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The Broadcast Engineers' Journal

Latest Color TV
Reports

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Official I. R. E.

Condensations of Technical
Papers

* * *

Trade News & Labor-Management
News of Interest to Radiomen

NOVEMBER 1949

Vol. 16

No. 11

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



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THE BROADCAST ENGINEERS' JOURNAL

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NOVEMBER, 1949

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THE BROADCAST ENGINEERS' JOURNAL

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NATIONAL N.A.B.E.T. OFFICE

Room 1002, 421 Seventh Ave., New York 1, N. Y.

Mr. C. Westover, Executive Secretary

Wisconsin 7-0327

National Association Broadcast Engineers and Technicians

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Contact any of the following officers for further information:

J. R. McDonnell, Pres.
375 O'Farrell St., Room 101
San Francisco 2, Calif.
Ordway 3-8484

C. Westover, Exec. Sec'y.

H. E. Miller, Nat'l Sec. Treas.

C. L. Gorsuch, Nat'l Rep.

421 7th Ave., Room 1002
New York 1, N. Y.
Wisconsin 7-0327

Geo. Maher, National Rep.
80E. Jackson Blvd. Rm. 543
Chicago 4, Ill.
Wabash 2462

James H. Brown, Nat'l Rep.
6223 Selma Ave., Rm. 109
Hollywood 28, Calif.
Hillside 9311

Chapter Chairmen

Chicago:

George Maher
80 E. Jackson Blvd. Rm. 543
Chicago 4, Ill.

Cleveland:

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R. D. No. 2
Brunswick, Ohio

Detroit:

David B. Stewart
1160 Seward St.
Detroit 2, Mich.

Dixie:

J. Willard Dean
217 E. North St.
Raleigh, N. C.

Engineering:

D. C. Shultis
75 Kenwood Road
Riveredge, N. J.

Hollywood:

Ben M. Doty
3330 Charleston Way
Hollywood 28, Calif.

Hudson:

Frederick H. Sperr
60 Wilson Street
Hartsdale, N. Y.

Mohawk:

Donald P. Morey
12 Morningside Dr. RFD 6
Schenectady 6, N. Y.

New York:

Ed Stolzenberger
116-03, 91 Avenue
Richmond Hill 18, N. Y.

Omaha:

D. Roy Glanton
5500 Kansas Ave. Rt. 2
Omaha 12, Nebraska

Philadelphia:

R. J. Wilke
4718 Chestnut
Philadelphia, Pa.

Pittsburgh:

W. C. Stuchell
247 Cornell Ave.
Pittsburgh 29, Pa.

Rochester:
Edward Lynch, Vice-Pres.
109 Wolcott Ave.
Rochester 11, N. Y.

Rocky Mountain:
Aubrey F. Blake
2901 Eaton Street
Denver 14, Colorado

San Francisco:
Richard T. Parks
10 Leroy Place
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St. Lawrence:
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Syracuse:
Paul K. North
631 Midland Avenue
Syracuse 4, N. Y.

Washington:

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3108 Wellington Rd.
Alexandria, Va.

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Atlanta:
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P. Sarantopoulos
27 Exchange St.
Binghamton, N. Y.

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Pertinent Topics from the National Office

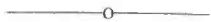
from

C. WESTOVER
Exec. Secy., NABET

Of all the topics being discussed these days, there is none that is more pertinent than the proposed affiliation of NABET.

Every member should read the President's statement on this page, and the official press release which appears below.

The NABET *affiliation committee* has been charged with the responsibility of gathering all factual data relative to the various International Unions, and the NABET membership will have this information before they receive an official affiliation ballot.



Official Report of the NABET National Council Meeting October 9-15 1949, Hotel Statler, New York

The NABET National Council has set up an Affiliation Committee, and authorized an affiliation vote by the NABET membership. The NABET Affiliation Committee is composed of James H. Brown, Hollywood, Chairman; George Maher, Chicago; Ed Lynch, NABET Vice President, Rochester; Willard Dean, Chairman Dixie NABET Chapter, Raleigh; and Ed Stolzenberger, New York.

The consolidation of the NABET Chapters in the New York area is a large step closer to accomplishment. When affected, the New York local will encompass 700 members. The Consolidation Committee is composed of the Chairman of the present New York Chapters, DeWitt C. Shultis, and Ed Stolzenberger.

Election of officers: NABET Pres. J. R. McDonnell continues in his 3-year term of office as President and Member of the Executive Board. Ed Lynch of Rochester was re-elected Vice-President and Member of the Executive Board. Also elected to the NABET Executive Board were Chairman Paul E. Anderson of Washington, Richard T. Parks of San Francisco, and Ed Stolzenberger of New York.

Present at the NABET National Council Meeting were: Executive Secretary C. Westover, Secretary-Treasurer Harry E. Miller, National Representatives Cliff Gorsuch, George



A Message to the Members of NABET

from

JOHN R. McDONNELL
President, NABET

As this is written, the NABET members are pondering the question of affiliation. It is imperative that we deliberate wisely and thoroughly, as our collective choice will affect the lives and livelihood of all radiomen for many years. We must not let ourselves be bolted or emotionally swayed by prejudice or loud talk, but should individually study each phase of affiliation on its merits.

First, we must decide if affiliation is necessary. A study of our history and the more recent events would seem to indicate that eventually affiliation is inevitable if we are to continue to exist. Once having arrived at this decision, there but remains to be decided: *Is it the time?*—and if so, *What course to take?*

At this time (October 16th) we have what would appear to be one bona fide offer, with one, perhaps two, others in the offing. We will do well to study them diligently in the light of what they may offer in the way of real improvement over our present independent status.

It is not a matter to be treated lightly, or a choice to be made hurriedly. May I again urge each of you to study all of the evidence that will be presented to you on the subject, and when the time comes to vote, vote wisely in the best interest of your own future and that of your fellow radiomen.

Sincerely,

J. R. McDONNELL, *President.*

Maher, and Jim Brown. The National Council ratified the President's reappointment of all of the full-time NABET officers. Also present, were President McDonnell, Vice President Lynch of Rochester, and Chairmen Anderson of Washington, Blake of Rocky Mountain, Brandt of Cleveland, Dean of Dixie (Raleigh), Doty of Hollywood, Dykeman of Syracuse, Glanton of Omaha, Lane of St. Lawrence, Morey of Mohawk (Schenectady), Parks of San Francisco, Shultis of Engineering, Sperr of WOR-Hudson, Stewart of Detroit, Stolzenberger of New York, Stuchell of Pittsburgh, and Wilke of Philadelphia.

The official minutes of the National Council Meeting will be available to the NABET membership shortly.

Additional information as released, along with photographs of the official dinner will appear in our next issue.

New Advances In Color TV • •

Dr. E. W. Engstrom of RCA Laboratories Supplies Commission Technical Data that Discloses Basic Features of the New RCA High Definition, All-Electronic Color System and Explains How It Operates in 6 Megacycle Channel Completely Compatible with Present Television Sets.

New and basic technical advances that resulted in the Radio Corporation of America's development of a high definition, all-electronic system of color television completely compatible with present receiving sets, were revealed in an engineering statement submitted to the Federal Communications Commission by Dr. E. W. Engstrom, Vice President in Charge of Research at RCA Laboratories.

Supplying the FCC with engineering data to supplement the initial announcement on August 25 that RCA had created the new system, Dr. Engstrom disclosed the scientific developments which made possible the accomplishment, heralded in the press, the radio industry and in scientific circles as "a momentous achievement."

The new system is all-electronic, Dr. Engstrom said. He pointed out that it operates entirely within a 6 megacycle channel without degradation of the quality of the received pictures. No changes in present transmission standards are required. Transmitting stations 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, without requiring adjustments to either type of receiver and, therefore, without any loss of audience.

Since the system is completely compatible with present black-and-white sets, Dr. Engstrom said that it enables existing television sets to receive color programs in monochrome without any modification whatever and without any converter or adapter. To receive the color transmissions in color, existing black-and-white sets can use a color adapter.

The new color system, which Dr. Engstrom said RCA will describe and demonstrate at the FCC hearings scheduled to begin on September 26 in Washington, D. C., has its roots in the RCA's all-electronic simultaneous method of color television which it first disclosed on October 30, 1946.

Describing the process in technical detail step-by-step, Dr. Engstrom said that the color camera at the transmitting end produces three signals, one for each of the primary colors of green, red and blue. These signals are sampled electronically in rapid sequence and combined. The

mixture is then broadcast as a single signal.

At the receiver, the mixture is separated, so that the signal representing each color goes to an electron tube which produces a picture in that particular color. The green signal is fed to the green kinescope, while the red and blue signals are applied to their individual kinescopes. The three colors are then projected to be viewed simultaneously to produce the completed picture in perfect color register.

One of the fundamental characteristics of the RCA system is the application of "time multiplex transmission," which has been adopted and applied to television from the art of radio telegraphy. Other innovations are the "electronic sampler" and "picture dot interlacing." All of the new developments are so ingeniously applied, Dr. Engstrom explained, that no change in normal transmitting equipment is required. In fact, the transmitter is used exactly as existing VHF transmitters are used, with the same vestigial sideband filter, sound transmitter, diplexer and antenna.

The electronic sampler, which is described as a new and outstanding engineering development, functions with microsecond precision in sampling the colors. From the sampler the signals, representing the three primary colors, are fed to an electronic combining device. Standard synchronizing signals from the synchronizing generator are also applied at this point, and the principle of "mixed high frequencies" is also utilized.

Each color is sampled 3,800,000 times a second—for the three colors a total of 11,400,000 samples a second. The green signal is sampled and less than 9 hundred-millionths of a second later the red is sampled, and then the blue. This means that the signals of each color are transmitted at an approximate rate of one every four millionth of a second. When viewed on the screen of a receiver the recurrence of the signal is so rapid that the color appears to be constant—giving a high quality picture without flicker or color breakup.

The three color signals from the camera are combined in an "electronic adder" and then are passed through a band-pass filter. The output of this filter contains

frequencies between 2 and 4 megacycles, with contributions from each of the three color channels. The signal at the output of the band-pass filter is known as "the mixed-highs signals." These mixed-high frequencies are fed to an "adder," which is already receiving signals from the sampler and from the synchronizing generator. The composite signal which comes out of a smoothing filter is applied to the modulator of the transmitter.

"We have demonstrated," continued Dr. Engstrom, "that the mixed-highs procedure is successful and satisfactory in a wide-band simultaneous system. In the RCA color television system the sampling process by itself is sufficient to carry high frequency components of each color signal so that when combined the resulting band width is below 4 megacycles (the sampling frequency determines the highest frequency which will be passed). However, the choice has been made to sample for the lower half of the video band (up to 2 megacycles) and to use the mixed-highs principle for the upper half of the video band, because this has technical advantages.

"The radio-frequency circuits, the picture intermediate-frequency amplifiers, the second detector, the sound intermediate-frequency amplifiers, the discriminator, and the audio circuits are identical with those of a conventional black-and-white receiver. The composite video and synchronizing signals from the second detector enter an electronic device called the 'sync separator,' which removes the video and sends the synchronizing pulses to the deflection circuits and to the sampling pulse generator. The sampling pulse generator utilizes the trailing edge of the horizontal synchronizing pulse to actuate the receiver sampler in synchronism with the transmitter sampler.

"The signal from the second detector also enters the sampler. It is a composite signal. An electronic commutator samples the composite signal every 0.0877 microsecond, producing short pulses. The amplitude of each of these pulses is determined by the amplitude of the composite wave at that particular instant.

"The commutator feeds these pulses into three separate video amplifiers which in turn control three cathode-ray tubes or

kinescopes having appropriate color-producing phosphors. This method for portraying the single color picture with three kinescopes in a projection system is similar to that which RCA has previously demonstrated to the Commission.

