors as age, sex, occupation, and earnings must be given weight in mapping out the details of a plan and determining the amount of contributions necessary to provide the benefits desired. These factors will, of course, vary from one group to the next. Since the rates and benefits applicable to one group of workers will not necessarily apply to another, it is not possible to take a plan that has worked well for one union and offer it, in all its details, as a proposed plan for the members of another union. To draw up a program that will be sure to fit, an actuary or insurance company agent should be consulted.

Unlike health benefit plans, pension plans cannot be considered as term insurance propositions which can be terminated at any time. They are relatively expensive if they are to provide adequate benefits, the minimum cost of a satisfactory plan being from 6% to 10% of the payroll. Vested rights and values, to be realized only in the more or less distant future, are built up gradually over a number of years under retirement plans. They endeavor to provide a lifetime of security and their termination not only results in severe hardship for those who depend upon them, but is made difficult by the rules of the Treasury Department. To protect these values and avoid future hardship, a sound program must first be developed and agreed upon before embarking upon such a long-term undertaking.

#### Adequate Benefits Essential

No matter what formula is used, a successful retirement plan must provide benefits high enough to permit the employee to retire without unreasonable hardship. The idea that "any amount is better than no pension at all," while no doubt true, is not a sound basis for dealing with the problem of negotiating a satisfactory plan. If a plan is to endure, benefits must be sufficient to convince workers that it is worth getting and keeping and is not to be discarded in favor of some other gain that might seem more attractive at the moment.

One problem that often arises over the years that a retirement plan is in effect, and that may cause disagreement is the

# LABOR-MANAGEMENT NEWS

(Continued)

question of whether or not particular older employees should be retired when they become eligible. Many employers favor putting a compulsory retirement or employers' option clause in the pension contract, since from their viewpoint the primary purpose of the plan is to insure them a relatively youthful and, allegedly, a more efficient work force.

Rigid compulsory retirement provisions should be resisted by union negotiators if the retirement plan is not to degenerate into a "scientific management" device. The chief aim of a plan should be to provide a reasonable degree of security in old age and a means whereby workers may retire comfortably when they become ready and willing.

The means to avoid controversy when the retirement age is reached lies in the level of benefits provided under the plan. Where the benefits are adequate to enable an older worker to retire with reasonable ease and comfort, he will usually be willing to do so. Where retirement benefits are too meager to provide independence and security, it is only reasonable for the worker and his union to resist retirement, even though he may actually be too old to work. The more nearly adequate the income on retirement, the more smoothly will the plan carry out its purposes for the benefit of all concerned.

## How Much Is Adequate

The \$64 question, of course, is—how much is adequate? It can be said in a very general way that the amount of benefit should bear a reasonable relation to the income level the employee has grown accustomed to during his working years. A plan chosen for cheapness of cost, rather than adequacy of benefits, may defeat its own purpose—the purpose being to provide an income at which the employee who has grown too old to work effectively will be satisfied and willing to retire. He will not be satisfied if the retirement benefit is drastically out of line with the compensation he has received, or is grossly inadequate to sustain a decent living standard.

\* \* \* \*

## UMW Fund Issues New Report on Operations

The United Mine Workers Welfare & Retirement Fund has issued an audited statement on operations from July 1, 1948 to June 30, 1949.

Receipts from tonnage collections for the year were \$90,891,905 while other receipts including \$1,238,855 left over from the 1946 fund and \$42,959,379 from the 1947 fund brought the total accountability to \$135,814,016.

Expenditures for benefits totaled \$104,705,017. Death benefits totaled \$5,546,853; disability \$64,030,828; medical, health and hospital care \$4,761,071; and pensions \$30,366,264.

Administration expenses totaled \$1,536,473 or 1.4% of benefits. Total expenditures were \$106,389,266, leaving \$29,424,750 in the fund on June 30, 1949.

\* \* \* \*

Ohmite Manufacturing Co., Chicago, has established a contributory pension plan.

\* \* \* \*

A company paid hospitalization plan, including dependents, is included in the new contract of Winchester Rubber & Plastics Co., Lodi, N. J., with Textile Workers—CIO.

