

THE BROADCAST ENGINEERS' JOURNAL
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THE BROADCAST ENGINEERS' JOURNAL

OF, BY, AND FOR
THE BROADCAST
ENGINEER

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The RCA 50 KW BTF-5 0 FM Transmitter Data

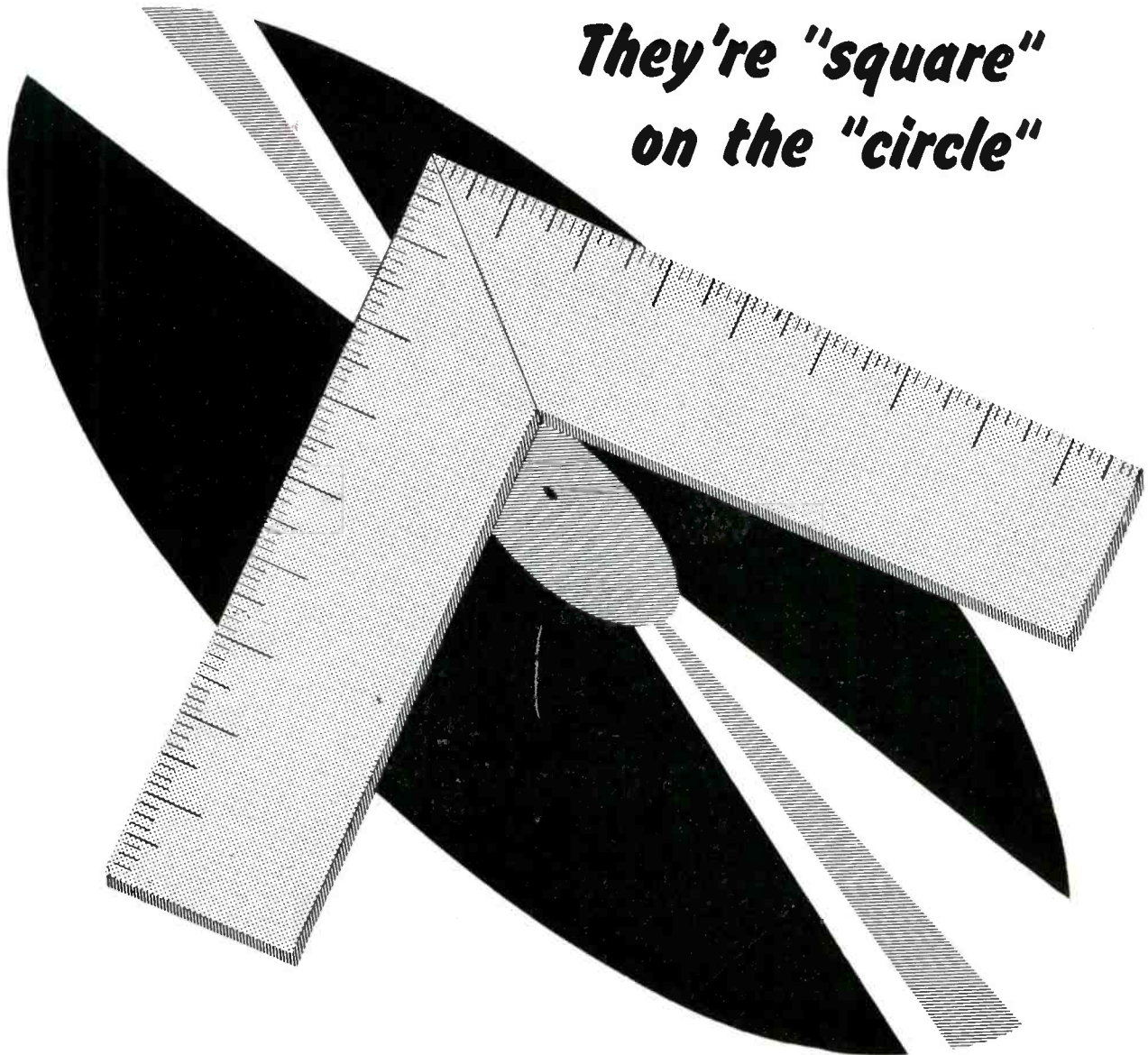
VOL. 16, No. 2

FEBRUARY, 1949

OFFICIAL PUBLICATION OF N. A. B. E. T.

National Association of Broadcast Engineers and Technicians

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THE BROADCAST ENGINEERS' JOURNAL

ED. STOLZENBERGER, EDITOR AND BUSINESS MGR.

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National Association of Broadcast Engineers and Technicians

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Pertinent Topics from the National Office

from

C. WESTOVER
Exec. Secy., NABET



A Message to the Members of NABET

from

JOHN R. McDONNELL
President, NABET

A union is a business and the members are the stockholders. In NABET, the stockholders have the democratic continuous control of the business in their own hands.

Chapter and National Officers are keenly aware of their responsibilities to the members. The Chapter Officers reflect the membership's attitude and it is up to the membership to be constantly aware of the action of all the Chapter Officers, who serve as the Board of Directors in this business.

With the expansion of Television, with all its attendant complications and ramifications, NABET's members must keep in mind that this bawling infant will soon become a sprawling giant. Failure to maintain, and improve, our present position in this industry will mean that we will lose our birth-right and our jobs.

Presently an agreement is in effect between the writer and the International President of IATSE, looking for a solution of jurisdictional questions in Television. During the period of the time necessary for a joint survey, both unions will maintain the status quo, and in New York will observe the terms of a "local" agreement reached earlier in that area.

Pertinent to this issue, I have written to the National Office of the IBEW, offering to work together with that union in the matter of the upcoming network negotiations. Needless to say, the networks are in constant communications in such matters. Since both NABET and IBEW represent radio and television engineers and technicians and are working to advance the welfare of these engineers and technicians, why let rivalry, if there is any, work to the detriment of the very people we are supposed to advance. Competition between the networks is limited to business. They join hands to fight all unions. Why should we not join hands to fight our battle against them? To do otherwise is to defeat our own purposes.

In connection with this question, in New York last September, at a joint meeting of NABET and IBEW members in that city, NABET clearly stated that it would follow such a course of action. The IBEW members clearly indicated that they also desired such action. There is no change of heart on NABET's part and it is not believed that the IBEW members have changed their minds.

As soon as I receive an answer to my letter I will notify NABET's network Negotiating Committee of the nature of the reply.

(Signed) CLARENCE WESTOVER,
Executive Secretary, NABET.

ADDENDA: An answer has been received this date (Feb. 4, 1949) from the I.B.E.W. indicating that the I.B.E.W. International Office is not interested in our cooperation. Well, to date we have fought our own battle. To continue to do so won't kill us and if any I.B.E.W. members want to talk, unofficially, we will continue to offer our cooperation.—C. Westover.

It is a pleasure to be able to announce the lineup of full time officers now employed by NABET: C. "Westy" Westover, Executive Secretary; H. E. "Harry" Hiller National Secretary Treasurer; Clifford L. Gorsuch, Eastern National Representative; and George Maher, Mid-west National Representative. With the appointment and ratification of a Pacific Coast National Representative, NABET will have five full time men working in the Radio-Television field. Negotiations are under way for the filling of the West Coast Rep. job, which will be announced in the next issue.

As the 81st Congress convenes, it is evident they intend to do something immediately about labor legislation, and we may hopefully look forward to revision, if not actual repeal, of the Taft-Hartley Act. It is to be hoped that this Congress will approach labor legislation sanely and will make a bipartisan effort to enact labor legislation that will be equitable both to union and management. It behooves us, who are members of a union, to watch developments in Washington closely and let our respective Congressmen know how we feel in respect to prospective legislation. Let us urge them to act soon, but not hastily, to devise wise laws to govern labor and management relations.

Perhaps it is not too soon to suggest to the membership of the various chapters that they start considering the approaching elections for Chapter Chairmen. The members should give considerable serious thought to this question prior to the election, as the chapters and the union as a whole, will need the benefit of the best leadership we can provide.

Approximately April 1, we will start negotiations for new contracts with NBC, ABC, and WOR. In connection with negotiations, a questionnaire is being circulated among the NABET members effected. I recommend that each of you receiving this questionnaire give it serious study, to the end that your answers will provide considered guidance to the negotiating committee.

It is with considerable personal satisfaction as a member of NABET that I welcome "Westy" Westover to the job of Executive Secretary. If Westy's past performance is any criterion, I am sure that he will fill the office with leadership, initiative, and forcefulness. If, however, he is to do the job we want him to, he will need the cooperation and assistance of all of our NABET officers, and the wholehearted support of the membership. If this cooperation and support is forthcoming, I am sure we can look forward to one of the most successful years in the history of NABET.

J. R. McDONNELL,
President, NABET

The RCA Type BTF -- 50A FM Transmitter

Technical Data and Photos Courtesy RCA Engineering Products Dept.

Featuring modern FM circuit design, including "grounded-grid" amplifiers and RCA's "direct FM" system—the new model BTF-50A FM transmitter is designed for a nominal output power of 50,000 watts at any specified frequency in the 88 to 108 mc band. Already installed and operating in several of the nation's leading FM stations, the BTF-50A represents the first commercial type 50 KW transmitter to go on-the-air in the new FM band. It includes every design and operating feature needed to assure reliable, high-fidelity service at minimum cost.

In addition RCA engineers, with experience and knowledge gained from designing a long line of high-power transmitters, retained many time-proven features such as unified front, streamlined styling, centralized power and control units, motor-tuning, air-cooled tubes and emergency cutback.

Mechanically, the entire BTF-50A transmitter consists of a series of self-supporting sections arranged in line behind a unified front panel (84 inches high by 16½ feet long). The small size of individual sections and general compactness make it easy to install in almost any existing building. The direct MF exciter, low power amplifiers and necessary

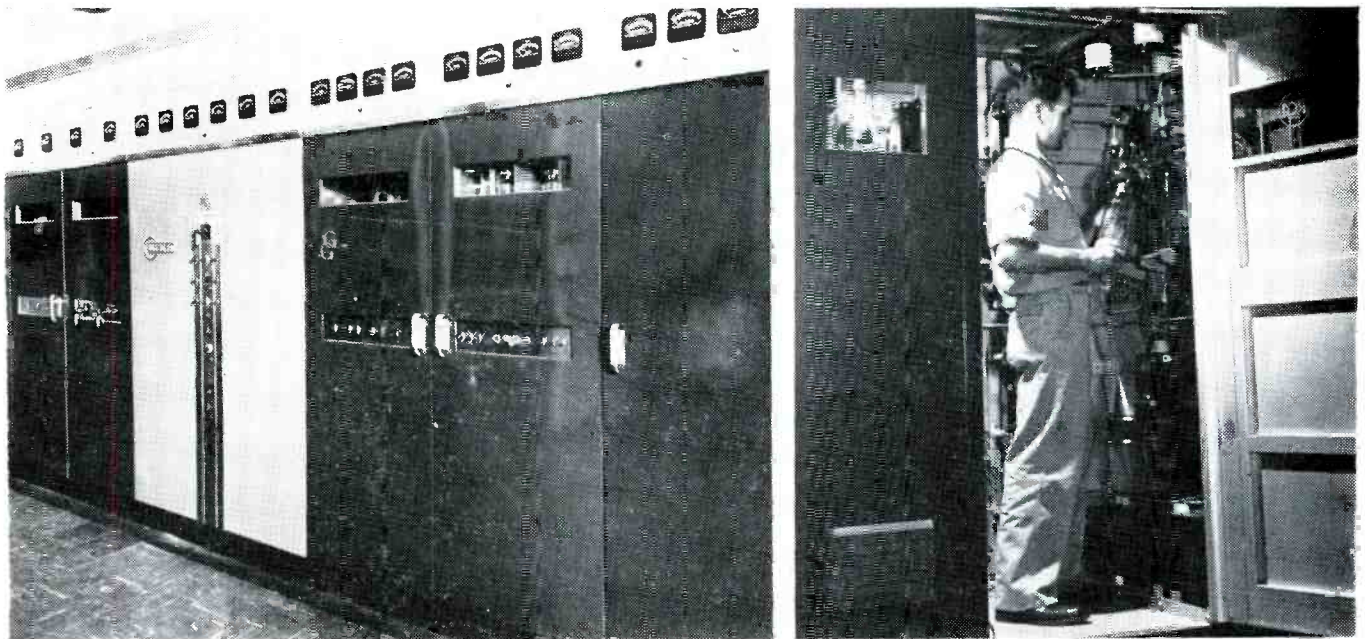
blower are located behind the right-hand front panels. In this arrangement the 50 KW blower is located on the left-hand side of the 50 KW amplifier (T.P.A. and Final)—and the balance of the equipment to the right of the low-power R-F sections.