"In our laboratory setup," said Dr. Engstrom, "we have obtained the same resolution when reproducing the color transmission on a black-and-white receiver as one may obtain with the same receiver using present broadcast standards. We

have also obtained the same resolution when reproducing the color transmission on a color receiver."

In submitting the engineering statement to the FCC, Dr. Engstrom gave detailed technical information, the newness of which is indicated by the many new terms in engineering parlance. He concluded by pointing out that he had described "an embodiment of the RCA color system," which operates within the framework of the present standards and

is consistent with the "Standards of Good Engineering Practice Concerning Television Broadcast Stations," as established by the FCC.

Dr. Engstrom summed up the characteristics of the new RCA color system as follows: (1) 6 megacycle channel; (2) Fully compatible; (3) 525 lines; (4) 60 fields per second; (5) Field interlaced; (6) Picture dot interlaced; (7) 15 color pictures per second; (8) Time multiplex transmission; (9) All-electronic.

High Definition Color TV Urged For VHF and UHF

Recommendations Are Presented at Washington Hearing by Dr. E. W. Engstrom of RCA Laboratories in Submitting Details of RCA's New High-Definition All-Electronic and Completely Compatible Color Television System—Immediate Lifting of Television "Freeze" by FCC Is Urged.

Development by the Radio Corporation of America of a high-definition, completely compatible all-electronic color television system enables the Federal Communications Commission to lift the television "freeze" immediately and allocate ultra-high frequency channels, with provision for color service on these same channels used in black-and-white television transmission, Dr. E. W. Engstrom, Vice President in Charge of Research, RCA Laboratories, declared today at a hearing before the FCC in Washington, D. C.

Testifying for RCA to give the FCC details of the all-electronic six-megacycle color television system announced by RCA last month, Dr. Engstrom said:

"RCA is pleased that its experimental work and engineering analysis provide the basis, and this we may now state with conviction, for high-definition color television within six-megacycle VHF and UHF channels and compatible with the present black-and-white service."

Scheduled field tests of the new RCA system will provide the necessary data, experience and assurance by which a color television service can be crystallized, Dr. Engstrom said. He summarized the RCA recommendations to the FCC as follows:

1. That the Commission lift the freeze immediately.
2. That the Commission proceed immediately to allocate UHF channels for television.
3. That the Commission specify that color television will be assigned the same six-megacycle channels in VHF and UHF as in black-and-white.
4. That the Commission specify compatibility as a requirement. This should

be on the basis that such requirement must not degrade the service. (Complete compatibility as provided by the RCA color television system makes it possible for existing television sets to receive color programs in monochrome without any modification whatever.)

5. That the Commission encourage prompt and thorough color television field tests.

6. That the Commission establish a time schedule for industry to recommend to the FCC standards for color television broadcasting.

"We believe," said Dr. Engstrom, "that it is now clear that color television may be scheduled for six-megacycle channels, VHF as well as UHF, and that compatibility is assured. We believe that color performance and black-and-white performance from color transmission will be of high quality and high definition, and that broadcasting apparatus, receivers and color converters can be provided. The Commission may lift the freeze with confidence and proceed with UHF allocations knowing that color will find its place as a broadcast service in an orderly fashion."

RCA has believed from the beginning, Dr. Engstrom declared, that television should progress from black-and-white to color as soon as this was practical.

"Believing this, RCA has aggressively worked upon all promising systems of color television and has earnestly directed its efforts to this end," he said.

"RCA has believed that color television, when established, should be based upon a lasting foundation of proper standards, excellent performance, and should be developed in an orderly manner with regard to the black-and-white television service."

Dr. Engstrom told the hearing that

field tests of the RCA color television system, now beginning in Washington, will provide RCA, the Commission and the radio industry "the extensive data and the assurance through experience needed to crystallize the service." He added: "We shall press forward with the field tests to obtain this information as soon as possible so as to permit transition to a regular color television service. We welcome others to join in the observations and tests."

Emphasizing that the RCA recommendations were based upon the fact that the RCA color system is completely compatible with the present system of black-and-white television, Dr. Engstrom said that this compatibility makes it possible for existing television sets to receive color programs in monochrome without any modification whatever. When a broadcaster shifts from black-and-white transmission to color transmission, the viewer of a black-and-white receiver will be unaware of the shift.

"The question of compatibility," Dr. Engstrom asserted, "is of great importance not only to a present owner of a black-and-white receiver, but may very well be fundamental to the economics of a color television broadcasting service. In considering the public interest, we must take account of 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 the receivers in his service area, both black-and-white receivers and new color receivers."

"The economics of the television broad-

casting 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 no doubt will be an important factor for some time, because it seems inevitable that many programs will be transmitted in black-and-white even when color becomes an established service."

Dr. Engstrom declared it to be the belief of RCA that, with appropriate production design, new color receivers of reasonable cost, practical to install and simple to operate can be made available by the radio industry.

While specific designs and final costs must await field tests and production engineering, he said, RCA has made the following engineering estimates to assist the Commission:

1. Deluxe receiver of the projection type with a picture 15x20 inches, \$800 to \$1000. (Current black-and-white projection sets retail for \$795.)
2. Medium-price receiver using the projection method or the direct-view method at \$550 to \$700, for the 7x 9½ inch projection type and \$650 to \$800 for the 10 inch direct-view model. (Current black-and-white 10 inch direct-view sets of console type market for \$250.)
3. Low-price receiver employing two color cathode ray tubes at \$400 to \$550. (Current black-and-white direct-view sets using 10 inch cathode ray tubes sell for \$250.)

"Economies and price reductions," Dr. Engstrom pointed out, "have been achieved in black-and-white sets. Similarly, economies and price reductions will be experienced in color receivers as demand and quantity production develop."

He said because color receivers would be simplified by a color picture reproducer of the single-tube type, RCA has continued research on this problem, and during the demonstration scheduled before the FCC on October 10, set-ups would be shown revealing principles which may be used. He said research points the way and gives RCA confidence that a solution to the problem will be found.

Moreover, Dr. Engstrom reported that RCA has started development of a field

type color camera and associated apparatus which is expected to be ready for field tests next spring. He said the field camera would use a new camera tube which would greatly reduce the size of the camera itself and that a mock-up of this camera and an operating sample of the camera tube will be available for display during the demonstration.

Existing black-and-white television receivers may be converted to receive color pictures by any one of three methods in the RCA color system, Dr. Engstrom reported. He described them as follows: (1) a separate converter unit containing appropriate electronic gear and picture tube viewing arrangement, giving a picture of 10 inch diameter; or (2) a new projection unit to be substituted for the cathode ray tube in the black-and-white set; or (3) a converter which adds a second cathode ray tube to the black-and-white set, thus providing for viewing of the two-cathode-ray tube combination. This may be built for 10-inch table model at a cost to the set owner of from \$125 to \$175, with an installation charge of approximately \$20.

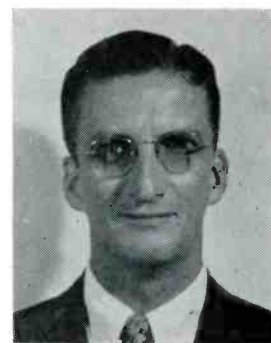
As part of the color television field tests in Washington, Dr. Engstrom disclosed that as soon as it is feasible, RCA will try network circuits four megacycles wide. The color programs originating at the WNBW studio in Washington will be sent to a distant city for experimental rebroadcasts. These and other tests, he said, will be conducted to provide specifications of the requirements to be met by the relay facility.

The color telecasting may be conducted over either the regular Channel 4 transmitter of station WNBW of the National Broadcasting Company in Washington, or a UHF transmitter operating in the assigned channel of 523-529 megacycles, he explained. Both transmitters are to be used for the field test.

Receivers and converters employed in the field tests will be research models, Dr. Engstrom said, and declared:

"From the experience of the initial field tests, we will begin a succession of receiver and converter designs leading to production forms. Product development and design engineers of our manufacturing organization will do this work, and they will produce the receivers in small quantities for the field tests. The demonstrations of October 10 will also include standard black-and-white receivers showing the quality of monochrome picture obtained from color transmissions.

"As more is learned from extensive field tests about the RCA color system, it may become desirable, in order to enhance color performance, to make certain



Henry E. Kenny

Broadcasting continues to take its toll—each time closer to home.

We were shocked to learn of the premature death by heart attack and nervous exhaustion of our friend and fellow broadcast engineer, Henry E. Kenny, on Thursday, Sept. 22nd, 1949, at the age of 45.

Kenny was born Dec. 18, 1903, in Buffalo, N. Y., and was graduated from St. Joseph's High School in Buffalo. During the Florida "land boom" of the 1920's, he worked as a surveyor and mapped large portions of that State. Following the land boom, he came to New York and joined the National Broadcasting Company's Engineering Department, April 6, 1929, as Studio Engineer. Kenny was studio engineer for many of the top programs of the day, and was promoted to Master Control Room engineer on Sept. 1, 1938, where he served under tremendous pressure and tension throughout the war and right up to the moment of his passing. His 20-year NBC service pin was awarded him post-humously.

The New York NBC Master Control has lost a valuable member of its staff. It is with extreme regret that we write a very untimely "30" to a fellow broadcast engineer.

—Ed. Stolzenberger.

minor changes in the specifications of the existing Standards of Good Engineering Practice. We believe, however, that it should be a rigid objective that any departure should be such as to have no detrimental effect whatever on black-and-

To Page 7

Latest RMA Color TV Report

Raymond C. Cosgrove, president of the Radio Manufacturers Association, asked that the Federal Communications Commission take the first official step toward color television by decreeing that it would approve no system that would obsolete the millions of receiver sets in the hands of the public.

At the same time, Mr. Cosgrove urged the "unfreezing" of additional channels for black and white broadcasting pending experimentation with color so that new areas, particularly small towns and rural sections, can have access to television without waiting for color broadcasting to be perfected.

Mr. Cosgrove said, "No system for broadcasting color has been proved by field tests to be ready for commercial use yet, and, therefore, no standards should be adopted until that is done."

Mr. Cosgrove spoke preliminary to hearings before the FCC to determine whether color television is ready for commercial use, and whether to continue its existing prohibitions against new transmitting facilities.

He urged that any standards approved for color television include the principle of compatibility, stating that otherwise the sets now in the hands of the public would be rendered largely obsolete.

He explained that if a non-compatible color system is approved existing sets would be rendered obsolete because they could not receive color broadcasts even in black and white unless they are radically altered.

"By compatibility," he said, "we mean that a requirement of any color system must be that the millions of receivers now in the hands of the public, and which they will continue to purchase, will be able, without any extra cost or inconvenience, to receive in black and white, all programs transmitted over the air, whether they be transmitted in color, or in black and white.

Mr. Cosgrove said that Subcommittees of the RMA Color Television Committee began work in July in an effort to answer questions about the status of color. The membership of the committees, he pointed out, was representative of the industry and was not confined to RMA members.

The committee reports, on testing with regard to color television, he said, indicated that 30 separate tests are necessary to accurately gauge any color system.

He pointed out that members of the committee said these tests had not been

conducted and that they are necessary before approval of any system. In addition, he advocated additional tests under field and practical home conditions, including the broadcasting of athletic events such as football and baseball games.

Mr. Cosgrove said that technical difficulties which had resulted in "freezing" the Very High Frequencies, in present limited use and restricting extension of black and white television, had been overcome. He urged that this "freeze" be lifted promptly. The adoption, he added, of "compatibility as a key principle of color television" would remove the major obstacle to UHF allocations.

"We are anxious," the association head said, "that service be extended to small town and rural areas as soon as possible. They are entitled to the educational and entertainment programs that have become a part of our life in the areas now having service."

Mr. Cosgrove said that his association "is entirely objective" about the question of color, and favored no particular system.

"Our sole interest," he said, "is in seeing that color television receivers get on the market just as quickly as they can, provided the millions who bought their existing sets in good faith are protected and there is no betrayal of future millions who look to this industry to give them the best possible service."