\* \* \* \*

## New Non-Contributory Plan

Under its new agreement with Electrical Workers—CIO, Manning, Maxwell & Moore, Inc., Bridgeport, Conn., is providing \$1,000 accidental death and dismemberment, \$25 a week accident and sickness, \$8 a day hospital, \$80 hospital extras, and \$200 surgical. Employees only are covered. The

plan is non-contributory and the agreement specifies that any dividends or refunds belong to the company.

\* \* \* \*

## UNION CONTRACT REPORTS

**STEELWORKERS—CIO—Adirondack Foundries & Steel Inc., and Adirondack Iron Co., Watervleit, N. Y.—Co. paid life, accident, sickness and hospital, formerly contributed. . . . Baldwin Locomotive Works, Eddystone, Pa.—Additional insurance. . . . Edge Moor Iron Works, Edge Moor, Dela.—2c insurance. . . . Florence Pipe Foundry & Machine Co., Florence, N. J.—Increase in company contribution to group insurance and hospital. . . . Ohio Malleable Iron Co., Columbus, O.—Company to pay 50% of hospital. . . . U. S. Pipe & Foundry Co., Burlington, N. J.—New hospital and insurance. . . . Henry Vogt Machine Co., Louisville, Ky.—Additional hospital. . . . Wheeling Machine Products Co., Wheeling, W. Va.—To review insurance plan.**

**STREET, ELECTRICAL RAILWAY & MOTOR COACH—AFL—Brentwood Motor Coach Co., Pittsburgh, Pa.—Additional 3c for pensions. . . . Twin City Motor Coach Lines, St. Joseph-Benton Harbor, Mich.—To work out pension plan.**

**TEAMSTERS—AFL—Aetna Cooperate & Stevedoring Co., New York—Company paid welfare. . . . Allentown-Reading, Pa.—40 truck operators—Including company insurance contributing from \$3 to \$3.90 month. . . . Brass & Copper Sales Co., St. Louis—5% welfare fund. . . . Five Buffalo oil companies—2c additional company paid pensions. . . . 33 Cincinnati brewing companies—New welfare. . . . Kroger Baking Co., additional 1c contributed to union health and welfare plan. . . . Johnson Truck Lines, Mansfield, Pa.—additional company paid welfare benefits. . . . Northwest Brewers Assn., State of Washington—5c hour increase in 1949 to establish reserve for health and welfare fund in 1950. . . . Palmer Transfer Co., Dalevale, Pa.—Additional company paid welfare benefit. . . . 10 St. Paul, Minn. transfer firms—3c welfare fund. . . . Witte Hardware Co., St. Louis—Additional sick benefit.**

**TEXTILE—CIO—Butterick Co., Altoona, Pa.—Company paid life, accident, sickness, hospital and surgery. . . . Columbia Mills, Columbia, S. C.—Company increases insurance contribution from 30c to 45c week. . . . Continental Diamond Fibre Co., Bridgeport, Pa.—Additional insurance. . . . Delaware Rayon Co., Newcastle, Dela.—Joint committee to discuss pension plan. . . . Franklin Process Co., Philadelphia—Additional insurance. . . . Globe Woven Belting Co., Buffalo—Company paid life, A. D. and D., accident, sickness, hospital and surgery. . . . National Automotive Fibre, Inc., Cohoes, N. Y.—Additional insurance. . . . Steinfeld Fabrics Inc., Newburg, N. Y.—Additional hospital.**

**TRANSPORT—CIO—Jamaica Bus. Co., New York—Pensions and company paid hospital.**

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# Official I.R.E. Summaries of Technical Papers

Presented at the 1949 IRE Convention—continued from last month

## 133. Principles of Volume Scan.

DANIEL LEVINE, *Wright-Patterson Air Force Base, Dayton, Ohio.*

The equations of motion for an improved spiral scan for a radar system are developed, based upon transmitting to each point in space a specified number of radar pulses. In addition, the optimum value of the beam crossover point is discussed, as well as the dependence of angular resolution upon position within the region searched by the radar system. Expressions are derived for the optimum wavelength for a search radar set as a function of the scanning parameters and the antenna area.