All doors of the front enclosure allow free access to the driver and power amplifier, r-f cabinets, and to the transmitter area. With the transmitter "on the air," station personnel may walk behind the enclosure and around the individual units for close inspection. All incoming power supply and high-power rectifier switchgear, lower-power distribution circuits, contactors, and control relays are centralized in a single unit. This unit also contains the voltage regulator and distribution transformers. Operational controls, indicating instruments, indicator lights, and tuning controls are conveniently located on front panel. Tuning operations required for normal daily adjustments are remotely controlled by front panel key switches controlling motor drives on the tuning elements. P. A. tuning controls are conveniently located with respect to the corresponding meters for easy viewing of power input and R.F. output during tuning operations. For installation, the transmitter may be broken down into units no larger than thirty by

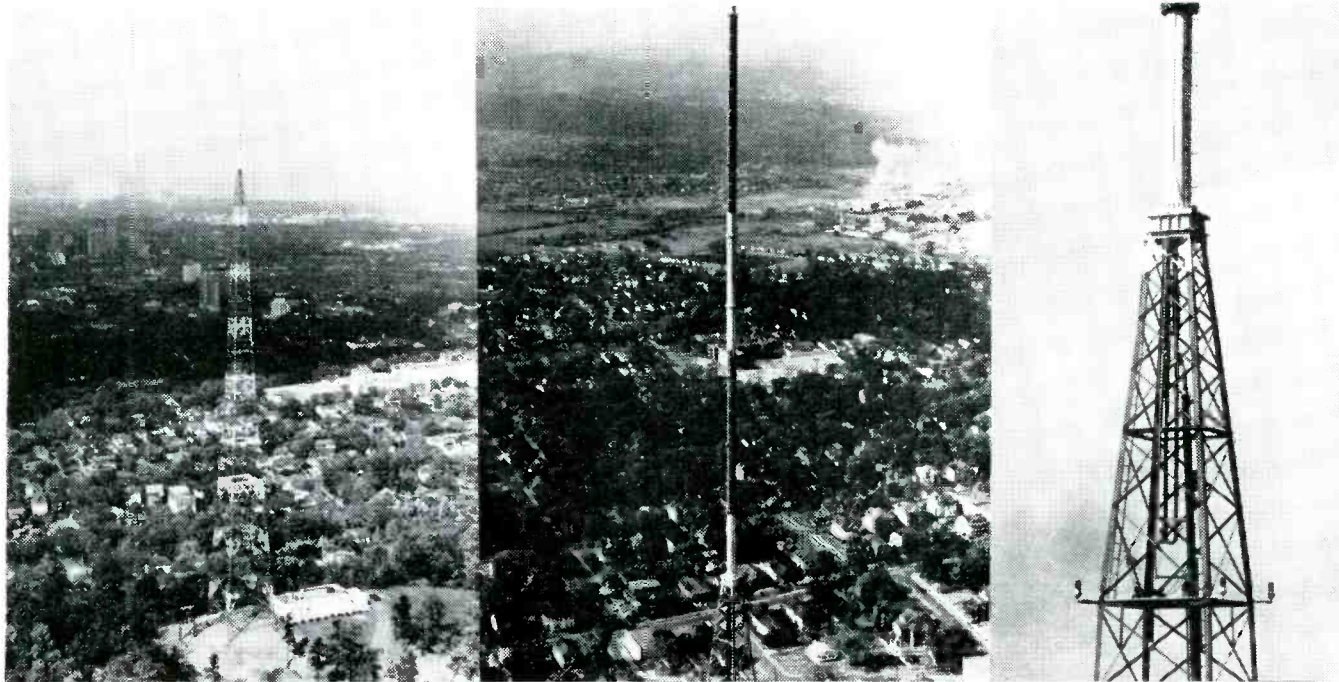
fifty-two and one-half by eighty-four inches.

Electrically, the low-power amplifiers of the BTF-50A are like those of the medium-power RCA FM transmitters in which grounded-grid amplifiers (with 7C24's) are used in all stages above the 250 watt level. Simplified, single-ended amplifiers, operating class "C" are used throughout to insure high-stability and easy tuning. The intermediated power amplifier, which employs a single RCA 5592 air-cooled triode in a grounded grid circuit, drives two parallel-connected RCA 5592's of the final amplifier. I.P.A. and final are built as one unit and, electrically as well as mechanically, each concentric-line tank forms an integral part of the grounded-grid circuit. Because of the simplicity of design, fewer tubes are required than in ordinary transmitters. Total complement is 42 tubes! 14 r-f, 2 a-f, 10 rectifier and 16 regulator and control tubes. Of these, *only 26* can effect carrier or contribute to transmitter outages; and as for spares, *only 14 different types are needed.*

Equally important to the FM Broadcaster, are the additional equipments provided with the transmitter—pre-emphasis network, harmonic attenuator, transmission line monitor, and a supervisory con-



Left, the WBRC 50 KW FM transmitter panels present a unified front and are flush-mounted to present a streamlined appearance. Right, WTMJ-FM engineer is shown installing an 857B rectifier tube; note the walk-in type of construction for ease of operation and maintenance of the 120 KVA rectifier.



Left, aerial view of WBRC-FM 50 KW tower, 8-section Pylon antenna, transmitter house, and Birmingham in the distance. Center, eight-section FM Pylon antenna with power gain of 12. Right, Closeup view showing trombone impedance arrangement and two-stub matcher.

sole with audio and transmitter control.

WHAT DIRECT FM IS

Methods of accomplishing frequency modulation can generally be classified as either "Direct" or "Indirect." Direct FM is the system in which the oscillator that determines the carrier frequency is modulated directly by audio frequency. This is easily accomplished by a simple, straightforward reactance tube circuit which varies the frequency of the master oscillator in conformity with the percentage of modulation. This system is without doubt the simplest, most direct method of producing high-fidelity frequency modulation. It uses fewer tubes and introduces less audio distortion (especially at the lower modulating frequencies) than other methods. Electrically, the direct FM exciter includes all of the frequency generating, modulating and frequency multiplying circuits of the transmitter except the final doubler.

The complete exciter, as illustrated here, is mounted on two vertical panels. The top vertical panel (the r-f unit) contains the modulator circuits, the automatic frequency control and the oscilloscope circuit. The bottom panel consists of the regulated power supply. All tubes and major components are mounted on the front of the panels. Wiring in the rear of these panels is "in the clear" with all terminals plainly marked.

THE 250 WATT AMPLIFIER

Simplified single-ended amplifiers, operating class "C" and comprising a minimum of variable elements are used throughout the 50 kilowatt FM transmitter. The output of the direct FM exciter is coupled through a coaxial transmission cable to the doubler stage which consists of a single RCA 4-125A/4D21 tube. A small adjustable trimming capacitor provides proper matching between the exciter transmission line and the grid circuit of the doubler. The output of the single RCA 4-125A/4D21 doubler is tuned to the carrier frequency. The doubler is used to drive the first r-f (250 watt) amplifier consisting of two RCA 4-125A/4D21 tubes in a parallel circuit. Tube costs have been kept to a minimum by the choice of inexpensive transmitting tubes of relatively low power.

Outstanding in the design of the first r-f amplifier are the gold-plated variable inductors. They are used in conjunction with three element "pi" networks, (which incorporate the tube plate and grid capacitance) to tune the doubler and first r-f amplifier. This circuit arrangement presents a high LC ratio, provides a maximum band-pass and reduces distortion and losses to a minimum.

Accurate adjustments of the variable inductors are made directly from a front-panel control strip, like the one shown

below, where all tuning controls and switches of the r-f unit are conveniently located at hand level. In general there is a control for each tuned circuit. The vernier controls are operated by a hand crank and incorporate a calibration dial which provides pre-set tuning information for future reference. The tuning handle is inserted only during actual tuning, thereby avoiding possibility of inadvertent detuning during operation.

THE 1, 3 AND 10 KW GROUNDED-GRID AMPLIFIERS

All of the advantages of simplified, single-ended circuits, high stability, perfect shielding and all-around ease of tuning are realized in the design of the 1, 3 and 10 KW amplifiers. All employ RCA 7C24 tubes in grounded-grid circuits and are identical in construction with the exception of coupling circuits. The 1 and 3 KW amplifiers which consist of two grounded-grid 7C24's in cascade provide driving power for the 10 KW amplifier which employs two 7C24's operating in parallel (See the two concentric-line tank circuits at right in page 5 photo).

Electrically and mechanically, each plate tank (tuned transmission-line type) is concentric with the anode of its 7C24 tube and each forms an integral part of the grounded-grid circuit. This design provides a low inductance path from grid to ground, effectively isolates plate circuits

from cathode circuits—and eliminates the need for neutralization.

The two tubes in the 10 KW amplifier have a common input circuit with motor-driven tuning and coupling adjustments. Just as in the 1 and 3 KW stages, the 10 KW plate circuits are tuned by adjusting the position of capacitor-type shorting bars and output coupling is effected by small loops between the inner and outer conductors of the plate lines. In all three stages—input, plate, and output—circuits are motor-tuned from front-panel switches.

Cooling air for the 1, 3 and 10 KW grounded-grid stages is supplied by a quiet external blower equipped with intake filters. Filtered air is supplied to each 7C24 tube through the center conductor of the plate lines. Where space is at a premium, individual internal blowers for each of the 7C24's may be obtained as alternate equipment.

THE GROUNDED-GRID DRIVER AND FINAL

The heart of the RCA 50 KW FM transmitter is the concentric-line tank assembly shown here—that provides perfect shielding of the driver and power amplifier grounded-grid circuits. The driver

amplifier (section at extreme right) feeds the two parallel-connected final sections (at left). Electrically and mechanically, each one of these concentric-line tanks forms an integral part of the grounded-grid circuit. Thus, one compact unit that eliminates neutralization, radiation, and r-f pickup in adjacent r-f circuits is provided. Each section is similar in design and uses an RCA-5592 forced-air-cooled triode in a grounded-grid circuit. Tubes and components are interchangeable. The base of the concentric-line units form a plenum chamber for cooling air and contains the control wiring and high voltage bus. Front-panel tuning of the plate line is provided by shorting bars (with contact fingers) which move vertically along the center conductor by means of motor-driven lead screws. Input tuning is accomplished by two flat plate air-capacitors, one motor driven and the other manually operated.

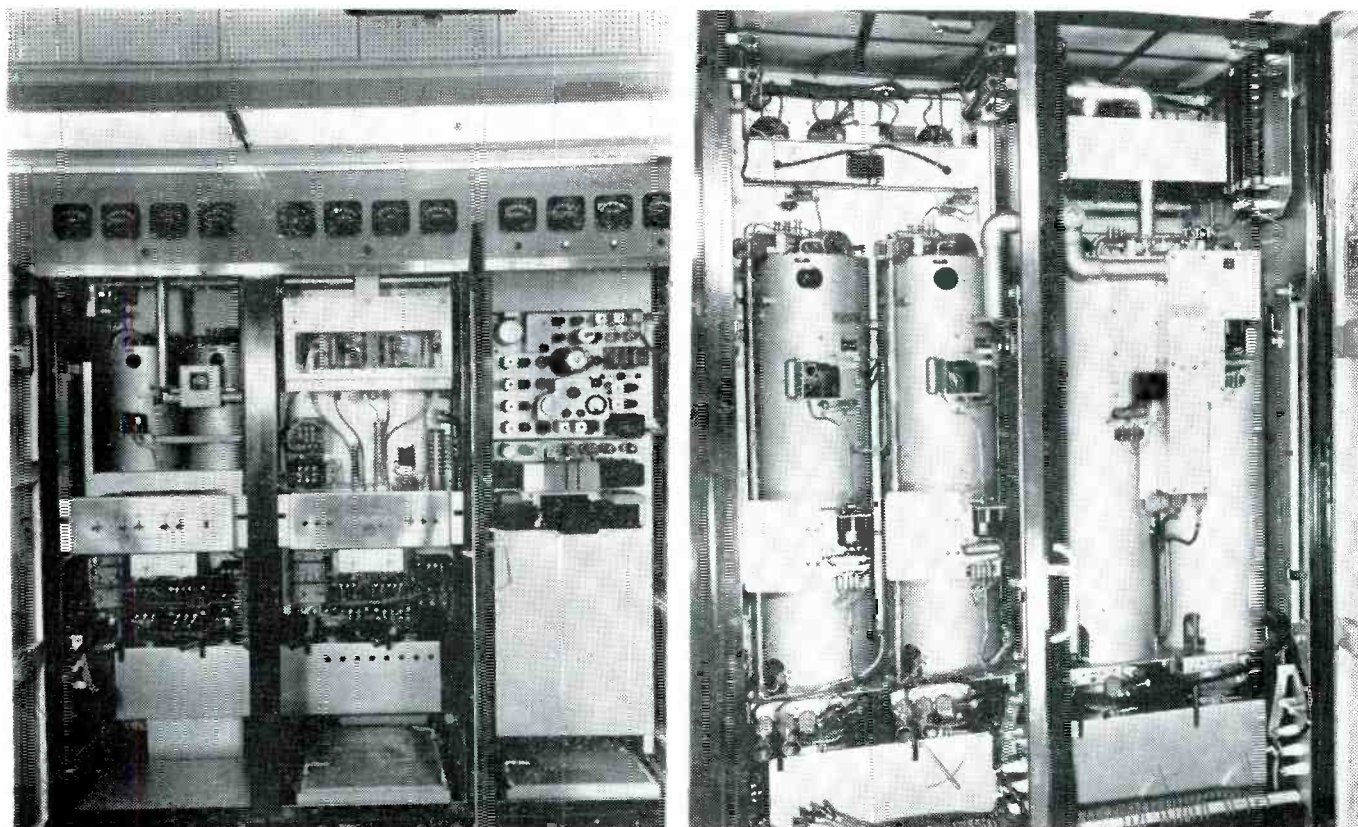
Output coupling is accomplished by motor-driven rotatable loops which are reactance tuned by series capacitors. Amplifiers feed equal load impedances, are individually motor controlled, and provide easy load balancing as well as smooth adjustment of power output. All amplifier

tuning controls are operated from the transmitter front panel—one set of controls for the driver tuning motors—and another set to operate the tuning motors of both final amplifier units (a balance-tune switch allows the simultaneous operation of final amplifiers. For emergency operation at reduced power, provisions are made to instantly switch the antenna to the 10 KW stage, thus assuring uninterrupted service.