Many persons had wondered, he stated, that since color television had been demonstrated experimentally, why there had been a delay in introducing commercial color television.

"The answer is," he said, "there is a vast difference between the television industry and other industries.

"In other fields, when a new model is out on the market, the consumer has a free choice between keeping his old model or buying the new. The new one may be better, but the old one at least will work.

"But a television set is a useless thing by itself. It becomes of value only to the extent that it receives a picture and a sound accompaniment—only, in other words, as it brings education and entertainment into the home.

"In order to receive this service each set must be synchronized with the transmitting station. This necessitates the fixing of definite standards by the Commission to which all transmitting and receiving apparatus must conform. Otherwise

chaos would prevail. These facts set the television industry apart as to the way in which it moves from one major phase of scientific development to another.

"The establishment of standards for color television will set the pattern for years to come. It is, therefore, essential that they permit the finest performance that now can be foreseen. Nothing less than this should be accepted."

Among Mr. Cosgrove's five recommendations was one for the establishment of an industry committee similar to the National Television System Committee, set up in 1940 to help draft standards for black and white television, to study the question of color and make recommendations to the Commission.

Near the opening of his statement, he said the Radio Manufacturers Association has more than 300 members, among whom are the producers of 85 per cent of all finished radios and television sets, producers of tubes and parts, manufacturers of radio and television transmitting equipment, and makers of sound amplifying equipment and other types of electronic instruments.

The RMA is predominantly composed of relatively small businesses, Mr. Cosgrove said.

Near the conclusion of his remarks, Mr. Cosgrove said:

"To repeat, what we are asking with regard to color television is that you make haste soundly. We have no preference for any particular system, but we do want standards which will permit us to manufacture receivers of the highest quality which will bring to the purchaser black and white and color pictures at least equal to those which are now being received.

"We do not want to be forced to manufacture receivers which do not fulfill these requirements and which cannot be efficiently manufactured. For unless we can do so, we will be unable to make the savings in manufacturing cost which will permit steady reduction in the selling price. The standards which you set for black and white met all of these requirements. The result is that the average price of receivers is only slightly more than half of what it was two years ago and the efficiency of the receiving sets has been materially improved at the same time that the substantial reduction in cost was achieved. We want standards which will permit us to do a comparable job in color."

The recommendations of RMA were as follows:

1. RMA recommends that color television be made available at the earliest practicable date consistent with the establishment of sound standards.

2. RMA urges the Commission not to approve final standards until adequate field and practical home tests—which have not yet been made—establish their soundness so that the public may buy with the assurance that the system is permanent and that further experimentation will not be done at their expense. Pending adequate testing, RMA does not recommend any particular system. RMA is confident that the combined knowledge and ability of the industry as a whole can produce a set of standards for a compatible color system of equal quality to present black and white.

3. RMA urges that such color television be based on the compatible principle by which programs transmitted in color may be received in black and white on the millions of receivers now in public use, without modification cost or inconvenience to the public, and without degrading the quality below that of present pictures.

4. RMA recommends the immediate lifting of the freeze on commercial television applications. It believes that, while the initial freezing was proper, technical progress and information presently available have eliminated the need for any longer withholding television service from the remainder of our country. The allocations in the UHF should proceed with all practicable expedition, and VHF allocations should be made promptly.

5. RMA suggests the establishment of an industry committee, similar to the National Television System Committee, to study the detailed problems involved and to recommend to the Commission specific standards for a compatible system.

COLOR TV—from Page 5

white performance from the color transmissions."

Dr. Engstrom reported that as soon as RCA has demonstrated its system to the FCC, it will hold a series of demonstrations to which it has invited representatives of the radio industry and others who may be interested. Moreover, he said, RCA will continue its policy of making information regarding these developments available immediately to the industry through bulletins to its licensees and publication of technical papers in the RCA REVIEW and other technical journals.



WASHINGTON

By W. D. DEEM

Last September five men left WOL and with the aid of NABET obtained work at WOR-TV in New York. This of course was the result of the selling of the station to WWDC here in Washington. The other men hung on to see just what would happen. One man, *John Neff* planned to withdraw from the engineering side of radio for good. He wanted to get into the management side of radio and TV.

The five men that went to WOR-TV included *M. J. Dowd*, *Lou Parrish*, *Harold Stark*, from the transmitter, *Earl Neely*, and *William Book*. Most of these fellows stood to lose in the salary end of the deal. And in New York they had to wait for an NLRB election in order to find out what union they were to be in. Locally their contract had expired in March of 1949 and up to September the company hadn't signed it.

Four new men were hired to replace the outgoing men. The first one to introduce is *Stan Kraft*, a school graduate and formerly a TV Service man. Next is *W. H. Mitchem* fresh from a local radio school, and *John Jones* (that's his name) who is also a graduate from the same school. The remaining new man is *Anibal Souza*, being fresh from school also. Even though their jobs were apparently temporary they were glad to gain the experience and also had the good fortune of becoming NABET members.

Over at WMAL-TV things are going along smoothly. *Frank Wildeboor* transferred from the transmitter to studio and field and likes the change very much.

Gil Ennes spent a well earned vacation in Florida, just missed the hurricane last September. *Jacob Goldstein*, a summer relief at WMAL and a former RCA Institute Graduate plans to return to New York to assume new television duties there.

Congratulations to *Elmer Hall* who was recently promoted to Field Supervisor at WMAL-TV.

The WMAL field crew is getting a workout once a week doing the Evelyn Tyner show from the Statler Hotel in D. C. The engineering angle of the show is unusual because they have to shoot through glass. This cuts down their light transmission somewhat, but *Bill Fowler*, video engineer, says that they don't have much light to begin with so what's the difference. Their good sensitive tubes make up the difference though and they emerge with some fairly good looking pictures. They are utilizing a 35mm lens in order to include most of the ballroom in one shot.

The microwave on this job was really a problem. *Frank Wildeboor*, microwave link man, says that if 16th St. was done away with they could throw a coaxial cable from the hotel over to the Commonwealth Bldg., but since the street is fairly permanent he had to use a horn type reflector instead of a parabolic reflector on his microwave transmitter. The WMAL field crew are also doing three more remotes a week. They might get a little overtime if this keeps up.

Another interesting field job was at one of the roller skating rinks in Washington. Dumont, WTTG, tried to pick it up, but due to poor light couldn't handle the job. The WMAL crew went in and with their more sensitive tubes did a fine job of it. Good work fellas.

Al Pouley has a "position." He travels with Harry Wismer, Sports caster, spends five days getting ready for two days' work each week.

Dick Edwards, WRC Studio Engineer had a busy summer. He became a happily married man as of June 17th and also got a new car. How can a man buy a new car and get hitched all at the same time.

Frank Fugazzi was another Florida visitor, while *Ralph Hammel* who vacationed in South Carolina says "Those southern gals without shoes are prettier than the northern gals with shoes."

Our ex-chairman *John Hogan* is a happy and relaxed engineer these days. No Union Duties other than that of "John-Q-Citizen member."

Bill Chew went to New Orleans in July and we understand that he spent

most of his time in air-conditioned bars; just to escape the heat of course.

Nick Close is sporting a new Olds, Model '76. *Nick*, who loves concert music is now on the morning shift and misses engineering the evening WMAL concert record shows.

Warren Kearse is a new engineer at WRC, a South Carolina boy with a Brooklyn accent.

Al Osterhoff, studio engineer from NBC in Chicago visited NBC in Washington and talked with *Roy Schneider* (the guy that no gal has been able to trap, yet!). Al had a very enjoyable visit and seemed quite impressed with what the Washington station was doing!

D. B. MacDowell is a comparatively new man with WRC. He was formerly with WINX doing studio and recording work and previous to that went through Radio School up in Boston. He also did a tour of duty at WGN, Chicago. He is married and is a native of Vermont. He is a cliff dweller in Washington now. He did summer relief work in recording at WRC, regularly works in the studio. Mac is possibly the only engineer at WRC to hold an IBEW card along with his NABET card. He had this card at WGN and held the card to complete a tour of duty there. Mac also holds an ROU card. He spent three years in the merchant marine during the war and during that time handled exactly five messages. The reason for this of course was the silencing of transmitters for security reasons.

At WNBW quite a few changes took place this fall. *Carrol Bolstad*, *Al Argenti*, *Vic Leisner* and *H. Duhamel* all came back from microwave duty.

Dodd Boyd was busy trying out his new Fearless camera dolly. WNBW got two big ones that really made the studio look like a studio. If you have been reading the newspapers you know what else has been going on at WNBW.

Rocky Mountain News

By GEO. SOLLENBERGER

With vacations over the faces of the local membership turn stoically to the cold hard future of Group II. Refresher courses in platter spinning will begin soon for those who have become unfamiliar thru lack of contact. Chairman Blake is spending odd moments brushing up on various publications related to the coming meeting of NABET.

The now nationally famous VIDEO ASSOCIATES scored again with a dem-

onstration at Denver's recent home show. Of course comments were varied from this hinterland of beauty by those not yet acquainted with TV. They calculate that better than 50,000 people were televised and able to see themselves. Of the telepeople, those who had seen TV other places were complimentary that this "was a better picture" than they had been used to seeing. The peasants who had not left this proximity seemed to expect more in detail and contrast. This could be compared to a man who had owned nothing but Fords all his life. VIDEO ASSOCIATES do not, however, offer the Cadillac in TV but the picture as viewed on Stan Neal's new 16 inch kit definitely has a Dynaflo quality.

All that is Dynaflo is not gold, according to Glen Glasscock, the most surprised new car owner in this area. If it was a puppy he couldn't have more trouble housebreaking it. But it runs and beautifully, so nicely in fact that he has caused Carl Drebing and one Sollenberger to be influenced toward buying guaranteed "dripless" Special models. This may or may not be a wise move but throwing caution to the winds, we plunge. Mr. Drebing, our volunteer secy.-Treas., has also decided to leave NBC. Not for another network but for permanent employment with a local heating contractor. I, for the membership, express appreciation for the work he has done toward keeping the Chapter paper work up to date. Thanks again, Carl.

Genial George Pogue, always anxious to stay in the company limelite, has scored again by being elected president of the newly organized employees association. He claims he was railroaded into it but he always was a sly campaigner in local elections. Note the length of term as Chapter Chairman and adviser and once again he is trying to put some life in this masoleum. This may include an employees' party and other yet unmentioned benefits. They should be equal to or better than group insurance for a buck a quarter dues. It is hoped that at least one drinking fountain will be connected to the nearest beer line.

Our other faithful members seem to be a little more unhappy than usual. This would seem to indicate that KFKA did not have an employees' association and beer in their drinking fountains. The fruit season has passed in Colorado and things aren't as peaches and cream as they could be. The Greeleyites are always represented at our meetings and we welcome them at any time.

In passing, it might be worth welcom-

ing other broadcast engineers in this area who read our monthly report to join this ever-growing union and enjoin with the organization exclusively for BC engineers. Much could be done to improve the standing of the above mentioned if every person would fall into the ranks thereby strengthening the underdogged profession that this group seems to represent out here in the wilds of our great nation. Any information will be cheerfully disseminated by any of the membership.

Color TV definitely has a place in the realm of the new medium. This was capably demonstrated by the utilization of something called CBS color at the recent Colorado Medical Association Convention. The local Telco provided microwave link from the hospital to the hotel, a distance of a little more than one mile. RCA TTR and TRR equipment performed nobly for a week under the guidance of the Telco.

Nothing else has happened that has passed this way so we send the best of 73's.

MOHAWK

By JOHN F. McMAHON

Well here we are again. Another month and I don't know just what I'm going to say, so stand by while I fumble for words.

Had a short talk with Jess Cripe, WRGB remote crew the other day and jokingly(?) mentioned the fact that at one of the recent remotes at a golf course I couldn't tell whether the golfers were using ball bats, tennis rackets or what. Jess shut me up with the remark that some other people thought the golfers were TREES. What a way to make a buck huh?

