PICK-UPS

FEBRUARY • 1937

New Microphone—See Page 8

PUBLISHED BY
Western Electric

In This Issue

— PICK-UPS —

BEING A PERIODICAL DEVOTED TO DEVELOPMENT IN SOUND TRANSMISSION. PUBLISHED BY THE

Western Electric Company

195 Broadway, New York, N. Y.

EDGAR S. BLOOM . . . . . *President*
H. B. GILMORE . . . . . *Secretary*
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FEBRUARY, 1937

Can educators and broadcasters work together, and give the radio public programs of real educational merit worthy of the public's interest and time? And if so, how?

These were some of things PICK-UPS asked more than 200 stations. The results are related on the next and following pages of this issue.

PICK-UPS found that stations are making a real effort to broadcast educational material. Many stations have made tie-ups with the best brains in the field of education. The microphone is no novelty on the campuses today. Educators are not strangers to the microphone and broadcasters, on the other hand, feel at home on the campus.

We believe, however, that this article is more than a presentation of current thought on the subject of education by radio. It is, we hope, of practical interest to every broadcaster. It tells what stations are bridging the gap between studio and campus and teaming with education. It should offer practical suggestions to stations which want to put more educational material on the air.

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A good many years ago, the world at large thrilled to the name of a young man who stuck to his post on a sinking ship, sent out an SOS, and saved passengers and crew. It was the first time radio had saved lives at sea. His name was Jack Binns. Today, in the territory devastated by raging rivers, there are many men who have shown the courage of radio's first hero. They are the engineers, the announcers, and studio officials of broadcast stations who stuck to their posts for days while death and destruction swirled about them.

This catastrophe has demonstrated once and for all time the fact that radio can be and is something more than entertainment!

Every type of radio communication rallied to the emergency and played a tremendous part in the battle against the flood. Police and aviation radio men did heroic work. Amateur radio operators covered themselves with glory, and demonstrated again that commercial broadcasting has a great reservoir of future engineers and technicians from which to draw.

More than anything else, the flood demonstrated that among the men of radio there is an esprit de corps of which every American should be proud.

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This Issue

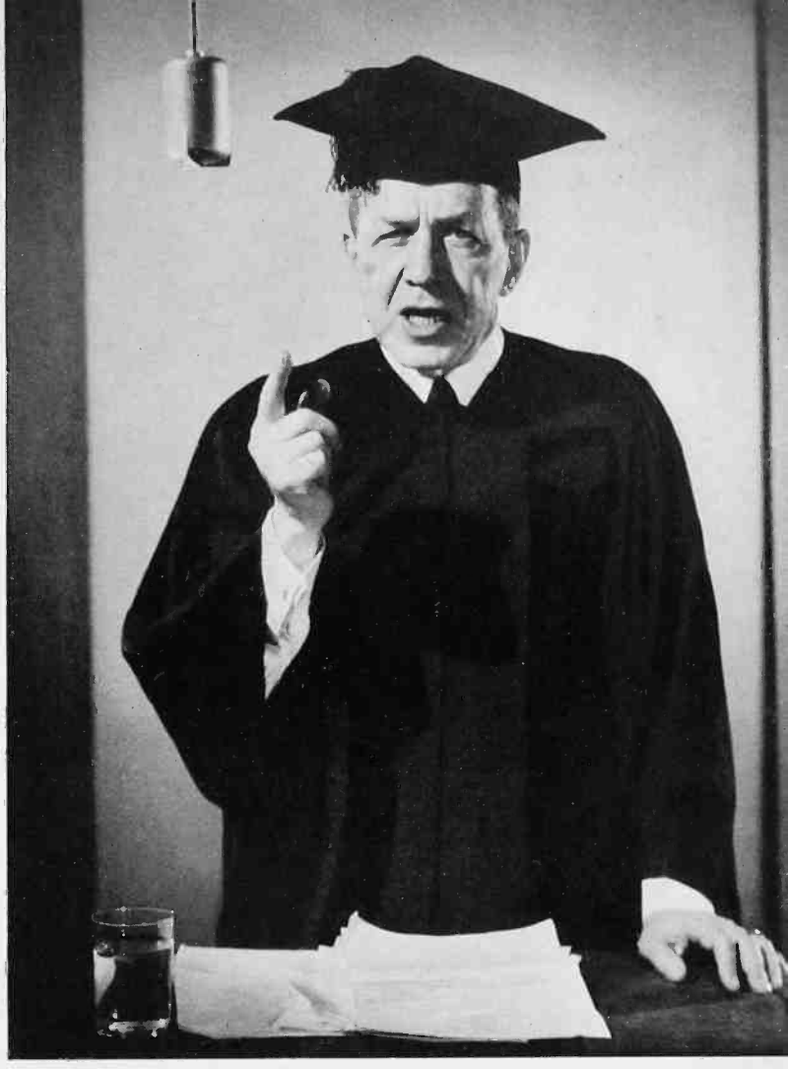
CAN
Education and Radio
TEAM?

Many Stations Show They Can and

Here's How

By

M. M. BEARD



What part does Radio play in Education? And conversely, what part does Education play in Radio?

Educators, scientists, engineers, federal, state and community officials in collaboration with broadcasters throughout the country are seeking the answers by putting radio to the test. More and more programs of an educational nature are winging over the air—standards of such programs are being raised and results checked. Meanwhile interested listeners by the millions are twisting their dials to discover just what radio has to offer as the great teacher of the air. Their silence or applause will, in a great measure, determine the future of educational broadcasts.

PICK-UPS has done some dial twisting of its own in the form of questionnaires sent to over 200 stations. It was like touching a spark to tinder—so prompt were the replies and so voluminous the reports received.

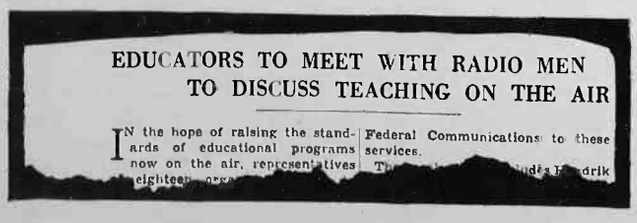
According to our survey there is scarcely a station in the nation that is not attempting to broaden or develop educational schedules. Health and Safety, Music, Art, Drama, Literature Appreciation, Home and Civic Interests, Travelogues and Current Topics and a miscellaneous assortment of other instructional programs are gaining favor in American homes. But heading the educational list are those broadcasts dealing directly with schools and colleges. They are numerous and far reaching.

From two great halls of learning come the programs of WILL (Urbana, Illinois) and KFKU (Lawrence, Kansas). The former speaks for the University of Illinois, the latter for the University of Kansas.

WILL, a pioneer in educational broadcasts, has been on the air since 1922. It is unique among educational stations in that more than 30 pick-up points on the campus are wired ready for use on short notice. Joseph F. Wright, director of public information for the university, is also station director.

In discussing radio as an educational medium, Mr. Wright says, "Radio will never supplant present formal teaching methods but it is a supplement to them. Broadcasts widen the service of the university to specific groups—study clubs, users of library service and correspondence students. At large institutions, especially state universities, there is found a source of general educational and informational material not available in any other center. On the staff are men of national and international reputation whose spoken word is likely to be the last word in authenticity. When they broadcast they are listened to willingly by those interested in the subject.

"When a newspaper editor will change his breakfast hour for a solid semester in order to listen to a radio discourse that broadcaster must have something to say that interests more than just this particular editor. When a group of club women will change the day of their meeting in order to hear dis-



EDUCATORS TO MEET WITH RADIO MEN
TO DISCUSS TEACHING ON THE AIR

IN the hope of raising the standards of educational programs now on the air, representatives Federal Communications to these services.

RADIO SERVICE OF THE MORNING OREGONIAN

1180 Kilocycles **KEX** NBC Blue Network

Radio Broadcasts

Direct to Portland Public Schools

Monday Mornings—11:00 to 11:15

Great Moments in History

A dramatization of outstanding Historical events especially prepared for school classes.

Tuesday Mornings—11:00 to 11:15

Geographical Travelogue

Will Travel sees the world in a special broadcast for the geography classes.

Wednesday Mornings—11:00 to 11:15

NATURE TRAILS

Herbert Lampman, well-known Portland naturalist and writer, in a special broadcast

Friday Mornings—11:00 to 11:1

CURRENT EVENTS

News of the week giving historical happenings in the present-day world.

C. S. Time

K F K U 1220 Kilocycles

University of Kansas

RADIO DEBATES

AND

DISCUSSIONS OF DEBATING AND THE GOVERNMENT OWNERSHIP AND OPERATION OF ELECTRIC UTILITIES QUESTION

Provided by

PROF. E. C. BUEHLER, DIRECTOR OF FORENSICS

Oct. 9—2:30 p. m. — ANALYSIS OF THE DEBATE QUESTION, Professor Buehler.

Oct. 16—2:30 p. m. — INTERVIEW, between Professor Buehler and James Molby, freshman debate coach.

Oct. 23—2:30 p. m. — DEBATE: Will Government Ownership and Operation of Electric Utilities Bring Lower Costs and Improved Service?

Oct. 30—2:30 p. m. — DEBATE: Will the Proposed Measure Give Us Improved Social Conditions?

Nov. 6—2:30 p. m. — DEBATE: Is the Affirmative Proposal a Practical One?

