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Ed. Stolzenberger, Editor
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The Only Autonomous Union of Radio-TV Engineers & Technicians

The Broadcast Engineers' Journal

THE 1949 I. R. E. CONVENTION

and

OFFICIAL I. R. E.

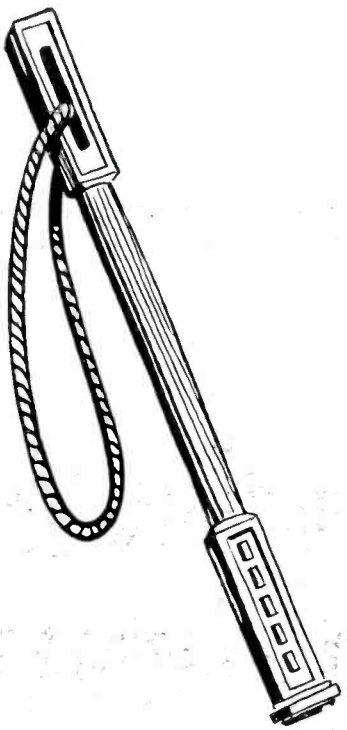
Condensations of Technical Papers

APRIL 1949

Vol. 16 No. 4

SINCE 1934 . . . OF, BY AND FOR

THE BROADCAST ENGINEER



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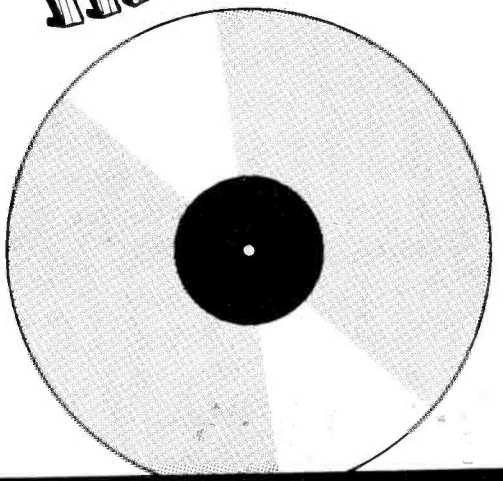

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THE BROADCAST ENGINEERS' JOURNAL

ED. STOLZENBERGER, EDITOR AND BUSINESS MGR.

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VOLUME 16, No. 4 — 135 — APRIL, 1949

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Nothing appearing in The Broadcast Engineers' Journal shall be construed to be an expression of The Broadcast Engineers' Journal or the National Association of Broadcast Engineers and Technicians, but must be construed as an individual expression of the author or authors.

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OF, BY, and FOR THE BROADCAST ENGINEER

NABET is **your** democratic union, because
NABET rank-and-file **members control** their union.
NABET means **good** trade-union practice.
NABET is the **progressive** union in the Broadcast Field.

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Pertinent Topics from the National Office

from

C. WESTOVER
Exec. Secy., NABET

The National Association of Broadcast Engineers and Technicians is being subjected to attack by Unions that are desirous of driving NABET from the Television and Broadcast fields. These attacking Unions are desirous of taking over the jobs and security of NABET members. In order to accomplish these ends, charges are now being published that NABET is "raiding" the field in which these other Unions normally operate.

The NABET has a membership in the Television, Recording and Broadcasting industries of less than 3,000 members. The IATSE has a membership, of stage hands and projectionists in theatres and motion picture houses of 50,000 to 60,000 members, about 40% of whom are unemployed, whom the IA President wants to put into Television stations. For NABET to attack the IATSE would be similar to putting a boy in the ring with Joe Louis. The IBEW has a membership estimated at 400,000 electricians, of which less than 1% are in the radio industry. It is quite evident that NABET has picked quite a sizable opponent to "raid" if this statement is to be credited.

The NABET has, since the experimental days of Television broadcasitng, performed the functions of operating projector type of equipment for film programs (after pioneering the necessary electronic and mechanical changes to adapt the machines to television needs) in the plants of its contracting companies. It has been, and still is, performing the lighting operations referred to by the IATSE from these early experimental days to the present time. The Union men who perform these operations are members of NABET by free choice and have indicated clearly that they do not want to be represented by the IATSE or the IBEW under any circumstances.

The close integration of the many technical operations required in Television broadcasting makes it imperative that these split-second operations be performed by a crew of engineers whose knowledge of the art, and the operations involved, enables them to form a closely knit unit. This would be impossible if the crew members were split among different Unions.

As for the so-called "inroads" by NABET upon the IATSE's field of operation, NABET is a Union of Radio, Recording and Television technicians and confines its operations to those fields. NABET has not gone into theatres or motion picture houses to "raid" the IATSE's stage hands' or projectionists' jurisdiction and does not intend to do so. Rather, the IATSE is now attempting to force its way into Television broadcasting, a field that has been NABET's for years without dispute.

The IATSE's claim amounts to the statement that radiomen must get out of the fields that they have developed and turn over to the IATSE, as the IBEW had done, in accordance

To Page 3

A Message to the Members of NABET

from

JOHN R. McDONNELL
President, NABET

April and May are perhaps the most important months of the year for NABET members. During the month of April, we should all be surveying the record of our Chapter Chairmen, with an eye to the elections on May 1. This year, perhaps more so than ever before, each Chapter should make a determined effort to select its most competent and devoted NABET member as Chairman. In many cases, perhaps in most cases, this man is the present incumbent, in which case the members should feel no qualms about drafting him to serve another term. The Union will need his experience and leadership.

Where the Chapters find it necessary, for one reason or another, to elect a new Chairman, the members should search their ranks thoroughly for the best available material. The man you elect should not be one who merely talks the best union, but should be one who thinks and acts sincerely along lines intended to promote solid NABET practices. Don't be swayed by a lot of noise, but arrive at a decision which will provide you with not only capable leadership in the Chapter, but forceful, intelligent representation on the National Council.

You, the NABET member, should give equal consideration to the selection of your other local Chapter Officers, the Secretary Treasurer and the Group Councilmen. These men share with your Chapter Chairman the responsibility of the conduct of chapter affairs and this year, of all years, they should be the best men you can find among you for the job.

Nineteen forty-nine finds NABET faced with a potential battle with other unions over vital jurisdiction in television. The membership should make a determined effort to keep acquainted with the situation as it develops, and sincerely strive for an understanding of the problems facing the Union. The National Officers are working unstintingly on your behalf in this respect and need every iota of cooperation and intelligent support of the membership.

As this goes to press, the network contracts (NBC, ABC, and WOR) will be in the process of negotiation. If past experience is any criterion, there will be rumors and counter-rumors, mostly without foundation or fact, to be heard for the listening. I strongly advise network members in particular to pay no heed to such unfounded statements, but to depend upon your Chapter Chairman and Group Councilman as sources of information as to the progress of negotiations. The unchecked spread of unfounded rumors can do more to embarrass and hinder the effective functioning of your Negotiating Committees than any one other factor. Your Chapter Chairman will be supplied with information on the progress of negotiations immediately it is available for distribution. See him and get the facts.

J. R. McDONNELL,
President—NABET

FLESH and BLOOD—WHOSE?

Like a carnivorous animal, the IATSE is looking for blood, and flesh. The blood and flesh are the jobs and salaries of Television Engineers, presently you and I.

The latest reported attempt is in Hollywood where the IA offers to put Television cameramen to work on a trial basis —for free.

This Hollywood station, NABET contract, is manned by a staff, many of whom formerly in the IA and left it after receiving that proudly proclaimed "benign" treatment we hear about. Remember back to 1928—1932 the radiomen who went into movie sound work! They acted as tutors to IA members and then were given the heave-ho. The crew at this Hollywood station will have no part of the IA.

The IA has quite a record of going into stations and writing contracts at the lowest salaries in the community. Now, the IA starts to offer its members' services—for free—just to get a foothold. The question arises, what kind of a union is it that it will allow its members to work unpaid? Where is the payoff? Even IA members must eat. Who pays who— for what?

Is this part of the IA-IB agreement?

—o—

NAT. OFFICE—From Page 2

with that Union's "under the table" agreement with the IBEW's President, Dan Tracy. This idea is not acceptable to NABET. It is doubtful if it is acceptable to the IBEW's own Radio-Television membership.

Certain acquiescent radio managements would like to see such an arrangement because of the ease with which "ideals" can be made with the Presidents of some large A F of L Unions. NABET is headed by men of long years of experience in the broadcasting industry and their sole purpose is to protect the jobs and security of the radiomen. NABET's leaders are not amenable to "deals" that would cause loss of security or jobs to its members, and will not accept involuntary peonage under the self-proclaimed "benign" protection of the IATSE or the IBEW.

NABET, in sticking to its beliefs and principles, is fighting for more than ITS members' jobs and security. It is fighting for ALL radiomen, even those in the IBEW, and those still unorganized. Should NABET be defeated by weight of numbers, collusion and chicanary, all radiomen in this country will be forced, eventually, to give up their jobs to the IATSE.

—o—

NOTICE

The NABET National Office requires additional file copies of the official Minutes of the First, Second, and Fifth National Council Meetings. Contact Mr. H. E. Hiller, NABET Secretary-Treasurer if you have these minutes. If you do not care to permanently release them, NABET will be interested in having them photostatted and originals returned to you.

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

NABET CERTIFIED STATIONS AS OF MARCH 1, 1949

Akron, Ohio ..... WHKK
Albany, N. Y. ..... WABY, WOKO
Atlanta, Ga. ..... WAGA, WAGA-TV, WAGA-FM
Binghamton, N. Y. ..... WINR
Bound Brook, N. J. ..... WNBI, WRCA, WNRE, WNRA, WNRI, WNRX
Canton, Ohio ..... WHBC
Chicago, Ill. ..... WENR, WENR-TV, WLS, WMAQ, WMAQ-FM, WNBQ, WAIT
Cleveland, Ohio ..... WHK, WTAM, WTAM-FM, WNBK, WHKX
Council Bluffs, Ia. ..... KSWI, KFMX-FM
Denver, Colo. ..... KVOD, KFKA, KOA
Detroit, Mich. ..... WWJ, WWJ-FM, WWJ-TV, WJLB
Dixon, Cal. ..... KNBA, KNBF, KNBI, KNBX (Int'l Broadcast)
Elmira, N. Y. ..... WENY, WENY-FM
Endicott, N. Y. ..... WENE, WENE-FM
Fairmont, W. Va. ..... WMMN
Flint, Mich. ..... WBBC
Ft. Wayne, Ind. ..... WKJG, WKJG-FM, WOWO, WOWO-FM
Greensboro, N. C. ..... WBIG
Kingston, N. Y. ..... WKNY
Los Angeles, Cal. ..... KFI, KFI-TV, KFI-FM, KECA, KECA-FM, KECA-TV, KNBH
Louisville, Ky. ..... WGRC, WBOX-FM
Massena, N. Y. ..... WMSA, WMSA-FM
Newburgh, N. Y. ..... WGNY
New York, N. Y. ..... WOR, WOR-FM, WOR-TV, WJZ, WJZ-FM, WJZ-TV, WNBC, WNBC-FM, WNBT
No. Platte, Neb. ..... KODY
Omaha, Neb. ..... WOW, WOW-TV
Philadelphia, Pa. ..... KYW, KYW-FM
Pittsburgh, Pa. ..... WCAE, KDKA, KDKA-FM, KQV, WJAS
Poughkeepsie, N. Y. ..... WKIP, WHVA
Raleigh, N. C. ..... WPTF
Richmond, Va. ..... WLEE
Rochester, N. Y. ..... WHAM, WHTM, WHFM, WRNY, WRNY-FM, WHEC, WHEC-FM
Rockford, Ill. ..... WROK
San Diego, Cal. ..... KFSD
San Francisco, Cal. ..... KNBC, KGO, KGO-FM, KGO-TV
San Mateo, Cal. ..... KSMO, KSMO-FM
Schenectady, N. Y. ..... WGY, WRGB, WSNY, WGFM, WGEA, WGEO, WGEX
Springfield, Mass. ..... WSPR
Syracuse, N. Y. ..... WOLF, WOLF-FM, WAGE, WAGE-FM, WFBL, WFBL-FM
Washington, D. C. ..... WMAL, WMAL-TV, WOL, WRC, WRC-FM, WNBW, WOIC
Watertown, N. Y. ..... WWNY, WWNY-FM

ADDITIONAL CERTIFIED UNITS

New York City—NBC Traffic/Comm., ABC Traffic/Comm., NBC Sound Effects, NBC Model Shop, RCA/Victor—Recording, Muzak Recording, RCA/Victor—Matrix, WOR (Draftsmen, Electricians and Air Conditioning).