There has been some talk about affiliation with a national labor group; while I don't feel that this is any spot for pro and con arguments by yours truly, I'd like to suggest that we all give it a lot of thought before deciding one way or the other. By all, I mean the entire membership and not just the councilmen, chairmen, etc.

The time has come around for thought about the Journal Yearbook and I'd like to ask for the help of all the local lads who might be able to talk to the artists and other folk.

One of our summer relief boys, Dave Burdett, tells me that he saw one of our mobile units flying low the other night. Guess they can't blame that on the boys on the Hill though.

LABOR - MANAGEMENT NEWS

The Sec'y of Labor says:—

President Truman and Congress have taken a great step forward in bringing about greater efficiency in Government and in strengthening the Nation's economy through Reorganization Plan No. 2. This is an important step in the rebuilding of the Department of Labor.

As I contemplate the widening of the Department's activities, I am pleased that I will have the advice of the Federal Advisory Council, composed of public, employer, labor, and veteran representatives. I will be happy to cooperate with this outstanding group of citizens. We are taking steps to coordinate the activities of all bureaus with the immensely important work of the Bureau of Employment Security in finding jobs for men and women, and men and women for jobs.

The employment service and unemployment compensation operations of the Bureau of Employment Security will be administered with fairness and impartiality, the same as the other bureaus in the Department. Our services will continue to go to workers and employers, small businesses and farmers, merchants and professional men.

More needs to be done to carry out the expressed desire of the President to rebuild the Department to its greatest usefulness. Steps will be taken in the near future to secure the return to the Department of Labor of other labor functions now outside the Department, including those recommended by the Hoover Commission.

Important New York S.L.R.B. Decision Challenges T-H

A recent decision of the State Labor Relations Board in a union representation case challenges one of the basic doctrines of the Taft-Hartley Law, taking direct exception to its principle that a worker does not have a stake in his job if he goes on strike.

The case came before the SLRB when a strike was called by Local 32-B of the Building Service International Union in order to obtain union recognition. As soon as the strike began, the landlord of the struck building hired scabs.

The landlord argued that since the two striking employees had been "permanently" replaced by two other employees "only the replacements should be eligible to vote or, in the alternative, both the strikers and the replacements should be eligible."

Rejecting this argument, the SLRB declared:

"A strike is not a quitting of employment. It is a cessation of work with the intention of resuming the job under more advantageous terms or conditions.

"It was recognized, even before the advent of the Labor Relations Acts, that a strike does not itself sever the employment relationship for it has long been a matter of common acceptance by both employers and employees, that striking employees return to their jobs on the termination of a strike.

"If the problem of determining whether the employees in question have been permanently replaced were before us, we should have little hesitancy, upon this record, in finding that persons hired at will during the strike did not become

'permanent' replacements by the employer's mere say so. But we are not concerned with that problem in this proceeding. Although economic strikers who have been permanently replaced, may have no absolute right to reinstatement, they have the right, while the dispute is still current, to select a representative to bargain with their employer not only on the question of their possible reinstatement, but also as to rates of pay, wages, hours and other conditions of employment.

And in issuing this decision in the case of Wallace vs. Local 32-B, the SLRB ruled that "in this election, only the employee on strike, and not his replacement shall be eligible to vote."

NLRB Distinguishes Between Primary and Secondary Boycotts

The National Labor Relations Board has ruled unanimously that picketing at struck plants in support of a lawful strike is legal even though it may have the same incidental effect as an illegal secondary boycott.

The Board's first ruling on this point was made in a case growing out of a strike of the Oil Workers' International Union (CIO) at a Toledo, Ohio, refinery of the Standard Oil Co. Charges of secondary boycott were brought against the union by the Pure Oil Co., after its employees, who were members of the same local union as the Standard strikers, refused to load Pure Oil products from a dock on the premises of the Standard refinery.

Pure Oil contended that picketing of the dock violated the secondary boycott ban because it induced Pure Oil employees to refuse to handle its products in order to force the company to cease doing business with Standard. The Board rejected this contention and dismissed the entire complaint against the union, stating:

"The fact that the union's primary pressure on Standard Oil may have also had a secondary effect, namely, inducing and encouraging employees of other employers to cease doing business on Standard Oil premises, does not, in our opinion, convert lawful primary action into unlawful secondary action within the meaning of section 8 (b) (4) (A) (of the Taft-Hartley Act).

Same Location

Applying this general rule in another case, a four-member majority of the Board held that picketing the premises of a primary employer does not become illegal because it affects employees of a secondary employer who is located on the same property. In this case, the Board ruled that, since the picketing was limited to the premises of the struck plant, it was primary picketing and therefore was beyond the reach of the secondary boycott ban.

This ruling was made in a case based upon charges filed by the Ryan Construction Corp., of Evansville, Ind., against the United Electrical, Radio and Machine Workers of America (CIO) and its Local 813 at Evansville.

The Ryan company was building an addition to the Evansville plant of the Bucyrus-Erie Co., of South Milwaukee, Wis., when members of the CIO union in the Bucyrus plant went on strike. The Ryan company filed charges of secondary boycott against the CIO unions when the Ryan employees,

I hope that by the time this article gets into print, Gus Coopersmith has worked a W-7. Gus says he never hears any 7's; what say fellows, give him a break on 40 MCW.

There are a couple of new pets at the HILL the boys rounded up a couple of deer mice and the little creatures are now living the life of Reilly.

I have been hearing a bundle of reports about the DX on 40, but didn't actually hear the stuff till this week. Some fine stuff.

Ralph De Graf at WGY Xmtr, spent a few weeks at Lake Catherine, Vt., and had a big time with a peanut whistle of a rig. He was really burning a path through the 75 Fone Band with it, too, as Don Morey, Newt Barnes and various other hams will attest.

Can the boys at WGY Studio tell me why Roy Meyers had a red face recently? Well maybe he didn't know the young lady was standing nearby, when he blew his top.

Everyone at the G. E. stations here had identification cards and buttons issued recently and let me tell you, they are really dillys. Why I'll bet they don't take any better photos at Sing Sing, or Ellis Island either.

At a tele remote recently, Marce Reeds didn't know he was on the air via the ST link. I haven't seen him yet to ask about what was wrong with the young lady who was passing by. How about it Marce?

I guess that Herb Kohl, WGY studio, has that RCA 45 RPM turntable installed by now. That gadget will be handy as some place for feeding those half-hour FM musical programs.

About the time this issue reaches you the National Council will have been concluded; have fun, fellows!

I guess that is enough talk from the Mohawk Teepee for the nonce, or something like that, so I'll say 73 es CUL.

DETROIT

By RED LEWIS

The past two months' events have left Detroit chapter a little breathless, but it's still braggin'!! Total membership is now 60, with about 40 hanging fire, and there's a big group to be accounted for in the future.

News of the proposed affiliation stunned most of the younger members here, especially in view of the fact that NABET has IB hanging on the ropes in

Detroit. We hadn't realized the rest of the Chapters were allowing themselves to be pushed around so much.

In spite of all the glowing accounts emanating from the New York office about CWA, some of us are frankly skeptical. As a result of this attitude, Chairman "Davie" Stewart has ordered a flying squad composed of McDonnell-Maher-CWA rep. in to convince us at a bigsize Chapter clambake come Oct. 2. Pretty direct action, you say? Well, little "Davie," who has been one of the foremost reasons for this Chapter's growth, is like that.

That hectic, "never-got-enough-help" vacation season is behind us now, but we must take note of a little laughing matter that crept into our history during that time. A certain television station in Detroit (we won't name names, but they have two prankish ex-WWJ-TVers on the engineering staff and a production dept prone to publicity stunts) telecast a whole half-hour show with its pix UP—SIDE—DOWN. The reaction was wonderful—but there must have been a sadist in the crowd. All the phones at the station were unanswered, and as a result the two companion stations in town were deluged with irate and sometimes accusing phone calls. The program, by the way, was the final judging for Miss Detroit.

Well, WWJ-TV's third and newest remote camera has been fitted with a new gimmick for the opening of football season. Rumor has it that three cameras weren't enough for the sponsor—he had to have a ZOOMAR. We used it for the first time on the opening Michigan-Michigan State game Oct. 24. It was very wisely and sparingly used, because it wasn't felt that there would be any profit in scaring the audience to death. Besides, we want to see the blocking develop in front of the runner.

One of the aforementioned hangfires

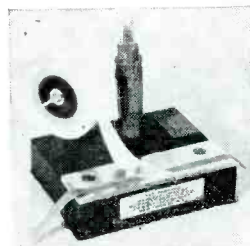
is the WJBK situation where the boys are being further held up on their way to negotiations. Desperate IB has passed the ball to IA and they are continuing the delay tactics by requesting an oral presentation of argument before the Washington board.

The CIO station, WDET, is another example. Labor Board held a hearing September first and the company changed its mind about things, agreeing that the IBEW "contract" was no bar to an election—but it now claims the station is not an interstate commerce affair!! Meanwhile the engineering staff wait patiently for their desired NABET membership cards.

DuMont Labs announce a new camera, the 314-A Oscillograph-Record Camera, for recording patters from any 5-inch cathode-ray oscillograph. Experience with a previous model has resulted in a modified camera which is easier



and more efficient to use. The 314-A camera serves for single-frame exposures of stationary patterns as well as for continuous recording of constantly-changing phenomena. Film speed is continuously variable from 1 inch per minute to 5 feet per second.



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who were members of the AFL building-trades unions, refused to cross the CIO picket line. The NLRB general counsel contended that the picketing of a gate cut through the plant fence for Ryan employees was a violation of the boycott ban. A majority of the Board rejected this theory and dismissed the entire complaint against the CIO unions.

*Not Secondary
Same Location*

The majority opinion in the Ryan case said:

"When picketing is wholly at the premises of the employer with whom the union is engaged in a labor dispute, it cannot be called 'secondary' even though, as is virtually always the case, an object of the picketing is to dissuade all persons from entering such premises for business reasons. It makes no difference whether 1 or 100 other employees wish to enter the premises. It follows in this case that the picketing of Bucyrus premises, which was primary because in support of a labor dispute with Bucyrus, did not lose its primary character and become 'secondary' at the so-called Ryan gate because Ryan employees were the only persons regularly entering Bucyrus premises at the gate."

The majority opinion was signed by Chairman Paul M. Herzog and Board Members John M. Houston, James J. Reynolds, Jr., and Abe Murdock. Board Member J. Copeland Gray dissented.

Deciding another aspect of the secondary boycott ban, the Board also has ruled unanimously that inducing railroad workers to withhold their services does not come within the scope of the ban.

The Board based its decision upon a finding that railway workers are not "employees" as defined in the Taft-Hartley Act. The Board's decision overruled a contention of the NLRB general counsel that the secondary boycott ban should be applied to a union's secondary action involving individuals and employers not covered by the act's definitions. This decision was made in a case brought against a local of the AFL Teamsters Union by a group of Louisiana rice mills.

Important Supreme Court Decisions

An employer may not, without consulting his employees' collective bargaining representative, grant a general wage increase substantially greater than that offered to the union. In a unanimous decision, the United States Supreme Court ruled that such a unilateral wage increase was an unfair labor practice unless "bargaining had come to a complete termination." The decision was made in the case of *National Labor Relations Board v. Crompton-Highland Mills, Inc.*, decided May 31, 1949.