THE BTF-50A COMES COMPLETELY EQUIPPED

... With Supervisory Console, Antenna Cutback, Harmonic Filter and Line Monitor, and Tube Hoist.

A new and revolutionary Supervisory Console has been especially designed for use with the RCA 50 KW FM transmitter. Complete with Transmitter Control and Audio Control Turrets, it provides maximum ease and efficiency of station operation. Essential operational controls and indicator lamps are duplicated on the r-f turret. The audio turret has all the controls needed for program handling. Complete switching, mixing and control-circuit metering facilities are provided. Important control-circuit keys such as "transmitter on," studio and local switches



Open door view at WBRC. In the left photo, from left to right are the 10 KW r-f amplifier with parallel 7C24 concentric-line tanks visible, 250 watt r-f amplifier (with 1 and 3 KW amplifier at rear not visible), and Direct FM exciter at right. The photo at the right shows, from left to right, rear view of Low Power grounded-grid r-f amplifiers using 7C24 tubes in the 1 KW, 3KW, and 10 KW amplifiers.

are protected from accident tripping by chromium plated guards.

Complete antenna cutback equipment consisting of new type triple-latch transmission line switches is provided. Electrical switching is accomplished by utilizing impedance characteristics of shorted, quarter-wave transmission line sections.

A single control switch transfers the antenna to the 10 KW stage, and at the same time isolates the final amplifier, driver, and high-power blower. Final and driver tube changes or maintenance are thus possible in complete safety while program continuity is maintained.

A harmonic attenuator is provided to insure maximum suppression of harmonic radiation. A self-contained unit, it consists of a pre-tuned low-pass filter capable of 38 db attenuation. Use of generous size line elements assure low-insertion loss. The transmission line monitor acts as a "watch dog" over the antenna and transmission line. Any unwarranted change in signal intensity actuates the monitor and shuts down the transmitter. A reclosing mechanism returns the transmitter to air, if the fault is cleared. If fault persists, process is repeated and locks out on third attempt.

It is easy to change tubes in the BTF-50A with the tube hoist equipment shown on the left. This mechanically operated tube hoist is solidly mounted in swivel supporting structure. Since two swivel supports are provided, the hoist may be lifted from one support to the next—thus accommodating the tube to be removed. Provision is made behind the 50 KW amplifier front panel to store a spare tube

and to receive a tube being removed. Quick tube removal is further facilitated by use of quick acting tube connectors.

THE HIGH-VOLTAGE RECTIFIER

A single high-power rectifier supplies all anode voltages to the r-f stages of the BTF-50A. In the main rectifier, six long-life RCA 857-B mercury-vapor tubes are connected in a three-phase, full-wave circuit with a half-voltage tap to supply the lower power stages. A pre-heated spare tube can be manually switched in place of any of the six operating tubes, at the same time removing the defective tube from the circuit.

The a-c input from the plate transformers is brought in through a duct in the side, and the d-c output goes to the r-f sections in an overhead duct. The plate transformer is a three-phase air-cooled unit, totally enclosed and located between the switch-gear cubicles and the rectifier. It is arranged for either throat or conduit connection. Primary taps are provided to accommodate line voltage from 440 to 480. Extended primary windings give lower plate voltage for test purposes. The rectifier is a completely enclosed unit and is protected by automatic interlock switches. Only one other rectifier is used (excluding the exciter regulated power supply), and this is a small unit located in the low power r-f section to supply screen voltage to low-power tubes.

The complete high-voltage rectifier section is located in the rear center of the transmitter enclosure for convenience of making the d-c and a-c connections mentioned above. All inter-connections are

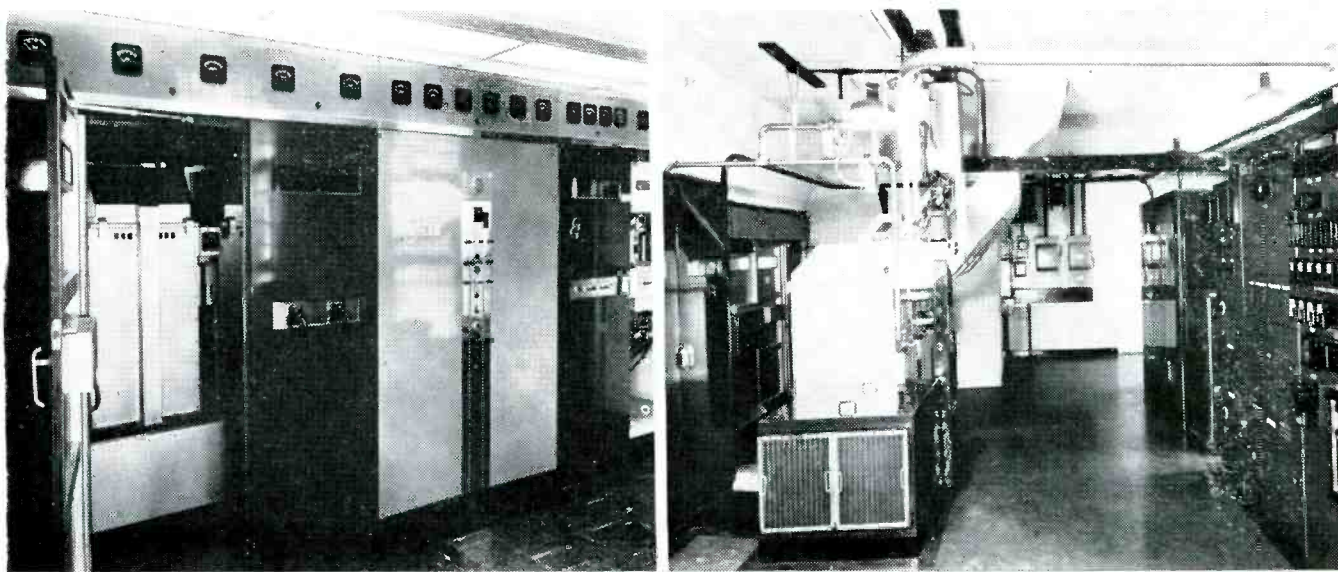
made in either built-in or over-head ducts, so that the only conduit or trenches required are those for the supervisory console and incoming power.

CENTRALIZED CONTROL AND DISTRIBUTION UNIT

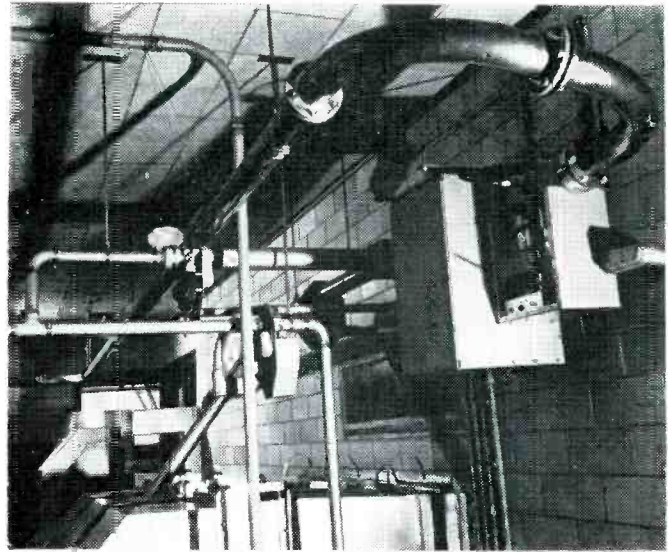
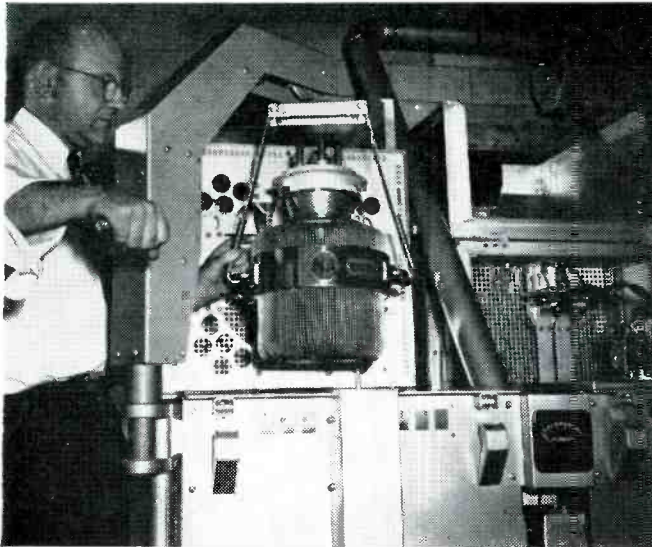
Providing fully automatic sequential operation or step-by-step manual operation, as desired, all the necessary controls, circuit breakers and relays are centralized. Standard power-switchgear cubicles are used. Without doubt, it is one of the most complete centralized control systems ever designed for any transmitter. Overload relays, filament voltage induction regulator, filament starting reactors, distribution transformers, blower interlocks and time delay relays of the latest design assure protection of all transmitter equipment.

High-speed air circuit breakers of the hum free mechanical latch type are employed in all high power switchgear. Overload protection consists of a selective relaying system combining high speed tripping on d-c overloads and short circuit faults, with time delay tripping on nominal a-c system over-current and under voltage faults.

The control system is carefully engineered to provide proper starting sequence and automatic protection against operating faults. Circuit indicator lamps provide a quick means for analyzing and localizing transmitter, tube or line faults, etc. A reclosing system will return full power automatically if the plate voltage is removed due to operation of overload devices on rectifier backfires, vacuum tube gas arcs, antenna flash-overs or other



Left, a view of center sections of the BTF-50A transmitter with door to 50 KW amplifier opened to show walk-around space. Stepping thru the door presents the view shown in the photo at the right, showing overall view of the transmitter room enclosure with 1, 3, 10 KW amplifiers and blower at extreme left, the 50 KW amplifier and air duct, 50 KW rectifier, and at extreme right, the plate transformer and distribution unit.



Left photo shows A. B. Van Alstyne, WTMJ-FM transmitter supervisor, using tube hoist to remove one of the RCA type 5592 power amplifier tubes from one of the two 25 KW amplifiers; the other 5592 tube is shown in place ready for operation when outer cover is closed. Photo at right shows harmonic filter, transmission line monitor and coaxial line to antenna at WTMJ-FM.

causes. This operation is repeated three times on the high power rectifier. If the fault persists on the third re-application of plate voltage, the recloser will lock out until reset manually.

HIGH-GAIN PYLON:

An unbeatable combination for the high—or "Super"—Power FM broadcaster is the BTF-50A transmitter and an RCA 8 section high-gain pylon antenna. The RCA 50 KW FM transmitter and 8-section RCA Pylon enable high-power FM installations and are capable of radiating an effective power of up to 600 Kilowatts to serve primary service areas up to nearly 200 miles in radius, when mountain elevations are used for the high-power, high-gain installations.

The proven dependability and practicability of RCA 50 KW FM transmitters in daily operation plus the excellent power handling capabilities of the high-gain Pylon are making possible the expansion of FM service over wide areas to distant rural communities.

PERFORMANCE SPECIFICATIONS

Type of emission... Frequency modulation
 Frequency range... Any specified frequency between 88 to 109 mc
 Power output (into transmission line)... 10,000 to 50,000 watts
 R.F. Output impedance... 51.55 ohms
 Carrier frequency stability, deviation less than... 1000 cycles
 Modulation capability... ± 100 KC
 Method of modulation... Reactance tubes
 Audio input impedance... 600/150 ohms
 Audio input level for 100% modulation

(at input terminals of pre-emphasis network MI-4926A)..... $+ 10 \pm 2$ dbm
 Audio input level for 100% modulation (without pre-emphasis filter -14 ± 2 dbm
 Audio frequency response* 30 to 15,000 cycles within ± 1 db
 Audio frequency distortion* 30 to 15,000 cycles (including all harmonics up to 30 KC at ± 75 KC Swing) less than 1%
 FM noise level** (below 75 KC wing) Not more than $- 65$ db
 AM noise level (below 100% amplitude modulation) Not more than $- 50$ db
 Power line requirements—transmitter line voltage (nominal open circuit) From 440 to 480 volts
 Phase 3
 Frequency..... 60 cycles (can be adapted for 50 cycles with minor modifications)
 Total variation below nominal, including regulation 5%
 Power consumption 125 KW (approx.)
 Power factor 87% (approximate)
 Power line requirements—crystal heaters
 Line voltage 115 volts
 Phase 1
 Frequency 50/60 cycles
 Power consumption 28 watts

*—For pre-emphasis response the pre-emphasis filter (MI-4926A) is provided to be inserted in the 600 ohm input line, at most effective point.