Chicago—RCA/Victor Recording, Universal Recording, NBC Traffic/Comm., ABC Traffic/Comm.

Hollywood—NBC Air Conditioning, NBC Sound Effects, NBC Traffic/Comm., ABC Traffic/Comm.

San Francisco—ABC Traffic/Comm.

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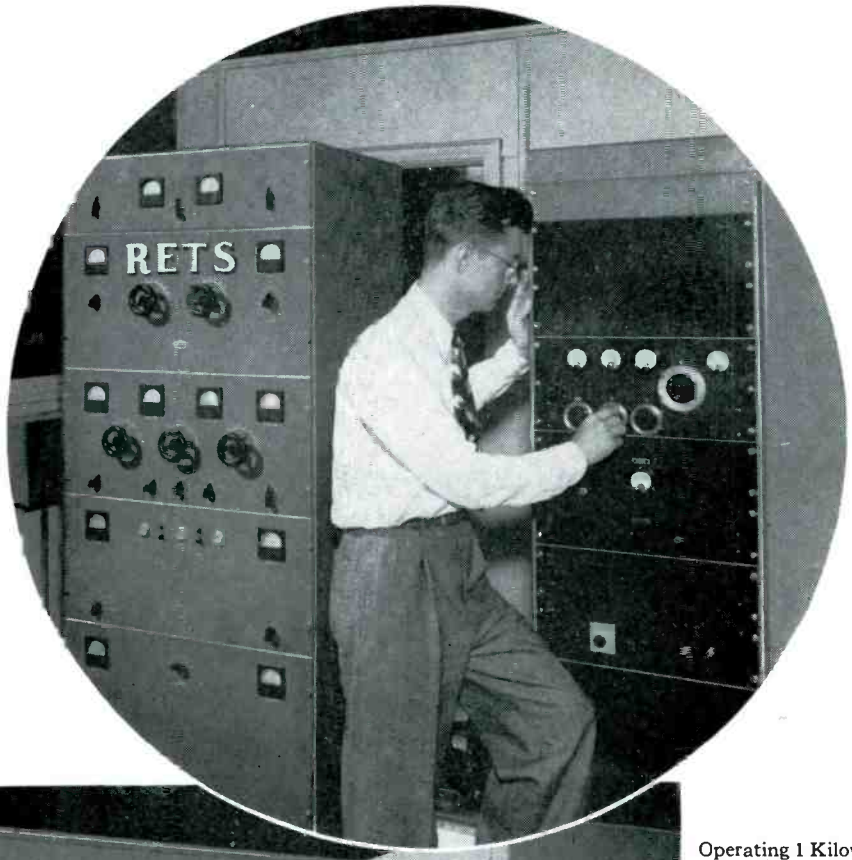
Unique Policy Produces Trained Students WITH Actual Experience



Operating 1 Kilowatt AM Transmitter.

Pictured on these pages—Our completely new and modern AM-FM Television Transmitter Rooms, Control Room and Studio. Specially designed to give the students full Commercial practices.

FM Transmitter and Doherty Transmitter

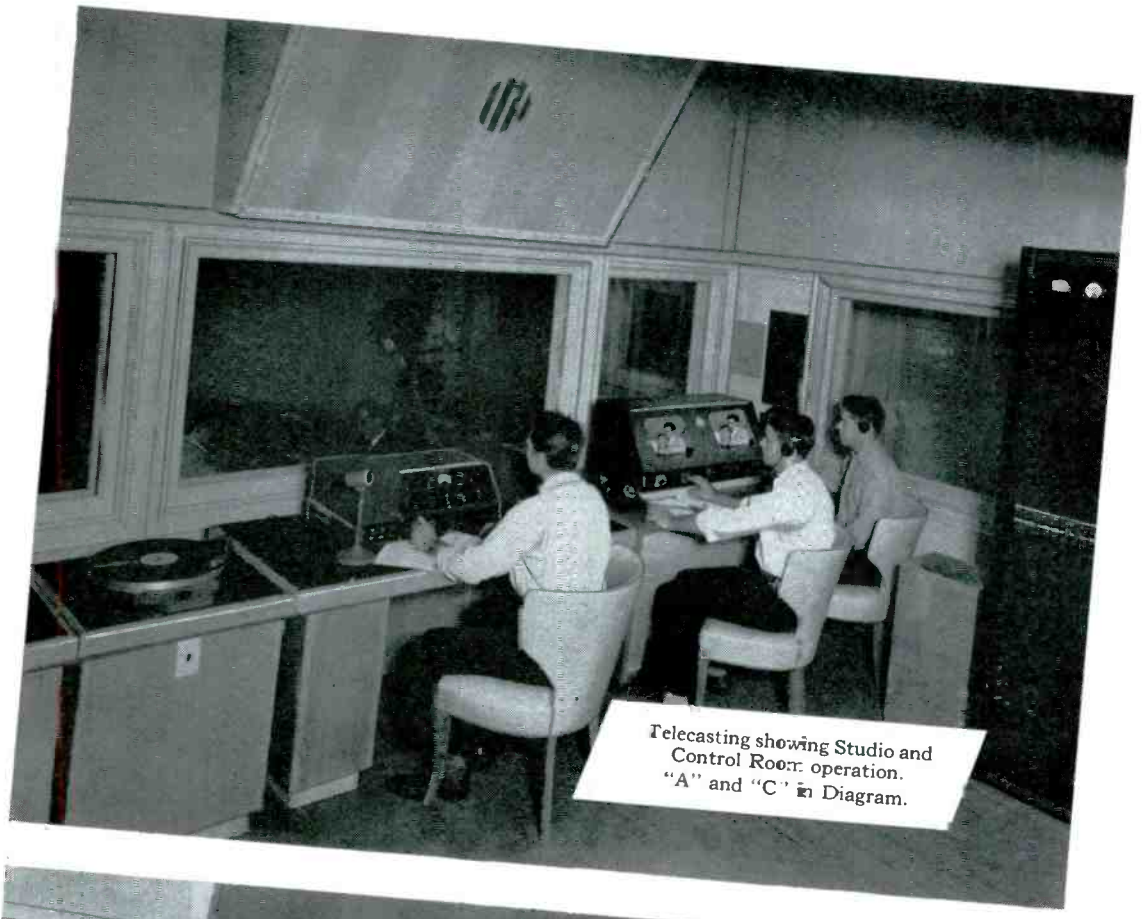
The R.E.T.S.—Radio Electronic Television Schools were founded in 1935, in Detroit. On a recent personal visit to the RETS, we were impressed with the high aims and policies of the school, and felt our readers should know about them.

A school of this type, offering specific job training, cannot long attract students if it cannot place its graduates—and keep them placed thru competence and employer-satisfaction. As we all know, there are dozens of radio schools throughout the country, many of which feature and survive on their correspondence courses. Correspondence training has one inherent weakness, and that is the complete absence of applictaion of the theoretical instruction to the everyday job that the graduate will be expected to regularly perform.

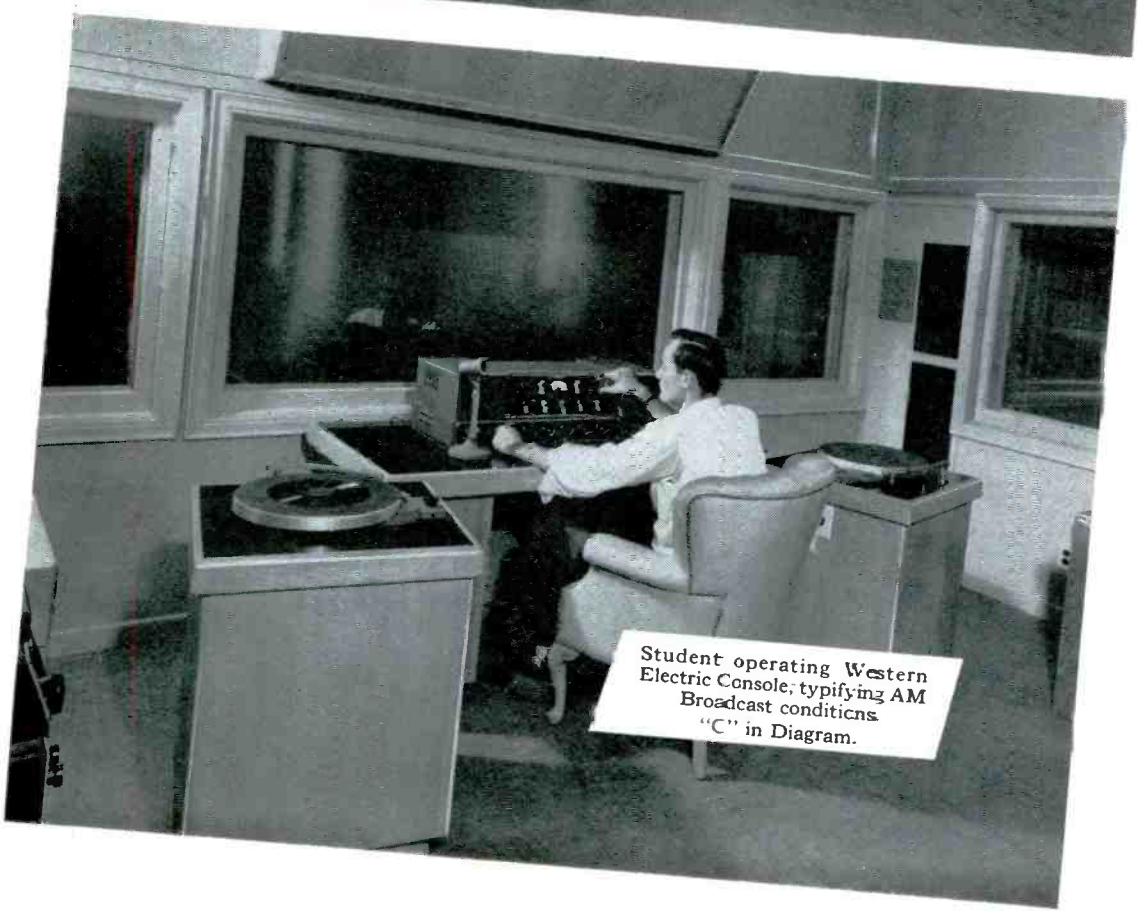
R.E.T.S. has no correspondence courses, which means they have economically and professionally survived since 1935 on the merit of their residence training, and the placement and employer-acceptance of their graduates.

We met their chief instructor, personnel director, and many of the classroom instructors and lab men. We had found *half* the answer; the attitude and emphasis was on *application*—and is gotten over subconsciously to the student body thru utilization of class room instructors with individual practical radio and television backgrounds of ten to twenty years. The second half of the answer was immediately apparent; the R.E.T.S. is a complete AM, FM and Television broadcast plant, from turntables and mike booms, to Image Orth TV cameras, sync generators and TV transmitter, and a complete maintenance and service section with the latest test equipment. That was it—qualified instructors with actual broadcast and TV experience, *and* the actual operating equipment with which to train and provide experience for the students.

The R.E.T.S is unique in another way. The students continue their studies voluntarily—they are not under obligation of signed contracts or notes, which would have to be paid whether or not the student lost interest or could not make the grade. The R.E.T.S is strictly "pay-as-you-go." The several courses must be completed in sequence. Course 1, Basic Electronics and Radio Service, requires 825 hours of class room instruction, 5 days a week, 5½ hours a day, for 30 weeks, at a cost of approx. $435. Course 2, Fre-



Telecasting showing Studio and Control Room operation. "A" and "C" in Diagram.



Student operating Western Electric Console, typifying AM Broadcast conditions. "C" in Diagram.