The case came before the Supreme Court on an appeal by the NLRB from the refusal of a Federal court of appeals to enforce its order that Crompton-Highland Mills, the employer, cease and desist from refusing to bargain collectively with the Textile Workers Union of America (CIO) concerning wages, hours, and other conditions of employment. On August 13, 1945, the union, after winning a statutory election, was certified by the NLRB as exclusive bargaining representative for some 800 employees of one of the employer's mills engaged in the production of cotton goods which were sold in interstate commerce. The employer and a committee of the union subsequently negotiated concerning rates of pay, hours, union security, and other conditions of employment without reaching

To Page 17

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Presented at the 1949 IRE Convention—continued from last month

ACTIVE CIRCUITS II

Chairman, R. W. HICKMAN

(Harvard University, Cambridge, Mass.)

93. High-Power Sawtooth Current Synthesis from Square Waves.

HEINZ E. KALLMANN, Consulting Engineer, New York, N. Y.

A sawtooth wave S , with rounded peaks but with a straight slope extending over nearly 90 per cent of the period, is obtained by (1) synthesis of a step wave from three or four members of a series of square waves P_n and by (2) smoothing the step wave by attenuating its higher harmonics in a simple filter network with negligible transmission at and beyond the lowest missing harmonic. Networks having good transient response are found to be most suited. The efficiency of a tube circuit for sawtooth current synthesis approaches 50 per cent when comparing power output with power supplied to the tube anodes. A modification of this circuit, using gated square waves, may have an efficiency approaching 100 per cent.

94. Comparison of the LC Toroidal Filter with the Parallel-Tee Feedback-Amplifier Filter.

A. J. STECCA, Naval Research Laboratory, Washington, D. C.

It is the purpose of this paper to describe the analytical study and laboratory investigation conducted with an LC toroidal network as a passive band-pass filter and the parallel-tee feedback amplifier as an active band-pass filter designed for a specific application. For this application the filter has a center frequency in the region of 1,000 cps and a bandwidth of 15 per cent. It was required that over the transmission band the phase shift be linear with frequency and that the attenuation be at least 30 db at a frequency ratio of 1.5. The conclusions show that the toroidal filters provided a very satisfactory operating characteristic and require less physical space, and equally good, or better, temperature stability than can be obtained with the present art of parallel-tee construction.

95. A Peak-Selector Circuit.

M. J. PARKER, Naval Ordnance Laboratory, Silver Spring, Md.

A problem required that the maximum positive peak of an asymmetrical periodically recurring wave, having a frequency in the range of from 2 to 20 cps, be used as a trigger for a sawtooth generator. The phase shift between the trigger pulse and the maximum positive peak, from which the trigger was derived, had to be less than one-half degree per cycle over the frequency range mentioned. A circuit consisting of an amplifier, a maximum peak selector, clippers, and differentiators was designed. When activated by a simulated output signal this resulted in a sharp spike which met phase-shift requirements. Due to the phase shift introduced by oscilloscopes, a novel method of measuring the performance of the circuit had to be devised.

96. A Low-Frequency Synchronized Sawtooth Generator Providing Constant-Amplitude Sweep with Aperiodic Synchronization Input.

P. YAFFEE, Naval Ordnance Laboratory, Silver Spring, Md.

The functions of the instruments described in this paper are such as to provide a synchronized linear voltage function which sweeps between two constant reference levels, notwithstanding variation in its period in accordance with an aperiodic synchronization input. The design of this device is covered, and details concerning its circuitry and operation are given. Special circuit features, such as the method of achieving automatic control of the linear sweep between the reference levels in conjunction with the variation in the period of the sweep, are pointed out. The generator, as described, provides an output potential sweep of 0 to 150 volts with good linearity over the required range of frequency control. While the requisites of its intended use are satisfied by a synchronization frequency range of 4 to 10 cps, operation beyond this range appears feasible.

97. A Rectifier Filter Chart.

REUBEN LEE, Westinghouse Electric Corporation, Baltimore, Md.

All rectifiers generate ripple in the rectifier dc output. Adding a suitable filter between the rectifier and the load reduces this ripple, but it also introduces regulation, both steady and transient, and affects the rectifier peak current. A properly designed filter must keep these properties within tolerable limits. A chart has been

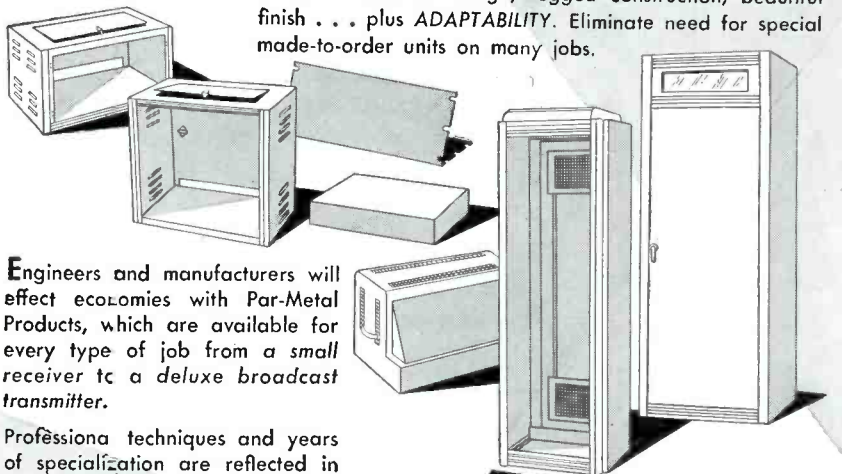


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made for choke-input filters which relates the various filter properties and enables the rectifier designer to choose quickly components such that specified performance limits are not exceeded. Use of the chart is discussed, and an example given.

98. Regenerative Amplifiers.

Y. P. YU, *North Dakota Agricultural College, Fargo, N. Dak.*

This paper describes the principles and applications of regenerative amplifiers which may be used, for example, to mark the instant when two voltages become equal. A peak-voltmeter circuit based upon the switching properties of a regenerative amplifier is introduced to minimize the error encountered in measuring low-duty-cycle pulses. The use of a regenerative amplifier in forming a pulse-width discriminator circuit is also described.

INSTRUMENTS AND MEASUREMENTS IV

Chairman, SCOTT HELT
(Allan B. DuMont Laboratories, Inc.,
Clifton, N. J.)

99. High-Impedance Millivolt Measurements Above 5 Mc.

WALTER K. VOLKERS, *Millivac Instruments, New Haven, Conn.*

Germanium diodes and other types of crystal rectifiers fall into the general classification of square-law detectors at input voltage levels below 25 millivolts. These rectifiers can be used as "pseudo-thermocouples" for high-impedance millivolt measurements at input power levels considerably lower than those of conventional thermocouples, and when the diode is combined with a dc vacuum-tube millivoltmeter.

The use of this technique for millivolt measurements above 5.0 Mc is described.

100. Some Aspects of the Performance of Mixer Crystals.

P. D. STRUM, *Airborne Instruments Laboratory, Inc., Mineola, L. I., N. Y.*

This paper will show that the microwave performance of a mixer crystal as a circuit element can be predicted with good accuracy from its dc characteristics. Conversion loss, rf impedance, if impedance, and noise temperature of the crystal can be calculated directly for frequencies below the region where the internal reactances of the crystal become comparable with its resistance. By using the parameters as determined by the methods presented in this paper, a complete mixer-circuit analysis can be made using standard network-analysis techniques.

101. A Wide-Band Audio Phasemeter.

JOHN R. RAGAZZINI AND LOTFI A. ZADEM,
Columbia University, New York, N. Y.

The problem of measuring the phase angle between two sinusoidal voltages is an important one in laboratory procedure.

Phasemeters which can make this measurement accurately over a substantial frequency range have heretofore been bulky and relatively stationary. This paper describes a circuit which results in a phasemeter which is accurate to about 30 minutes, has a dial adjustment which is independent of frequency, operates over a range of from 10 cps to 100 kc, and is relatively small and inexpensive. The principle used is to match the phase shift between the unknown voltages with a calibrated phase shift in the meter channel. This phase equalization is observed on a standard oscillograph, which is used only as a comparison instrument. The oscillograph amplifier phase shifts are balanced out with an approximate phase shifter cascaded in the meter channel, and do not affect the measurement.

102. A Device for Admittance Measurements in the 50- to 500-Mc Range.

W. R. THURSTON, *General Radio Company, Cambridge, Mass.*

The device to be described is based upon a null method of comparing an unknown admittance to a fixed standard of conductance and a fixed standard of susceptance. Three rotatable loops are the balancing variables, and their positions

under null conditions indicate conductance, susceptance, and a multiplying factor for the first two values.

An adjustable susceptance standard is used that is set to the same value for each frequency, and loop positions are calibrated directly in millimhos and multiplying factor, independent of frequency. The model that has been constructed has scale ranges of from 0 to 25 millimhos for conductance, from -20 to +20 millimhos for susceptance, and from 1 to infinity for the multiplying factor.

103. An Improved RF Capacitometer.

E. F. TRAVIS AND T. M. WILSON, *General Electric Company, Schenectady, N. Y.*

Some time ago the General Electric rf capacitometer was developed to meet the need for rapid, accurate measurements of small values of capacitance and inductance. To meet the need for an instrument to measure wider ranges, the original capacitometer was redesigned to extend its range, and at the same time improve the circuit and increase the ease of operation. This paper describes some of the problems encountered in the development, manufacture, and testing of this instrument, and how these difficulties were overcome.

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104. **A Radio-Frequency Gas-Discharge Phenomenon and its Application to Mechanical Measurements.**

KURT S. LION AND JOHN W. SHEETZ, *Massachusetts Institute of Technology, Cambridge, Mass.*

A gas-filled tube with two electrodes is brought into an electric radio-frequency field of sufficient intensity to produce a gas discharge. If the rf field is slightly unsymmetrical with respect to the electrodes of the glow tube, a dc voltage can be observed between both electrodes. The magnitude and polarity of this dc voltage depends upon the asymmetry of rf field strength on both electrodes and, within wide limits, is independent of the frequency and voltage of the applied rf field. The method is suitable for the measurements with great sensitivity and with a high degree of stability.

**ELECTRONICS II—
ELECTRON-TUBE CATHODES**

Chairman, E. A. LEDERER

(*RCA Victor Division, Radio Corporation of America, Harrison, N. J.*)

105. **The Effects of Various Barium Compounds With Respect to Cold-Cathode Behavior as a Function of Life in a Glow Discharge.**

HAROLD JACOBS AND ARMAND P. LA-ROCCUE, *Sylvania Electric Products, Inc., Kew Gardens, L. I., N. Y.*

The effects of various barium compounds in glow-discharge tubes are determined and compared with those of barium metal. The various barium compounds are shown to require different activation schedules, in order to obtain the lowest initial regulation voltage. The regulating voltage, as a function of time, is determined for all the cathode surfaces. The composite surfaces are found to have greater stability than the metallic surfaces over a long period of time. The composite barium surfaces are shown to reach an asymptotic limit in their respective regulating voltages, with these values being of the same order of magnitude as the original regulating voltage of the metallic barium surface.

106. **Oxide-Cathode Properties and Their Effects on Diode Operation at Small Signals.**

G. CONRAD DALMAN, *Microwave Research Institute, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.*

Recent experimental data obtained on commercial-type cathodes are presented which show the order of magnitude of the low-frequency cathode resistance and the high-frequency cathode impedance. These factors cause deviation from the small-signal low-frequency and high-frequency ideal-diode response given by Llewellyn, and partially explain the difficulty in obtaining diode oscillations.

A brief discussion will be given of the properties of the cathode affecting its behavior as a circuit element. Some experimental evidence that a nonlinear resistance may reside in the coating near the coating vacuum boundary will also be presented.

107. **Microanalysis of Gas in Cathode-Coating Assemblies.**

HAROLD JACOBS AND BERNARD WOLK, *Sylvania Electric Products Inc., Kew Gardens, L. I., N. Y.*

A study of gases evolved from oxide-coated cathode assemblies was made during degassing and activation conditions. It was found, first, that the volume and nature of gases evolved from uncoated nickel cathode-sleeves were practically independent of the three different cleaning methods used and, second, that hydrogen-fired cathodes liberated slightly larger quantities of hydrogen when heated in vacuum. The release of hydrogen from nickel cathodes was not instantaneous but was observed to continue even after two and a half hours of continued heating at 900°C Br.