**—Distortion and noise are measured following a standard de-emphasis network.

RURAL COVERAGE FEASIBLE WITH FM

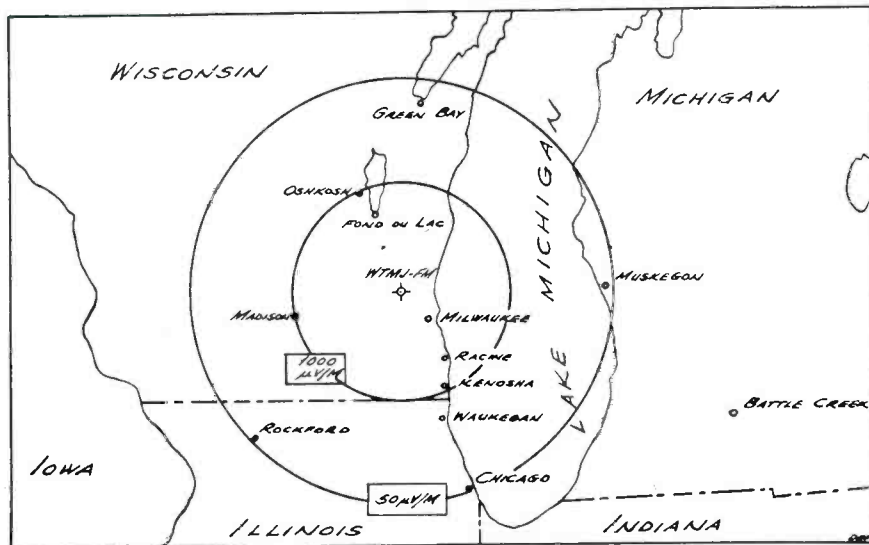
Extension of FM service to wide rural areas was proven practicable when Station WBRC-FM, Birmingham, Ala., the world's most powerful FM radio outlet, received reports from listeners that its super-power broadcasting had been heard as much as 200 miles away. The station's new RCA 50-KW FM transmitter, in conjunction with an RCA eight-section Pylon antenna with power gain of 12, developed an effective power of 546 KW on a frequency of 102.5 megacycles. WBRC's new broadcasting station achieves maximum program coverage by its ideal location atop Red Mountain, famed iron-ore mountain overlooking Birmingham. The mountain-top is more than 1000 feet above sealevel, and the 108-foot antenna surmounts a 450-foot tower. The Alabama broadcasting station is designed to house the new FM equipment as well as a 5-KW RCA television transmitter. Studio facilities, storage space, garage with parking facilities, and an observation deck are provided in WBRC's modern, concrete-block quarters.

Station WBRC is owned and operated by Eloise Smith Hanna, one of the very few women broadcasters in the country. G. P. Hamann is technical director and manager of the station.

FIRST INSTALLATION MEETS PERFORMANCE EXPECTATIONS

The new RCA 50-kilowatt FM transmitter installed by Station WTMJ-FM, of Milwaukee, at nearby Richfield, Wisconsin,

CONTOURS OF WTMJ-FM
RICHFIELD, WISCONSIN



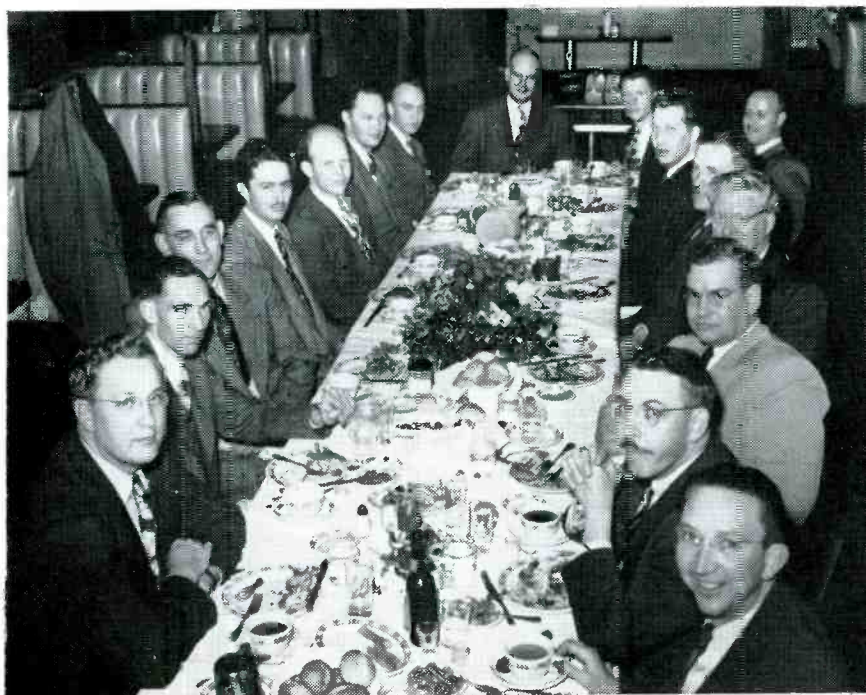
sin, which is the nation's first high-band, super-power FM station, is affording excellent reception to listeners within a radius of 105 miles and has been in commercial operation since September 18, 1948. Located in a modern two-floor brick

building, atop Richfield Hill, which is about twenty-one miles from the downtown metropolitan district of Milwaukee, the RCA BTF-50A transmitter is providing signal strength in the order of twenty-five to thirty thousand micro-volts over

the city area. Primary coverage, within the one thousand micro-volt contour, is being given to an estimated population of 2,432,000 in an area of approximately 18,000 square miles, including Wisconsin's four largest cities—Milwaukee, Madison, Racine, and Kenosha. The operation of the transmitter has been extremely stable and has turned in an excellent record of continuous performance at 50 Kilowatts output on 93.3 megacycles, according to a report made by Phillip B. Laeser, chief engineer of FM and television facilities at Station WTMJ. Measurements taken on the transmitter indicated that the AM noise level runs better than 52 db and the FM noise level better than 65 db, which includes studio and the 26-mile circuit of a telephone program line. The second harmonic content at 186.6 megacycles was measured one-half mile from the transmitter and found to correspond to 120 micro-volts. This value is not considered to be objectionable to other services. Mr. Lesser pointed out that field intensity measurements beyond the twenty-microvolt contour indicate that the performance of the station is morer than meeting the original estimates of coverage.

ROCKY MOUNTAIN NEWS—

By GEO. SOLLENBERGER



Left to right, Aubrey Blake, Ray Green (transmitter councilman), Carl Nesbett (Studio Councilman), George Pogue (Chairman), George Sollenberger (Rocky Mountain Editor), Kenneth Raymond, Charles Eining, Harold Austin, Walter Morrissey, Carl Drebing (Sec-y-Treas.), George Anderson, and Conley Holcomb, at their Annual Christmas Dinner.

The year's best wishes from the Rocky Mountain gang. Living out here is a real advantage. You're a mile high even before you start celebrating. The sign-off gang at all the midnight switch-pulling transmitters doubtless broke records for getting out of the establishments rapidly!

Encouraging is the news that Garland Dutton is recovering rapidly from an acute appendectomy.

On December 21st, all available members turned out for a fine dinner and get-together as evidenced by the shining faces. Among those who blew in from out of town were Bob Austin of KCOL, Fort Collins, Colorado, and George Oblander from KFKA, Greeley. All present agreed that the dinner was a complete success even if the only fried chicken in the place was on the plates. George Pogue expressed the desire that we have as complete a turnout for the regular luncheons as we had this meeting.

Yours truly was amazed at the complexities of NBC, New York on his recent visit. Between telephone calls, became acquainted with the editor of this monthly mag. A very interesting get-acquainted tour, though it was too limited by time. So until this reporter returns to the mile-high city a Happy New Year and 73.



Review of Current Technical Literature

By Lawrence W. Lockwood

The Bell System Technical Journal—October 1948

MAXIMALLY FLAT FILTERS IN WAVEGUIDE—W. Mumford

Microwave radio relay repeaters require the use of band pass filters which match closely the impedances of the interconnecting transmission lines and which suppress adjacent channels adequately. A type of structure called a Maximally Flat Filter meets these requirements and is discussed here.

TRANSIENT RESPONSE OF AN FM RECEIVER—M. Zinn

This paper develops various formulas for the response of an FM receiver to signal or noise input voltages of arbitrary form.

Communications—October 1948

TV CONTROL CONSOLE DESIGN—J. Ruston

General problems involved in the design of TV transmitter consoles; master control requirements; video signal monitoring; bridging connections; terminating connections; percentage modulation measurement; video and audio circuitry; metering and switching and mechanical layout.

FM BROADCAST NETWORK WITH RADIO LINKS—D. de Neuf

Six station network, operating on 153.59 Mc, formed by ten farm organizations in N. Y. State, linked by radio relay covering nearly 118,000 farms or about 76% of the farms in state. Each station uses 250 watt setup with four bay pylon with power gain of six.

THE KLEE 5 KW AM INSTALLATION IN HOUSTON, TEXAS—P. Huhndorff, R. Sively

Transmitter site selection procedure—use of four 400 foot towers in-line antenna system—Phasing methods adapted—dummy antenna employed in tests—application of measurement techniques such as 'Scope of modulation monitoring—maintenance practices followed.

A REPORT ON MICROWAVE TV NETWORKS—S. Freedman

Recently completed survey provides pertinent data on Coax vs. microwave costs, present and possible routes in Middle West, South and Far West areas, and detailed analysis of Boston-N. Y. link, equipment used and its operations.

BROADCAST TRANSCRIPTION-REPRODUCING SYSTEM MAINTENANCE PROCEDURES—R. Peters

Proper use of isolation transformer and recording stylus.

(To Pae 10)

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REVIEW—from Page 9

Sources and cures for hum and rumble. How to handle transcription discs.

CQ—November 1948

LOOKING OVER VHF ANTENNAS—C. Lester

A general discussion of the many types of vhf antennas being employed in and out of amateur circles.

Proceedings of the Ire—November 1948

PENTRIODE AMPLIFIERS—H. Zeidler, J. Noe

Conventional video amplifier design is complicated by low-frequency phase shift and degenerative decrease in gain caused by inefficient screen grid and cathode by pass circuits. This paper describes two amplifier circuits in which phase shift and degeneration in those by pass circuits may be eliminated throughout the entire range to zero frequency.

DUPLEX TETRODE UHF POWER TUBES—P. Smith, H. Hegbar

Major factors affecting the design and development of wide band hum power tubes are considered and emphasis is given to the television application.

HIGH FREQUENCY POLYPHASE TRANSMISSION LINE—C. Tai

The transmission line equations that determine the current and voltage relationships on these lines have been derived and solved. They are useful in designing lines to fed polyphase radiating systems and in computing the input impedance of triple folded dipoles and other antennas.

LOW PASS FILTERS USING COAXIAL TRANSMISSION LINES AS ELEMENTS—D. Mode

Four transmission line low pass filter designs are presented which specify the mechanical dimensions required for constructing low pass transmission line filters having pass bands with a width of as much as 4000 mc.

A HIGH LEVEL SINGLE SIDEBAND TRANSMITTER—O. Villard, Jr.

Double sideband suppressed carrier signals can be generated with relatively high efficiency at high power levels in grid modulated balanced modulators so biased that very little plate current flows in the absence of audio input. The simplicity and power economy of this circuit make it attractive for those applications where moderately low distortion and reasonably good rejection of the undesired sideband are satisfactory.

AN ANTENNA FOR CONTROLLING THE NONFADING RANGE OF BROADCAST STATIONS—C. Jeffers

A new type of broadcast antenna is described which radiates very little energy over a wide, high angle.

Teletech—November 1948

TV IN UHF (475-890 mc)—A. Francis

Nineteen additional black and white six mc channels proposed; upper 300 mc reserved for color, due in a few years—higher tube powers seen.

500 WATT TV TRANSMITTER—M. Gaskill

Engineering design for residential areas where low power provides needed coverage—may be installed “off limits” with 12x directional antenna.

DESIGNING AND ENGINEERING THE TELEVISION CHASSIS

A series of articles describing the various phases of manufacture of a television receiver from research to cabinet design—Philco Corporation serves as model.

Western Electric Oscillator—November 1948

PROGRAM DISPATCHING UNIT AND FM TRANSMITTER MAKE A SHOW PLACE AT WIP—

Description of Western Electric installation with emphasis in design on display of facilities.