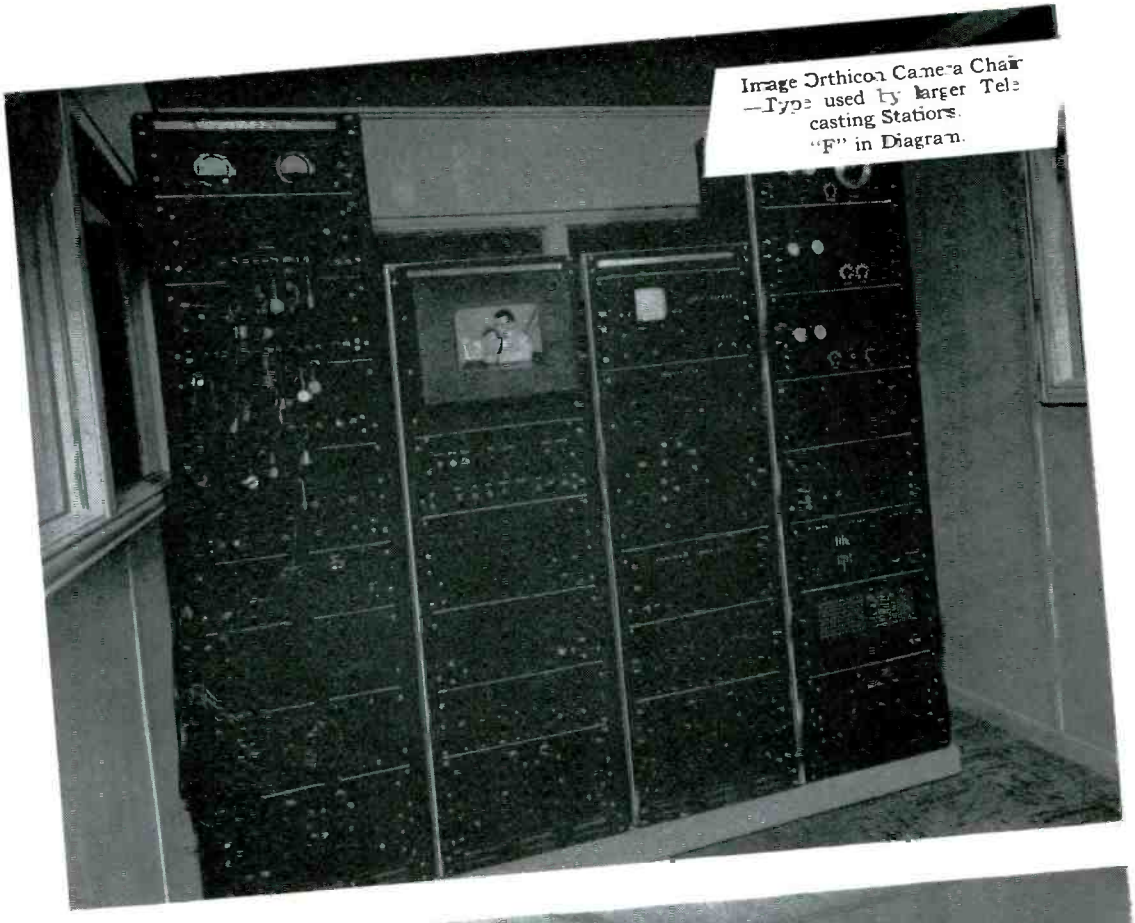
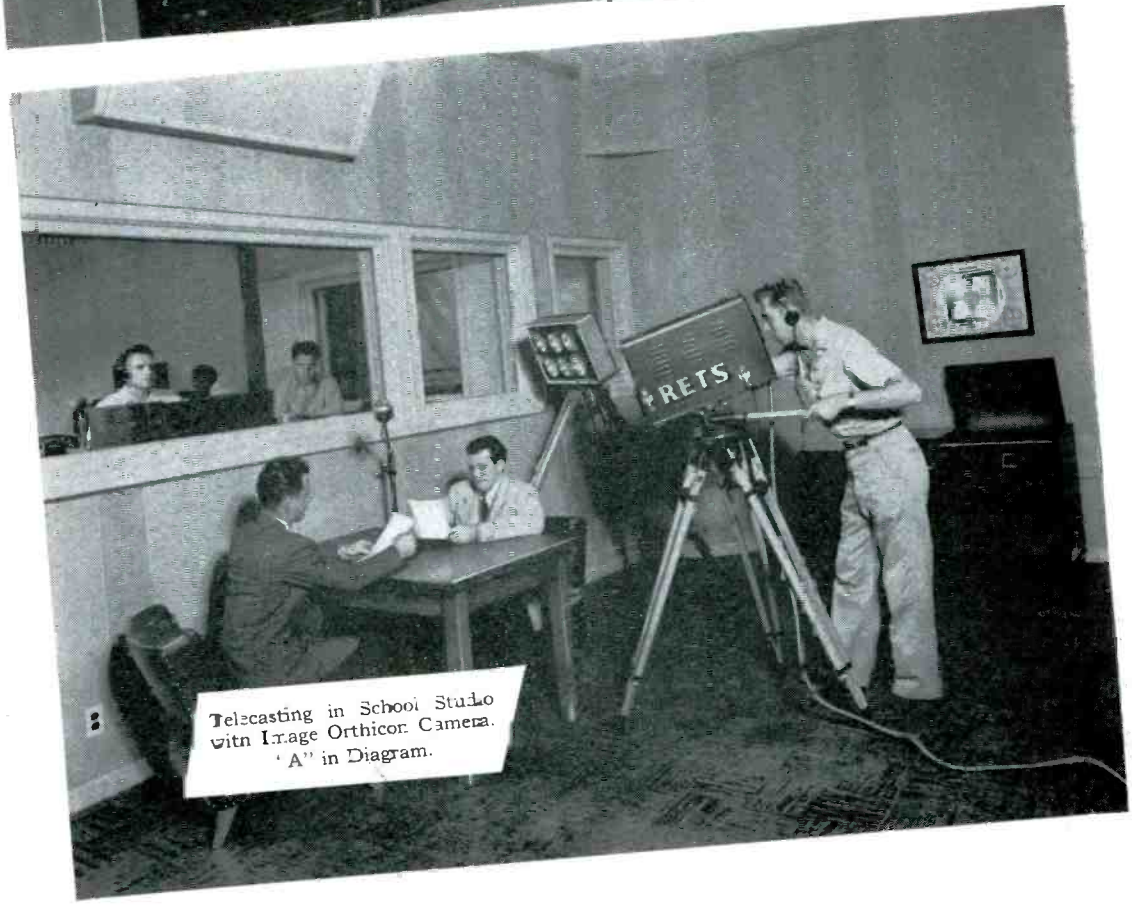


Image Orthicon Camera Chain —Type used by larger Telecasting Stations. "F" in Diagram.



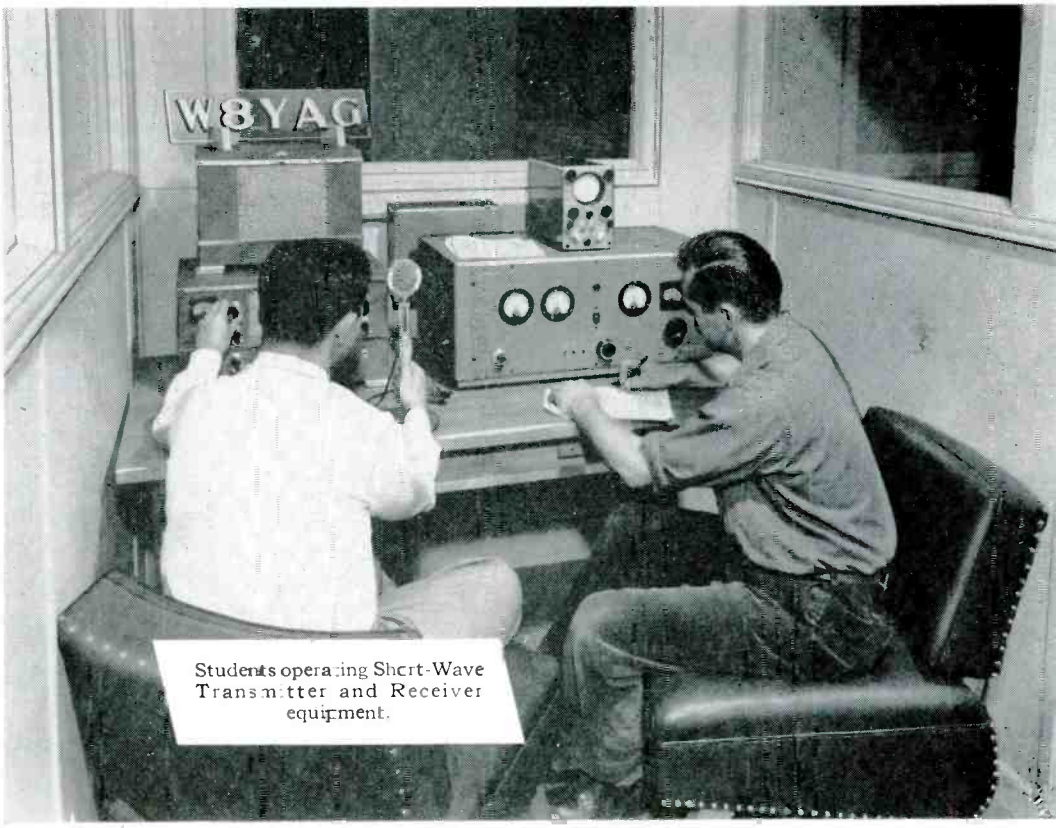
Telecasting in School Studio with Image Orthicon Camera. "A" in Diagram.

quency Modulation, requires 440 class room hours of instructions, 5 days a week, 5½ hours a day, for 16 weeks, at a cost of approx. $232. At this point, the student is required to obtain a First Class Radiotelephone License. The student is then eligible for Course 3, Television Technician, which requires 24 weeks, 5 days a week, 5 hours a day, for a total of 600 hours of instruction. Course 4 is the culmination of the R.E.T.S. training, and requires 30 weeks, 5 days a week, 5½ hours a day, for a total of 825 hours; Course 4 is titled, "Practical Television and Communication Engineering." The total course requires 100 weeks, a total of 2690 hours of instruction in radio theory, mathematics, radio laboratory, shop practice, broadcast maintenance and studio operation, transmitter operation, playback and recording operation, television camera chains, and remote pickup practices. The graduate was required to construct, wire, and test an AM, an FM, and a TV receiver, to locate and clear trouble on them. He was required to build cathode ray oscillographs, square wave generators, signal generators, etc., and with them, to locate and clear trouble on commercial broadcast equipment and Image Orthicon television camera chain.

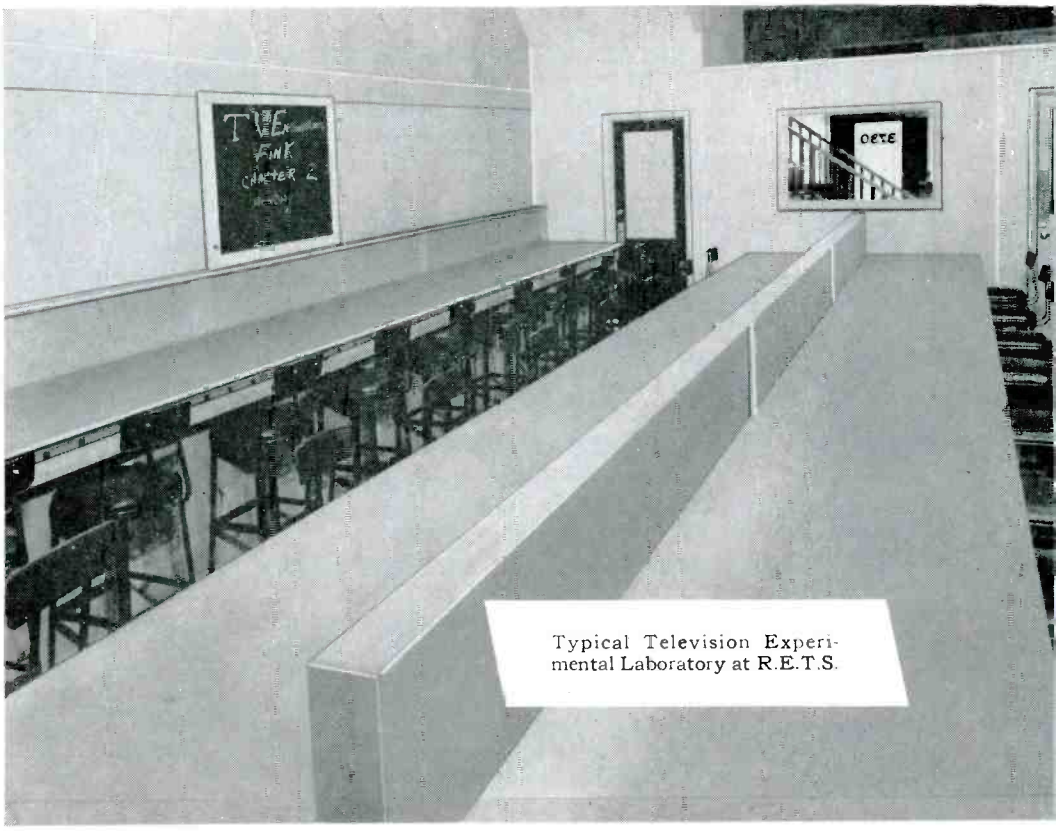
It is also the policy of the R.E.T.S. to require their students to obtain part time employment in the vicinity. Early in the overall course, the student is required to apply his training (at regular wage rates) in the servicing and maintenance of electrical appliances; as his training progresses, the R.E.T.S. makes the necessary contacts which will give the student the chance to apply his training in the broadcast receiver service business (at regular wage rates). Finally, the student is competent in the TV field, and is required to gain industry experience in the service and installation of TV receivers. Thus. throughout the overall course, the student's feet are kept firmly "on the ground." The student learns early in his training, the important element of "job responsibility" and is lectured on the important aspects of "personality," "dependability," and the art of "getting along" with people—his fellow workers and the employer, alike.