Nov. 13—2:30 p.m. — ROUND TABLE DISCUSSION, Mr. James Molby, chairman; participants, members of the University Debate Squad.

Nov. 20—2:30 p.m. — DEBATE: Resolved, That there should be Government Ownership and Operation of Electric Utilities; Kansas State College vs. University of Kansas.

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To New England Through

WTIC—Hartford
WCSH—Portland
WTAG—Worcester
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Tuesdays and Thursdays at 9:15 A.M.

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conducted by

MARJORIE MILLS

Boston's best known newspaper and radio home service economist, whose Herald and Traveler page is an institution among New England women.

The following clients are yearly renewals to this service;—Oakite; Corn Products; Oxo; Tetley's Tea; White House Coffee; Peter Pan Salmon; and Mueller's Macaroni.

Listen to the Homemaker's Council Broadcasts and give the family a big surprise with a new recipe by Marjorie Mills.

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RADIO STATION

K R O W

ANNOUNCES THE

"KROW NEWSPAPER OF THE AIR"

Foreign - National - State and Local News

FIVE DAILY FIFTEEN MINUTE EDITIONS

8:15 A. M.

12:00 Noon

6:00 P. M.

ONE SUNDAY EDITION — 6:00 P. M.

9:00 P. M. and 11:45 P. M.

"HOT NEWS FLASHES"

EVERY HOUR ON THE HOUR

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DAILY FROM 8:00 A.M. TO 12 MIDNIGHT

The "**KROW** NEWSPAPER OF THE AIR" features the **complete** release of UNITED PRESS, consisting of the most vital news of the day — **as it happens.** The news is crisply written, expertly edited, fully authenticated, and is presented without distortion or partiality.

MRS. H. CHILDS HODGENS

(President—Philadelphia Federation of Women's Clubs and Allied Organizations)

THE FIRST OF THE FALL SERIES OF PROGRAMS DISCUSSING CURRENT WOMEN'S CLUB ACTIVITIES UNDER DIRECTION OF MISS MARGARET LENNING, PRESIDENT OF THE CIVIC CLUB, THE PROGRAMS ARE CONDUCTED BY CAROLYN ANN CROSS

TODAY

WIP

11:00 A. M.

610 KC.

ABOUT . . . YOU LI

THE

"RADIO KITCHEN"

. . . featuring . . .

Arlien Betty Colón

- A home economics program that is "TRULY DIFFERENT".
- Broadcast direct from KROW's ultra-modern, scientifically designed, all electric, "RADIO KITCHEN."
- Where recipes are tested for perfection and presented by a former radio representative of the United States Dept. of Agriculture.

"MEET THE AUTHOR"

EVERY TUESDAY BEGINNING

NOVEMBER TENTH, NINETEEN HUNDRED AND THIRTY-SIX

WEEI at 4.15

EMILIE LORING
RUSSELL GORDON CARTER
WILLIAM DANA ORCUTT
EDWARD WEEKS
SARA WARE BASSETT
ELEANOR EARLEY
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CONDUCTED BY

HORACE J. GARDNER

(RENOWNED AUTHOR AND BOOK CRITIC)

3:45 P. M. WIP TODAY

610 KC.

cussions by an authority in another field, that man must have a message of more than local interest. When a college graduate, out of school 20 years, writes to say that book reviews and the reading of the daily storybook come into her home with grateful thanks because there is no library within several miles of her home, there must be hundreds of others in similarly isolated places."

At present a series of weekly health dramas, presented by a mid-western chain of 21 stations, is being prepared by George E. Jennings, production director of WILL. This method of presenting information—dramatizing the facts—is used regularly by this station. Direct lectures by experts is another method. A third is broadcasting direct from University of Illinois classrooms or lecture halls. Student announcers and program personnel are chosen only after careful auditions and must conform to a high program standard. With a student body of 11,806 and 1,738 persons on the university staff, the radio station can be "choosey" about what and whom it puts on the air. Special training in preparation and presentation of radio programs is one of the courses offered this year.

In Mr. Wright's opinion audiences of educational stations have increased many fold in the last three or four years because the general standard of educational broadcasts has been raised.

KFKU, although on the air only a limited time each day, manages to crowd in a series of interesting and meaty broadcasts. The "School of Education" sponsors two programs each week. One on "Educating Yourself," is addressed to the general radio public, the other is directed primarily to the Kansas Congress of Parents and Teachers. Dr. Bert Nash, president of the State Mental Hygiene Society, talks twice a month on these broadcasts.

Foreign language lessons offered by KFKU receive much favorable comment. The department of speech and dramatic art schedules two of the most popular programs the station carries. These include a series of episodes dramatizing Kansas history and a program of request readings. The readings, given by Professor Robert Calderwood, include a wide range of poets' works—from Shakespeare to Eugene Field. Faculty members and advanced students present four musical programs each week featuring the University of Kansas symphony orchestra, band, glee clubs, a capella choir, string quartet and chamber music ensemble. News flashes, Athletic Scrapbook, book reviews, debates, music appreciation period and programs sponsored by high schools complete KFKU's broadcasting schedule.

WLW (Cincinnati) and WHK (Cleveland) carry broadcasts of the well known "Ohio School of the Air," founded and directed by Ben H. Darrow in 1928. Broadcasting talent comes from many sources—from schools and universities, public libraries and museums, art, dramatic and musical organizations, from various state departments as well as the Ohio Senate and House of Representatives. WLW also schedules a weekly broadcast from the University of Cincinnati which includes talks by department heads and discourses on adult education.

WHK, one of the oldest stations in the country, has been educationally minded for some years. Last year 20 percent of the station's time was devoted to programs of this type. Its directors believe that although many broadcasters are anxious to bring the activities of schools and colleges to the radio audience the programs in most cases are lacking in the tempo of radio production. WHK discussed the problem in open forum with music supervisors of the Northeastern Ohio Teachers Association. Difficulties of the educators and broadcasters were ironed out and as a result a series of high school programs is going out over the air from WHK, far superior to those previously broadcast. Says WHK, "Radio has a place in our educational systems, both state and national, and in order to keep pace with the times, one cannot do without the other."

WJAY, sister station of WHK, carries a weekly high school program with pupils participating. Vocal, instrumental and dramatic groups take their places at the microphone as does the president of the school's student council speaking in behalf of his student body.

University of Notre Dame students have stepped backstage in the radio theatre and are operating a studio of their own. For these embryonic broadcasters the WSBT-WFAM combination, owned by the *South Bend Tribune,* South Bend, Indiana, has set up complete studio equipment. The room has been acoustically treated, a control room partitioned off, in which a complete speech-bay including high fidelity program amplifier, four channel mixer, monitor amplifier, talk-back and microphone pre-amplifiers have been installed. The equipment is manned entirely by a student organization under the supervision of the Rev. Eugene Burke. The staff consists of student announcers, production men, operators and publicity writers. The organization, just getting under way this year, is at present on the air three hours a week. Broadcasts feature talks by faculty members; student vocalists; instrumentalists; dramatic programs enacted and produced by students.

A similar experiment is being conducted by KGGF (Coffeyville, Kansas) in connection with public schools. Weekly programs featuring work of the senior and junior high and grade schools are broadcast direct from studios in the high school building. These are presented in round robin fashion, a different school participating each week. Student "engineers" handle the remote control equipment. Enthusiasm runs high and through this contact a

(*Continued on Page 24*)

4 Watts at 600 Mc.—The 316A

Small "Doorknob" Tube Reaches New Limits in Ultra-High Frequencies

By C. E. FAY

Vacuum Tube Development,
Bell Telephone Laboratories

Development of radio communication at ultra-high frequencies has proceeded with such rapidity that whereas a few years ago the range of frequencies from 30 to 100 megacycles was practically unexplored, today experimental activity extends to much higher frequencies. The 304B tube—described in the July, 1936, issue of PICK-UPS—is suitable for frequencies up to 300 megacycles, and considerable experimentation at these frequencies has been carried on, but beyond 300 megacycles very little has been done. Heretofore, the only sources of power at the very high frequencies, corresponding to wavelengths of less than a meter, were tubes of either the electron-oscillation or magnetron types.

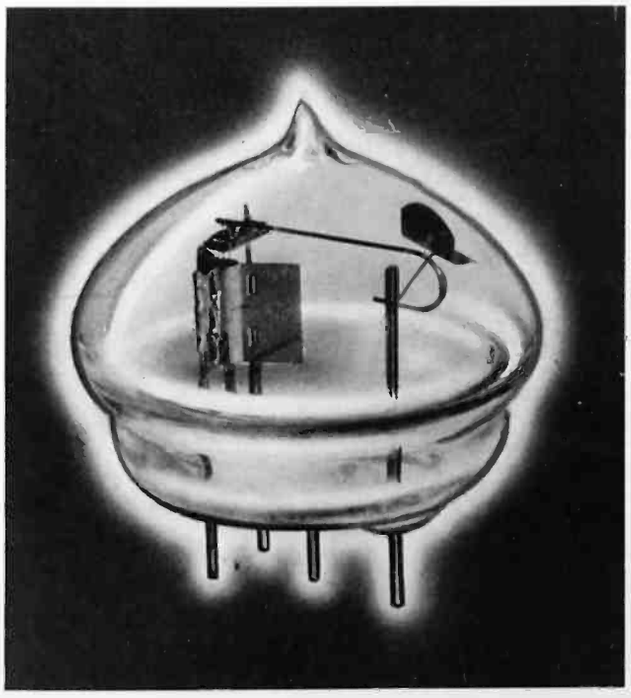


Fig. 1.—New realms in ultra-high frequencies may be explored with this unusual tube, the 316 A.