PROGRAM QUALITY DEPENDS ON TURNTABLE PRECISION—J. Lawrence

Description of new Western Electric low-flutter, low-rumble drive No. 1304 reproducer.

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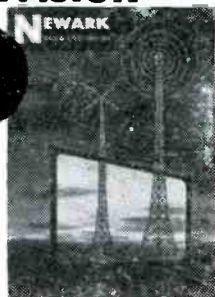
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NABET - IATSE

It is learned from reliable sources that a representation case before the NLRB was adjourned until March 16th, 1949, when the National Officers of NABET and IATSE decided that further effort on their respective parts might solve the controversy. The hearing was on the petition of NABET for representation for all TV Lighting on the NBC. A similar case is pending over the same question on ABC. A temporary local—New York—solution had been arrived at in December and it has been agreed by the International President of IATSE and the Executive Secretary of NABET that in the best interests of the industry, and the unions involved, that both unions would seek a solution acceptable to the industry and the unions.

RMA ANNUAL REPORT

More than 975,000 television receivers were produced during 1948, bringing the postwar total TV set production to at least 1,160,000, the Radio Manufacturers Association reported today. An additional 25,000 to 30,000 unassembled TV set kits were reported to have been manufactured last year.

With set manufacturers applying an increasingly large share of their manufacturing facilities to television, particularly during the second half of 1948, production of radio receivers last year declined about 20 per cent under the all-time peak reached by the industry in 1947. Last year's output of radios, however, was the second highest in the industry's history.

Total industry production of radio sets in 1948 was estimated by RMA at more than 16,000,000 of which RMA member-companies manufactured 13,265,793. In 1947 the entire industry's production of radio sets exceeded 20,000,000.

TV set production by RMA member-companies reached a new high of 161,179 in December, only 17,500 sets under the entire output of television receivers in 1947.

RMA member-companies reported manufacturing 866,832 TV sets in 1948 as compared with 178,571 in 1947 and 6,476 in 1946. Production by non-member manufacturers brought the total TV set output in 1948 to more than 975,000.

Almost 44 per cent of the TV set production by RMA members came during the last quarter. Weekly production during December reached a peak of almost 39,000, but the total for the five-week month was cut during the last two weeks by holiday shutdowns and other factors.

FM-AM and FM only sets made by RMA members, however, last year rose 35 per cent above the 1947 output despite the general decline. RMA companies reported 1,590,056 in 1948 as compared with 1,175,104 in 1947, and the December tabulation reached a new high of 200,326 FM-AM sets as against a previous peak of 171,753 in September. Over 100,000 of the 1948 output were FM only sets.

Table models in the FM-AM category made even a sharper climb in 1948 and accounted for 42 per cent of the total FM band sets reported by RMA manufacturers. Many TV receivers also included FM reception facilities, but no accurate count of these is available. The 1948 output of FM-AM sets by RMA members brought their postwar total to almost three million.

Continuing the high level of production attained in 1947, both automobile and portable radios accounted for much higher percentage of the radio receiver output of RMA members last year than in 1947.

Auto radios reported to RMA numbered 3,409,013 and accounted for 26 per cent of the year's total of radios manufactured. Portables numbered 2,114,133 and accounted for about 17 per cent.

A decline in "AM only" home receivers accounted for the entire decline in radio set production in 1948. Table models dropped from 72 to 46 per cent of the total radio output, while consoles maintained about the same proportionate share it had in 1947 or 12 per cent. Table models in the TV line represented 68 per cent of all television receivers produced.

Following is a month-by-month table on television and radio set production by RMA member-companies for the year 1948:

	TV	FM-AM	AM	All Sets
January	30,001	136,015	1,173,240	1,339,256
February	35,889	140,629	1,203,087	1,379,605
March	52,137	161,185	1,420,113	1,633,435
April	46,339	90,635	1,045,499	1,182,473
May	50,177	76,435	970,168	1,096,780
June	64,353	90,414	959,103	1,113,870
July	56,089	74,988	552,361	683,438
August	64,953	110,879	759,165	934,997
September	88,195	171,753	1,020,498	1,280,446
October	95,216	170,086	869,076	1,134,378
November	122,304	166,701	827,122	1,116,127
December	161,179	200,326	876,315	1,237,820
Totals	866,832	1,590,046	11,675,747	14,132,625

LOOSE-JOINT DETECTOR

How the infra-red detector or bolometer, a device used in war by the Germans to accurately track the course of ships through the English Channel, has been adapted to peacetime use for locating faults on power transmission lines, was disclosed at the annual winter general meeting of the American Institute of Electrical Engineers which was held in the Hotel Statler, New York, (Jan. 31-Feb. 4).

The detectors which during wartime were mounted high on the cliffs near Calais, France, by the Germans and which were sensitive enough to pick up radiations from the funnels of ships in the channel, have been developed to find quickly over-heated transmission line joints, J. R. Leslie and J. R. Wait of the Research Division of the Hydro-Electric Power Commission of Ontario, Canada, told the engineers.

Failure of overheated conductor joints on transmission lines can cause accidents and interruption of service, and therefore the detector can be put to good practical use in preventing both, the authors pointed out.

In a two months period more than 300 transmission line joints were checked by the infra-red detector, according to a technical paper presented by the two men.

"With the infra-red detector, joint temperatures can be measured with the line in normal operation by merely setting up the detector's tripod to one side of the line and sighting the bolometer on the joint," it was reported. "The procedure takes less than five minutes time."

The detector consists of two parts—a parabolic mirror which collects the heat radiation from the transmission line joint being tested and a heat sensitive element mounted at the focus of the mirror.

DO WE HAVE YOUR ZONE NUMBER?

TELEVISION PROGRESS IN 1949

A Statement by Dr. Allen B. Du Mont



TELEVISION moves ahead even faster in 1949. For it starts out with terrific momentum. Witness the 50 stations already serving 26 marketing areas, to be joined shortly by upwards of 75 new stations. In addition to 77 construction permits soon to be converted into TV stations, there are 310 applications waiting to be processed with the raising of the momentary "freeze" order whereby the industry takes inventory of present and future needs, and gives due consideration to UHF possibilities quite in addition to present VHF channels. Meanwhile, coaxial and radio relay networks spread out to a goodly third of our country—the eastern and northern states and again along the Pacific coast—already accounting for the bulk of the total population. There are well over a million TV sets in use, with more being produced at a rate in excess of 130,000 monthly, for at least 2,750,000 TV sets in use by the end of 1949. Topping it all, television becomes real "show business" and that means irresistible entertainment for every man, woman and child. What with boom business in sets, tubes, antennas and accessories, in transmitting equipment, in programming and operational activities, in network facilities and other TV aspects, the young industry now takes its rightful place among the billionaire industries. Definitely, the Television Age is here.

Aside from television's spectacular growth in 1949, the outstanding development must be the lifting of the "freeze" and the early exploitation of the UHF frequencies. True, there will be many technical angles to be worked out, especially in actual practice. But UHF means the opening up of many more TV channels, which in turn means TV stations for the smaller cities, towns, villages and rural areas. Also, it can mean two or three stations in every section of the coun-

try for an adequate choice of competing programs.

The UHF channels to be opened up are quite in addition to present VHF stations and receivers. In fact, it seems now as though the densely populated areas will continue to be served by VHF transmitters tuned in by present types of receivers, while the smaller cities, towns, villages and wide open spaces will be served by UHF transmitters calling for new types of receivers. For UHF signals introduce many new problems which will be worked out as such channels are opened up. New TV receivers capable of handling those signals will become available in the UHF service areas. Entirely new types of receiving antenna will be required, along with special coaxial cable downloads. The economic considerations may dictate that receivers be limited to either VHF or UHF programs only, although Du Mont engineers already have a new continuous-tuning technique that can take care of both the UHF and VHF bands. It may even be found necessary in some installations requiring very long downloads, to place the RF head at the antenna itself, so critical are the ultrahigh-frequency signals. Regardless, whatever technical developments may be required are more than justified by the increased "elbow room" to be gained in the very crowded ether.

As for TV reception generally, it seems that direct-viewing reception continues as the popular choice because of its brighter, more detailed, and all-around most pleasing images. The 12", 15" and 20" picture tubes will be the popular sizes in 1949, with production advances and economies permitting large-tube sets to come within reach of the average household budget. One thing is certain: No obsolescence of present TV receivers is yet in sight. Existing operational standards have been set for years to come. Also, notable refinements in transmitting equipment and operation during the past year have proved that current receivers are capable of still greater pictorial quality.

While practical progress has been scored in the metal-type tube during recent months, I believe the glass-type will still constitute the bulk of the picture tubes used during the next year at least. Recent developments in metal tubes came about mainly because of serious glass shortages. In fact, the greatest bottleneck in TV receiver production has been in

the limited supply of glass blanks, but with the recent expansion and greater mechanization in glass production, this critical shortage is rapidly disappearing.

We enter the new year with telecasting services available in Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland-Akron, Detroit, Fort Worth, Los Angeles, Louisville, Memphis, Milwaukee, New Haven, Philadelphia, Pittsburgh, Richmond, St. Louis, St. Paul-Minneapolis, Salt Lake City, Syracuse, Schenectady, San Francisco, Toledo and Washington. Many of these stations are linked together by the Bell System Networks in the East, extending from New York to Baltimore, Washington, Richmond and Pittsburgh, to the south and west, and to Boston to the northeast. In the Mid-West, Chicago, Milwaukee, St. Louis, Toledo, Cleveland and Buffalo are linked together by coaxial cable, with radio relay links to Detroit and Pittsburgh. With these two networks joining hands at Pittsburgh early in 1949, a combined coverage of a large part of our country and indeed the bulk of our population, becomes a reality. Corresponding network progress along the Pacific Coast must ultimately be climaxed in the joining together of the East and West for coast-to-coast telecasting in the not-too-distant future. Meanwhile, there are numerous inter-city channels such as the New York to Schenectady and the New York to New Haven radio relay circuits, linking stations off the beaten path of the coaxial cable and radio relay trunk lines, for the rapidly spreading TV coverage.

While coaxial cable and radio relay networks serve to bring the program facilities of our leading entertainment centers to scattered telecasting stations and at the same time provide the commercial sponsor with a numerous audience worthy of national advertising appropriations, many programs are being recorded on film for telecasting at any time and place. Marked progress made in tele-transcriptions or the filming of TV programs directly from the monitor screen, will contribute much to 1949 telecasting variety especially among smaller and isolated stations.

The close partnership between television and movie mediums, increasingly apparent this past year, will become still closer during 1949. Because of the time difference between actual event and favorite looking-in hours, or again in the

matter of the news locale being beyond reach of TV pickup facilities, the filming of TV news events becomes generally accepted practice. Many of the "commercials" in which repetition is the primary means of impressing a brand name or slogan or design or usage upon the audience, are recorded on film for precise presentation over and over again. Most TV transmitting facilities already include film processing equipment whereby film can be developed, reversed, fixed, rinsed, and dried, all in a matter of minutes since time is of the very essence of most news programs. Air transport of timely films can bring overseas news events to American homes in minimum time. Television news coverage during 1949 will spread out to the entire world. I see no diminution of the film presentation but rather a still more effective use of this companion medium in TV programs.

Another phase of the television-movei partnership is at the theatre level. Eastman Kodak and Du Mont engineers have evolved a practical means whereby televised news events or sports coming over direct coaxial cable or over the air, can be filmed directly off a special cathode-ray tube, processed, dried, and ready for projection by standard theatre equipment all in the matter of minutes if not seconds. TV economics, particularly in the matter of prohibitively-priced sporting events, may yet introduce the box office method of collecting maximum revenues, in which case one or more theatres may be joined together by wired television or special radio relay. Something along this line may appear in 1949.

But by and large, TV programs will continue to cater to home audiences on both sustaining and sponsored bases. We have witnessed the evolution of the commercial pattern of telecasting during the past year. The economic cycle of good programs justifying the buying of TV receivers by the public, which receivers in growing numbers justify still better programs which sell still more TV sets, has at last been completed. The result is the array of outstanding television presentations with which we enter the new year, among them stage plays with "big name" actors, as well as the vaudeville revivals, involving production costs well up in the five figures for a single performance. This is real "show business."

Over and above the many and varied entertainment programs, I anticipate still greater emphasis on the educational potentialities of television. This seems to be a logical outcome of daytime program-

(To Page (15))

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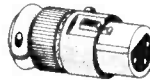


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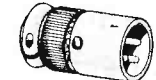


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WASHINGTON

By Warren Deem

First I want to make apologies to MELVIN WARD, Studio A, WOL Studios here for leaving him out of the listing in the yearbook for the Washington Chapter of NABET. It was purely an oversight. Forgiven MEL?

BILLY CORNNELL has moved up to Operations Supervisor at WOL, the post vacated by TED BELOTE'S resignation. BILLY is very capably handling the job and is well liked by everyone. He is a "regular guy." CORNNELL just purchased an 80z G.E. TV set and is very pleased with same.