The numerous well-equipped class rooms, service, lab, and construction shops are not shown here. We have shown those photos that bear out the operational experience given the students.

And that's the story behind the R.E.T.S., and how they produce that rare combination of technical training and operational experience, *the student with experience* and a real sense of responsibility to himself, his fellow workers, and his employer.



Students operating Short-Wave Transmitter and Receiver equipment.



Typical Television Experimental Laboratory at R.E.T.S.

See page 8 for floor plan of R. E. T. S.

Review of Current Technical Literature

By Lawrence W. Lockwood

Bell Laboratories Record—November 1948

ALPETH CABLE SHEATH—R. Ashbaugh

A new type of cable sheath is now being produced in considerable quantity called Alpeth which is a complete covering of aluminum, water resistant cements and polyethiene developed by the Bell labs as a possible substitute for lead alloy sheaths.

Communications—November 1948

THE WBZ RADIO AND TELEVISION CENTER—W. Hauser

Recently completed center on soldiers field road along the Charles River in Boston, houses 10 KW FM and 5 KW TV transmitterse and studio and ausio facilities for WBZ-WBZA, WBZ-FM and WBZ-TV.

A SPEECH INPUT INSTALLATION FOR TWO STA-STATIONS—F. Bartlett

Additional FM consolette added, without disturbing AM on-the-air schedule to provide handling of programs from any of five studios, network or playback tables without affecting operation of AM console.

CUSTOM-BUILT DUAL RECORDING CONSOLE SYSTEMS—A. Karker

Dual recorders built into consoles which can be used in two single channel recorder work, dual recording of same program or for continuous recording without the necessity of a break to change recording blanks. Console can also be used as a program monitor, when not recording, or receive the cue and monitor program being recorded.

HIGH FIDELITY TAPE RECORDING—R. Baruch

A review of the design and application characteristics of professional type tape recorders now available, editing practices and the features and drawbacks of the systems.

A REPORT ON MICROWAVE TV NETWORKS—S. FREEDMAN

Part II—Circuity of NY-Boston net. Characteristics of links between Chicago-Milwaukee, NY-Schenectady, South Bend-Chicago and Philadelphia-Washington. Features of Microwave equipment, including design and application features of tubes and antennas used in linq systems.

Proceedings of the IRE—December 1948

SIGNAL TO NOISE RATIO IN AM RECEIVERS—E. Fubini, D. Johnson

Experimental tests have been made to determine the effect of linear detectors upon the signal, and the signal-to-noise-ratio obtained from the demodulation of an rf carrier and the results are shown here.

THE NEGATIVE ION BLEMISH IN A CATHODE RAY TUBE AND ITS ELIMINATION—R. Bowie

This paper is a critical review of the widely scattered and somewhat conflicting data regarding negative ions in cathode ray tubes and blemish formations.

THE PATTERNS OF SLOTTED CYLINDER ANTENNAS—G. Sinclair

A method is described for calculating the patterns of arrays of axial slot antennas mounted on the surface of a metallic cylinder. A number of calculated patterns are shown to indicate the extent of the control of the pattern which can be obtained by using arrays of slots on a cylinder.

PHASE DIFFERENCE BETWEEN THE FIELDS OF TWO VERTICALLY SPACED ANTENNAS—E. Hamlin, A. Straiton

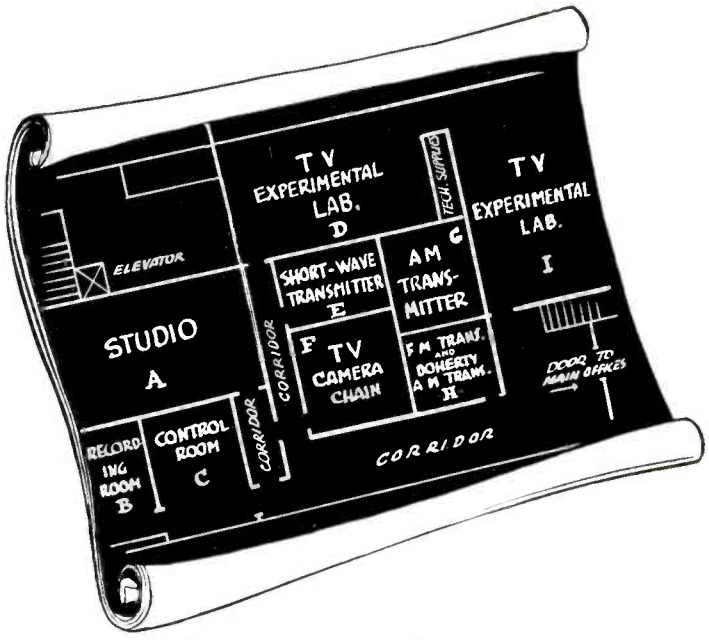
This paper discusses the phase differences between the fields of two vertical spaced antennas as a function of transmitter height, receiver height, and distance between transmitter and receiver.

QST—December 1948

A NOVEL MICROWAVE MEASURING TECHNIQUE—R. Gladfelter, L. Davis

A radio frequency adaptation of Michelson's interferometer.

R. E. T. S.—From Page 7



FLOOR PLAN REFERRED TO IN PHOTOS

Heading Cuts for Chapter news columns. Chapters without regular heading cuts and desiring same, should send in photo, cartoon, or drawing of subject matter that they wish used to identify and distinguish their column.

CHICAGO By FRANK GENEREAUX

There can be a limit to seniority and in Chicago that time has come. How I came to be appointed editor of the Chicago Chapter still remains a mystery to me but I have my suspicions it was bumped down the grand ole line of seniority and came to rest at the bottom! So as low man on the totem pole I now am the editor. BUT someday I will be senior—then watch out!!!

Harry Johnson NBCSE and Ed (Smilin') Golec W9VGA were recently appointed summer relief in Master Control. As group 4 men they're in for a session of blinking lites, buzzers and what have you, but knowing Ed and Harry, I'm sure they'll live thru it.

Harry Prester, ABCSE W9FBO, exchanged vows with Jean Frodin of Chicago. We're all watching the effects of marital life on Harry. Good luck O.B.

Vern Mills, NBC Transmission Engineer, was elected on the first ballot and is now our chapter chairman. We know that Vern will do a fine business job for us at the Chicago Chapter.

Bill Cole NBC SS (Senior Supervisor) W9BU, won the ARRL 14th DX competition in Illinois. Bill sez he used his atomic underground antenna. He's really going to blast them soon, however, I hear he's putting in a pair of 813's in the final.

Frank Genereux, ABC SE, W9FDL, worked KH6KA last month and was very happy. He almost had apoplexy, however, when he got a card KH6KA/9 (portable nine). It seems that this particular KH6 was a friend of a number of the boys in master control, and they arranged the card with the portable 9 after it. Then KH6KA must have mailed it to them and they remailed it in Chicago. The doggone card had a Chicago post mark as big as life. Frank hooked KH6KA again on 11 meters and learned of the plot.—Who's the wise guy???

George Smith ABC SE is our new secretary and Fred Shidel NBC MC our new Treasurer. Both of these fellows are capable, and we know they will do a bang up job in the coming year. Incidentally Fred's wife is a C.P.A. so he has expert advice on the books from that quarter.

In communications, Elizabeth Genthner, councilwoman, is leaving the company. She won't tell anyone why but we have our suspicions—one of them. She and her hubby bought a TV set; good luck to Elizabeth and we hope you visit the gang once in a while.

A new member of communications is Orville Pawlik. He is filling the gap left by Mrs. Genthner. May we say "Welcome to NABET" Orville.

It's not much from Chicago but I'll promise you more next month.

THE 1949 I. R. E. NATIONAL CONVENTION

About 15,000 of IRE's 25,000 worldwide membership attended the 1949 National Convention held at the Commodore and Grand Central Palace. Engineers from about 30 different countries were present.

Nearly 200 technical papers were presented, the largest ever. We are going to publish the official IRE condensation of every paper presented, for the benefit of those many Radio-TV broadcast engineers and technicains whose work didn't permit their attendance. Much attention was devoted to the subject of nucleonics —instrumentation related to the production, control, and utilization of fissionable materials. This new sub-atomic world is expected to add much to our medical and scientific knowledge.

The convention heard about some of the aspects of the new science of "cybernetics"—the study of the electrical nature of man and his behavior—and the detection and study of the electrical nature of the brain and the senses of living things.

Exhibits exceeding seven million dollars in value were presented by 220 exhibitors at the radio engineering show at the Grand Central Palace, and included everything from the sub-miniature components to complete broadcast and TV stations.

At the President's Luncheon (photo this page), the featured speaker was D. W. Rentzel of the C.A.A. His subject was "All Weather Flying" and how it can be safely accomplished with the aid of new electronic devices.

Dissolving tumors without surgery is only one of the many potential uses of the ultrasonic fountain, a crystal built in a parabola, which can focus so much energy at a fixed point that it will gain enough power to spurt a column of water two to three feet in the air, and which may revolutionize modern surgery by doing away with the knife. Furthermore, the fountain can force the mixing of nonmiscible liquids, and thus homogenize such previously uncombinable substances as oil and water.

Snow was manufactured right before the public's eyes in one of the many spectacular demonstrations. Nucleation of a steam-cloud with dry ice will produce manmade miniature snow in a cabinet containing a scale model of a United States Army Signal Corps Arctic installation, while a miniature electric train runs around the scene plowing snow off the tracks. The atom was split before the audience in a demonstration at the Nuclear Studies Center, by means of an apparatus which dynamically shows the fission of uranium 235.

Those concerned with the current record controversy were interested in a new pickup which will play 33 1/3, 45, and 78 rpm records without changing needle pressure.