## 134. The Control of Resonance Effects on the Radio Bearings of an Aircraft High-Frequency Direction Finder.

M. K. GOLDSTEIN, *Office of Naval Research, Washington, D. C.*

The metallic surface of an aircraft constitutes an environmental effect having a pronounced obscuring influence on high-frequency (1.5 to 30 Mc) bearings in aircraft direction finders. It is shown that this environmental effect is essentially an electrical resonance phenomenon whose resonance frequency can be predicted from the craft's structural dimensions. Techniques are presented for successfully combating these resonance effects which involve the use of electrical loading of the aircraft's structures. A feasible method for using these techniques is given whereby usable radio direction finder bearings can be obtained for the entire 1.5- to 30-Mc frequency range. Without the use of these corrective measures, less than 25 per cent of this frequency range is usable for direction-finder purposes.

## OSCILLATORS

Chairman, ROBERT ADLER  
(*Zenith Radio Corporation, Chicago, Ill.*)

## 135. An Analysis of Oscillator Performance Under Varying Load Conditions and an Electronic System for Automatic Load Compensation.

EUGENE MITTELMAN, *Consulting Engineer, Chicago, Ill.*

An analysis of the class-C oscillator shows that constant power absorption in a variable external load impedance can be maintained by proper changes of the operating parameters of the oscillator. The equivalent dynamic generator impedance is primarily determined by the angle of flow and the plate voltage. A system is described in which, for low load

impedances, the dc plate voltage is automatically decreased and simultaneously the angle of current flow increased. For high load impedances the dc plate voltage is increased, accompanied by a simultaneous narrowing of the angle of current flow.

Electron-tube oscillators of up to 30 kilowatts for 450 kc and 40 Mc were operated successfully; these are shown in slides.

## 136. Low-Power Wide-Tuning-Range UHF Oscillators.

F. J. KAMPHOEFFNER AND J. M. PETTEF,  
*Stanford University, Calif.*

This paper presents a study of negative-grid triode oscillators for the uhf region. Discussion is confined to oscillators using the modified Colpitts arrangement wherein the feedback is provided by the internal tube capacitances. It can be shown that this is the most useful choice where the frequency must be easily varied over wide frequency limits. Lead inductance and transit-time effects are considered for several commercial tube types, along with the requirements of the tuned circuit.

## 137. Reactance-Tube Modulation of Phase-Shift Oscillators.

F. R. DENNIS AND E. P. FELCH, *Bell Telephone Laboratories, Inc., Murray Hill, N. J.*

Frequency modulation or electronic deviation of phase-shift oscillators may be accomplished by employing a portion of the feedback circuit itself as a quadrature network for driving a reactance tube. Advantages, in addition to simplicity, are wide deviation capability, freedom from amplitude modulation, and excellent mean frequency stability. The phase shifting networks may be of the conventional RC or LC type or may consist of distributed reactances such as sections of transmission line.

RC oscillators operating at audio frequencies, LC oscillators at high frequencies, and both LC and coaxial-line oscillators in the 100-Mc region will be demonstrated. Linear deviations up to  $\pm 10$  per cent are obtained with amplitude modulation of less than  $\pm 1$  db. Mean frequency stability compares favorably with conventional unmodulated oscillators.

## 138. A Low-Distortion Audio-Frequency Oscillator.

C. W. CLAPP AND C. L. HACKLEY, *General Engineering and Consulting Laboratory, General Electric Company, Schenectady, N. Y.*

A push-pull RC-type oscillator has been

developed having distortion less than 0.1 per cent over the range from 35 to 15,000 cps. Distortion normally introduced by the nonlinear element used to stabilize the oscillator is largely eliminated by the push-pull mode of operation. The theory of the circuit is developed and design requirements discussed.

## 139. An Automatic-Frequency-Control System for Mechanically Tuned Oscillators.

J. G. STEPHENSON, *Airborne Instruments Laboratory, Inc., Mineola, L. I., N. Y.*

This paper describes a system of automatic frequency control employing mechanical tuning of an oscillator and capable of very wide pull-in range. The system operates from a 30-Mc signal, cw or pulsed, which may be generated at another frequency and heterodyned to 30 Mc by the oscillator whose frequency is controlled. For normal afc operation, a discriminator, pulse stretcher, and balanced modulator are employed to produce 60-cps output of a phase and amplitude determined by the frequency of the incoming 30-Mc signal. The 60-cps signal, amplified and applied to a servomotor, produces frequency correction by tuning the oscillator.