CARSON A. ANDRICK "Andy" resigned to accept a position as Purchasing Agent for National Electronic Lab., Alexandria, Va. He likes it very much—especially the regular hours and Saturdays and Sundays off.

RAYMOND KAPLAN resigned December 24th to go to work with the State Department. He is in administrative work with a P-5 rating, no less.

JIM MELINE formerly of WRC is now with WNBW-TV running audio for same. JIM has six years broadcasting experience and feels right at home in his new job.

JIM BUTTS is attending Iowa State College. ISC is the only college holding a TV license as of last November and JIM is moren' likely working there right now. His address is 203 Hawthorne, Waterloo, Iowa.

WELCOME TO KEITH PRICE, new engineer at WRC from AT&T.

LEON CHROMAK was quite provoked when a fellow driver tried to beat him to a parking space. LEON backed into the freshly vacated spot and ran into the "poacher." MRS. CHROMAK was with LEON and it wouldn't look right to have this other guy take advantage so LEON gives the fellow a piece of his mind over his shoulder and the other guy docilely moves on. About a week later LEON was at Severn micro-wave tower and over the phone FONSO MORGAN at the WNBW Xmtr says "are you still sore at me for trying to grab your parking space"? A small world, eh?

Technical history was made on Dec. 17th during the ceremonies honoring the Kitty Hawk on its return to this country from England. The principal actors in this little drama in a DC47 at 11:20 A.M. were DODD BOYD and JOHN ROGERS. It was the first telecast from the air received by the east coast viewers. During the trial runs and also during the air-time flight JOHN and DODD picked up 6½ hours flyning time apiece. The first time up JOHNNY asked "where'm I gonna put it?" Next time up the crew chief furnished paper cups. The announcer, prior to air time was on all fours with his green head out the door. At the standby signal he valiantly stood up to the mike, described the goings on and immediately knelt for the rest of the miserable flight as far as he was concerned. The only guy that didn't feel it enough to show it was DODD BOYD.

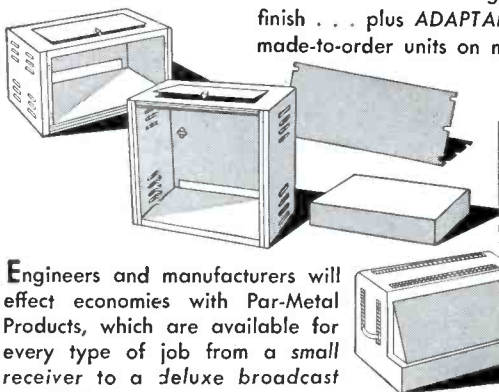
For power, a put-put of the type used for aircraft mobile gasoline power motors was used. The exhaust pipe ran from the motor back through the plane and out the door and served as a handy gadget to light cigarets on. One camera chain plus sync former and shaper was used in the plane, securely tied down. DODD used a 135 mm lens outside the plane and a 50 mm lens inside changing lenses on the air. The plane flew at between 1500 and 800 feet during air time and sometimes got as low as 500 feet. The Washington Monument is 555 feet. The audio portion and engineering cues from the plane were done over a BC 375E Xmtr and a 312 Liaison Rcvr. with a Transceiver on the ground station at the Smithsonian Institute. There was no switching unit in the plane so engineering PL's, two EE8B's were used. The DC 47 had an antenna on top for ground operation and one protruding from the bottom used while in flight. Reception was at times poor due to the speeding and banking of the plane while it was trying to keep



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abreast of the B20's to get them in the picture.

The summing up by JOHNNY ROGERS after it was all over, "Next time it will be a routine pickup, but it sure wasn't this time."

TV PROGRESS—from Page 13

ming. Instead of being limited to a few evening hours, as has been the general rule until now, we enter 1949 with daytime schedules such as that of Station WABD in New York with its 80 hours weekly. Thus telecasting is no longer confined to an audience that wants to be entertained at the end of a long day, but rather can appeal all during the day to children, to young people, to the women folk, and even to students with programs of genuine educational content. I make bold to predict that even as early as 1949, we may see the beginnings of educational television worked into our school and college life.

Finally, the non-telecasting applications of television are yet to be touched upon. The "seeing at a distance" technique offers many challenging possibilities in everyday life. The executive sitting in "the front office," who looks into any department of the scattered plant merely by flipping a switch on his desk; bank personnel checking signatures over its intra-television installation; prison guards possessed of all-seeing eyes with which to watch all sides and corners of their institution; inter-city sales meetings and demonstrations over leased circuits; the training of scattered groups from a central lecture platform; intra-store television whereby goods and demonstrations can be simultaneously shown at various strategic spots—these are but samples of the tremendous potentialities of this TV art in brand new fields.

Much of our American living is undergoing modifications because of this newly opened "window on the world." We are setting aside many hours of leisure time in order to see things all about us via the television screen. And it all adds up to this in 1949: A still more learned, broader-minded, more enterprising people is in the making, thanks to the impact of practical television.

—If it concerns the
Broadcast Engineer, he
will read it in the

BROADCAST
ENGINEERS'
JOURNAL

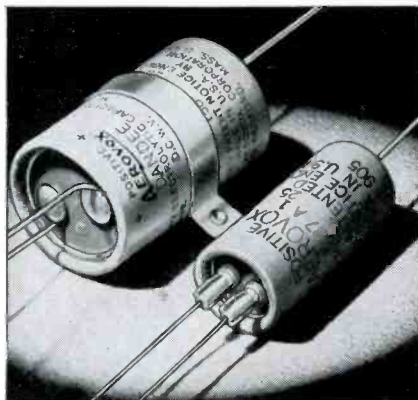
TRADE NEWS

Sylvania Electric announces that its research staff has built an automatic recording spectroradiometer for production control of commercial television tubes. This device will accurately plot energy output of TV tube screens throughout the entire visible light spectrum in 48 seconds. In addition to use as a precise production control instrument, the device is expected to help solve screen standardization problems and provide a scientific means of screen decay study.

Don A. Davis, Cannon Electric Sales Manager, has appointed Leroy W. Beier, manufacturers representative at 6000 South Michigan Avenue, to represent Cannon Electric Dev. Co. of Los Angeles, in the Chicago area.

Sylvania Electric announces purchase of a plant at Seneca Falls, N. Y., for the immediate production of TV tubes.

American Broadcasting Co. announces that it has acquired exclusive TV license to the Dunning Animatic Projector developed by Dunning Color Corp. of Hollywood. Device is said to achieve low cost method of producing 16 mm TV films.



Aerovox Corp. of New Bedford, Mass., announces new stud terminals in place of conventional rivet-type terminals. This has greatly reduced the bulk of the new PRS midget can dual section electrolytic condensers.

The Annual Winter Meeting of the AIEE heard some interesting facts about electric eels; they are said to have an attack power of up to 600 volts, and the discharge pattern was demonstrated with an oscillograph. These eels also have radar ability, since they have poor eyesight and live in murky swamp water, but are always able to locate their objectives promptly. There are about six dif-

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ferent varieties of electric fish known; the polarity at the head is always positive, and negative at the tail!

DuMont announces that its laboratories are available to the industry for the development, design, and construction of special cathode ray instruments.

The RMA announces that over two hundred million radio tubes (receiver types) were sold in 1948, an increase of five million over 1947.

United Transformer Corp. announces an input transformer matching any low impedance source to grid, with built-in jack for the input, and standard single-plug for the output; frequency response, 50—10,000 cycles.

At the close of 1948, 2,034 AM broadcast stations were authorized, an increase of 239 for the year; 1,020 FM stations were authorized, an increase of 102 for the year; and TV stations increased to 109, an increase of 43 for the year.

G. E. Co. has shipped a 5 KW TV transmitter to WKRC-TV, Cincinnati, and will operate on Channel 11. G. E. Co. will also supply complete studio equipment.

ROGER ELLIS....There is a time and a place for everything. The average man just wouldn't think of taking a pass at some cute 'house mouse' at first sight of her; he usually waits until he learns her name. After checking the walls of the negotiating chamber for hidden mikes, the negotiators don't start right in with their screams of starvation wages, they say "Good Morning," first. By the same token, the Detroit chapter cannot treat, with its usual levity and lack of respect, the recent, abrupt and completely unexpected resignation of ROGER ELLIS, Detroit chairman for the past two and one-half years. A few short, hectic days ago, ROGER experienced what we shall politely term a "tummy ache." He looked up his doctor—the doctor looked up ROGER—and now, if you want to look either one of them up, you'll have to go to Deaconess Hospital, Detroit, where they will be found, ROGER prone and the sawbones at a ninety degree angle to MR. ELLIS. The elongated ELLIS is suffering from,

wheels. To this time, DAVEY has been serving as sec.-treasurer and doing a fine job.

NOTHING DEPARTMENT—Detroit—Ah, beautiful Detroit, where men are men, and strong women quail and grow faint at the thought of any other arrangement. Detroit—where this day we tied into the fabulous East-West co-ax—and where everyone is more than slightly daft at the prospect. Detroit—where this afternoon, a labor board observer, lethargic in the tedium of it all, sat and watched the parade of NABET membres troop into studio C (that's the one with lights) and cast their ballots for or against the idea of labor unions in general, as stipulated by T-H. If, as the T-H bill seems to imply, there is a better side to everyone of us, and also, if that better side is against labor, the "better sides" of the Detroit chapter must have been out trying to make the grade with a blonde. The final tally was fifty-one votes for a continuation of our present setup, and one vote against. Could be that one of the "better halves," the ONE that voted NO, didn't know what a source of "rainy night" literary entertainment a blonde could be—so he just voted NO and let it go at that. (Note to that one NO vote—check into this blonde situation—there's a future in it—a short future but a merry one!—(Det. Ed.)

VENETIAN CANALS SMELL IN SUMMER—This boy MAHER, who has been extremely active as a caller in the recent WJ/NABET cotillion, promises to supply a wealth of material for the Detroit column. Practically none of it will be true, you have been warned. (Bring 'em back half shot) STEWART was to meet GEORGE, and after looking under every freight car in the NYC yards, he finally did meet him. GEORGE was discovered sleeping under a Sante Fe (roller bearings, no less) refrigerator car, wrapped in a gorgeous blanket emblazoned with his initials, "THIS BLANKET WAS BORROWED FROM THE RALEIGH YWCA." We in Detroit think GEORGS has one of the longest names in the world. The story of Detroit's search for a room for GEORGIE has an O. Henryish twist. The need for his presence came to a flying focus without ample time for the gentry hereabouts to prepare for it. Social protocol, Detroit laws, and the temperature all combined to preclude MAHER sleeping in Grand Circus Park. After much cogitation, the Detroit chapter just couldn't stomach the thought of some irreverent "flat foot" whopping Mrs. Maher's hubby across the soles of his tender "dogs" with a three foot night stick. DAVEY (who stole my bicarb) STEWART and TED (if it pours, I can drink it) PENNYBAKER conspired to use their connections in the room search. The two of them would get a room for our boy through their own private network of hotel managers, who, for the promise that they (TED and DAVEY) would never enter their hospice again, would provide rooms for itinerant NABETIANS. After twenty telephone calls, they were no closer to a room than before. GEORGE M. began taking a rather dim view of Detroit in general, and the Motor City gang began to go slightly frantic in their cumbersome way. With such an excruciating breach of etiquette being laid at our doorstep, we could see our friends across the country leaving us enmasse. We could see the Chi blood pressure mounting ever upward to a new and astronomical high—we envisioned HJORTH frowning (spelled H-J-O-R-T-H—how the hell do you think it's spelled?). DAVEY)brown bottles keep it better) STEWART foresaw a stoppage of Chi beer in Michigan, and his lachrymose manifestations of dis-



"Negotiations are under way!"

of all things, ulcers; that occupational hazard of itinerant announcers, bilious producers and IBEW organizers (IBEW—that's a union??—I mean, that's a union!). ROGER is skedded to do time in this horizontal position for two or three weeks, during which time, and unless they immunize themselves, the nurses will find their left eye looking soulfully into their right, their left molars (bottom level) trying to hit their right molars (bottom level) and their left—oh, well! This phenomena has been known to happen in the sanctum sanctorum of the negotiating chambers due to these tender ministrations of ROGER the ELLIS. ROGER has done a lot for NABET in general and for the Detroit chapter in particular; his work will be missed. The dismal picture occasioned by his signing off is partially lightened by the assumption of administrative command by DAVEY (lumpy) STEWART, whose elfinly evasive tactics have caused our chief engineer to scream, again and again: "Where—the—Hell—is—STEWART—now???" That's our boy DAVEY! It will be of more than passing interest, to see if and how, the overall strategy of the Detroit mob changes under this reshuffling of the union

pleasure and chagrin were recorded west of Denver, by an AT&T man who shook his head dolefully and muttered: "Beats the hell outta me!" All this was a calculated risk we could ill afford to take. Happy Hips SANDERSON, who thinks our whole staff is unusual because we don't have thirteen toes, sat stolidly in a corner, taking in this scene of frenzied activity. Suddenly he smiled; his face lit up like a fluorescent light with a bum starting switch, and he spoke words of unquestionable depth and wisdom: "Why don't you fellows just call the desk clerk at some hotel?" The simple ingeniousness of his statement was readily apparent, and brought roars of acclamation and accord. The first call and our plaintive question: "Do you have a room, with or without anything?", hit paydirt, and GEORGE MAHER of the Chicago beer North side MAHERS, found himself ensconced in a real, four walled room, with a lovely view of the eastern entrance to the Detroit dog pound. MR. MAHER's statement to the press was brief: "I like dogs!"