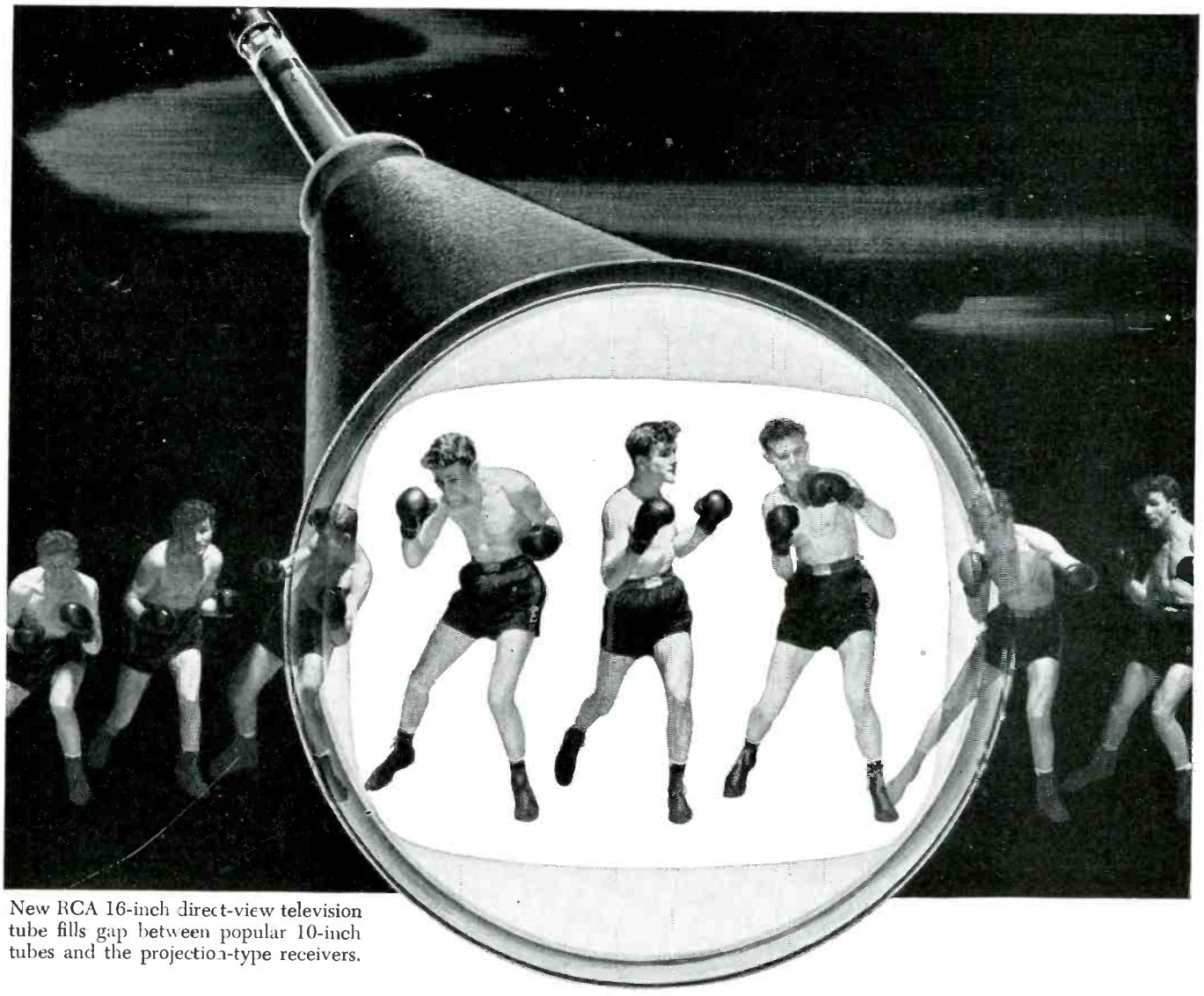
Unique television equipment, including rotatable antennas and a guest television system for hospitals were demonstrated and some very startling developments were revealed, as well as much unusual radio equipment.

Facsimile recorders receiving weather maps from Washington, Tokyo and the Rhine Main, printed circuits for television receivers, dynamic relay testers, and new germanium triodes in dynamic applications are but a few of the innumerable scientific developments which were shown.

Among the more spectacular achievements was a report on high-speed X-ray motion pictures capable of analyzing rapidly moving objects and human organs without blur. This development, described as giving X-ray analysis the same advantages which slow-motion movies bring to sports events, utilizes war-developed radar circuits to team up exposures of 10 millionths of a second—2,000 times faster than a person blinks—and a shrutterless camera shooting movies at 150 frames per second.

In the television field, new work was described which may make possible better television reception for New York apartment residents with limited antenna space. Utilizing electronic multicouplers

THE I. R. E. PRESIDENT'S LUNCHEON



New RCA 16-inch direct-view television tube fills gap between popular 10-inch tubes and the projection-type receivers.

"Inside story" of a bigger, brighter picture on your television screen

The screen on which you are accustomed to seeing television is the face of an electron tube—on which electrons "paint" pictures in motion.

And the size of the picture, unless projected, is determined by the size of the tube.

Working to give you *bigger*, brighter pictures, RCA engineers and scientists developed a new way to make large, direct-view television tubes. They found a method of "welding" large areas of glass and metal... while keeping a vacuum-tight seal!

Using this development—ideally suited to mass production—RCA can now build television tubes of light, tough metal... using polished glass for the face, or "screen."

An achievement of research

Development of this new television tube is a continuation of *basic television research* which began at RCA Laboratories. Such leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

• • •

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

RADIO CORPORATION of AMERICA

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I. R. E. CONVENTION

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—devices which enable one antenna to supply signals to several receivers, engineers who made the report, stressed applications to frequencies used by the armed forces at large receiving stations, but their work points the way to further developments in the conventional television frequencies. The engineering attack on the television allocation problems faced by the Federal Communications Commission was high-lighted by reports on television transmission in the ultra-high frequencies and supported by new methods of avoiding interference in television bands now in use.

The problem of avoiding co-channel interference in television channels now in use was reported minimized "by operating television stations that are on the same radio frequency channels in synchronism." R. D. Kell, Radio Corporation of America engineer, said as a result of the experiments it would be possible to lift the FCC "freeze" on new television station applications, since this new development reduced interference on co-channels which made original FCC channel allocation plans seem unworkable.

D. H. Preist, research engineer for Eitel McCullough, Inc., outlined a possible solution to the problem of generating enough power in transmitting in the ultrahigh frequencies. Mr. Preist's research indicates that high-band television transmitters may be doveloped around existing vacuum tubes of small size, relatively convenient and cheap to manufacture, thus precluding the long and tedious development of the larger tubes previously believed necessary.

A status report on ultra-high frequency television standards for black-and-white as well as color television, possible allocation plans, and industry-wide developments in transmission and receiving equipment was presented by T. T. Goldsmith, Jr., of the Allen B. Du Mont Laboratories.

Television programming fast approaching complete independence of lighting conditions was reported by R. B. Janes, of RCA. He summarized developments of television camera tubes which has made possible the telecasting of more and more pickups under adverse lighting conditions and the use of lower and better lighting in studios.

Highlights of the Annual Banquet was Dr. Frank Stanton, President of CBS, featured speaker. His subject was, "Television and People." Dr. Stanton spoke in a very down-to-earth manner on the

whole subject of TV from the standpoint of *people*—the people who presently or in the future will constitute the TV audience. He made the important point of *availability* of TV right in the home, as against the inertia required to get up and walk a block or two to the movies. Dr. Stanton made a very pertinent observation relative to TV and the other mass media communication arts and sciences. Few of us closely related to any phase of broadcasting are really able to make a calm appraisal of TV's eventual place among the mass-media. Dr. Stanton reminded us that the movies, one of the greatest mass-media, did not displace the newspapers, and that radio broadcasting did not displace the movies. Dr. Stanton said that TV will *take its place* among the other great mass-media, not *replace* other mass media.

An innovacation at this IRE Convention was the recognition of the Sales Engineer—his importance in relationship to technical manufacturing. A symposium on marketing covered these topics:

"Market Research."

"Application of Market & Field Research in Product Planning and Design."

"Sales Planning and Distribution."

"National Advertising."

"Sales Training and Sales Promotion."

A comprehensive picture of marketing technical products was covered by these five papers. The *Sales Engineer* has at last arrived!

I. R. E. Technical Papers

None of the papers listed in this program is available in preprint or reprint form nor is there any assurance that any of them will be published in the PROCEEDINGS OF THE I.R.E., although it is hoped that many of the papers will appear in subsequent issues.

SYSTEMS I—MODULATION — SYSTEMS

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

1. **Development of a High-Speed Communication System.**

   DONALD S. BOND, *RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*

An experimental ultrafax system operating at transmission speeds up to 15 pages a second is described. A flying-spot scanner employing a single-line sweep scans the copy which has been previously photographed on film. A projection kinescope of improved electron-optical focus and with a short-persistence, high-efficiency phosphor was developed for the scanner. The receiving apparatus includes circuits similar to those required in the horizontal channel of television equipment. Clamp circuits are provided in both scanner and receiver to maintain the dc axis of the video wave in the presence of rapid changes in background brightness. A 5-inch projection-type kinescope with a P-11 screen is used. The continuous-drive recording camera uses 16-mm motion-picture film. The exposed film is developed in a hot-processing unit with an elapsed time of about 45 seconds. Tests have been conducted over a 7,000-Mc television relay system.

2. **Distortion in a Pulse-Count-Modulation System with Nonuniform Spacing of Levels.**

   P. F. PANTER AND W. DITE, *Federal Telecommunication Laboratories, Inc., Nutley, N. J.*

The first part of the paper deals with statistical properties of the signal. The signal power is expressed in terms of the probability density of the signal.

In the second part these properties are applied to the problem of distortion in a pulse-count-modulation system using a nonuniform distribution of the levels. It is shown that, for a signal having a probability density $P(y)$, the level spacing can be chosen to yield minimum distortion. It is shown that the minimum distortion is significantly less than the distortion due to uniform level spacing when the crest factor of the signal exceeds 4.

Nonuniform spacing of the levels may be thought of as equivalent to compression followed by a uniform quantization of the signal. It is shown that, when the spacing of the levels is logarithmic, the resulting distortion is nearly independent of the signal.

3. **Cross-Talk Considerations in Time-Division Multiplex.**

   S. MOSKOWITZ, L. DIVEN, AND L. FEIT, *Federal Telecommunication Laboratories, Inc., Nutley, N. J.*

An experimental study was made of the effects on interchannel cross talk of the bandwidth characteristics of the transmission medium in pulse-time-multiplex systems. Both pulse-amplitude and pulse-position modulation systems are considered. The effects of various types of high- and low-frequency response are discussed from both the experimental and the theoretical point of view.

4. **Experimental Verification of Various Systems of Multiplex Transmission.**

   D. R. CROSBY, *RCA Victor Division, Radio Corporation of America, Camden, N. J.*

Using a microwave link of 12 miles, six different modulation methods for multichannel transmission were studied. Some

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modulation methods used frequency division; others used time division employing pulse modulation. Some of the systems used triple modulation; one pulse system quantized the signal.

The purpose of the work was to get an acquaintance with each of the systems to see if there were important properties that the theoretical studies had not emphasized. Good agreement with the theoretical performance formulas was obtained.

For each system the signal-to-noise ratio was evaluated for four types of noise: (1) thermal noise, (2) continuous-wave interference, (3) impulse noise, and (4) co-channel system noise.

5. **Interference Characteristics of Pulse-Time Modulation.**

E. R. KREITZMER, *Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Mass.*

The susceptibility to interference of a modulation system is one of its most important characteristics. The interference characteristics of pulse-time modulation, of which pulse-duration modulation and pulse-position modulation are particular forms, are discussed with particular reference to two-station and two-path interference. Experimental investigation, as well as mathematical work largely based on N. Wiener's autocorrelation method of analysis, lead to some interesting and useful results not heretofore known. Single-channel pulse-duration modulation, in particular, is found to have some remarkable characteristics, exhibiting a strong capture effect in favor of the stronger of two interfering transmissions, and permitting relatively good reception under most conditions of severe multipath interference. The basic facts responsible for these results, as well as the practical requirements that must be met to attain them, will be briefly discussed.

6. **Factors Involved in the Design of an Improved Frequency-Shift Receiving System.**

COLIN C. RAE, *Naval Research Laboratory, Washington, D. C.*

A discussion of the theoretical and practical aspects of a frequency-shift converter developed for the purpose of reducing noise and multipath interference effects on Naval facsimile circuits. Practical results, obtained over a period of six months operation on Naval radiophoto circuits, provide proof of the system's superiority over existing equipments and confirm theoretical predictions. It is expected that application of the principles involved to teletype and high-speed keying circuits will provide worth-while increases in radio circuit reliability.

ANTENNAS AND WAVEGUIDES

Chairman, LAN JEN CHU
(Massachusetts Institute of Technology, Cambridge, Mass.)

7. **Eliptically Polarized Radiation from Inclined Slots on Cylinders.**

GEORGE SINCLAIR, *University of Toronto, Toronto, Ont.*

A methods is presented for calculating the patterns of slots of finite length and arbitrary orientation on the surface of a cylinder. Previously, it has been shown that, by assuming the slot to be of infinite length and parallel to the axis of the cylinder, the pattern in a transverse plane can be calculated. It will be shown that, under certain reasonable assumptions, it is possible to calculate the 3-dimensional pattern of a slot of finite length located arbitrarily on the surface of a cylinder of circular or elliptic cross section. It is found that the radiation from an inclined slot is generally elliptically polarized.

Experimental verification of the accuracy of the calculations will be presented. Application of the theory to the design of FM antennas for linear and for circular polarization will be considered.