## ELECTRONICS IV—

### NEW FORMS OF TUBES

Chairman, R. R. LAW  
(*RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*)

## 140. The Graphechon—A Picture-Storage Tube.

L. PENSAK, *RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*

Long-time storage of television-quality pictures is possible with a new experimental type of storage tube consisting of two independent cathode-ray guns and a target plate coated with a thin film of insulating material. A new type of bombardment-induced conduction effect provides high sensitivity and stability. The two guns can operate simultaneously, the one to "write" down any arbitrary pattern to be stored, and the other to scan repeatedly over it to both generate signals and erase the pattern at a controlled rate. The tube makes possible television pictures of oscillograms or radar patterns that can be viewed for several minutes.

#### 141. The Pencil-Type UHF Triode.

G. M. ROSE AND D. W. POWER, *RCA Victor Division, Radio Corporation of America, Camden, N. J.*

A new triode construction is described which not only meets the basic requirements of minimum transit time, lead inductance, and internal capacitance, but also incorporates other desirable design features such as small size, good thermal stability, low heater wattage, and convenience of use in circuits. In addition, the construction lends itself to high-volume production methods. The double-ended type of structure is used wherein the rod-type anode and cathode connections extend outward from each side of a central grid disk. The internal elements are cylindrical and coaxial. Two sets of electrical characteristics are shown, one for a medium- $\mu$  oscillator and the other for a high- $\mu$  oscillator-amplifier. Typical circuits for the tubes are described.

#### 142. Practical Applications of the Resnatron in the High-Power Transmitter Field.

W. W. SALISBURY, *Collins Radio Company, Cedar Rapids, Iowa.*

Recent developments in the resnatron tube, including adaptation of the tube for operation as a high-level power amplifier, means for plate-modulating the tube, operation as a class-B amplifier, and design improvements leading to quick replacement of cathode assemblies at the time of filament failure, will be presented. The advantages of continuously pumped, demountable tubes, as compared with sealed-off tubes, will be discussed. The theoretical discussion will include consideration of the structure of these tubes, which contain internal tuning cavities; the selection of dimensions and operating parameter for optimum results; transit-time effects; secondary-emission effects; improvements in the filament life and emission; and the selection and control of the operating modes of the cavities.

#### 143. The Electron Coupler—A Developmental Tube, Utilizing New Principles, for the Modulation and Control of Power at the Ultra-High Frequencies.

C. L. CUCCIA AND J. S. DONAL, JR., *RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*

The electron coupler is a fundamentally new type of electron tube, under development, which is installed between a uhf power generator and its load, and which permits modulation and control of the power reaching the load. In the basic tube an electron beam, passing through an input cavity which is connected to a power source, absorbs the input power

in the form of rotational energy and delivers this power to an output cavity and load or to a collector. As a uhf circuit element, the electron coupler can be employed as a unilateral-circuit control impedance by using any of several methods of power-transfer control which permit the amplitude modulation of high power by use of very low modulation of the power-generator output.

#### 144. A Wide-Tuning-Range Low-Power CW Magnetron.

L. R. BLOOM AND W. W. CANNON, *University of Illinois, Urbana, Ill.*

A low-power cw magnetron is described which is continuously tunable over approximately a 2 to 1 frequency range from 1,500 to 2,800 Mc by changing only one parameter, the length of a coaxial resonator. The tube elements consist of a conventional magnetron interaction region with vanes electrically tied alternately to the inner and outer conductor of a coaxial resonator tuned by means of a contact-type shorting plunger. Lumped reactance of the tube is thus continuously variable by changing positions of the plunger. Hot tests indicate that this tube has a power output of 100 mw or greater in the operating frequency range. Starting currents are as low as  $I=4$  ma at  $H=2,000$  gauss. Operation is in the  $\tau$  mode and stable over the usable range. A description of the detailed performance of the tube will be given.

—END—

## REVERSIBLE BEAM TV ANTENNA

A new television antenna array, engineered specifically for use in fringe reception areas lying between stations occupying the same or adjacent channels, when the signals are received from opposite directions, has been introduced by the RCA Tube Department.