GET OFF YOUR KNEES, MOTHER DEAR, YOU JUST LOST YOUR FIN—This concerns TRUMAN (don't fix it,



"Negotiations are proceeding on a high plane!"

clean it) OLIVER, rotund AMSE, dog lover and sales manager for Mother Murphy's Hips Reducing Powder (50% off to obese NABET members). TRUMAN recently underwent a series of rather severe treatments for a nerve injury to his eye. The treatment consisted of ample slugs of pure alky shot into the area behind his eye or the cheek area (let's localize that a bit—it was the cheek area near his eye—make something out of that!) STEWART, he of the beer flavored tooth brush and BRIDGEMAN of anti-freeze fame, consider this an out-and-out waste of the precious fluid, this being a uni-lateral thought in which OLIVER has little sympathy. TRUE recently became the proud owner of a carpenter dog. This breed of pooch, according to ED (look Mom, no hands) BOYES, who can boast of many titles, among them "studio super," and triple tail feather president of the Birmingham Audubon Society, Nest No. 3, a carpenter dog is one which tears about the house doing odd jobs on the fly. TRUE

agrees wholeheartedly for his day is filled with what his wife GERT efficiently terms "mopping up" operations. Of late, we have heard no complaints from "Ole Button Bottom," therefore, we assume everything has come out OK.

MARITAL NOTE—Or should that be spelled MARTIAL? We have all of us experienced moments, when the "little woman" is inwardly described as something else, and at such times, the spelling of the word is a source of confusion. Mystifying or not, one (saints be praised) ELMER (button happy) JEWELL recently took that long last step, so fraught with binding commitments and safety pins. He now qualifies as a full fledged member of the "house mouse" brigade.

HEARTS AND FLOWERS DEPARTMENT—The editor of this column recently received a telephone call from some character purportedly in search of information concerning unions in the radio industry. In the course of the discussion, many comparisons were made between NABET and other so-called "radio unions." Said character summed it up by stating he thought he would join IB, and could the editor give him any advice on how to do it. The editor could and did, and new repeats for the benefit of all who compare unions and find IB is the top—lay down, chum, you're dead!

PIGEON LOFTS ARE THE HOMES OF PIGEONS USUALLY—Stopped in to see the FM/TV boys the other day, and ran into a touching tableau. There in the corner of that lofty spot (700 feet or so straight up) stood a brand spanking new 10 KW REL FM final, so dolled up with so much chrome and scintillating green paint, it looked like its mother had been frightened by a new Buick. Operationally, it appeared to be a hybrid cross between a snow plow and a GM egg beater, but it did look good. As the Detroit ed entered, the new xmtr was the subject of an extremely torrid monologue by RONNY (I came with the lease) FISK, xmtr supervisor without portfolio. At the moment, RONNY was discussing in quite some detail, the ancestry of the electronic abortion, and had just gone back through the fourth generation while picking up speed and brushing up on his descriptive lexicography. He is very adroit, too, we might add. Standing about in a sleepy looking circle, if you can imagine two somnambulant engineers forming a circle, were KEN (I been sick) ROBINSON and JAMES (honey chile) NORTON. Their attitudes indicated a deep and overall devotion to something other than physical labor, as they stood gazing soulfully into each other's heavy lidded eyes. It's a better than even money bet they were conjuring ways and means to get back to their control boards, and the mesmerizing influence of a million twinkling lights of all colors. The incongruousness of the scene could have been enhanced only by CLIFFORD (bubble bucket) RIES, practicing turns and banks with his garden tractor on the congoeum, as he prepared for his yearly battle with the weeds and his eternal search for a RIES grown carrot that can be seen with something less than an eighteen power glass. Incidentally, the areas of CLIFFORD's epidermis, which last month were reported as being more than slightly fried, have regained their natural elasticity and "bounce." According to the "gentleman" in question, they feel more like a pillow and less like the head of a snare drum in very wet weather.

HEALTH NOTE—AL (bagle beak) FURGET, once the heftiest hefty on a really hefty staff, has, by a dint of will power and lack of ready cash, dropped his weight forty pounds. We think he weighs about two hundred now. There are drawbacks to this reducing; AL says he has to take four steps before his pants move, and it's oftimes embarrassing. So long from Detroit.—"Red" Lewis.

THE PROPOSED ADMINISTRATION LABOR BILL

The Administration's replacement bill to supercede the Taft-Hartley Labor-Management Law, if enacted as proposed, will bring labor's legal position back into balance in a number of important details.

In broadcasting, the T-H Law provided for decimation of the ranks of unionized engineers by permitting the employers arbitrarily to designate any or all of its engineers "supervisors," then officially defining supervisors in such broad terms that, for example, approximately 20% of the unionized engineers have been declared by the Broadcasters disenfranchised of union representation and protection of their salaries, working conditions, and seniority. Broadcast management effected a large wedge between the staff engineers and the working-supervisory engineers at the last negotiations in 1947, by the simple expedient of granting of 5% *smaller* raise to the supervisors than to the staff engineers. Serious effort must be made to undo this wrong. Regardless of the fact that the proposed Administration Labor Bill will permit retention of these supervisors in the present union units, the broadcasters are uniting for the "Spring Negotiations" and plan to hit this wedge another blow. The several unions representing broadcast and television engineers recognize this tactic for what it is.

The closed shop would again be legal; States which have anti-closed shop laws would be superceded in all industries involving inter-state commerce; for broadcasting, the closed shop would be legal in all States.

Union welfare and retirement funds would again be legal; it would again be legal for unions to engage in political activities like any other citizen group; de-certifying union elections would be eliminated. All pending Taft-Hartley cases which cannot be based on the proposed labor law would be quashed.

In addition, the new bill would require binding arbitration clauses, and would make it an unfair labor practice for employers or unions to fail to give mediation service 30 days' notice of contract termination.

This is written just as the proposed bill has been presented to the Congress, and is therefore not complete. These are the highlights most concerning broadcast engineers.

AN OPEN LETTER TO THE EDITOR

To the Editor:

The year 1949 is being called the year of decision and rightly so. Not only for the country but for NABET as a union. This is the year that should see real progress in the relationship between NABET and the other unions in the New York area, a real awakening of the need for one radioman's union.

In a few short weeks we will again be seated around the contract table considering the conditions under which we shall work during the next year. Many ideas will be presented, some good, some bad, but it is our ideas and suggestions that will be incorporated into this contract. If you as a member of NABET do not make suggestions you will have no one to blame but yourself when this contract is signed.

It is the feeling of the writer that today we are, with the increased NABET officers, better represented than ever before when we set down to negotiate. One of our principal negotiators is Clarence Westover, who did such a fine fighting job in the past 18 months for the New York Chapter. His work

during that period of time was outstanding and his suggestions and opinions will be respected not only by the NABET membership but by management as well. The other unions also know Westy's word is his bond. The TV actions were ample proof of this.

The committee must decide what is best for the general membership for the coming year and by their decision will we rise or fall in the opinion of the other radio unions. If NABET is to lead, as we must, the decisions acceptable to the membership must not be produced by other unions and contracts, but must be decisions that are the brain child and ideas that have been presented by our membership.

Let's make this a "Year of Decision" by making this 1949-1950 contract the decisions of the entire membership of NABET, full of the ideas and suggestions that you as members of a free and independent union have submitted.

Let's call our contract for 1949-1950 The Decision Contract.

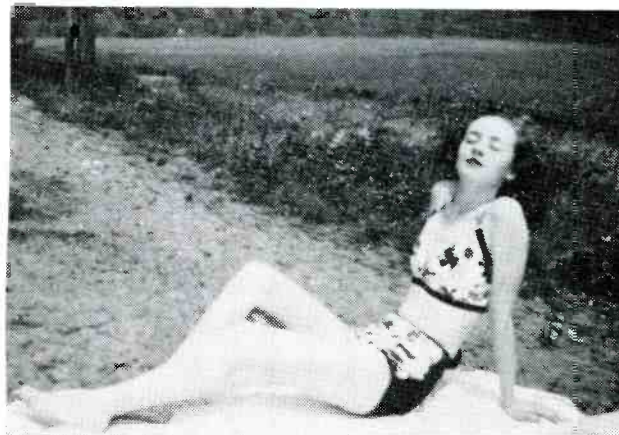
M. K. MOON,

Councilman Bound Brook Group,
New York Chapter NABET.

ST. LAWRENCE NEWS

By ALEEN A. CORBIN

The photographic revelation which accompanies this "news" is a reasonable kodak reproduction of one of our female control ops (now I'm being redundant, am I not?). This picture is the first of four; probably they will not all be as candid. Although I mentioned a few pertinent facts about Caroline before, I think this occasion calls for some additional data. One aspect is already disposed of. No further physical description is needed.



Caroline Mary Ryan

Caroline has been at WWNY for five years with time off now and then for some studies at Syracuse U, where she put in a few hours in the school radio workshop.

Just about everyone at the station had a rather unique bet with her. Caroline was wagering anywhere from one to ten dollars that, if she weren't married in five years (the bets started about two years ago), she would become a nun. If she became a nun, we lost. If she didn't, she lost. And if she got married, the bet was null and void. It is with great pleasure that I announce that nobody is going to be out anything. Caroline is marrying one Jim McDonald, formerly an an-

nouncer here and now at WSYR, Syracuse. An intelligent and ambitious lad, Jim also attends Syracuse U. At one time Caroline seriously considered entering a silent order, the kind where once you take your vows, you never speak aloud again without consent of the Mother Superior. This sort of monastic life probably strikes you as being a very dull existence, but the idea of Caroline's entering it does not seem particularly humorous. But, believe me, this can only be due to the fact that you don't know Caroline, not, of course, that she is any more loquacious than any other female, but that should be explanation enough.

Incidentally, the boys in Hollywood got the wrong idea. I didn't promise a picture of myself (lucky readers), but only of the other girls (well, I have at least to pretend to be modest, don't I?). However, since they insist (unh, unh, it isn't going to do them any good to protest now), I'll send a snap of myself next time. Kiddin' aside, I want to thank them for their interest. The gang here gets a real bang out of their articles. The reason I don't write oftener, fellows, is that besides working a full week (and sometimes, despite the broken heart of the management, I have to work overtime), I am taking twelve hours at the local college center, three of which is devoted to calculus. Why didn't someone warn me? Now I find that it is absolutely no trouble to contrast the Freudian prototype of a personality and its origin of motives with the Allport theory of functional autonomy of same. But, to find the volume of a solid that is such that any cross section perpendicular to an axis is a circle, with its radius equal to the square root of the distance of the section from a fixed point of the axis, the total length of the axis from the fixed point is 6, is quite a different story. For you mathematical geniuses this is probably just child's play. I wonder how I'll like money and banking this next semester?

On Christmas the station held its annual party. Now I mention this despite the fact that quite some time has passed since the holidays because WWNY does not have the ordinary old type of party consisting of eating, drinking, and entertainment by local talent. No, sir, that would be too normal. First (after they collect our money, naturally), we draw names and buy a small gift not exceeding a quarter in price for that person. We then attach a poem that connects the gift with some particular facet of the individual, if possible, but at any rate, one that is descriptive of the recipient. At the party a chosen one among us plays Santy Claus and passes out the gifts. But each person has to open his gift in front of everyone and read the ode, written for him. Oh, believe me, it's jolly good fun. I guess George Gebhard summed up the feelings of all of us when he said—but wait, isn't there a ban on that kind of language in literature in this state? But, anyway, we assured the rest that George wouldn't really get violent. I received a pocket book mystery story, a rather unimaginative gift, especially since I never read them. However, this must have been because the person used all his imaginative energy on his perm, which follows:

Just pushing buttons and pulling plugs
And looking at homely announcers' mugs
Is pretty tough on our fair Aleen
Certainly enough to make her scream.

So here's a present to pep up your day
While you are drawing the company's pay
Just settle back in your old arm chair
Put your feet on the consloe without care.

It's the time of the year when anything goes
From "Two Front Teeth" to "Buttons and Bows"

So throw me a "mike" and give me your ear
While I say 'Merry Xmas' and 'Happy New Year.'

Last Thursday, January 28, the station repeated its special infantile paralysis show. They get all the local, well-known talent that they can corral in the studios, and then they run a request show. It is really surprising how much enthusiasm such a small town as Watertown and the even smaller surrounding communities manifest at these times. Altogether the station collected eleven hundred dollars between 10 P.M. and 2 A.M. A local businessman named Bill Hardiman came up to the station, and while he was there his wife called and said that she would donate ten dollars to hear her husband sing "My Bill." Hardiman said he would double that if he didn't have to. As a clincher, a friend(?) of his called and said he would donate twenty-five dollars *not* to hear him, too. Wonder what kind of a voice he's got?