8. **Some Properties of Radiation from Rectangular Waveguides.**

JOHN T. BOOLLJAHN, *University of California, Berkeley, Calif.*

Certain exact relationships between the radiation pattern and impedance characteristics of a radiating rectangular waveguide with vanishingly thin walls are developed. In particular, it is shown that the ratio of radiation intensities in certain preferred directions and the power gain in these directions are related in a simple manner to the reflection coefficient inside the waveguide. Although the information obtained is restricted, in the sense that it applies to only a few discrete points on the radiation pattern, it is quite general as regards the manner in which the waveguide is broken or perforated to allow radiation. The results are shown to apply equally well if conducting sheets having arbitrary shapes but lying on specified planes are present in the vicinity of the radiating waveguide.

9. **Theory of End-Fire Helical Antennas.**

ARTHUR E. MARSTON AND M. D. ADCOCK, *Naval Research Laboratory, Washington, D. C.*

An exact formula for the radiation field of a helix energized by a traveling wave of current along its length is obtained. This formula yields a definite condition to be satisfied by the geometry of the helix and the propagation constant of the traveling wave of current in order that the radiation field of the helix be end-fire with circular polarization on axis. In addition, the general radiation formula yields a simple, explicit expression for the ellipticity on axis of any helix excited by a traveling wave of current. Further, it is shown that the current distribution for the end-fire helices is the current distribution associated with the $n=1$ mode of the helical traveling-wave tube as analyzed recently by C. Shulman and M. S. Heagy of the Radio Corporation of America. Combining the theory of this mode with the general results indicated above, a complete theory of the radiation fields of end-fire helices is achieved which checks well with experimental observation.

10. **A Broad-Band Transition from Coax to Helix.**

C. O. LUND, *RCA Laboratories Division, Radio Corporation of America, Princeton, N. J.*

A new type of coax to helix transition, consisting of a nonuniform helix in which the pitch changes continuously from infinity to the pitch of uniform helix, is described. The smooth change in pitch is accompanied by a gradual change in conductor size, so that the part with infinite

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NEW YORK—By Bob Zweck

I don't know if I'm in the right MOOD for writing the column at this moment: I'm just a leetle bit BURNT (in more ways than one). . . I had a copy of a new mag. with me; one that I brought in to show Stolzy because of its CULTURAL contents. I had been carrying this valuable around with me all of the morning giving it an occasional glance when announcers and producers proved trying. This resulted in having aformentioned personnel TRYING to outglance me (especially on certain pages when they even grew so bold as to grab my WRIST and yell, 'Don't TURN the page yet!") This will give you a ROUGH idea of the attractiveness of this publication. To get to the pernt:—We had just finished with the Fred Allen ork rehearsal and I stepped out of the control room to "knock down" the studio. Now, I make THE mistake; I lay the magazine down on a chair and turn my back. This, with a studio full of musicians! Radio-type musicians, at that. You guessed it. As soon as I turn around, I notice the publication is gone! Doing the one smart thing of the day, I race to the elevators. This is the only way they can get out unless they walk. Knowing musicians, I remain at the elevator. Now, why did I try so hard to recover a magazine, the contents of which I had perused, used and abused? Was it because of the 15c it had cost me? Naa. . . . It was simply that if Stolzy saw the contents and approved (and what person without myopia wouldn't) and the original publisher's approval was obtained, YOU, the readers, would be able to view borrowed material. To ease the suspense and have you stop that fingernail biting, I'll tell you that the pictures were recovered and, barring a negative reply from friend publisher, will GRACE our pages.

And speaking of PICTURES, we have been inspired by the one so thoughtfully submitted by our colleague, Miss Aleen Corbin of the St. Lawrence chapter. She has started us (whether she knows it or not) on great LENGHTH with that picture of our fellow engineer (Feb. issue—page 18). We'd like to see each chapter, through their col-yum-ist, submit pictures of their most "photogenic" bathing suits. These, of course, need not be members of NABET. After submitting, let's say, six or seven, ENTRIES, the chapter would select a "Miss St. Lawrence, Miss New York, Miss Hollywood" or what-have-you. . . These various titleholders would then have NEW and DIFFERENT pictures of themselves entered to see just which one of these HIGH-LEVEL girlies would be chosen as Miss Broadcast Engineer of 1950 with her CHARMS gracing the cover of our next yearbook. Now, if you are of the same mind, drop me a note and say so; if you are not, let me know, too. Send your cards or (if you do fee shows) letters to me at Room 558, RCA Bldg., Radio City 20, N. Y.; or the editor (address in the Journal).

In the last issue, we mentioned the series of lectures being given to employees at NBC. These, dealing with the broad aspects of television, are really becoming quite INTERESTING. The last one I attended might have been titled, very appropriately:—How PRACTICAL can we get? It went like this: During the Q and A period which follows each lecture, some bright boy from the news room asked if it would be feasible to televise the soap-operas and similar day-time shorties because of the time it would take away from the housewives' routine of chores, etc. (You can work from room to room with the radio on in each but video requires a fixed position while attention is focused on the screen—A good point.) "Consideration is being given to the needs of the housewife. In fact—I understand they are now working on a set that will project the picture, you should pardon the expression, on the bedroom ceiling." He then went on to say that if he were quoted on this point, he would deny it all. It is your writer's naive opinion that the speaker was not serious in his remarks. Hmm, I believe there really is a FUTURE in TV.

A CHANGE IN POLICY has recently been announced by NBC with regard to playing "canned" shows on the net. Henceforth, this will be permitted—with the aim of permitting a more flexible program arrangement and improving productions still further—provided client, agency, and net are in accord. The Crosby show on ABC is THE classic example of this tec-nic. It will be interesting to note how and where NBC uses it. One possible CLUE is the very recent assignment of operations-engineer Gus Sisko and "Dud" Connolly to the two tape recorders now located in the news-room. Gus will be on duty, more or less constantly, throughout the day while Dud Connolly takes over on the evening trick. The gear is so "Patched" that transmission, in MCR, can pipe one feed in either, or both, machines which can record alternately or two separate feeds which can be recorded simultaneously. I'll have some technical details for you in the next issue.

SOMETHING I'D LIKE TO SEE in the next issue is an elaboration on a gadget that was written-up in the Feb, issue. This article (that no home should be without) was fascinatingly named a "LOOSE JOINT DETECTOR." I wonder if friend editor can help us out on this one.

And following the scent of greener fields we find Messrs. Clayton, and Coleman of studio and Mr. Dibbins of maintenance heading into television. . . . There really must be something to this RUMOR of the POT of gold, tho. I can remember when Gene (Here's my chit) Lynch was in our midst. In those bygone days, he came to work on the BMT (subway to you out-of-towners) . . . . Came the transfer to TV, and HE SWITCHED, not to Calverts, but to a Kaiser; yep, he drove in like a producer. . . . A couple of pay-periods came and went Gene got the feel of TV, and nowo, lo and behald, Gene drives in like an announcer—in a brand new

MERCURY. . . . (I think Gene would like me to add that all OUTSTANDING chits must be HONORED, Mercury or no.)

We'll have to end this on a rather sad note. It has been learned that because of the EXORBITANT FEE demanded for use of the pictures mentioned at the start of this column, we will not be able to print them for your benefit. I offered to print one of mine, but after seeing it, Stolzy said that not only wouldn't he advise it, but that he (and the Journal) would not be RESPONSIBLE. . . . I'm not disheartened tho, 'cause I've spent the last week LINING UP eligible gals for the proposed "contest" I told you about. What fun we're gonna have!

THAT'S ALL from me; for a slant on the BLUE, . . . Take it George.

ABC—New York News

By GEORGE HALVONIK

Thanks, Bob.

About the time that spring rolls around, negotiations for a new contract between NABET and NABET employers will be under way. This is going to be the toughest fight that NABET has been faced with in years.

At a recent Councilmen meeting our new Chapter Chairman, Ed Stolzenberger, painted a grim picture of the struggle that confronts us. Not only have we a determined resistance on the part of management to break down, but we must also ward off unethical rival unions. One union in particular, the IATSE, has declared war on NABET's jurisdictional rights in TV. This IA union has the unsavory reputation of being a strike breaking outfit. Last year, this scabby outfit broke a strike at WFIL in Philadelphia. In order to get the jobs of the strikers they allowed the employers to write their own contract. These are facts that can be proven.

At a closed meeting with NABET the IA president declared that he would have all the TV jobs that he wanted; even if it took him two years to get them, they would be his. TV, to the IA way of thinking, belongs to them. Mr. Stolzenberger pointed out that "it's not jurisdiction over TV lighting they want. It's not jurisdiction over TV projection they want. They just want the TV jobs for their members." To further aggravate the situation, NABET has been informed, via telephone, that NABET employees may be locked out when the present contract expires on May 1st. Can this mean that a deal is pending between IATSE and NABET employers?

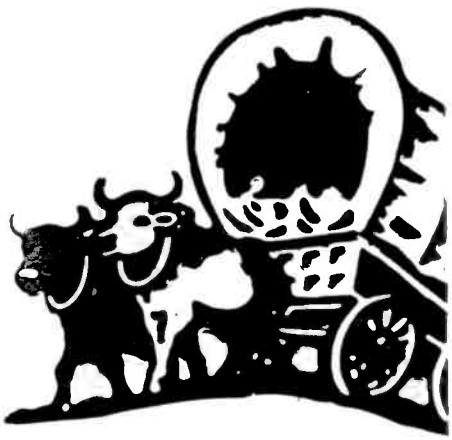
We are not backing down from any of these threats. To be prepared, a strike committee has been elected. Also, ABC Councilmen have selected an Advisory Committee to handle ABC-NABET questions. The following have been appointed to this committee: for AM—O'Leary and Hutson; for TV-Kinsel and McDonald.

Vacation periods here at ABC begin on April 18th and continue on through to October 21st. Three men at a time will be out. The vacation schedule had been posted when a change in company policy was announced and made things rather confused. Here is a paragraph taken from a memo dated March 2, 1949; to All Employees; from Robert E. Kintner:

"Personnel who have been with the company for five or more consecutive years will be granted a vacation of three weeks. This shall not modify the vacation provisions of any existing collective bargaining agreements but, of course, in those cases where collective bargaining agreements call for company policy, the provision outlined inthis memorandum shall apply."

The question we would like to have answered; do NABET members get the extra week? The contract with ABC does not contain any reference to company policy, which leaves everyone up in the air. There has been no change, nor has there been any contemplated change in vacation schedules. We hope the engineers are not excluded from this extra week and we don't think that they will be.

On my next report I hope I may have news more pleasant to report.



OMAHA NEWS

By CY HAGRMAN

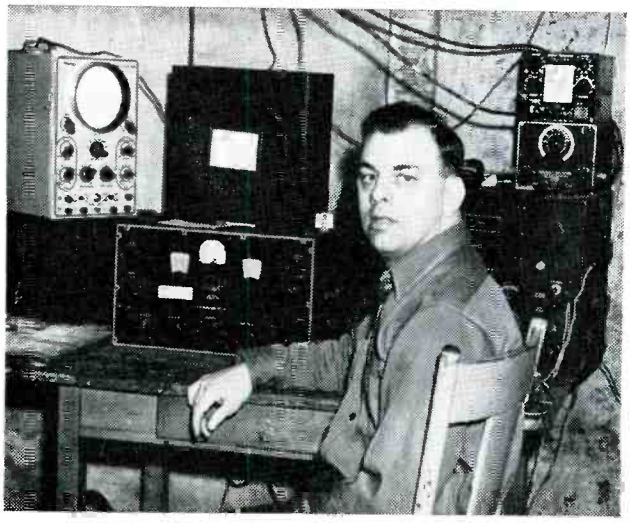
Hi, fellas! It's been a long time since we've been able to give you a word-picture of one of the WOW gang. However, when "ye ed" was digging himself out of one of the many Nebraska snow-storms (surely you have have heard of them) he dug up a little information about one—Al Maller—that he thought you might like to hear about.

A. H. (or Al—as he prefers being called) Maller first saw the light of day on December 4, 1919. He took an Electrical Course and graduated from Omaha Technical High School in June, 1939. From there he went to what was then called the Telegraph and Radio Institute of Valparaiso, Indiana, from September 1939 to December 1940. Then, in rapid succession, he worked at KDRO, Sedalia, Missouri, March 1941-July 1941; KORN, Fremont, Nebraska, July 1941-September 1941; Police Radio WPFS, Ashville, North Carolina, September 1941-March 1942; KBON, Omaha, Nebraska, March 1942-February 1943. Since February of 1943, Al has been at WOW as studio engineer with occasional "subbing" at the transmitter.

He was married July 18, 1947 to Elaine Nelsen and they

now have a six months old son named Bobby.