Called the RCA Reversible-Beam Television Antenna Array, it is designed to prevent the signal of one station from interfering with the signal of a station lying in the opposite direction.

The new antenna array is part of the comprehensive line of television antennas recently announced by the RCA Tube Department.

Developed at the RCA Laboratories, in Princeton, N. J., specifically to solve the problem of co-channel interference, the new antenna has a high front-to-back ratio which provides maximum gain in one direction while "rejecting" signals

arriving in the opposite direction. An ingenious "diplexer" permits instantaneous reversal of the directivity of the antenna to provide reception from either station. This is accomplished by the flicking of a switch which may be conveniently located near the television receiver, without rotation of the antenna array.

The diplexer also eliminates the adjacent-channel interference from stations in opposite directions, sometimes encountered in receivers having limited selectivity. Similarly, it absorbs ghost pictures caused by mismatch of the transmission-line impedance and the receiver-input impedance.

An outstanding feature of the new RCA array is the use of RCA-developed "V" attachments which provide uni-directional reception on all channels. The "V" attachments eliminate the need for compromise antenna orientation in fringe areas by overcoming difficulties encountered with many antennas which have varying pattern characteristics for the high channels.

The unique action of the new RCA Reversible-Beam Television Antenna Array is accomplished without the mechanical and electrical difficulties of reflectors, parasitic elements, or unduly large size. The array consists of four dipoles arranged in the form of a square and interconnected through the diplexer network to the television receiver. The diplexer is a phasing network consisting of four one-quarter wave-length lines, an absorbing resistor, and a switch to permit choice of dipole combinations.

Sturdily built throughout of high quality aluminum, the new RCA array comes complete with four sets of dipole elements with "V" attachments, terminal board assembly, 19 feet (4 sections) of 1 $\frac{3}{8}$ -inch-diameter heavy-wall aluminium tubing, two section crossarms, two guy rings, 22 harness standoffs, 11 lead-in standoffs, diplexer, and installation instructions. It is now available from RCA parts distributors. List price of the RCA Reversible-Beam Antenna Array, Type 212A1, is \$59.50.

### New Phenolic Head Assures All-Weather Performance With Clear Beam V-Cone TV Antenna

Newest feature of the Clear Beam V-Cone line of TV antennas is a specially designed phenolic plastic head, which will not "short" in rain, fog, snow, or sea air. Projecting dipole plastic separators, and a protective wrap-around ledge, give com-

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# Color Television Comparison Tests

In a side-by-side demonstration of color television for the Federal Communications Commission here recently, the Radio Corporation of America showed marked improvement in its new all-electronic, high-definition, compatible system over previous showings, while the Columbia Broadcasting System demonstrated its method that uses mechanical operation.

Simultaneous comparison of the RCA and CBS color television systems was begun at 9 o'clock in the morning upon the request of the FCC in an effort to evaluate standards for color television and eventually to adopt a system that will provide the most practical and satisfactory service to the American public. Coincidentally, opportunity was afforded Allen B. DuMont Laboratories, Inc., for demonstration of black-and-white television.

As competent observers watched the rival television screens come to life with natural colors, it became evident immediately that the images on the RCA sets were far brighter and of truer color fidelity than in earlier tests. Operation was stable and completely free of flicker.

Moreover, the RCA system showed superior results in reproducing test patterns as compared to reception on the CBS system. Many of those who witnessed the demonstration commented upon the increased brightness and exceptional color quality of the RCA pictures in contrast with the CBS images.

Dr. C. B. Jolliffe, Executive Vice President in Charge of RCA Laboratories, declared: "All proponents of the art should be impressed by this demonstration that RCA's all-electronic system offers the best means through which color television can be improved and developed into a reliable service to the public. Experience has taught us that the whirling mechanical disk has no place in home-television."

Dr. Jolliffe pointed out that RCA first demonstrated its new all-electronic color television system on October 10, 1949.

"We had learned from experience in

black-and-white television," said Dr. Jolliffe, "that the only practical system for public use was an electronic system completely compatible with existing black-and-white receivers, thus providing their owners added service and protection from obsolescence.