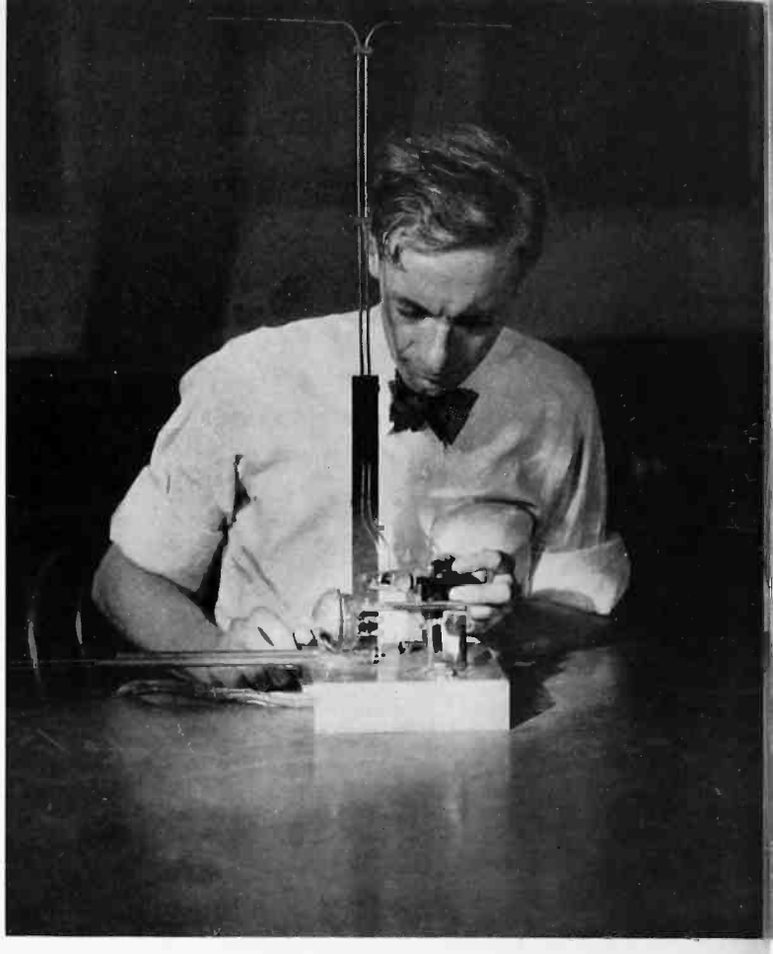


Fig. 2.—Six watts can be radiated from the transmitter using the 316A. It oscillates at a frequency of 500 mc., and has a power output of six watts.

Both of these types of tubes are under rather severe disadvantages compared to the more usual type of vacuum tube, since they require critical adjustment which is hard to maintain. The electron-oscillation, or Barkhausen tubes, moreover, are characterized by rather low efficiencies; and the magnetrons require a magnetic field of considerable intensity, which results in rather large and heavy equipment, and additional power supply. To avoid these difficulties at the high frequencies, a new tube of the ordinary negative-grid type has recently been developed, known as the Western Electric 316A. Although of lower power rating than the 304B, it may be used for frequencies as high as 600 megacycles, corresponding to wavelengths of half a meter.

This new triode, shown in Figure 1, is of radically different design compared to what has heretofore been standard practice. The conventional base has been completely eliminated, and the leads—in the form of tungsten rods—are brought out through a molded-glass end plate, which is part of the tube envelope. Circuit connections are made by means of brass sleeves that slip over the tungsten rods and are fastened to them by set screws. Soldering is not recommended because of the high operating temperatures.

Within the tubes, the electrodes are mounted directly on the tungsten leads and as close to the glass as feasible, so as to hold the inductance and resistance of the leads to minimum values. To

attain short electron-transit time, and also to keep the inter-electrode capacitance within bounds, the electrodes have been made very small. The cylindrical plate is only an eighth of an inch in diameter. The necessity for the small size is evident when it is realized that at 600 megacycles, one micro-microfarad has a reactance of only about 260 ohms. The smaller the size, on the other hand, the more difficult it is to dissipate the heat from the electrodes.

To avoid heating difficulties arising from the very small size of the tube elements, the plate is provided with three large radial fins, and the material is roughened to assist further in heat radiation, with the result that 30 watts, plus an additional seven watts used to heat the filament, may be readily radiated. The filament is a single strand of thoriated-tungsten wire passing along the axis of the plate cylinder. The grid requires an unusual design to obtain proper functioning in the restricted space available. For efficient operation, electron emission from the grid must be prevented, and this requires that its temperature be kept relatively low.

Instead of employing the conventional helical winding, the grid is of the cage type, with vertical rods connecting to collars at each end. This construction not only permits the heat generated in the rods to be readily conducted to the end collars, where it can be effectively radiated, but provides an electrode of low inductance and resistance to the flow of high-frequency currents. The entire grid structure is blackened to improve its heat-radiating properties and to prevent the emission of electrons from it. No solid dielectric is used inside the tube envelope except a small piece holding the grid in alignment, which is nominally at grid potential and avoids a closed loop in the grid-supporting structure, which might absorb high-frequency power. Nonex glass is used for the tube envelope to avoid softening at the high temperatures.

It is hoped that this new tube will assist materially in the study of radio transmission in the ultra-high-frequency region, and in the utilization of this region for general communication. Antenna dimensions at these short waves are very small; the length of a half-wave doublet antenna at 500 megacycles is less than a foot. An oscillator circuit arranged for plate modulation is shown schematically in Figure 3, and as actually built, in Figure 2. A power pentode, such as the Western Electric 312A, which could be driven by a carbon microphone through a transformer, would provide sufficient power for modulation. Six watts can be radiated from this transmitter. Suitable receivers can be made using tubes already available, so that many uses will undoubtedly be found for these ultra-high-frequency channels.

Because of its low capacitances and lead inductances, this new tube is very useful for ultra-high-frequency measuring equipment. It also affords a convenient and adequate source of power for experiments with antennas and radiating systems, which may be built at very little cost, and is suitable for variable-frequency apparatus at frequencies above 300 megacycles.

Filament Potential	2.0 Volts
Filament Current	3.65 Amperes
Average Interelectrode Capacities	
Plate to grid	1.6 mmf.
Grid to filament	1.2 mmf.
Plate to filament	0.8 mmf.
At a Plate Potential of 450 Volts and Plate Current of 67 Milliamperes	
Amplification factor	6.5
Transconductance	2400 micromhos
Plate resistance	2700 ohms
As an Oscillator or Amplifier—plate modulated	
Maximum direct plate potential	400 volts
Maximum direct plate current	80 milliamperes
Maximum direct grid current	12 milliamperes
Maximum plate dissipation	30 watts

Nominal Power Output Obtainable

Frequency—Mc.	Power Output—Watts
300	8.5
400	8.0
500	6.5
600	4.0
750	Limit of oscillation

Characteristics of the 316A. Note that at even 600 mc. the tube has a power output of four watts.

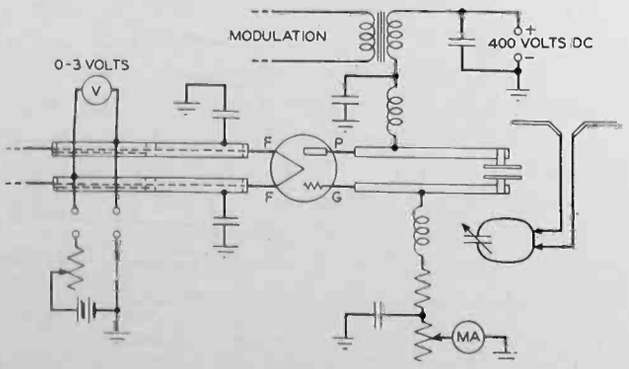


Fig. 3.—Here's the circuit for the transmitter shown in the photograph in Figure 2. The transmitter is intended for plate modulation.

Mount Vernon, N. Y., Gets Police Radio

The Board of Estimate and Supplies of Mount Vernon, N. Y., has awarded a contract to the Graybar Electric Company for a Western Electric ultra-high-frequency police radio system consisting of a 50 watt, 16B Transmitter, a station house 19A Receiver, and 25 car receivers. Operation of the system is expected to start sometime in March.

Radio Studio | Remote Pick-up | Public Address

The "Salt-Shaker," a New Microphone

Like the "Eight-ball," the 633A Is Directional and Non-directional; Baffle Slips on or off with Ease

When the 630A microphone first made its appearance over a year ago, it caused much interesting discussion. Because of its spherical shape, small size, and black coating it was immediately dubbed the "Eight-ball." And now that radio men have become accustomed to this eight-ball, a new dynamic microphone, the 633A, makes its appearance.

This 633A mike is made in the shape of a cylinder, two inches in diameter and three inches long, with a perforated shield forming a cap at one end. The unusual shape has already earned for it the name "Salt-shaker." It may be used in three different mountings—desk stand, floor stand, and hung by the speech cable. This make the Salt-shaker an unusually flexible and versatile microphone.