Al's hobbies are many and varied. He's been in ham radio for the past nine years. However, he says that he's never



AL MALLER

gone in for it very seriously—just more or less tinkered around with it. He never follows diagrams, etc., but likes to "go out on a limb" to see what will happen.

Before the war he worked the coasts with his rig on ten meters, but now he confines his operations to 80 meters. His call is W∅DCQ.

He was at one time also interested in flying and came fairly close to having his license, but now, among other things, he has to consult his family before he can risk his neck.

As for something a little more safe and sane—also a little closer to the ground—he likes to putter around with his camera and does most of his own photography work—as witnessed by the Christmas-Card-Photo of his attractive wife and son.

Al's a very likeable guy. In fact, to coin an expression—"There's no-better-NABET'er"—and on that one, we say 73's till next month.

New Cooling Method For Large Electrical Machines

A new method of cooling large electrical machines reported to be as revolutionary as hydrogen cooling in the twenties, was reported at a technical session of the annual winter meeting of the American Institute of Electrical Engineers.

Considerable savings as well as other advantages are expected from the new process, according to Th. de Koning, of Drexel Hill, Pa., who described it in a paper on "Vaporization Cooling of Large Electric Machines."

"The principles of vaporization cooling are totally different from those customarily associated with air, hydrogen and fluid cooling," Mr. Koning said. He held that vaporization cooling provides "a standard universal solution, feasible for the cooling of large machines of all types. Water in mist form is supplied to the natural surfaces," he explained.

"Machines for vaporization cooling," Mr. Koning contended are: "practically one solid block of material, are fully self-contained, do not require openings in the foundation, are compacted by the external pressure, and are (because of the vacuum) as noiseless as hydrogen cooled machines."

The author expects that the proposed vaporization cooling system will have for machines the following advantages over the present cooling systems.

1. A savings of 5-15% in cooper and punching volume, without increasing the current densities or the flux densities. If these are increased the saving is larger.
2. A slightly better efficiency, improved simplicity, a saving of 25% and more in weight, and a saving of 15% in cost of large machines.
3. Just as hydrogen cooling cuts the space needed for air cooled units in half, so will vaporization cooling cut the space needed for hydrogen cooled units.
4. Filling or exhausting the machines becomes a matter of minutes, instead of hours. Painstaking supervision is not needed, and the yearly outlay for lost hydrogen and scavenger gas can be saved.
5. The machines are suitable for any size and environment, and for any constant or variable speed. There is a saving in housing, and shields, shaft seals, bearings, couplings, and so on.
6. The auxiliary equipment is in wide use and the cost is small.

New Type Transistor

Scientists of Bell Telephone Laboratories described a new and improved type of Transistor. Appearing before the winter convention of the American Institute of Electrical Engineers, the Bell scientists told how they had developed a unit which promises to be more stable and efficient and to handle greater amounts of power than the type originally designed.

Physicists, chemists and electrical engineers the world over have shown intense interest in the Transistor. The device has many unique and significant potentialities for telephony and electronics in general, and has been termed the first real challenge to the vacuum tube since the latter was introduced nearly forty years ago.

Transistors, which are about the size of medicine capsules, can perform most of the key jobs now done by vacuum tubes. They operate entirely without vacuum, they have no flimament to cause warm-up delay, and they are smaller and lighter than commercially available vacuum tubes. They function on an entirely new physical principle discovered in the course of Bell Laboratories' program of fundamental research into the electrical properties of solids.

Like the first model, the new Transistor requires the use of a tiny pin-point of germanium, a metallic substance of the semi-conductor class. In the first type, the germanium was mounted at the base of a hollow cylinder and two wire contacts were mounted above it, their points resting on its surface.

In the new unit, the germanium disc has depressions ground into each side of its center section, so that this center section is only a few thousandths of an inch thick. The disc is then fitted into the center of the cylinder and the point contacts, which emit and collect the current, are placed against it on opposite sides.

This, the scientists explained, is expected to provide more mechanical stability than the original model and permit a "shielding" which isolates the input and output circuits.

PITTSBURGH

—By FRANK E. HENRY

Left to right: Gus Sadlon, Ken Walborn, Geo. Meyer, Glenn Luther, Jim Rock, Chas. Bickerton, Buck Dice, Frank Tooke, and Ward Landon.

The Grand Old Man of Broadcasting has retired.

He is Charles R. Bickerton, the only remaining member of KDKA's staff who participated in airing the Cox Harding election returns, which inaugurated the era of radio broadcasting.

After more than 28 years in radio, included in his 32 years with Westinghouse, Charlie was still the biggest, strongest, most boisterous, and most dependable member of the engineering staff. He has never been late for work and his colleagues claim that he has never missed a station break.

In addition to the first broadcast he is credited with many other firsts, including the first pick up, first church service, baseball, football, and hockey pick ups. Charlie attributes his big muscles to the many years of rassling pick up equipment in the days when it was a lot heavier than it is today. His reminiscences are inexhaustible and would make a fine book.

Most valued among his host of friends were, Mr. H. P. Davis and Frank Conrad.

The staff threw him a big farewell dinner in "A" studio. What do you think the station gave him. Oh no! Not a radio! Correct. Among many other presents were two fine pipes, tobacco and cigars from the Pittsburgh Chapter of NABET.

"Bick" and his wife will take their life of ease in a brand new home, and will appreciate the time to enjoy the companionship of the families of their daughter and son, which include the three smartest grandchildren in the country.

Charlie is tops and KDKA won't be the same without him.

THE ROCHESTER STORY

—By O. BULLIS

Lead-off news from the Rochester Chapter, NABET, is the rapid approach of TV in this area, through WHTM, WHAM's TV outlet.

WHTM is rounding into shape, with the completion of the new transmitter building atop Pinnacle Hill, at the southern boundary of the Rochester City limits. New RCA equipment is being installed at the moment, and all that is needed for the erection of the steel work of the 325 foot self-supporting tower, is a good old-fashioned March blizzard—believe me, it's never been done any other way at WHAM.

The new 10 KW FM transmitter (now in use at the downtown location) is all set for removal to the new spot, and tentative Studio and Remote TV crews have been familiarizing themselves with cameras, shapers, etc., for weeks, now.

The crew at the Pinnacle Hill TV location, busy as you know what, are at the moment,—Balling's Busy Beavers—"Yo" Seiler, Alex Gressens and Don Anderson —more to be added, later—natch.

New men at AM and FM transmitters, replacing the TV transmitter crew are Clyde Parker and Ted Cullian at Brookdale, and Ralph Leurgans at FM.

The tentative crew—WHAM's 7 old men—assigned to TV Studio and Remote, consists of Fred Ambrose, Orm Bullis, Elmer Grabb, Jerry Hall, Walt Harrison, Charlie Snyder and Bum Holly. Said crew now being trained by Charles Atlas (and they'll need it).

Replacements at WHAM for the above men are Al Mario and Charlie Laniak from WRNY, Bernie Lynch (yeah, Chapter Chairman Ed gets jobs for the whole family), from WVET and Dale Eldridge. We understand that there will be six more new faces in the Tech staff at WHAM, before we're on the air with WHTM—fine Biz—the more the merrier.

Speaking of new faces—happy to welcome Carl Cleveland to WRNY as of last Dec. 6. Also Lee Cowles, John Micsak, and Pat Amico to the portals of WVET's new layout—and others who *would* be mentioned, here and there, if somebody would *pullease* inform the writer, as to what's going on!

The hospital jinx, which makes its home in the morg—er, pardon me, Rochester's Radio City—is now playing "footsie" with Ray Gondek. As the saying goes, he's "resting comfortably" at Strong Memorial Hospital and is expected to join his partners in crime at an early date.

Lacking reports from various and sundry councilmen, who shall be nameless at this writing, the news from *other* stations in the Chapter, is on the scanty side.

Contract time at WHEC, early in March (at long last—due several postponements). Negotiations scheduled for week of March 7th—Happy Landings—and we are given to understand that the boys at WENY, Elmira *think* they have a new contract signed—hey, Gorsuch—Wot Hoppen??

Incidentally, orchids to the crew of ops from Elmira who show up regularly for Chapter meetings in Rochester. A small matter of over 200 miles of hill driving through winter blizzards, icy roads, etc. for each meeting—what I mean—a fine example of sincere interest in NABET and its principles. Some of our members who skip meetings for one reason or another, might take a lesson from the WENY gang.

May I point out that the Rochester Chapter meetings are rapidly assuming the characteristics of a convention. As of Feb. 28th we have 55 active and 10 inactive members and more in the offing, as replacements move into the Rochester area. Rumor has it that the Chapter will expand to include approximately 14 new men in the near future. Here's hoping!

ROCKY MOUNTAIN NEWS

By G. A. SOLLENBERGER

You're no doubt wondering what happened to the rest of the people in the photo in February's Journal. Probably the typesetter knocked off for lunch right in the middle of the process and caused many bad feelings around Colorado. For the information of all interested, the characters shown (get the last month's journal out of the file) are as follows, reading from West to East:

Aubrey Blake, Ray Green (transmitter councilman), Carl Nesbitt, George Oblander (KFKA), Mert Marley (KFKA), Verne Andrews, Stan Neal, GEORGE POGUE, George Sollenberger (still Rocky Mountain Editor), Kenny Raymond, Charles Eining, Harold Austin (KCOL), Walter Morrissey, Carl Drebing (Secy.-Treas.), George Anderson, and Conley Holcomb.

Speaking of beer and beer cans, all of you 420 mc hams will find that some of the eastern models make very fine coaxial antennae for that band. George Anderson will drink the beer and send the plans and the cans for the postage.

All of the transmitter men are finally settled on the somewhat tedious subject of vacations. And consequently Barney Nesbitt has trotted out his fishing gear. Andy Anderson will not be able to enjoy the pleasures of his new (to him) '47 Dodge unless we get a raise so he can buy some gas for the thing.

Roy Carrier is finishing the last of a case of celebration water and is still not quite sure what he was celebrating. Russ Thompson can boast of a new Chev and proposes a toast to the manufacturer who lowered the price for him.

Colorado's cold weather even snapped the center conductor in the FM feed line a few weeks ago. The darned thing was so efficient the watts lost didn't keep it warm enough and so no RF amps.

Andrews and Raymond have been keeping their coax lines warm to the following scores: WØZEA-103 countries and WØNWW-85. "W-Zero-Dog-Yoke Charlie in Motion" now will drive right to your door to swap surplus gear if you'll just give him a call on ten phone and ask Joe to drop over.

Perry Perregrin has made another purchase of a new Ford. The ski racks aren't mounted yet but will probably soon be seen.

Ray Green's new ten meter converter has the finest noise to signal ratio and will hear any signal 38 db over S9. So far he's given Turre a good report but the confidential scoop is that they were both parked in the transmitter garage.

Dutton is back in the pink of condition but now finds that he is going blind from working graveyard shift and anyone who has a spare pair of dark glasses will please forward same to KOA KOA FM, Denver 2, Colorado.

AFRA-ite Bill Ballance noted KOA announcer has been trying to bribe yours truly to let him write this column but I'm afraid the strain of the KIBITZER and this strip would be too much.

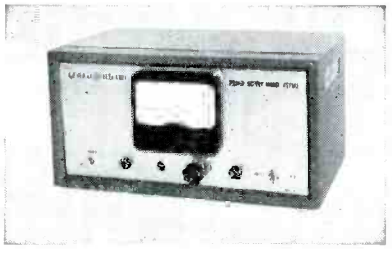
Welch's boy Drebing upped and bought a house in nearby Aurora. Now the order of the day will be a crystal set for every room in the house so that all of the KOA watts won't go to waste.

Next month will be replete with pictures and description of the local TV project. Luckily this month is a long month and spare minutes of Messrs. Neal, McClellan and Eining will be spent in squeezing the electron beams to the utmost. Until then it's SK.

—o—

TRADE NEWS

A new regulated power supply, continuously variable from 180 to 300 volts at 60 milliamperes, has been announced by the Specialty Division of the General Electric Company at Electronics Park, Syracuse, New York. The new power supply, type 4ST1A1, weighing only 17¼ pounds, is intended primarily for use in



research laboratories, educational institutions, and production test departments, according to R. H. Rudolph, sales manager of precision instruments for the division. A separate a-c voltage of 6.3 volts at 2½ amperes center tapped can also be supplied by the new unit. It will deliver a constant output regardless of variations in line voltages or loads.