Union-wise things have been going very well here, too. Dave Lane, our chairman, is a very hard-working guy. He has been holding general meetings on the first Tuesday of every month. Dave has appointed several committees to make the chapter more efficient. There is one in charge of public relations, of membership, of keeping the rest abreast of new technical developments, and, finally, one in charge of entertainment.

Things up to Massena are progressing, too. As I have said before that station is much smaller, and the turnover is sometimes quite rapid. In a letter from Ray Bistany the other day, he said that he and Stan Ivill have been joined by a new full time engineer, William Willig, and a part time one, Hal Perlis, who also goes to Clarkson College.

Stan and Ray went to school together at RCA, Stan graduating three months after Ray. Previously Stan had been working in the office of the Bureau of Internal Revenue. Ray says he is a big help right now in making out his income tax! If there is a loophole, Stan will find it for him. I think I'll change and correspond with Stan for the next couple of months. The fellows have been friends for a long time, having gone to school with one another.

Their FM has been on the air since the last part of last year. This is good news to the FM listeners in Watertown. WMSA carries ABC, which is very difficult to get here. Like WWNY FM, WMSA FM specializes in carrying all the local sports. Ever since this policy was inaugurated, the hooperating of both the FM stations has jumped enormously. None of these events are ever carried on AM, despite the fact that local interest runs high. Did someone mention the word "Coercion"? Why no such thing. We're just trying to "persuade" them that FM is indispensable. Every home must have one. (After all, the Brockway Company can't afford to run FM on a sustaining basis indefinitely!).

NABET EMPLOYMENT SERVICE

Due to the day-to-day changes in status and availability of unemployed NABET members, it has not been deemed practical to publish such a list of names in each issue of the Journal. Instead, each available member should immediately notify the National Office, with copies to his Chapter Chairman, of availability together with brief resume of experience, etc., and notify them immediately of any change in status or availability. The Chapter Chairman for the area, and the National Office, each of whom are called upon to fill vacancies, will thus be kept up-to-date to the mutual advantage of all concerned.

MORE CHANNELS FOR TELEVISION

Discussing the challenge of what he described as television's "phenomenal rise," Elmer W. Engstrom, representing the Radio Corporation of America and the National Broadcasting Company, at a recent hearing before the FCC, outlined several considerations in the orderly development and extension of present commercial television service.

Mr. Engstrom, Vice President in Charge of Research of RCA Laboratories, declared that in the three years since the Commission's 1945 Allocations Decision, television had "caught the enthusiasm of the public, the broadcaster, the advertiser and the entertainment world."

He said that the public, as of June 30, had invested \$228,000,000 in television receivers, being produced at that time at the rate of 65,000 a month by more than fifty competing manufacturers. The number of television stations on the air has jumped from six to thirty-one as of the same date, he added, and permission has been granted for construction of seventy-eight additional stations, while 285 applications are pending. Of this total of 394 stations, five are owned and operated by the NBC.

This rapid progress of television resulted as follows: First, the Commission's decisions on standards and allocations which provided a stable basis for planning; second, the manner in which the radio industry expedited conversion to peacetime manufacturing, and took the maximum advantage of wartime developments; third, vision and courage of broadcasters which prompted them to go ahead, in the face of monetary losses, during the pioneering years of operations, and with faith in the future of television as a service to the public.

"Commercial television service is today a reality, and this reality has been built upon the bedrock of the twelve channels allocated to television by the Commission," affirmed Mr. Engstrom. "In our opinion, the further development and expansion of television must continue to be built upon the basis of these twelve channels.

"RCA-NBC agree with the Commission that more channels are necessary for commercial television. It is our desire that as many people as possible in the United States have an opportunity to receive television service. We are willing and anxious to work with the Commission and the industry to advance this objective as rapidly as possible. In so doing, there are several possible avenues of approach.

"RCA-NBC feel that the Commission should authorize the use of higher power for television stations. We feel that it is only by the use of higher power that improved reception can be provided for the public throughout the service area of a television station. This higher power would make possible the simplification of the receiving antennas and the installation of television receivers."

A second possibility for expansion consists in the assignment of additional channels for television below 300 megacycles. Accordingly, Mr. Engstrom urged the Commission to examine thoroughly the allocations below 300 megacycles to determine whether some additional channels could be made available there for television.

Mr. Engstrom suggested further that the Commission should continue to explore the characteristics of the band 475 to 890 megacycles to determine whether it is feasible also to assign space there for the expansion of television.

The problem of using this latter space, he pointed out, is a complicated one which must be approached cautiously, with the full understanding of both the capabilities and limitations of this band.

In reference to his statement on the RCA-NBC position on the question of introducing television to the upper frequencies, Mr. Engstrom said:

"We feel that any plans for commercial use of the uhf band should provide for the use of the same standards, insofar as they relate to interchangeability of operations as those in use on the present 12 channels. While, of course, the opening of these higher frequencies to commercial service would not immediately produce an answer to the problems which the industry and the Commission face, it would serve to stimulate the commercial development of equipment and shorten the time until the problems of this region would be solved."

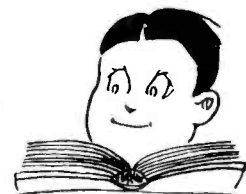
Recalling that for many years RCA has carried on research in the upper reaches of the radio spectrum, Mr. Engstrom declared that allocation by the Commission of frequencies above 475 megacycles for the future use of television and research with respect to color television had stimulated RCA study of this area of the spectrum. He pointed out, for instance, that RCA had begun propagation tests in Washington earlier this month.

"With the announcement of this hearing," he said, "our plans were altered and

it was decided to shift some of the propagation tests from New York to Washington. By expediting the work of installation we were able to get on the air with transmissions at a date prior to the beginning of these hearings. The present transmissions will be continued for a suitable period of time in order to permit persons who so desire to make investigations, and in particular, to give the Commission ample opportunity to make such studies as it requires."

In conclusion, Mr. Engstrom declared: "We are here to help the Commission by supplying data in the testimony which follows and to develop any points which the Commission may regard as relevant. Just as crystallization of standards and allocation of channels a few years ago resulted in today's television industry and service, an orderly progression leading toward assignment of additional channels will permit the radio industry and the broadcasters to make concrete plans for expansion of television service to the American people and to do this without disturbance and with full realization of the best public interest."

If It Concerns
The Broadcast
Engineer



—he will read it in the
**BROADCAST
ENGINEERS'
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A new television picture tube which will give more viewing area in low-priced sets has been developed by General Electric. The new tube has a diameter of eight and one-half inches and will cost no more to build than seven-inch tubes now used for low-priced sets. It will offer, however, 50 per cent more picture to set owners. Tube Divisions' Manager, J. M. Lang called it a major move to give the public larger pictures in low-priced sets. "Cost of the new tube," he said, "will probably be no more than the present cost of the seven-inch tube." He estimated that the picture on a seven-inch screen covers about 26 square inches of area. The new eight and one-half inch tube easily handles 39 square inches, a 50 per cent larger picture. The new tube employs magnetic focussing and deflection.



Mercury, "messenger of the gods," was slow compared with Ultrafax—which moves at the speed of light.

This messenger delivers a million words a minute

Recently, at the Library of Congress, a distinguished audience saw documents flashed across Washington by a new means of communication . . . and reproduced *in facsimile*.

This was Ultrafax in action—a super-fast television communications system developed at RCA Laboratories. Reproductions of *any* mail—personal, business, or military . . . including police descriptions, fingerprints, bank drafts, government records—can travel at 186,000 miles a second!

Material to be sent is placed before an RCA "flying spot" scanner, and transmitted by ultra-high frequency radio signals. Miles away the pictures appear on a picture tube and are photographed. Negatives are ready for printing or projection in 40 seconds.

Eventually, when Ultrafax comes into commercial use, a complete Sunday paper—every word, every picture—may cross America in 60 seconds . . . a letter in the twinkling of an eye.

Science at work . . .

Ultrafax is but *one* of scores of major achievements pioneered at RCA Laboratories. This leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

Examples of the newest developments in radio, television, and electronics may be seen in action at RCA Exhibition Hall, 36 West 49th Street, N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.

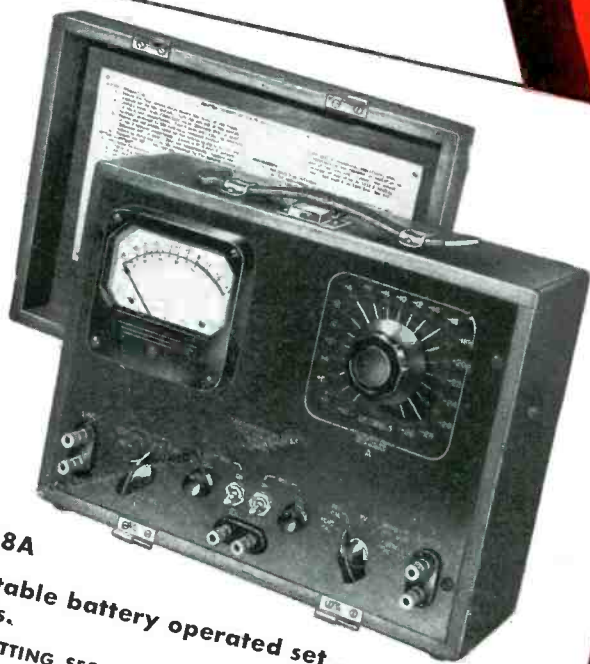


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To accurately measure transmission characteristics of audio systems and their components

These transmission measuring sets are accurately designed instruments for the measurement of the transmission characteristics of audio frequency communication systems. This equipment may be applied to measure gains or losses through amplifiers, repeaters, attenuating networks or communication lines without the use of laborious calculations, complex setups, or sensitive meters. The sets shown here are sturdy compact units built to exacting specifications. Your further inquiry is invited. Technical questions will be answered by our Engineering Department.

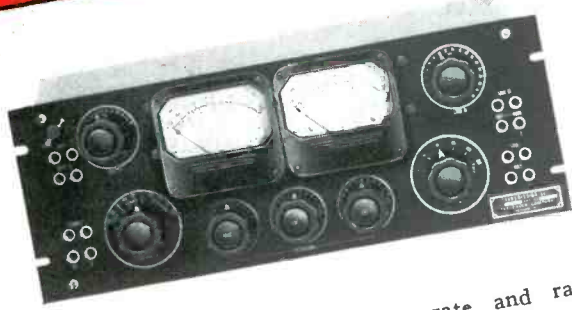


TYPE 8A
A portable battery operated set . . . weight 14 pounds.

TRANSMITTING SECTION: Contains an internal oscillator, operating at a frequency of 1000 cycles. Output impedance is 600 ohms either balanced or unbalanced to ground. Output levels are 0 DBM* and -20 DBM*.

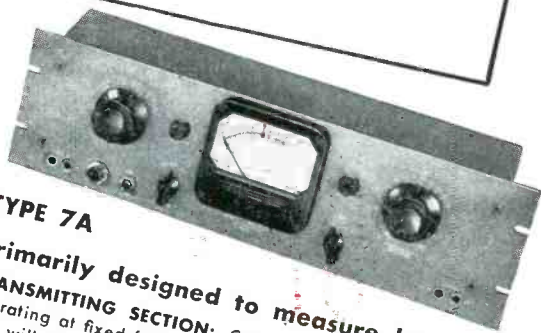
RECEIVING SECTION: Frequency response is ± 0.3 DB from 30 to 10,000 cycles. Input impedance is 600 ohms terminating, and 6300 ohms bridging either balanced or unbalanced to ground. Will measure levels of -30 to +10 DBM* at zero VU meter indication, when terminating a line.

DIMENSIONS: 9 $\frac{3}{8}$ " high x 6 $\frac{1}{2}$ " wide x 12 $\frac{7}{8}$ " long.



TYPE 10A
The industry's standard for accurate and rapid measurement of transmission characteristics of audio systems including AM & FM broadcasting.

1. Completely shielded wide range isolation transformers used in the Input, Source and Load networks. Set functions equally well from balanced or unbalanced oscillators and measures balanced or unbalanced systems.
2. Accuracy ± 0.1 DB, 50 cycles to 15 KC.
3. Accuracy independent of level over the range +26 to -100 DBM.
4. Attenuation steps of 111 DB in steps of 0.1 DB.
5. Source and load impedances within $\pm 2\%$ over range 50 cycles to 15 KC.



TYPE 7A
Primarily designed to measure losses.

TRANSMITTING SECTION: Contains an internal oscillator operating at fixed frequencies of 500, 1000, and 2500 cycles and will provide output levels of -13, 0, +4, and +10 DBM*.

RECEIVING SECTION: Frequency response is ± 0.3 DB from 30 to 10,000 cycles. Will measure levels of -30 to +10 DBM* at zero VU meter indication when terminating a line. Impedance is 600 ohms in both the transmitting and receiving sections.

* DBM is based on a reference of 1 MW into 600 ohms.