In the development and manufacture of this "salt-shaker" one goal has been kept in view—low cost; but low cost without sacrifice of quality or ruggedness. This has been achieved by careful design of every component. The diaphragm alone represents an outstanding achievement of Bell Telephone Laboratories, and the special process developed for assembling the diaphragm and magnet structure has radically reduced the number of parts ordinarily required for an instrument of this type.

The "salt-shaker," by the way, has two separate and distinct frequency responses. In the non-directional position and without the baffle, the microphone's response is fairly well balanced around an output level of —90 db throughout the entire range from 40 to 10,000 cycles. When tilted to the directional position and equipped with the baffle, the microphone has an increase in sensitivity in the range from 1,000 to 3,000 cycles. Analyses of articulation tests show that this is the region most critical for intelligibility of speech.

The new microphone has gained popular acceptance in the public address field. Because of its directional response, with the baffle attached, it is particularly useful in this field, where feed-back is always a problem. Restaurants, hotels, schools and other users of public address equipment now recognize the importance of high fidelity in their sound systems. The popularly priced 633A is the answer to the demand for a quality microphone of low cost for this field.

Radio broadcasting stations have welcomed the "Salt-shaker" for remote pick-up work. This sturdy little instrument has shown that it is able to "take a beating" and still operate with perfect fidelity. Its directional baffle makes it ideal for broadcasting sports events, meets and gatherings of all kinds, where back-ground noise, echoes and reverberations can be minimized by merely pressing the little disc into place.

Broadcasting stations are also using the "Salt-shakers" as occasional microphones for short "spot" broadcasts or announcements, or for spare or emergency microphones. For these or other cases where the extremely high fidelity of the more expensive 630A is not necessary, but where high quality and definite response are still desirable, the 633A will fill the bill.

And as salt, sprinkled on the tail of a bird, will capture it unharmed (so they say), so also a "Salt-shaker" placed in the path of bouncing sound waves will capture them and pass them on whole and unchanged.

One Man's Hobby Grows Into Network

John Shepard Started in Radio in 1922; His Chain Now Covers New England

In 1922, WNAC, Boston, was just one man's hobby but a hobby destined to become the nucleus of one of the leading broadcasting networks in the country. It was John Shepard, 3rd, now president of the Yankee and Colonial Networks, who rode the hobby—rode it so enthusiastically and efficiently that today WNAC is the key station for a broadcasting chain whose stations are located in the major New England cities.

Originally located in the Shepard store in downtown Boston, WNAC consisted of two studios, a control room, a "clothes-line" antenna on the roof and a third studio on the ground floor operated as WBIS—the shopping service station—forerunner of the shopping service program now heard on the Yankee Network.

On January 4, 1923, Boston listeners were treated to a unique program—the first chain broadcast in the history of radio. It was the forerunner of the coast-to-coast and continent-to-continent broadcasts of today. The program originated in New York at WEAF, then owned and operated by the American Telephone and Telegraph Company and was sent by direct wire to WNAC, Boston.

On September 18, 1927, WNAC became a basic member of the Columbia Purple Network which later became the Columbia Broadcasting System. WEAN also joined the network on the same day. Fifteen stations throughout the country, east of the Mississippi, formed the chain.

In conceiving the plan of joining various New England communities by radio, John Shepard's idea was to reach the greatest possible listening audience at the least possible expense. Shortly after the linking of WNAC and WEAN the network began to weave its way over New England. From 1930 to 1935 ten stations joined the chain.

In the meantime WAAB had become the alternate key station of the Yankee Network. Tracing WAAB's history is as difficult as fitting together the pieces of a jigsaw puzzle. For during the first eight years of operation the station led a nomad existence—forever changing its name and bobbing up in different towns and cities. In 1923 Providence was its home and WSAD the call letters. When John Shepard purchased the outfit in 1931 it was located in Lexington and known as WLEX the "Voice of the Minute Man." And surely no minute man ever covered more territory than did WLEX in its wanderings.

Under the Shepard management the station received the call letters WAAB. Studio and staff moved from Lexington to Boston to occupy quarters with WNAC while the transmitter equipment was installed in the same building with WNAC at Squantum, Mass. On August 7, 1931, WAAB started operating, bringing into action the first commercial, single-tower, half wave, vertical antenna broadcasting WNAC and WAAB programs simultaneously on different wave lengths.

On January 1, 1932, WAAB became a basic member of the Columbia Broadcasting System with WNAC the alternate Columbia outlet in Boston. For four years, 11 stations throughout New England were served with programs from the two key stations WNAC and WAAB. In the fall of last year WNAC became the Boston outlet of the National Broadcasting Company's basic Red Network and the key station of the re-aligned Yankee Network for 10 New England stations. At the same time WAAB became a basic member of the Mutual Broadcasting System and key station of the newly organized Colonial Network serving 12 stations scattered from Bangor to Bridgeport. This web of Yankee and Colonial Network stations manned by over 800 people completely covers New England and claims a listening audience of well over 6,000,000 persons.

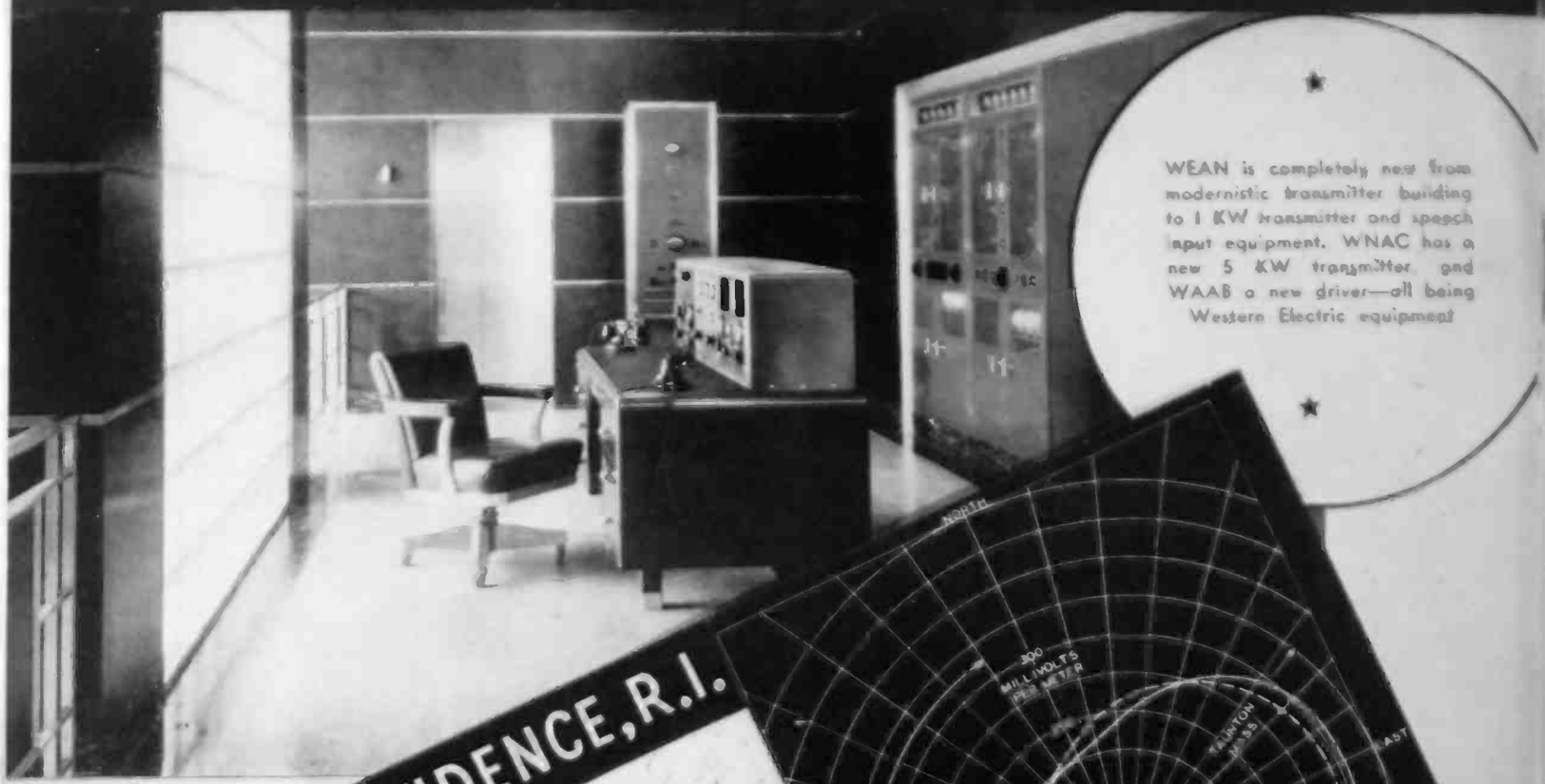
Today, with WNAC as key station, the Yankee Network includes the following stations: WTIC, Hartford; WEAN, Providence; WTAG, Worcester; WICC, Bridgeport; WCSH, Portland; WLBZ, Bangor; WFEA, Manchester; WSAR, Fall River; WNBH, New Bedford; WLLH, Lowell; WLNH, Laconia, N. H. and WRDO, Augusta. The Colonial Network with WAAB as key station includes WEAN, Providence; WICC, Bridgeport; WSAR, Fall River; WSPR, Springfield; WLBZ, Bangor; WFEA, Manchester; WNBH, New Bedford; WTHT, Hartford; WLLH, Lowell; WBRY, Waterbury; WLNH, Laconia; and WRDO, Augusta.