The American Standards Association Sectional Committee on Electron Tubes C-60 formerly sponsored by the Electrical Standards Committee is now sponsored by the Joint Electron Tube Engineering Council, according to Virgil M. Graham, chairman of the Council and director of technical relations for Sylvania Electric Products, Inc.

According to Graham, the committee is being reorganized and its scope is being broadened to include definitions; classifications; methods of rating and testing; dimensions and interchangeability of electron tubes for all applications. The former committee concerned itself only with electron tubes for industrial use.

—o—

Daven Co. 11-A Measuring Set

The Daven Company's engineers have developed a simplified Transmission Measuring Set, which utilizes only one transformer, one meter, and one meter range control, yet provides most of the functions of more complicated sets.

Daven's purpose for developing this simplified measuring unit is to provide a popular priced set for AM and FM broadcasting stations and laboratory use. No loss is suffered in the accuracy attained through this simplification. Actually the over-all accuracy is better than that found in the more complex sets. The commercial model of this set is the "Daven 11-A Transmission Measuring Set."

The simplified 11-A Transmission Measuring Set is designed for use with an external audio signal generator. Primarily this is done to keep the initial cost low and to prevent duplication of equipment. Most broadcast stations and laboratories have one or more such signal generators, which can be conveniently used in conjunction with the gain set.

The set is calibrated on the basis of 1 MW into 600 ohms and utilizes the standard VU meter. Some novel construction features include sectional assembly and hinged front panel. Each section is individually mounted with its own terminal block and may be readily removed for inspection or repair.

TECHNICAL PAPERS
From Page 14

pitch is essentially a cylindrical conductor with a thin longitudinal slot. The transition, designed primarily for traveling-wave tubes, can have other uses. An approximate theory for this transition is outlined and compared with measurements.

11. **Equivalent Circuits for Coupling of Waveguides by Apertures.**
    N. MARCUVITZ, *Polytechnic Institute of Brooklyn, Brooklyn, N. Y.*

The rigorous description of the field behavior within waveguide structures may be expressed in terms of transmission lines and lumped-constant circuits. This leads to a waveguide network theory closely related to ordinary low-frequency network theory. The determination of the parameters that characterize a number of waveguide networks—in particular, those involving aperture-type discontinuities—will be considered. The Kirchhoff analysis of such wave-guide networks as well as the Schwinger integral equation and variational method of evaluating the network parameters will be discussed for the case of small apertures of various shapes coupling different waveguides.

SYMPOSIUM: NETWORK THEORY

Chairman, J. G. BRAINERD,
(Moore School, University of Pennsylvania, Philadelphia, Pa.)

1. **Modern Developments in the Topology of Networks.**
   RONALD M. FOSTER, *Polytechnic Institute of Brooklyn, Brooklyn, N. Y.*
2. **A Survey on the Status of Linear Network Theory.**
   E. A. GUILLEMIN, *Massachusetts Institute of Technology, Cambridge, Mass.*
3. **Recent Developments in Broad-Band Active Networks.**
   JOHN G. LINVILL, *Massachusetts Institute of Technology, Cambridge, Mass.*
4. **General Review of Linear Varying-Parameter and Nonlinear Circuit Analysis.**
   W. R. BENNETT, *Bell Telephone Laboratories, Inc., Murray Hill, N. J.*

The symposium on Network Theory has been planned in such a way that there will be a general review of recent work in practically all of the fields of network theory in which there is major activity. These four papers are on the geometry of networks, passive and active networks with lumped parameters, and linear varying-parameter and non-linear circuits. Prof. Foster's paper will discuss new developments in the geometry of networks, a field in which little has been written but from which network theory has drawn many of its basic tenets. Profs. Guillemin and Linvill will review lumped-parameter network theory, with Prof. Guillemin giving a broad general review of the field and Prof. Linvill emphasizing recent work in broad-band active circuits. Dr. Bennett will give a broad general summary of linear varying-parameter and nonlinear circuit analysis.

(Continued Next Month)

RMA Sees Good Business Continuing

Seasonal Decline Smaller Than In 1948!

Despite a shortage of cathode ray tubes, which retarded production in some instances, February television receiver output was approximately at the same level as January, the Radio Manufacturers Association reported. TV receivers produced by RMA member companies in February numbered 118,938, slightly below the 121,238 sets manufactured in January. (There are three less working days in February.—Ed.)

While TV production was down slightly during the month, the average weekly rate of production in February was more than 78 per cent above the average weekly rate for the year 1948. RMA member-Companies averaged 29,735 TV sets weekly in February.

Production of all types of radio and TV receivers by RMA members declined during February to a total of 716,538 units compared with 830,871 radio and TV sets produced in January.

Coincident with the decrease in all set production, the number of FM-AM and FM receivers produced in February dropped to 98,969 from 147,733 in January. (These figures are higher than the 1948 figures, indicating a smaller seasonal decline in 1949 than in 1948.—Ed.)

The following table shows radio and television production in February compared with January:

1949	TV	FM-AM	AM	All Sets
Jan.	121,238	147,733	561,900	830,871
Feb.	118,938	98,969	498,631	716,538
Tl.	240,176	246,702	1,060,531	1,547,409

Theatre TV Progress

Progress in the development of television equipment for motion picture theatres was outlined by Ralph V. Little, Jr., RCA Engineering Products Department engineer, in an address before the winter meeting of the American Institute of Electrical Engineers.

"Two basic systems of large-screen television are being studied by RCA at the present time," Mr. Little disclosed. "One is the direct projection system under which high-brillinace kinescope images are projected by a highly reflective optical system upon special screens; the other an intermediate film system, using standard motion picture projection technique after television images have been photographed on motion picture film and suitably processed."

At the present time, he said, the problems of the engineer is to develop kinescopes capable of handling greater beam currents and operating at higher potentials in an effort to increase the light output, while at the same time developing smaller, less costly reflective optical systems, and directional screens with increased light gain.

Commenting on the performance of the two systems, Mr. Little said: "The capabilities of the projection system are equal to the best studio television equipment, but, of course, any deterioration of the signal between the camera and the projector causes an inferior picture on the screen. Experience has shown that large-screen images produced by both the direct and intermediate systems are entirely acceptable to critical audiences. The equipment and techniques of operation will continue to be improved to bring high-quality television programs to the theatre."

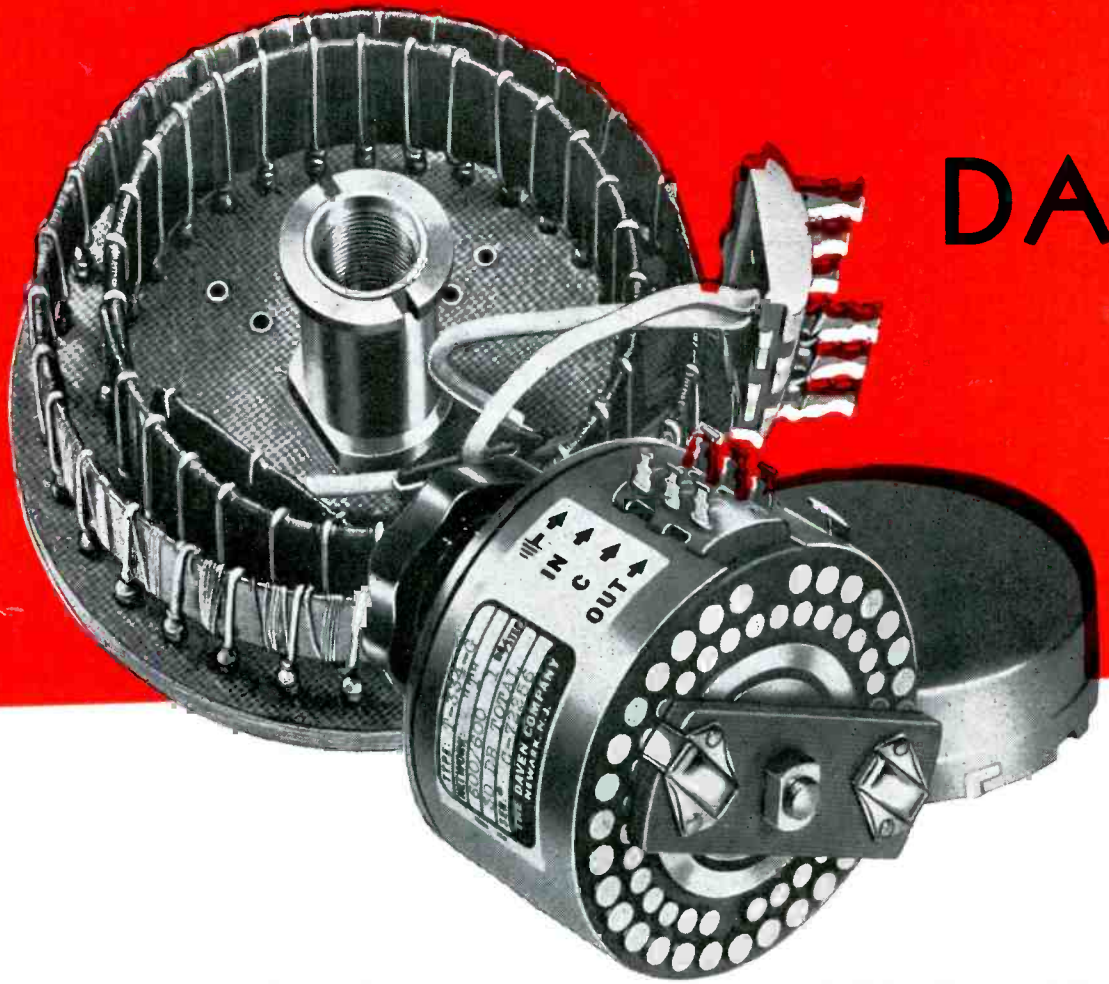
Annual Spring Meeting Of the RMA-IRE

Some of the newest technical developments in the radio-television industry will be discussed at the annual spring meeting of the RMA Engineering Department and the Institute of Radio Engineers April 25-27 at the Benjamin Franklin Hotel in Philadelphia. Technical sessions will occupy the mornings of the three-day conference of radio engineers, and RMA and IRE committee meetings and inspection trips will occupy the afternoons, according to Virgil M. Graham, chairman of the committee in charge. Stuart L. Bailey, president of the Institute of Radio Engineers, will speak at the spring meeting dinner on Tuesday, April 26, at which T. A. Smith, chairman of the RMA Transmitter Division, will be toastmaster.

TWENTY YEARS OF ATTENUATOR PROGRESS

BY

DAVEN



As one of the oldest and most progressive manufacturers of attenuators, we take pride in presenting our recent contribution to the users of fine volume controls. . . the **"Knee-Action Switch."*** This revolutionary type of rotor is now being offered on Daven attenuators and switches at no additional cost.

For longer life and uninterrupted performance, we offer a switch with the following advantages:

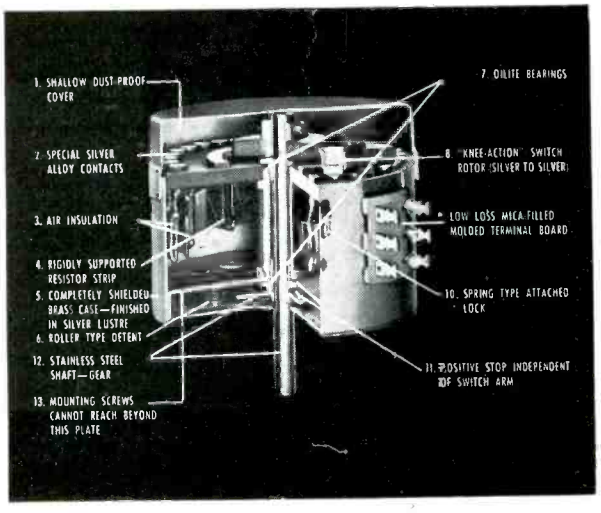
★ Multiple wiping blades of the **"Knee-Action Switch"** are enclosed in a tamper-proof housing.

★ Each blade conductor is individually spring loaded, giving a perfect balance to the entire conducting surface.

★ Uniform pressure on the contacts and slip rings is assured, resulting in low, even contact resistance, over the life of the unit.

★ The considerably shorter rotor arms, result in lower overall switch resistance, due to the reduced conducting path.

★ For specialized switch applications, where space is limited, this new type of switch construction permits up to 6 poles on a 2¾" diameter deck. A greater number of poles may now be obtained than heretofore, on all smaller diameter units.



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