"Those witnessing the first demonstration of the RCA color system in October, while impressed by our achievement, realized that because of lack of time the full possibilities of the system had not yet been sufficiently translated in the laboratory models. During ensuing days, however, improvements were made and better color pictures resulted. Today's demonstration showed a marked improvement in our system.

"Our motive for insisting on the electronic system, as difficult as that course may be," continued Dr. Jolliffe, "is based solely on long and extensive experience in this field. Results of research conducted over many years have convinced us that only through electronics can America have the best system in both black-and-white and color television. That is our objective."

Today's demonstration was unique in several ways. In the studios of the National Broadcasting Company's station WNBW, at the Wardman-Park Hotel, NBC provided facilities for test of not only the RCA and CBS color systems, but the commercial black-and-white system. Programs transmitted by all three systems were fed from the cameras in the NBC studios to three different transmitters in the Nation's capital and broadcast to receivers located in Temporary E Building, 4th Street and Adams Drive, S. W., where members of the FCC observed the comparative demonstrations.

The RCA color pictures were broadcast from station WNBW; the CBS from station WOIC and DuMont broadcast black-and-white pictures from station WTTG. The telecasts presented live talent, films, slides and test patterns, so that the FCC might compare and study the qualifications of the color systems in competition

with each other as well as in black-and-white. The transmissions were all on standard 6-megacycle channels.

During the demonstrations, RCA demonstrated its ability to transmit color television pictures over a coaxial cable. In this test, the television signal was fed into an eight-mile loop of coaxial cable capable of carrying 4-megacycle bandwidth and then broadcast by Station WNBW to the receivers being observed by the FCC. Thus it was proved that RCA color can be transmitted over coaxial cable, contrary to generous statements from some quarters that it cannot. In another test the RCA color television signals were transmitted over a radio-relay loop capable of 4-megacycle bandwidth from Washington to Baltimore and return.

Dr. Jolliffe re-emphasized the fact that the RCA color television system is a compatible system. This means that present television receivers can receive color programs in black-and-white without any modification, or converters or adapters. This feature was clearly demonstrated in the tests today. While the RCA color broadcasts were on the air, the public in Washington could see the pictures on their monochrome receivers, because the RCA system is fully compatible with the existing sets. Such reception was not possible while the CBS system was on the air, because it is not compatible.

Dr. Jolliffe explained that, when a broadcaster shifts from black-and-white transmission to the RCA color transmission, the viewer of an existing black-and-white receiver is unaware of the shift. On the other hand, a viewer of a new color set, receiving programs in color, will, when the broadcaster changes from color to black-and-white transmission, see black-and-white pictures without making any changes in his receiver.

"Compatibility is of great importance not only to the present owner of a black-and-white receiver, but may very well be fundamental to the economics of a color television broadcasting service," said Dr.

# INTERNATIONAL TELEVISION

Jolliffe. "In considering the public interest, it is necessary to take into account these economic factors, because the public cannot be served unless the broadcasters are able to render a commercial service.

"With a compatible system a broadcaster first starting color schedules is automatically assured that he will retain his full potential audience on all receivers in his service area both black-and-white receivers and new color receivers. The economics of the television broadcasting industry appear to be such that regular color broadcasting service might be seriously delayed if the broadcaster must sacrifice circulation, and therefore revenue, in order to provide color transmissions.

"With a fully compatible system, however, the broadcaster can change at will, either from color to black-and-white or the reverse, without disturbing the viewers of either the existing receivers or color receivers, and without requiring adjustments to either type of receiver. This means no loss of audience at the start or later, which will no doubt be an important factor for some time, because it is probable that many programs will be transmitted in black-and-white even when color becomes an established service. It is also likely that some programs, or commercials, will be televised partly in black-and-white and partly in color."

Dr. Jolliffe said that, with appropriate production design, RCA believes that new color receivers of reasonable cost, practical to install, and simple to operate can be made available by the radio industry. He pointed out that economies and price reductions have been achieved in black-and-white sets and similarly it may be expected that economies and price reductions will be experienced in color receivers as demand and quantity production develop.