In contrast to WNAC's original two studios 15 years ago—WNAC and WAAB now located in the heart of Boston occupy one of the most modern broadcasting headquarters in the country. On the staff are over 200 artists, announcers, technicians, operators and office workers. Last year WNAC installed the new high fidelity Western Electric transmitter at Squantum and the station power was boosted to a new high with a daytime power of 5000 watts.

Under the guidance of John Shepard WNAC-WAAB have led in many fields. On March 1, 1934, Mr. Shepard organized the Yankee Network News Service, a service which has since been extended to include the Colonial Network. This was the first

(*Continued on Page 22*)

★ ★ ★ ★ YANKEE NETW



WEAN is completely new from modernistic transmitter building to 1 KW transmitter and speech input equipment. WNAC has a new 5 KW transmitter and WAAB a new driver—all being Western Electric equipment

Transmitter room at WEAN

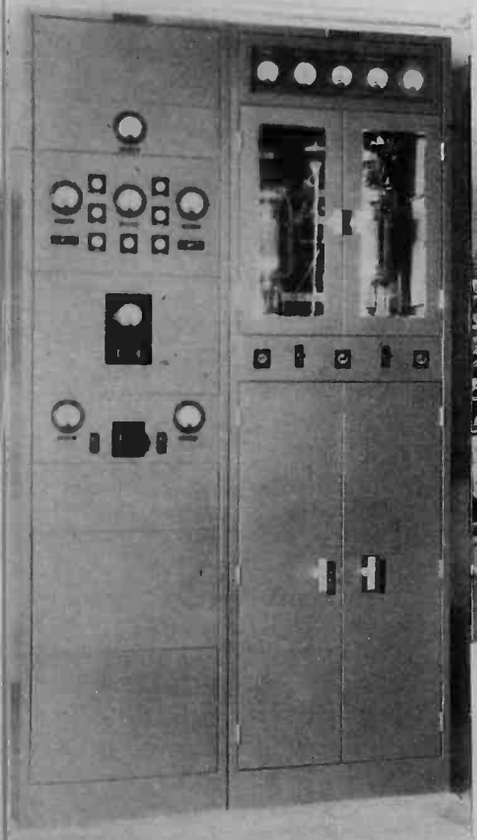
WEAN ★★ PROVIDENCE, R.I.

WEAN's unattenuated field intensity at one mile

WEAN's twin grounded radiators

One of the two antenna coupl

ORK STATIONS ★ ★ ★ ★



Five hundred watt Western Electric Ultra - High - Frequency Transmitter

Four signals radiate from this mast

Twin doghouses for WNAC and WAAB

WNAC ★ WAAB ★ BOSTON, MASS.

Yankee Network operates four transmitters at Boston —WNAC, WAAB, and two Ultra-High-Frequency radio transmitters

WNAC's 5 KW Western Electric transmitter

J. S. Dodge, transmitter supervisor, checking antenna current at WNAC

Grounded radiator for WNAC, WAAB

KFBB Climbs to Prominence With New 5 KW and Network Affiliation

First Grounded Radiator Puts Out Strong Signal and Widens "Voice of the Treasure State"

The passing of 1936 marked the acquisition of two real treasures for station KFBB—the "Voice of the Treasure State," Great Falls, Montana. One took the form of a complete new transmitting ensemble consisting of a modern high fidelity 5 kilowatt Western Electric transmitter, housed in an attractive new fireproof building and a 430-foot vertical Blaw-Knox tower; the second—an affiliation with the Columbia Broadcasting System. Thus KFBB starts the new year fully equipped to give its listeners the best in broadcasting technique and a wide variety of excellent programs. This is the first station in the country to install the grounded radiator, a development of Bell Telephone Laboratories, described in the November 1936 issue of PICK-UPS.

Mrs. Jessie Jacobsen

The grounded radiator, better known as the Shunt-Excited Antenna, puts out a much stronger signal and contributes to a more efficient coverage of KFBB's listening area. Among other advantages interruptions of programs caused by lightning or static charges are greatly reduced.

In initiating the establishment of KFBB 15 years ago, F. A. Buttrey, a progressive business man of Havre, Montana, had in mind bringing to the isolated Montana farm and ranch communities the entertainment and educational features afforded by that still young "eighth wonder"—radio. Studio, office and 50 watt transmitter—all were located in one room on the second floor of the Buttrey store in Havre.

A major change came along in 1928 when the station was granted permission to increase its power to 500 watts. At the same time new studios and offices were built at the original location. Just prior to these developments Mrs. Jessie Jacobsen took the helm of KFBB in her capable hands and, as manager, began guiding the station along a road that steadily broadened as the years rolled by. She is one of the comparatively few women in the country today managing a broadcasting station.

It was the desire to keep her family around her that brought about Mrs. Jacobsen's association with radio. In order to be near her husband who was working in Havre, Mrs. "Jake," as she is known to her friends and associates, gave up a teaching job in Great Falls and eagerly accepted the offer to join the staff of KFBB. Up to this period the station had not become commercialized but Mr. Buttrey felt it was high time for this lusty youngster of his to contribute to its support. It therefore became Mrs. Jake's duty to look up advertising jobs to help carry station expenses.

In 1929 it was decided to move the organization to Great Falls to facilitate a wider coverage of the state and to strengthen the link between Great Falls, the industrial center of the Treasure Belt, and the surrounding agricultural territory. So it was that on October 1, 1929, KFBB, temporarily installed in the Park Hotel, became an integral part of the city of Great Falls. Less than two months later the station was granted an increase in power—this time to 2,500 watts and permission to operate full time.

It would seem that the wanderlust had entered KFBB, but not of the rolling stone variety, for with each move the station gathered more moss. In 1930 the organization again moved to better studios in the Medical Arts Building. Four years later new quarters were acquired in the First National Bank Building.

The modern Western Electric transmitting equipment and Blaw-Knox tower were installed and tuned for test programs under the expert supervision of John Morrison of Bell Telephone Laboratories and turned over to the care of John Parker, chief engineer of KFBB. Parker was formerly located at Kalispell, Montana, where he constructed the original station KGEZ. Buttrey Broadcast Incorporated obtained his services in 1931.

According to station officials the "Voice of the Treasure State" owes a debt of gratitude to two outstanding members of the staff—the young engineer and the capable woman manager who has played such an important part in KFBB's progress. Her success rather explodes the old idea that women are not particularly fitted to become leaders in the business world. Mrs. Jake is rightfully proud of this success but she is prouder by far of her two charming daughters and her fine six-foot son.