When a similar analysis was made of gases liberated from nickel sleeves coated with alkaline earth carbonates, the evolution of hydrogen was reduced considerably, but with a corresponding increase of CO.

The gas condition in the tubes during cathode degassing is shown to be related to the speed of exhaust.

108. **Exposure of Secondary-Electron-Emitting Surfaces to the Evaporation from Oxide Cathodes.**

C. W. MUELLER, *RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*

Heretofore, the exposure of a secondary-electron-emitting surface to the evaporation from an oxide cathode has been considered impractical because of the rapid deterioration of the secondary-emission surface. Consequently, in previous grid-controlled tubes using multiplying surfaces, complicated focusing structures were necessary to bend electron beams and avoid surface contamination. Experiments discussed in this paper show that the evaporation difficulties can be overcome, and even used to enhance secondary emission in some applications. Methods will be illustrated by examples of the use of secondary-emission surfaces exposed to filamentary and indirectly heated oxidecoated cathodes in practical grid-controlled multiplier tubes.

109. **The Use of Thoriated-Tungsten Filaments in High-Power Transmitting Tubes.**

R. B. AYER, *RCA Victor Division, Radio Corporation of America, Lancaster, Pa.*

Thoriated-tungsten filaments have dem-

onstrated their reliability in low-power transmitting tubes for the past quarter century. More recent experience has proved that this type of filament is equally reliable in all classes of high-power, high-voltage transmitting-tube service. This has been accomplished by improved materials and techniques.

Filament power consumption only one-third that required for the equivalent pure-tungsten filament type, improved mechanical strength, lower bulb temperatures, improved high-frequency performance, greater emission reserve, and improved plate characteristics are a few of the advantages gained through the use of thoriated-tungsten filaments in high-power transmitting tubes.

Types developed for use in the broadcast and industrial field during the past year and a half are described in the paper.

SYSTEMS II—RELAY SYSTEMS

Chairman, RAYMOND F. GUY
(*National Broadcasting Company, New York, N. Y.*)

110. **A Microwave System for Television Relaying.**

J. Z. MILLAR AND W. B. SULLINGER,
Western Union Telegraph Company, New York, N. Y.

The paper describes two television relay circuits established by Western Union between New York and Philadelphia utilizing recently developed Philco 6000-Mc equipment.

The transmission requirements for relaying video programs are discussed, and the methods of meeting these requirements are described. The relay circuits are independently reversible in short switching time, making possible the use of a single relay circuit for transmitting consecutive programs in opposite directions, thus reducing the amount of equipment necessary as compared to two-way, or duplex, service. The equipment is described for both terminal stations, to be located at the broadcast stations of the customers, and relay stations located at Western Union sites. Photographs of the installations will be shown.

111. **Synchrodyne Phase Modulation of Klystrons.**

VINCENT LEARNED, *Sperry Gyroscope Company, Philadelphia, Pa.*

The method of phase-modulating a klystron amplifier beam to obtain side-frequency output will be explained. By tuning the input resonator to the incoming microwave carrier and the output resonator to the phase-modulation side-band, a klystron may be used as a device to change the frequency of a microwave carrier by a predetermined amount. A tube utilizing this principle that has been developed for high-quality television relaying will be described.

112. Intercity Television Radio Relays.

WILLIAM H. FORSTER, *Philco Corporation, Philadelphia, Pa.*

Television radio relay equipments may be divided into two classes. Systems employing second detection at each repeater are most suitable for intracity and remote pickup service, and those employing heterodyne remodulation at the repeaters are well adapted for intercity long-lines service. At the present time, television radiorelay network facilities have fidelity and signal-to-noise characteristics which exceed those provided by many other parts of the television system. As picture-generating sources are improved, better performance will be required of the network facilities.

The paper discusses specifications for television network facilities and compares them with design specifications and performance data of the Philco equipment used by Western Union in their New York-Philadelphia television circuit. Methods of improving the performance of this equipment, for a greater number of repeaters, particularly the signal-to-noise ratio and the transient response, will be described. A color film of relay installations will be shown.

113. Video Design Considerations in a Television Link.

M. SILVER, H. FRENCH, AND L. STASCHOVER, *Federal Telecommunication Laboratories, Inc., Nutley, N. J.*

A repeater link for the transmission of standard composite television signals must meet exacting noise and transient-response requirements. This paper is devoted to the transmitter-modulator section of a relay link consisting of 10 repeaters. Design problems encountered in conforming with specifications for frequency and transient response, and signal compression, are treated in detail. Solutions to these problems in a practical circuit design are presented.

114. Six-Channel Urban Mobile System With 60-Kc Spacing.

R. C. SHAW, P. V. DIMOCK, W. STRACK, AND W. C. HUNTER, *Bell Telephone Laboratories, Inc., New York, N. Y.*

This paper describes a six-channel mobile radiotelephone system in Chicago, operating in the 152- to 162-Mc band; and using 60-kc spacing of carrier frequencies, rather than the 120-kc spacing of previous practice. The measures required to achieve this frequency saving are described, including filters and special antenna arrangements at the land transmitter, "off-channel squelch" in the land receivers, age in the mobile receivers, connection of six land receivers to a common antenna, and other special co-ordinating means.

TRADE NEWS

The RMA-IRE fall meeting at Syracuse, N. Y., will convene Oct. 31 thru Nov. 2nd. There will be a series of morning and afternoon technical sessions dealing with the usual variety of subject matter.

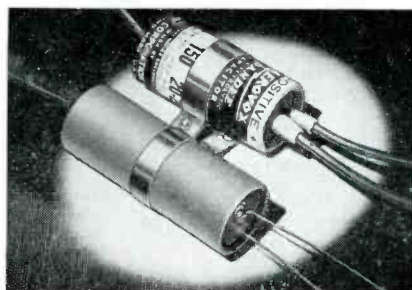
The hams will be interested in the General Electric Ham DX Log, which contains an alphabetical country list, a prefix cross-index, and a state list. Also available from your G.E. dealer, is a very convenient binder for filing the individual issues of the G.E. Ham News.

RMA reports that vacuum tube sales of receiving types increased in June, over the May figures.

ABC-TV in Chicago reports the opening of its video recording operation, and marks another forward step in ABC's TV facilities and programming.

G.E. announces shipment of a 5 kw low channel TV transmitter and studio equipment to WMBR-TV, at Jacksonville, Florida.

Aerovox Corp. announces insulated-terminal midget-can electrolytics. Stud terminals in place of conventional rivet-type terminals for dual or triple leads serve to reduce tubular diameter by some



40%. The photo contrasts the conventional dual section bare pigtail midget can electrolytic with the new insulated terminal insulated pigtail Dandee.

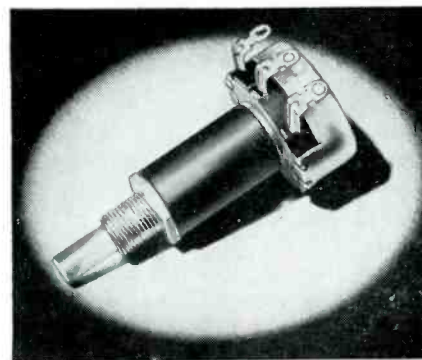
The nation's first "Audio Fair" is to be sponsored by the Audio Engineering Society at the Hotel New Yorker, New York, October 27, 28 and 29th, according to an announcement made by C. J. LeBel, president of the Society.

The Graduate Division of New York University College of Engineering will institute a new course called "Nuclear Energy Engineering" during the 1949-50 academic year. In addition, NYU offers a new course in "Principles of Research Procedure" during the fall term, and is designed for students preparing for ad-

vanced degrees or a research career.

IRE-AIEE sponsor second annual nucleonics symposium at the Hotel Commodore, New York, October 31 thru Nov. 2nd. Feature topic will be "Evaluation of Radiation Hazards." Some of the topics to be discussed include: Audible Interpretation of Electroencephalograph; High Fidelity Electrocardiography; Electrical Methods of Blood Pressure Recording; Stable D-C Amplifiers for Biological Recordings; etc.

Clarostat announces high voltage coupler controls, that provide safe insulation factor for controls used in TV and cathode ray oscillographs, etc. The type 56-125 high voltage coupler makes use of a plastic straight-thru shaft in place of the previous insulating strip joining separate



sections of the metal shaft. The control-to-ground breakdown rating is better than 10,000 volts. See photo.

RCA has made available to servicemen a "Pict-O-Guide" for TV trouble shooting. The New book is a handy loose leaf album of photographs showing common operating troubles encountered in TV receivers, and is designed to help servicemen localize faults in TV receivers quickly and easily by the "picture analysis" method. Comparison of the picture displayed on the screen of a faulty receiver with a similar picture in the "Pict-O-Guide" helps the servicemen to identify the source of the trouble. Simple captions under each photo describe the symptoms and explain the causes of the trouble. Each Chapter of the Guide is devoted to a basic section of a TV receiver and gives a complete schematic of the basic circuit for the section. The book contains 100 pages of text and exclusive photographs made from actual signals.

The 66th semi-annual convention of the SMPE will be held at the Hollywood-Roosevelt Hotel, Hollywood, October 10 to 14th. The convention has been assured of many significant technical pap-

ers on new developments in motion pictures and television.

Some ten years ago, when TV got under way in New York, it was largely felt throughout the industry of TV advertising that TV would be found primarily among the higher income families. Since then, as TV production has increased, prices have steadily been reduced, and today RCA announces its 10th Year TV anniversary model at \$199.50 (10" set) and Meck Industries announces a 16" TV set at \$279, a 12" set at \$219, and a 10" set at \$179. A number of 7" sets are selling from \$99 to \$129.

Cannon Electric Development Company announces a completely revised fourth edition of the Cannon Electric Laboratory and Switchboard Connector Bulletin. The 8-page bulletin in complete in all details; copies may be obtained by writing the Cannon Company.

Aerovox Corp. announces still smaller midget-can electrolytics. This fact is dramatized in the photo showing a 8 mfd. 450 volt Dandee alongside a regular size cigarette. The new Dandee is only 13-16" diameter, and 1½" long! These smaller metal-can electrolytics are available in single section ratings from 25 - 700



DCW, 4 to 100 mfd, and again from 25 to 450 volts DCW, 8-8 to 100 -100 mfd. In the low voltage series, the Dandees are available in voltage ratings from 6 to 25 DCW, 100 to 2000 mfd. The reduced size results from new manufacturing developments. See photo.

RCA announces that industrial TV is being used to evaluate combustion efficiency of ram-jet engines. The infra-red sensitive image orthicon can see hot spots before they can be recognized by the human eye.

PEC—you'll hear more about them—Printed Electronic Circuits—score again in TV receiver manufacture—to save space, reduce troubles, and cut costs. Latest is the "Vertical integrator network." It consists of 4 resistors and 4 capacitors,

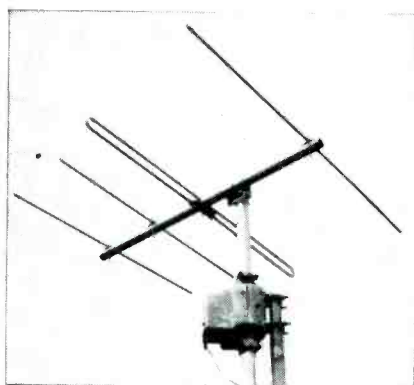
terminating in 3 leads. The usual assembly would mean 16 soldered connections, use much space. The Centralab "PEC" is about the size of a folder of paper matches! The units are oscillograph tested at operating frequencies.

Sylvania announces development of a 4 element germanium crystal. The crystal tetrode is expected to perform favorably in mixer applications. Sylvania reports further that the crystal tetrode has a conversion transconductance equal to that of an ordinary vacuum tube mixer, but requires less power, smaller, and operates up to 200 mc, and has "interesting possibilities."