"We are delighted," said Dr. Jolliffe, "with this comparative test, for it has proved the soundness of our thinking and has revealed, we believe, to any who may have doubted the practicability of the RCA all-electronic color system that we have advanced in the direction which scientific facts indicate is correct and most efficient for the eventual establishment of

A major step toward solving problems of international television standards has been achieved by the Radio Corporation of America through development of a new television receiver built to operate on the varying power line voltages and frequencies prevalent in many foreign countries, it was announced today by Meade Brunet, a Vice President of RCA and Managing Director of the RCA International Division.

Mr. Brunet said that the new television set, known as a non-synchronous receiver, was demonstrated with success recently at Milan, Italy, where competitive tests with other makes showed it to be the only receiver capable of providing satisfactory performance under varying power frequencies.

"All countries abroad are familiar with the problem of variation in voltages and frequencies," stated Mr. Brunet. "It has been one of the main obstacles in the adoption of universal television standards."

The new RCA non-synchronous television receiver was designed for world markets by engineers of the RCA International Division in conjunction with the RCA Victor Division. It operates from any voltage between 110 and 240 and on any power frequency between 40 and 60 cycles. This power supply need not be the same as the power furnished the transmitting station. The set operates on either the American system of 60 fields (30 frames), 525 lines, or on the proposed European system of 50 fields (25 frames), 625 lines. Another feature is that the set will receive any of the 12 very high frequency channels, in contrast with most

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color television as a service to the public.

"We shall continue our experimental developments at our laboratories in Princeton, N. J., and field tests of our color system here in Washington. When the final comparative tests are held for the FCC in February, we expect to show further improvements, because electronics is unlimited in its possibilities for invention and continued progress."

foreign-made receivers that pick up only one channel.

"The new receiver is a major step toward the establishment of international television standards," Mr. Brunet continued. "It facilitates the interchange of programs between nations as well as between different cities of the same country with different power frequencies.

It is a versatile receiver. For example, should the receiver be operated in a location with a power line of 220 volts, 50 cycles, it can pick up telecasts from a station operating on 60 fields and 525 lines. In another location, the same receiver may operate on 150 volts, 42 cycles, and receive from a station using 50 fields and 625 lines."

Mr. Brunet said that television engineers of the RCA International Division are continuing their efforts to achieve still more flexibility in television receivers, while maintaining a close watch on the cost to the ultimate consumer.

"It is the express policy of this Division to aid in finding a solution to the question of International Television Standards," he concluded.

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## PHENOLIC HEAD—from P. 18

plete protection—rain rolls right off, and moisture can not condense to form any "bridge." This head, plus the V-Cone assembly of the elements, give weather-proof performance in all areas, with extremely high impact, and low loss. The head is guaranteed for five years physical characteristics include: heat tested, 370° F., 1 hour, hot oil; water absorption, 1/2 of 1%, 24-hour immersion; dielectric V.M.S.T. 325; A.S.T.M. standards. Clear Beam V-Cone antennas, with the new head, are now available in three models, for normal, "fringe," and "low signal" areas. A recent survey has shown that Clear Beam antennas, starting from scratch six months ago, are now being installed in three out of every five installations in Southern California. This widespread preference for Clear Beam is attributed to the V-Cone, which was originated by Clear Beam, and to the new phenolic all-weather head, which has zoomed Clear Beam sales in the coastal areas.



# When Mickey and Felix were our leading “TV” stars...

Those celebrated “movie actors”—  
Mickey Mouse and Felix the Cat—were  
pioneer helpers in television research

No. 1 in a Series Tracing the High  
Points in Television History

Photos from the historical collection of RCA

● Strange though it seems, two toys had much to do with television as you now enjoy it! As “stand-ins” during television’s early days, Mickey Mouse and Felix the Cat helped RCA scientists and engineers gather priceless information.

Choice of this pair was no accident. Their crisply modelled black-and-white bodies were an ideal target for primitive television cameras. The sharp contrast they provided was easy to observe on experimental kinescopes.