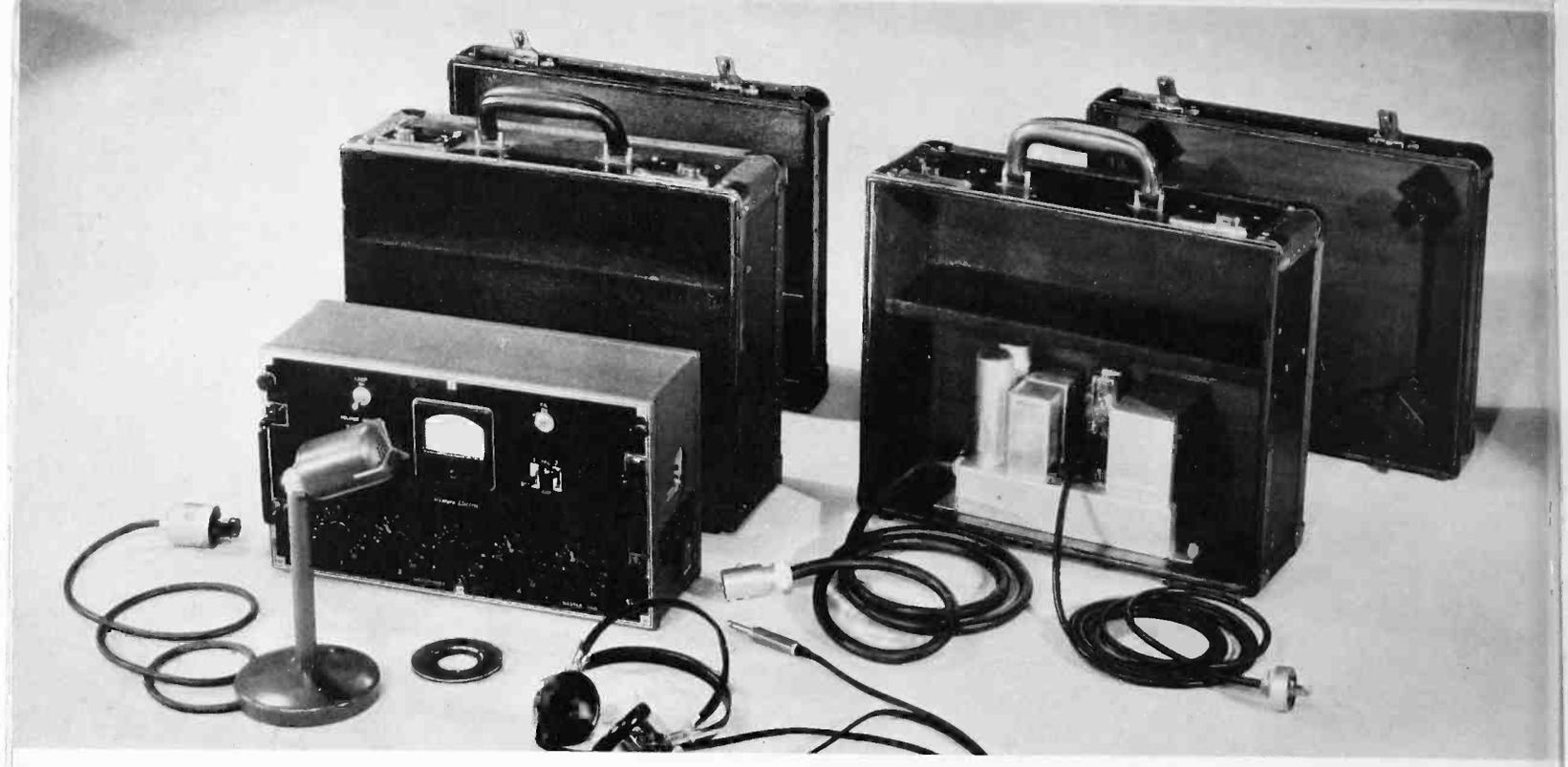
KFBB GREAT FALLS, MONTANA

To KFBB goes the honor of having the first Shunt-Excited Antenna—it is 450 feet high

New transmitter building

John Parker, chief engineer, at the control desk in the transmitter room

Transmitter room showing at right the new Western Electric 5 KW transmitter



Paired for Remote Pick-ups—The 633A Microphone and the 22A Portable Speech Input Equipment.

Modern Speech Input Equipment

Introduction by Western Electric of the 22A and 23A Speech Input equipment to the radio broadcasting field makes available two newly developed units, incorporating stabilized feedback, which have long been needed. The 22A is a really portable complete speech input unit which can be used in any remote pick-up situation, no matter how difficult. It can be operated even in complete darkness. The 23A is an entirely new idea in units, especially suitable for studio and semi-permanent remote installations where its high grade performance, compact assembly, ease of installation and the absence of inter-bay wiring make it ideal.

The 22A weighs less than 50 pounds, and, fitted into two compact luggage type carrying cases, may easily be carried and set up anywhere by one man. The power supply case is arranged to contain either a 115 volt 50-60 cycle AC power unit, or batteries, with ample space to carry both of these power supply equipments at the same time if desired, plus all connecting cables. The Amplifier-Control unit 9 inches by 15 inches by 5 inches in dimension and weighing only 15 pounds is easily slipped from its carrying case, and if space is restricted may be held on the lap of the control technician, the internally illuminated volume indicator giving excellent visibility for control purposes.

Stabilized feedback design, a development of Bell Telephone Laboratories, insures a standard of high fidelity performance that has been available heretofore only in larger equipments. The following are some of the 22A's outstanding performance features: A frequency response flat from 30 to 10,000 cycles; amplifier capable of delivering program levels as high as 6 db above 6 milliwatts (zero level); maximum gain of amplifier approximately 92 db; 600 ohm or 150 ohm output impedance allowing for a degree of line equalization; a maximum of control facilities through provision of four microphone mixing circuits plus master gain control; jacks for two monitoring headsets.

The 23A Speech Input Equipment is a new departure in program production units and is a novel fulfillment of the need for a complete, compact, single unit speech input for studio service.

(*Continued on page 20*)

The 23A—For Studio Work.

Giant Sound System in Kansas City Auditorium Makes Multitudes Hear

High-Fidelity Reproduction in Main Arena, Seating 13,000, is a Feature of Big Installation

To engineer and install a public address system which would carry voice or music throughout the mammoth Kansas City auditorium in which were to be housed a huge arena, music hall, exhibition hall, "little" theatre and various committee rooms was the job engineers tackled some months ago. In addition, the system had to be so constructed that voice or music could be fed into lines connecting to broadcast stations and thus placed on the air by radio.

Here was a project far more intricate than planning a system for one large auditorium or amphitheatre as the numerous halls and chambers vary greatly in seating capacity and cubic feet. The main arena seats 13,000 persons within a space of 4,469,500 cubic feet; the music hall—3,000 in 700,000 cubic feet; the "little" theatre—600 in 74,214 cubic feet; committee rooms about 200 each with an average cubic foot measurement of 2,400; exhibition hall—1,389,000 cubic feet.

A central distribution point in the form of a group of high-powered loudspeakers in a "projectoler" was suspended from the center of the ceiling in the main arena. It overcomes any annoying result of interference from several smaller-powered sound sources at various points throughout the arena. This large unit, which includes several low-frequency and high-frequency sound projectors, so as to cover the entire audio-frequency range, literally sprays sound throughout the large auditorium from a central point. Difficulties resulting from timelag interference or echo effects are thus eliminated. Those seated at the far end of the huge arena can hear a speaker on the rostrum as clearly as though they had ringside seats.

The amplifiers used in the central installation have a total capacity of 300 electrical watts of undistorted output and can be divided into two channels or combined in one channel. Elaborate monitor controls are provided for the main auditorium as well as the music hall, the "little" theatre and the committee rooms. These controls may be tied together for performance in unison or may be operated independently for local performances.

The beautiful auditorium building is equipped for practically all types of entertainment, for, in addition to the public address system, the sound installation includes complete talking picture equipment capable of presenting the best in screen productions. Western Electric equipment is installed in the projection booth at one end of the main auditorium and the newest "Mirrophonic" talking picture loudspeakers are provided behind the screen at the opposite end of the auditorium. The power amplifiers of the public address system also serve for the sound movies. By means of special monitor and control devices operators may regulate the sound to suit the audience present. A similar arrangement is provided in the projection booth of the music hall.

Engineers of Electrical Research Products made a comprehensive study of the acoustical characteristics of the huge building and engineered the entire public address system to meet rigid acoustic requirements that were found necessary in order to secure quality reproduction in connection with high fidelity sound.

Descriptions of other public address systems have found their way into PICK-UPS' pages—the San Diego Exposition system—Jumbo's "Big Voice" at the New York Hippodrome—the Roosevelt Raceway equipment—the mammoth system at the Texas Centennial—but never has a more flexible or extensive sound installation been undertaken than the one now operating in Kansas City's palatial auditorium.

●

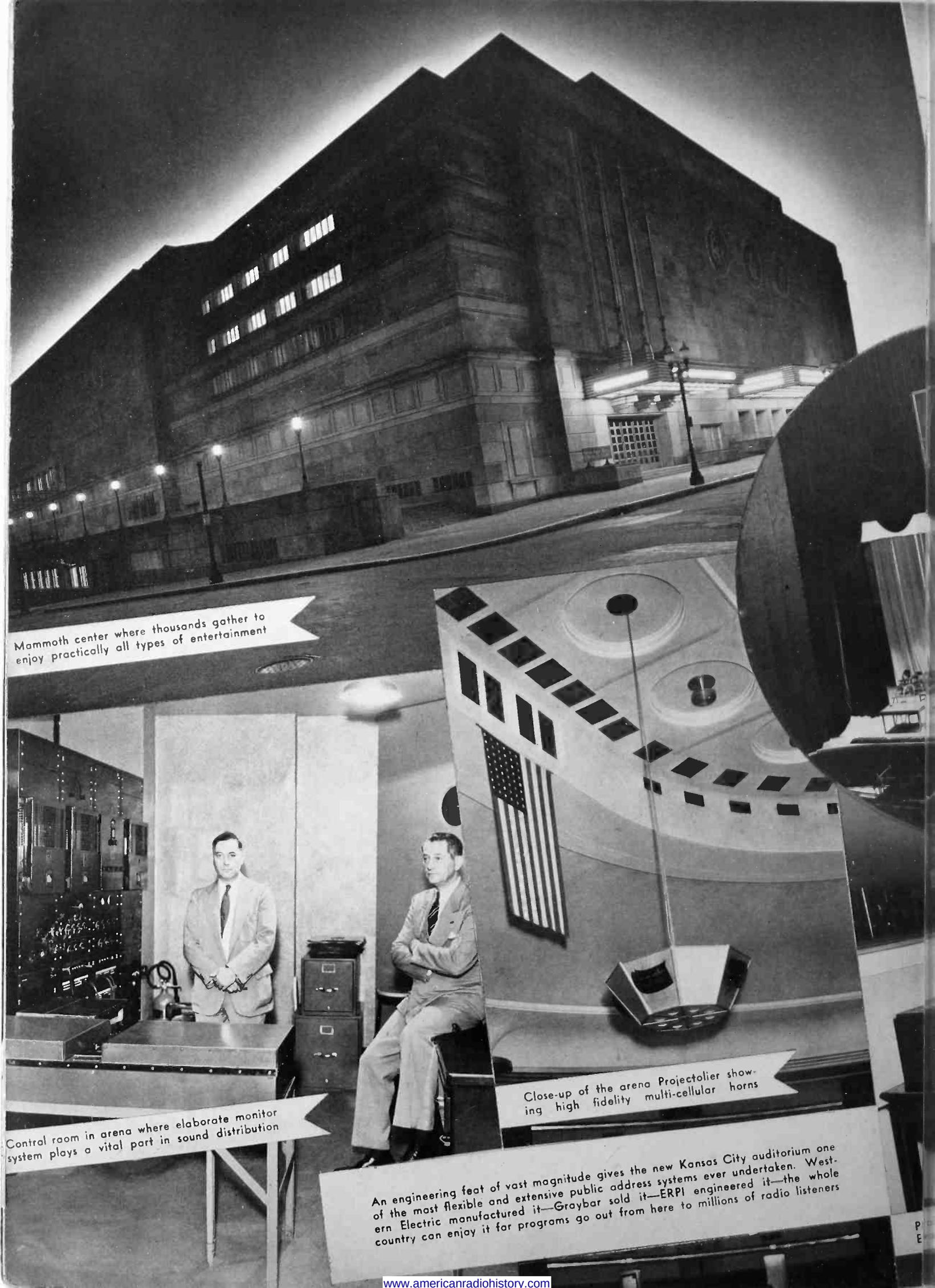
Turn to two following pages for pictorial presentation of the Kansas City Auditorium.