RCA reports increasing international interest in TV; its latest TV clinic was attended by visitors from Canada, Latin America, and Europe.

John Meck Industries, Inc., announces two new console TV sets, a 12 inch unit at \$249, and a 16 inch set at \$299. Feature high brilliance picture tubes and AFC synch.

Technical Appliance Corp. announces a new Yagi antenna for the high fre-

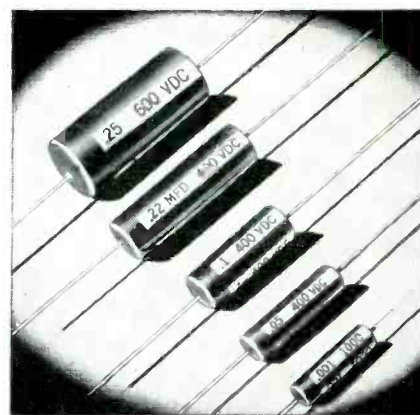


quency TV channels. Type 957-8 covers channels 7, 8, and 9; Type 957-10 covers 9, 10 and 11; Type 957-12 covers channels 11, 12 and 13.

General Electric is supplying the largest heavy-duty low band TV antenna ever built, for station KRLD-TV, Dallas, Texas. It is 99 feet long, weighs 10,000 pounds, designed for 150 mile-per-hour wind velocity.

Zoomar TV Corp announces 6 more TV stations have bought the Zoomar lens: WXYZ-TV; WFBM-TV; KSTP-TV; K ECA-TV; WOW-TV; and WTCN-TV.

Aerovox Corp. announces metallized-paper miniaturized paper condensers, featuring reduced size in cardboard tubes, lower RF impedance, and stability with temperature change. Aerolite construction eliminates the metal foils used in the

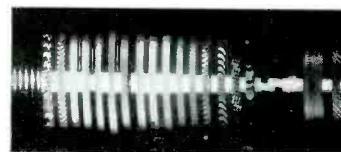


conventional condensers, and have self-healing characteristics.

General Electric announces new low TV receiver prices: \$190 (10"); 12½" console with "daylite" picture tube, now \$300. The 16" console has been reduced to \$430.

G. E. also announces that the TV transmitter equipment for WSYR, Syracuse, will be supplied by GE.

Du Mont announces substantial reductions in the prices of its TV picture tubes, resulting from increased production efficiency.



The Clarkstan Corporation, 11927 West Pico Blvd., Los Angeles, 34, California, manufacturers of many items in the electronic and mechanical fields, announces a new test record in which all the information needed by the engineer is annotated for both the cutting and reproduction. In cutting these records harmonic distortion has been kept to a minimum. Extreme care throughout the processing cycle is maintained. No polishing is involved and the very latest techniques are employed to insure exact duplication of the original recording in each pressing. No. 2000S is a steady state frequency record, cut on 12" vinylite, 78.26 RPM. It is recorded at constant velocity above 500 cps, constant amplitude below that point. The frequencies are from 50 cps to 10,000 cps in seventeen steps. Record No. 2001/2002S is a similar steady state recording for LP micro-groove use. One side of this record is recorded flat—the other side with the NAB curve. These records are priced, net \$3.90 each.

SUPREME COURT—from Page 11

any firm agreement. On December 19, 1945, a temporary impasse was reached and no further negotiations took place until January 1, 1946. At that time the union committee was summoned to the office of the employer's plant manager, who announced a general wage increase of from 2 to 6 cents an hour for most, but not all, of the employees in the bargaining unit. The only previous wage offer of the employer had been an increase of 1 to 1½ cents an hour. Charges were filed by the union against the employer with the NLRB.

Not in Good Faith

After hearing and argument the NLRB found that the employer, by presenting the unannounced wage increase to the union as an accomplished fact, had not acted in good faith in bargaining negotiations. Accordingly, the Board ordered the employer to cease and desist from refusing to bargain with the union over wages, hours, and other conditions of employment.

The court of appeals, however, refused to enforce the Board's order, on the grounds that the union had in fact broken off negotiations and called a strike vote and that the employer's action was caused by simultaneous wage increases in other nearby mills.

In reversing the court of appeals decision, the Supreme Court accepted the Board's finding that there was not a complete termination of bargaining negotiations. In such a case, the Court stated, "the opening which a raise in pay makes for the correction of existing inequities among employees and for the possible substitution of shorter hours, vacations on side leaves, in lieu of some part of the proposed increase in pay, suggests * * * infinite opportunities for bargaining * * *. The occasion is so appropriate for collective bargaining that it is difficult to infer an intent to cut off the opportunity for bargaining and yet be consistent with the purposes of the National Labor Relations Act."

Welfare Plans

The duty of an employer to bargain collectively with an employee representative includes a group health and accident insurance program. The Court of Appeals for the First Circuit (Boston, Mass.) so held in the case of *Cross & Co. v. National Labor Relations Board*, decided May 24, 1949. The decision assumes importance in view of the increasing number of employee health and welfare plans.

The court's decree was in enforcement of an order of the NLRB upon the employer to compel him to bargain on this matter. In its decision the Court approved of the reasoning of the Court of Appeals for the Seventh Circuit which had previously held that a pension and retirement plan for employees was a subject for bargaining in *NLRB v. Inland Steel Co.*, 170 F. (2d) 247. The United States Supreme Court recently denied certiorari in that case.

The court said that while "wages" did not include all satisfactions, it did include "direct and immediate economic benefits flowing from the employment relationship."

COMPENSATION LAWS

Bills to amend State workmen's compensation laws have been introduced in practically all of the 42 State legislatures which have convened so far this year.

To date, 13 of these States have passed one or more amendments to liberalize the benefits or to improve other provisions of these laws. They are Georgia, Idaho, Indiana, Montana,

New Mexico, New York, North Dakota, Oregon, South Dakota, Utah, Washington, West Virginia, and Wyoming.

Included among the enactments are provisions to increase the weekly benefits, the total compensation payable, medical aid and funds for burial expenses; to extend coverage to all employers; to cover all occupational diseases or enlarge the list of diseases subject to coverage under the law; to reduce the waiting period; and to set up a second-injury fund.

Twelve of the thirteen States which have enacted workmen's compensation amendments have provided for increases in the weekly maximum and minimum benefits allowed. The most substantial increase was provided by West Virginia, which raised its maximum weekly rate for all types of injuries from \$18 to \$25 and boosted the weekly minimum for temporary total disability cases from \$10 to \$15. Three other States, New Mexico, South Dakota, and Utah, raised the maximum weekly benefit to \$25. As a result more than half of the States now provide a weekly maximum of \$25 or more for one or more types of injuries.

Increased Medical Aid

In seven States more liberal allowances for medical aid have been provided. In three—Montana, Utah, and West Virginia—the amount was doubled. Utah also increased the amount allowed for an artificial limb from \$150 to \$450 and for an artificial eye from \$50 to \$450.

Other benefit provisions affected by the recent amendments included those for burial expenses. Five States acted to increase these amounts. In New York the increase was from \$200 to \$400.

Two outstanding changes in coverage of occupational diseases occurred in West Virginia and Utah, where the laws were extended to include all such diseases. Previously, West Virginia covered silicosis only and in Utah coverage was limited to a list of 27 diseases.

New Mexico became the first State to enact specific legislation for compensation because of injury from fissionable materials. South Dakota added tuberculosis resulting from the care of inmates in State institutions by State employees.

Employers of one or more persons, instead of three or more, are now covered by an amendment to the Utah law.

Second-Injury Funds

The number of States with second-injury funds was increased to 41 with the addition of Indiana. The 7 remaining States which do not have such legislation are Florida, Georgia, Louisiana, Montana, Nevada, New Mexico, and Virginia. The Indiana law allows an employee who has suffered the loss of a member of the body and who loses another in a subsequent industrial accident to receive full compensation for the combined injuries. The employer is liable only for the second injury, with the balance of the award being paid from the fund. The Indiana fund is financed by a levy on insurance carriers and self-insurers of one-half of 1 per cent of total compensation paid during the preceding year.

Wyoming reduced its waiting period required before an injured worker is eligible for compensation from seven to three and provided that, if the disability extends beyond eight days instead of 15 days, benefits become payable from the first day of the injury.

Extraterritorial coverage under certain conditions has been added to the New Mexico law to permit a worker of that State to be protected by the New Mexico law for an injury sustained while working in another State. The amendment also provides for a reciprocal arrangement with any other State which covers its residents while working temporarily in New Mexico.

Under a North Dakota revision, the injured employee in cases involving third parties may claim compensation under the workmen's compensation law and also sue in court for damages against the third party. Formerly, the employee in such cases could elect only one of these courses.

West Virginia has created an occupational disease medical board consisting of three licensed physicians appointed by the commissioner of workmen's compensation to determine all medical questions relating to occupational disease cases other than silicosis. A new independent board of industrial insurance appeals has been established in Washington and is composed of three members appointed by the Governor—one representing employees; one, Employers; and one public member who must be a lawyer. Georgia authorized the State Board of Workmen's Compensation to permit a change of physician at the request of the employee.

Three States, Idaho, South Carolina, and Wyoming, have provided for interim committees to study the need for changes in their workmen's compensation laws and to report on their findings at the next regular session of their legislatures. Two other States, California and Maryland, have extended the life of committees established for this purpose in 1947.

NLRB Bans Hiring Hall

The National Labor Relations Board has ruled unanimously that a "referral and hiring" arrangement by which a building-trades contractor hired only applicants who had been "cleared" for employment by a union is illegal under the Taft-Hartley Act. The Board ruled that the arrangement violated the act's closed-shop ban.

It was the first ruling by the Board on the legality of hiring practices in the building and construction industry under this act.

In accordance with its decision, the Board ordered Daniel Hamm Drayage, Inc., a St. Louis Missouri, contracting firm, to reimburse seven men for any loss of wages they suffered because they were refused jobs on an Alabama machinery-installation project when they were unable to obtain "clearance" for employment from the Decatur, Ala., local of the AFL carpenters union. The men were members of Lodge 1500 of the International Association of Machinists (unaffiliated), which filed the charges upon which the case was based. The charges, which were filed only against the company, alleged illegal discrimination in employment.

The company, as a defense of its refusal to hire the seven, contended that this method of hiring is the "custom and practice" in the construction industry. The Board rejected this defense, saying:

"That argument should properly be addressed to Congress and not to this Board. * * * It is our duty as administrators to enforce the law as written, and not to pass upon the wisdom or practicality of its provisions. Congress had made unlawful the hiring practices followed by the respondent. We have no authority to engraft exceptions upon the congressional enactment because this now unlawful practice was sanctioned by custom in this particular industry before 1947 or may be thought economically desirable or necessary"

Action Ordered

The Board ordered the company to:

1. Cease discouraging membership in Lodge 1500 of the IAM or "in any other labor organization of employees or applicants for employment" by refusing to hire properly qualified applicants;

2. Cease encouraging membership in the AFL carpenters union or any other labor organization of employees or applicants for employment;

3. Cease "in any other manner" interfering with, restraining, or coercing employees or applicants for employment in the exercise of their right to self-organization;

4. Reimburse the seven men for any loss of pay they may have suffered by reason of the company's discrimination against them, "by payment to each of them a sum of money equal to the amount which he normally would have earned as wages from the date of respondent's discrimination to August 22, 1948, the date of the completion of the respondent's project at Decatur, Ala., less his net earnings during that period";

5. Post notices for 60 days at its St. Louis office and at all presently operating projects, announcing its compliance with the Board's order.