Would living actors have done as well? No, for what RCA scientists were studying—as they trained their cameras on the two toys—was the effect of changes and improvements in instruments and telecasting techniques. With living actors it could never have been absolutely certain that an improve-



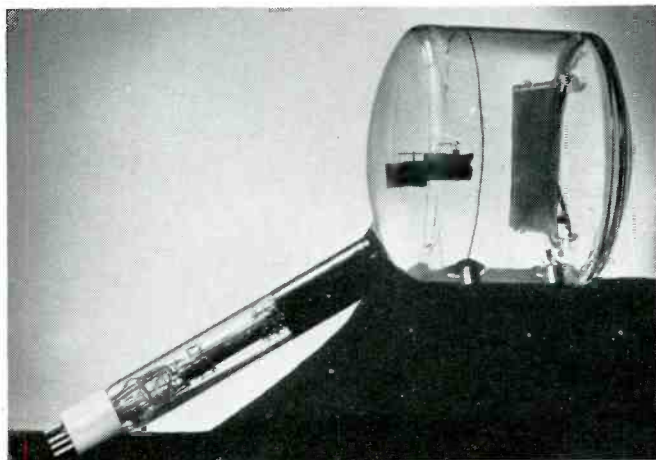
Felix the Cat and Mickey Mouse were, during television’s experimental period, the most frequently televised actors on the air. Using them as “stand-ins,” RCA engineers gathered basic data on instruments and techniques.

ment in the televised image came from an improvement in equipment and techniques—or from some unnoticed change in an actor’s appearance, clothing, make-up. Mickey and Felix provided a “constant,” an unchanging target which led to more exact information about television . . .

Problem after problem was met by RCA scientists, with the results you now enjoy daily. For example: In the “Twenties” and early “Thirties,” there were still people who argued for *mechanical* methods of producing a television image, despite the obvious drawbacks of moving parts in cameras and receivers. Then Dr. V. K. Zworykin, now of RCA Laboratories, perfected the iconoscope, to give television cameras an all-electronic “eye”—without a single moving part to go wrong. Today, this same all-electronic principle is used in the RCA Image Orthicon camera, the supersensitive instrument which televises action in the dimmest light!

Also developed at about this time, again by Dr. Zworykin, was the *kinescope*. It is the face of this tube which is the “screen” of your home television receiver, and on its fluorescent coating an electron “gun”—shooting out thousands of impulses a second—creates sharp, clear pictures in motion. Those who may have seen NBC’s first experimental telecasts will remember the coarseness of the image produced. Contrast that with the brilliant, “live” image produced by the 525-line “screen” on present RCA Victor television receivers!

Credit RCA scientists and engineers for the many basic developments and improvements which have made television an important part of your daily life. But don’t forget Mickey Mouse and Felix. They helped, too!



The iconoscope, electronic “eye” of television, invented by Dr. V. K. Zworykin, of RCA Laboratories.



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Input Impedance	Type 910 and 911—7500 ohms. Type 915—7500 ohms bridging and 600 ohms terminating. Type 920—12,500 ohms.
Frequency Range	Less than 0.2db variation from 30 to 17,000 cycles.
Meter Scale	—20VU to +3 VU and 0 to 100%. Type A has VU reading on upper scale. Type B has percentage reading on upper scale. Scale is large, clearly marked and carefully designed to minimize eye fatigue.
Indicating Meter	NAB Standard; 4 inch square, rectifier type possessing ideal characteristics for monitoring purposes.
Mounting	Rack models 19" long for standard delay rack; portable models available in walnut cabinets.
Finish	Standard, black aluminite panel. Other colors available upon request.



**Type 920**  
Rack model, low-level bridging type. Meter multiplier range: —20 VU to +20 VU. Power supply 100—130 V, 60 cycle AC, with voltage regulator for normal variations. Reference level: 1 mv into 600 ohms. Special ranges on request.



**Type 915**  
Rack model, terminating and bridging type. Meter multiplier ranges: Terminating, —4 VU to +22 VU; bridging —4 VU to +42 VU; or terminating, —0 VU to +16 VU; bridging, +4 VU to +26 VU. 2 VU steps. Reference level: 1 mv into 600 ohms.



**Type 910**  
Rack model has same characteristics as Type 911. Available with illuminated scale, if desired.



**Type 911**  
Portable model, bridging type. Meter multiplier is a constant impedance "T" network which extends the range of the instrument in steps of 2 VU from +4 VU to +42 VU or +4 VU to +26 VU. Reference level: 1 mv into 600 ohms.

Write to Dept. BE-5 for additional information.

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