●

Tube Going Strong After 50,000 Hours

From station KXL, Portland, Oregon, comes news of a Western Electric 212 D that has been on the air over 50,000 hours. This veteran performer originally came to the station with a composite transmitter from KHQ, Spokane, in 1928. With the exception of five months the tube has been continuously on the job and is still in use as a modulator in the 250 watt composite transmitter.

After many thousands of hours of normal operation, when the filament emission began to drop, the filament voltage was raised from the normal 14 volts to 15, 16 and finally 16½ volts. From all indications the tube is still going strong and is good for another year's operation.



Mammoth center where thousands gather to enjoy practically all types of entertainment

Contral room in arena where elaborate monitor system plays a vital part in sound distribution

Close-up of the arena Projectolier showing high fidelity multi-cellular horns

An engineering feat of vast magnitude gives the new Kansas City auditorium one of the most flexible and extensive public address systems ever undertaken. Western Electric manufactured it—Graybar sold it—ERPI engineered it—the whole country can enjoy it for programs go out from here to millions of radio listeners

NEW MUNICIPAL AUDITORIUM

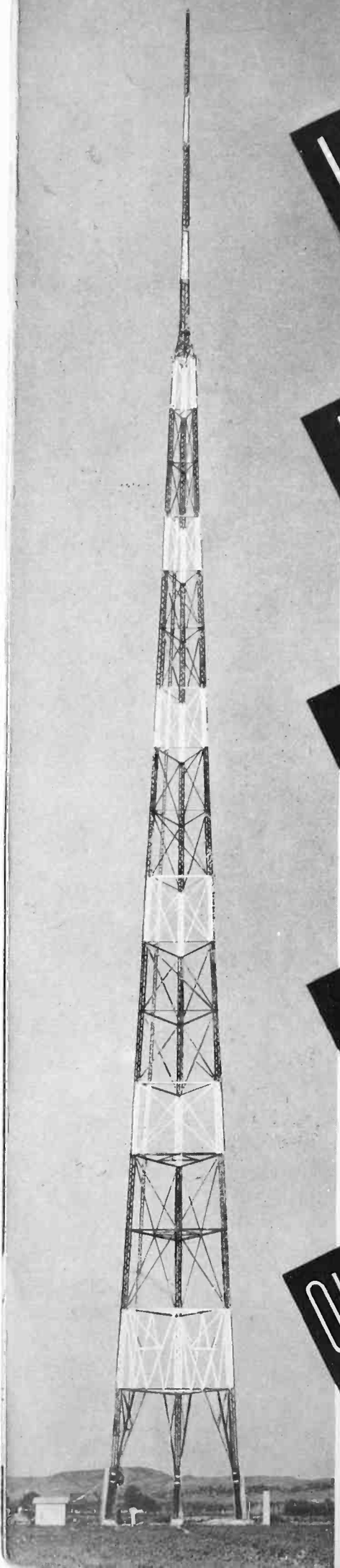
KANSAS CITY, MO.

Giant projectolier sprays sound to 13,000 people in arena. Circle: Projectolier in Music Hall

e volume control and switching cabinet with Roche, public address operator, at controls

Combined panels containing public address and ERPI switching equipment and amplifiers

Amplifiers in main control room have a total capacity of 300 watts of undistorted output



New antenna, one of the tallest self-supporting towers in New York State

WHDL

Chief Engineer Hathaway checks new Western Electric 310 B transmitter—Operator McDowell works at controls

First all glass transmitter building in the country

Leonard L. Hofmann, station director. Above: Hubert M. Hathaway, chief engineer

OLEAN NEW YORK

John T. Dowdell, operator

David W. Jefferies, operator

Warren E. McDowell, operator

WHDL Triples Listening Area with New Western Electric Installation

First All Glass Transmitter Building In the United States Houses Ultra-Modern 310 B Transmitting Equipment

For a youngster WHDL, Olean, New York, is expanding so rapidly and putting on such airs that its guardians, the Olean Broadcasting Company, are half distracted keeping their protege properly attired in transmitting equipment and studios. Practically over night it outgrew its 1936 outfit and had to be measured hurriedly for a new 310B Western Electric transmitter as well as one of the tallest self-supporting antennas in New York State. That's WHDL for you —always wanting the best of everything. You'd think it had been born to the royal purple instead of which, it let out its first howl in a dingy back room of a small electrical repair shop at Tupper Lake, New York. And a howl it was—if you ask some listeners.

However, these meager quarters were adequate to serve little WHDL's needs at the time, for the revenue from business done would barely buy blue pencils for the editorial desk today. With a handful of borrowed records the station launched its initial broadcast. Somehow right from the beginning there just was no keeping that youngster down—must have been personality or something. It kept on the move until it finally reached a suite of rooms in the Exchange National Bank Building at Olean. More than likely, the audience spoiled the child—applauding everything it did.

Now WHDL has nine studios—located in the Bank Building, at St. Bonaventure College and at Bradford, Pennsylvania. In addition there are some 30 remote points such as churches, theatres and hotels. These complete one of the most extensive layouts in program facilities of any station of comparable size in the country. Quite an outfit for a station that goes to bed at sundown.

And, if you please, WHDL has the first all-glass transmitter building in the United States. Seven thousand hollow glass blocks were used for the walls of the structure. Because the air has been almost completely exhausted from the blocks the insulating value of the wall, four inches thick, is said to equal that of 16 inches of brick or similar masonry construction.

The building includes a transmitter room 18 by 20 feet, sleeping quarters 12 by 14 feet —workshop 12 by 14 feet, two garages 10 by 20 feet. The basement does not extend underneath the entire structure but is approximately 12 by 20 feet and houses the power supply equipment, telephone line terminal panel, automatic gas heating and air conditioning system, water supply and pumping system, automatic hot water heater, power and gas meters.

A feature of the foundation construction is the "pipe trench" which extends from the center of the basement front wall to the front wall of the building, thence along the front wall and along each side of the building. This trench is 3 feet wide, 3 high and is used for the heating and air-conditioning ducts, conduits, gas pipe, electric and telephone services. It permits ready accessibility for possible changes or additional installations. One never knows when WHDL is going to spread out again.

With the 308 foot antenna and the ultra-modern high fidelity 250 watt Western Electric transmitter the listening area of WHDL has increased three-fold and embraces the major portion of the great Pennsylvania oil fields area and the rich agricultural sections of Southwestern New York State.

The 310 B Western Electric transmitter was described in detail in the July, 1936, issue of PICK-UPS.

Many Foreign Countries Install Police Radio

Western Electric police radio equipment is gaining world-wide recognition. Not only does it aid in protecting approximately one-third of the population in the United States but it also has been installed in various cities scattered over the globe. Police departments in Buenos Aires, Rio de Janeiro and Montevideo have put the equipment to work to good advantage. In Europe it is being used effectively to combat crime in Paris, Lisbon, Vienna, Antwerp, Oslo and several Finland cities. Even far-off China is adopting this modern method in its warfare against the criminal. Several shipments of Western Electric ultra-high frequency equipment reached Chinese ports during the past year.

Pick-Ups Is Not Issued Monthly

Many readers have written to PICK-UPS stating that they have not received copies regularly. This misunderstanding arises due to the fact that "Pick-Ups" is not a monthly. It appears quarterly.

WOR Broadcasts Heart Beats

With the Western Electric 3A Electrical Stethoscope as the star of the show, WOR recently sent to its audience the thump-thump of human heart beats both before and after the hearts were subjected to exertion.

The principal characters in this broadcast were Joe McCluskey, long distance track star; Captain J. B. Kuhn, ace transport pilot for Eastern Airlines; June Poppele, nine-year-old daughter of WOR's chief engineer; and Edna Janis, tap dancer from the new Ritz-Carlton Revue. These four persons, whose diverse activities promised varied types of heart beats, offered their cardiac organs for the demonstration.