The Board's opinion gave the following account of the hiring arrangement between the Hamm company and the carpenters union:

"Pursuant to its contract with the general contractor, Foster & Creighton Co., the respondent agreed with the Carpenters Union, No. 1274, Decatur, Ala., herein called the Decatur local, that the union would supply all men needed to complete the subcontract. In actual practice, the intent and effect of this arrangement was to delegate the hiring of new employees to the Decatur local and to require all to be members of the Decatur local. Thus, individuals who applied directly to the respondent for work, including the seven men found herein to have been discriminated against, were told that all hiring was being done through the Decatur local. Those applicants who thereafter applied to the Decatur local were told that the union was referring only its own members and that it already had sufficient men to fill the respondent's needs. The respondent did not hire any man who was not referred by the Decatur local; in every case, the man so referred was put to work.

"Some of the seven, after being told of the respondent's practice, were among those denied referral by the Decatur local. It is clear, and we find that it would have been futile, for those who did not pursue the respondent's advice, to have gone to the Decatur local and that they reasonably so understood."

The Future In General

So, we enter a new phase of life, as far as international relations are concerned and, for that matter, as far as our domestic economy is concerned.

Our domestic economy, let us not forget for a moment, for the next few years, hinges in large part upon our foreign relations, which is to say, on what happens in the rest of the world and between us and the rest of the world.

So, into the picture, wham, comes the news that Russia has the atomic bomb.

Maybe not the atomic bomb in mass production, maybe not even one or two ready for use right now, but the secret of how to do the job.

It is interesting to note that the news came just at the moment when it would do the most good for military appropriations. But, be that as it may, the Soviets know how to make atomic bombs.

That, in a flash, changed the whole American outlook, even though we knew that within a matter of a two or three-year

margin of time, Russia would know how to turn the trick.

* * * *

Well, Russia does know and we know that Russia knows. Now that means certain definite things in our immediate future.

It means that we keep up full speed in arming the Atlantic Pact countries.

It means that we keep up our own rate of speed—maybe accelerate it—in the business of stockpiling bombs and in the business of making the machines that are intended to put the bombs where our military forces want them put, if and when war comes.

So, we shall, because we must, keep on spending huge amounts of money for military equipment for ourselves and our allies. Note please, that for the first time in our national history, we have formal allies abroad.

This means that we shall have busy factories, busy places where arms are made and busy places that furnish the raw materials for arms.

* * * *

Now, all of this leads to two conclusions, one horrendous, the other at least portentous.

1. Because of our arms manufacture and export, we cannot have a depression in the foreseeable future, any more than we could have one if we were at war. That is the portentous matter.

2. The horrendous thing is that we shall have war, if and when we have it, on Russia's time table; not on ours.

We haven't a single thing to say about the final, awful issue of war.

We happen to have scruples about letting the other fellow hit first.

Russia has no scruples whatever about anything.

Russia will strike, or will not strike, strictly on the basis of what Russia considers to be the interests of the communist world revolution.

That, if you want to be candid about it, puts us in one devil of a fix.

And there isn't anything we can do about it.

* * * *

There is a grain of truth and hope in the United Nations. And no place else.

But Russia is not likely to be daunted even by that, although we may and must hope.

Surely now, the old days have gone forever.

The delightful rustic and semi-rustic calm that once was ours is shattered and gone forever.

All policies, including labor policies, must, unless we are utter fools, be made in the light of the situation that faces us, stark and crude and brutal.

Yes, the Russian people are nice people, much like ourselves. But we are not dealing with the Russian people at all. We are dealing with a revolutionary hierarchy that is as cold and calculating and ruthless as fate.

Let us do some tall thinking about where we are in this world of today.

Let us not be rash and hopeless and cynical. But neither let us be dull and starry eyed and sleep. We are at a fateful cross roads.—CMW.

Overtime Statute Sets New Principles

How H. R. 858, "an act to clarify the overtime compensation provisions of the Fair Labor Standards Act," sets new principles under the nearly 11-year-old Federal wage and hour law is outlined in a statement issued by F. Granville Grimes, Jr., as Acting Administrator of the Wage and Hour and Public Contracts Divisions, United States Department of Labor.

Under the amendment, certain premiums paid by employers for work on Saturdays, Sundays, and holidays, nights, or on the sixth or seventh day of the workweek need not be added to an employee's straight-time pay in determining his "regular rate" for overtime pay purposes, and may be credited against overtime compensation which may be due under the wage and hour law for work in excess of 40 hours in a workweek. Thus the enactment, which is retroactive in effect, makes it lawful to treat as overtime premiums, for purposes of the wage and hour law, certain premiums which the Supreme Court in *Bay Ridge Operating Co. v. Aaron* (334 U. S. 446, 1948) held were not "true overtime" pay under the act.

According to Grimes, the types of premium payments which now may be regarded as overtime premiums under provisions of the amendment are:

1. Extra compensation provided by a premium rate paid to the employee for work on Saturdays, Sundays, or holidays, or on the sixth or seventh day of the workweek, provided such premium rate is not less than one and one-half times the rates established in good faith for like work performed in nonovertime hours on other days.

2. Extra compensation provided by a premium rate paid to the employee under an applicable employment contract or collective bargaining agreement, for work outside of the hours established in good faith by the contract or agreement as the basic, normal, or regular workday of not more than 8 hours, or regular workweek of not more than 40 hours, provided such premium rate is not less than one and one-half times the rate established in good faith by the contract or agreement for like work performed.

Grimes emphasized that both of the above paragraphs are limited to rates and work periods "established in good faith."

DELAWARE, MISSOURI REPEAL "LITTLE TAFT-HARTLEY" ACTS

Delaware and Missouri legislative acts regulating union activities, passed in 1947, have been repealed. These acts were both based on the Federal Taft-Hartley Act.

The Delaware repealer was signed by Governor Carver on June 29. He had urged repeal of the measure in his message to the State legislature in January. Governor Smith signed the Missouri act repealing the similar measure on July 13.

The act that was repealed by the Delaware legislature was an omnibus measure covering all types of union regulation. While it did not prohibit the closed shop outright, it specifically declared that employers would not be guilty of an unfair labor practice if they refused to grant their employees a closed-shop or all-union agreement. The act also set up a code of unfair labor practices for employees. It made strikes unlawful unless they were authorized by a majority of all employees in the bargaining unit. It placed restrictions on picketing and prohibited the secondary boycott.

ENGINEERING INDEX

Announcement has been received from John F. Rider, president of the Electronics Research Publishing Co., Inc., that the Electronics Engineering Master Index for 1947 and 1948, and the index for January-June 1949 will be published during November 1949.

Of utmost significance to the electronic engineering industry, which uses these indexes, is the institution of a new idea in the contents of these publications. Heretofore, the Electronic Engineering Master Index contained references only to published technical papers. Beginning with 1947-1948 index, the contents will cross reference published technical papers and related U. S. Patents allowed during the period covered by the volume. Thus the electronic engineering industry will have available a single source listing all technical articles published in the U. S. and abroad during 1947 and 1948, the titles, patentee, serial number, and number of claims, of all electronic and related-subject patents issued in the U. S. during the same years. This program will be carried out in the 1949 index and all future issues of these publications.

Of equally great significance to the electronic engineering fraternity is the fact that beginning with the 1947-1948 issue of this index, a list of technical articles available from sources other than regularly published publications will be included. We are sure that this service will be of tremendous aid to all interested personnel because many very valuable articles and papers which were born of technical research during World War II never were printed in the usual run of publications. The full identification of the title, author and source will be included.

FILM CAMERA

A new General Electric television film camera (Model 4PC2B2) featuring a new video pre-amplifier and other improvements is now available for commercial use, according to Paul L. Chamberlain, Manager of Sales for the Transmitter Division.

The video pre-amplifier in the new film camera is sturdier, simpler and more accessible than previous units, he said, and is also available for modernization of existing G-E television film cameras.

Virtually free of microphonics, and pre-amplifier has excellent transient response and is free from objectionable overshoot-

ing, according to company engineers.

One of its main features is the simplicity of alignment since only three peaking circuits have to be adjusted. All electrolytic capacitors in the pre-amplifier are hermetically sealed and are of the "plug-in" type. The latter feature permits easy replacement of capacitors and rotation of spare capacitors—thus prolonging their life.

The pre-amplifier, which has six low-cost tubes, contains a polarity reversal switch for both positive and negative film.

Although the new pre-amplifier is part of the 4PC2B2 film camera, it can be easily adapted to the previous model, 4PC2B1, within a couple of hours, according to G-E engineers.

The new film camera has high intensity, prefocused, independently adjustable edge lights which reduce edge flare and eliminate undesirable reflections. A sweep reversal switch permits use of opaque material through the slide projector.

The camera also has a variable coupling yoke, the adjustment of which permits the picture raster to have very straight edges and angles.

Further information on the new G-E film camera with its new pre-amplifier and other improvements may be obtained from the Transmitter Division, General Electric Company, Syracuse, N. Y.

NEW TYPE TV ANTENNA

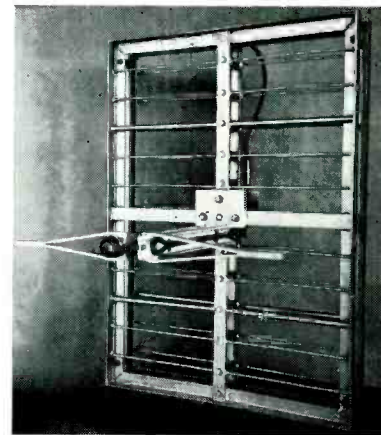
A new super-gain antenna developed by RCA to meet television requirements for higher power, greater power gain, and directional effects was announced today by the television equipment sales section of the RCA Engineering Products Department.

The initial equipment has been delivered to Station WBNT, Columbus, Ohio. RCA is now building several of these multi-layer antennas for TV stations in the Midwest and South, and on the West Coast.

The new WBNT antenna consists of dipole and screen combination units measuring 30 by 48 inches and weighing 100 pounds. These units are designed for directional mounting on the face of any standard radio tower.

The antenna achieves a new flexibility and other performance characteristics through the many possible arrangements of the individual units in the tower-mounted array. Each unit is capable of serving an area extending from the tower in the form of a quarter-circle. By

mounting one, two, three, or four dipole and screen combinations on as many sides of the tower, the broadcaster can obtain a directional pattern of a quarter-circle, a half-circle, or a three-quarter circle in any direction, or coverage in all directions.



NEW TELEVISION ANTENNA UNIT

Close-up view of dipole and screen combination comprising new RCA television antenna unit designed for directional mounting on the face of any standard radio tower. Each unit, measuring 30 by 46 inches and weighing about 100 pounds, is capable of serving an area extending from the tower in the form of a quarter-circle.

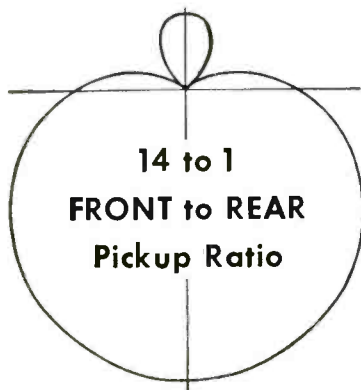
An important feature of the antenna is its ability to increase coverage of a television station in any desired direction. This is accomplished by stacking dipole and screen combinations above each other on the side of the tower facing in that direction, to achieve higher power gain. Conversely, units may be omitted or reduced in number on any side of the tower where signal interference with another station might result.

The new units are especially designed for higher power input, and can be tuned for use in both the high and low frequency portions of the VHF television channels. They are also expected to find wide use as standby television antennas for emergency use, as well as auxiliary units for broadcast stations which wish to increase power gain or eliminate interference with other stations by greater directional control of the signal.

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General Specifications:

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 relay rack; portable models available in walnut cabinets.

FINISH—Standard, black alumilite panel. Other colors available upon request.



Type 920
Rack model, low-level bridging type. Meter multiplier range: —20 VU to +20 VU. Power supply: 00—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, —6 VU to +32 VU; bridging +4 VU to —42 VU; or terminating, —6 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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