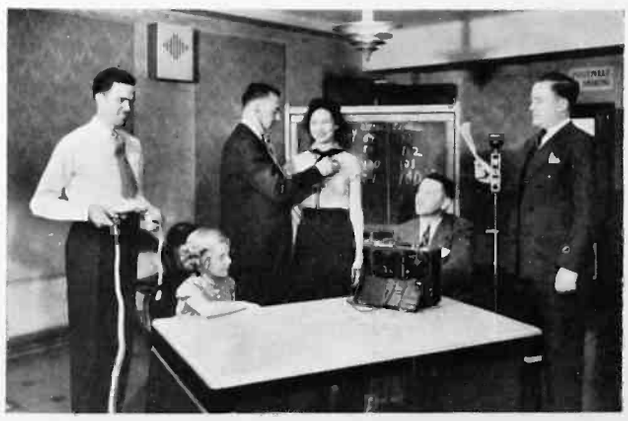
For ordinary use of the electrical stethoscope, the microphone is placed against a patient's chest. The sound passes through an amplifier to one or two receivers, to which are attached conventional acoustical stethoscopes. Output volume can be adjusted by means of a control switch. For this broadcast the stethoscope was hooked into the station's regular transmitting channels.

With announcer Dave Driscoll doing the honors at the "eight-ball" microphone, and Cecil F. Riley of the Western Electric Company operating the stethoscope, the experiment was carried out most successfully. As the radio audience listened in, the four "patients" were sounded and a notation made of the normal number of beats per minute. Each of them then went through some form of exertion and the heart beats were again checked.

Joe McCluskey started with a slow strong beat. A few minutes of fast rope-skipping raised his normal 64 to 80. Captain Kuhn also skipped the rope to raise his normal 80-per-minute to 100. Little June Poppele started with a fast count of 100. Her composure under the mental strain of playing the piano raised her heart count only to 108. Miss Janis' normal rate was 84, but a fast, breath-taking tap dance raised this to 100.

Reports from listeners showed that the heart beats were heard by the radio audience as clearly and distinctly as they would have been by a doctor actually using the same stethoscope in his office.

Dave Driscoll, WOR announcer, at microphone, describes studio scene as heart beats of girl are picked up by Western Electric Electrical Stethoscope and broadcast.



Speech Input Equipment

(*Continued from Page 14*)

Assembled in an "organ console" type cabinet, low enough to be set on a standard height table or desk without obstructing the view of the operator, this new equipment presents a rare combination of flexibility, simplicity of operation and high quality performance.

Exceptionally high fidelity is achieved through the use of stabilized feedback. The total gain of approximately 100 db is sufficient for modern broadcast microphones and the input impedance matches nominal microphone impedances of either 30 or 250 ohms, corresponding to the dynamic and ribbon types respectively.

The program channel is extremely quiet, as indicated by the fact that the unweighted noise introduced by the equipment, using the maximum gain ordinarily required for the Western Electric 630A microphone, is 61 db below the program level. Distortion is negligible being less than one percent at all audio frequencies in the useful range and less than ½ percent in the important middle frequency range at normal output levels. The frequency response is flat within ± 1 db from 30 to 10,000 cycles.

Four pre-mixing amplifier stages permit maximum signal to noise ratio to be obtained at all times. Level control is provided at the output of each amplifier. The microphone switching keys are arranged to accommodate eight microphones, four of which may be connected simultaneously.

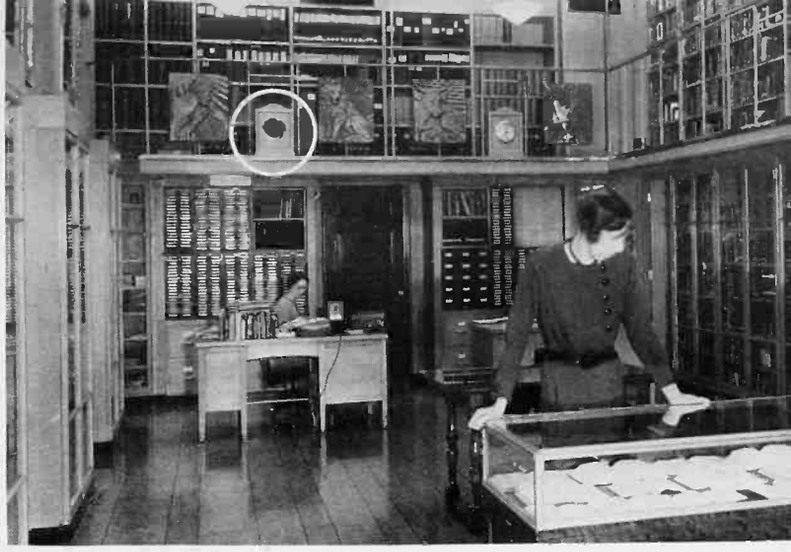
A fifth channel mixer accommodates a 500 or 600 ohm remote or chain program source and keys for terminating incoming program line trunks allow rapid switching of any of four pre-selected lines to the amplifier system and also provide preliminary or "cue" monitoring on these lines.

Incorporated as part of the design is a monitoring amplifier with talk back facilities, for operating the booth and studio speakers.

The power required is approximately 90 watts at 105-125 volts, 50-60 cycles commercial alternating current.

The weight of the complete equipment is approximately 110 pounds.

The 22A and 23A Speech Input Equipments, embodying in their construction the latest principles of engineering and design, offer to broadcasters high fidelity, great flexibility and wide application.



The Program Sound System has a conspicuous place at The Bible House—Cabinet stands at left of telephone operator—opposite photo shows a loudspeaker (in circle) installed in library

Program Sound System Speeds Work of the American Bible Society

As you enter the doors of The Bible House the blatant sounds of busy New York City are superseded by the restful strains of Handel's "Largo." It is 11:30 in the morning and the regular 15-minute program of classical and religious music is being broadcast throughout the six-story building at 57th Street and Park Avenue—headquarters of the American Bible Society. Here the most popular book in existence, perennial best seller—the Bible—is translated, prepared for publication and distributed to the four corners of the earth.

The noonday sun slanting through the windows of the library on the second floor is reflected on glass-topped tables and cabinets containing early printed editions of the Scriptures. One sees pages frayed and yellowed by the passing of centuries—bold black script and delicate lettering hardly legible—a Latin manuscript of the 14th century written on vellum—an Armenian manuscript richly illuminated dating back to 1607—the first printed English Bible of the year 1535—Bibles for the blind printed in four systems, Moon, Braille, New York Point and Line Letter—shelves containing the Scriptures translated into 650 languages. These form a part of the priceless collection owned by the Society. Their vaults contain Scripture plates in 61 languages valued at more than $1,000,000.

Browsing around among these beautiful exhibits of the oldest printed book, which had its origin over 1900 years ago, you hear someone announcing that a special meeting is being called in the committee room on the fourth floor. The well modulated voice comes from a loudspeaker at one end of the room. You're back in 1937 again—for here is a typical example of 1937 efficiency in the art of electrical communication—a program sound system in operation.

When the Bible Society decided to move from the old Astor Place House to their new quarters at 57th Street they had the equipment installed and ready for use by the time the move took place. Heretofore sound systems were generally stuck away in some obscure corner of a building where they could be heard but not seen. The ultra-modern system used at The Bible House, which was introduced by the Western Electric Company last year, is so artistically designed and harmonizes so perfectly with the attractive scheme of decoration throughout the building that the cabinet has been placed in a conspicuous position just inside the entrance, adjacent to the telephone switchboard.

Two loudspeakers have been installed on each of the six floors. To call them loudspeakers is misleading for the quality of reproduction is so natural and the volume so well adjusted and modulated that announcements come through quietly and effectively without disturbing the workers. This is a decided advantage particularly in those departments where editorial work is being carried on and where portions of the Scriptures that have been translated into various difficult tongues are being proofread and prepared for publication.

The Bible House uses the system for four purposes—paging and announcing, radio broadcasts, phonographic reproduction and for carrying on conversations with members located on different floors. This latter device, known as the "talk-back" feature,

(*Continued on Page 29*)

Hobby Grows Into Network

(*Continued from Page 9*)

complete news gathering organization ever to be assembled by any radio station.

The Yankee Network has pioneered in all types of surveys. What is claimed to be the first survey ever conducted by any radio station was sponsored by WNAC in which over 4,122 individuals were contacted.

Again WNAC sprang to the lead in 1932 by taking advantage of a then new development in acoustical engineering. The station was the first to be equipped with the system of live and dead-end studios which was perfected by Electrical Research Products Inc. WNAC was also the first station in New England to broadcast a complete opera from the stage of the Boston Opera House.

WEAN, Providence, R. I.

WEAN, Providence, has gone through many changes since that day back in 1927 when it first was linked to WNAC. The transmitting building of today, designed by Harry E. Davidson and Son, Boston architects, is an outstanding example of the architectural solution to the problem of a radio transmitter station. Economy, correct allocation of various areas and effectiveness of design were the fundamentals considered.

Harry F. Tilley, WEAN, Chief Engineer

It is of monolithic concrete construction; all exterior walls are just as they came from the forms. The plan is T-shaped, the center section being 22 feet high, 30 feet wide and 40 feet deep. The right and left wings measure 14 feet high, 20 feet wide and 33 feet long. There is no basement but the foundation runs around the entire structure with the first floor set two feet above grade. This arrangement allows for a dead space below the floor slab which is used for running heating, plumbing, electric lines and inside drains. The roof is flat with a tar and gravel finish and both first floor and roof are of re-enforced concrete.

One enters the building through a door set in an aluminum frame surrounded by a glass brick wall 8 by 12 feet. The remaining walls of the front facade are windowless and are an expressive representation of what the building represents; effectively presented in a modern manner.

Entrance is into a square lobby 14½ feet high. The wall opposite the entrance separating the lobby from the transmitter control room is of glass brick which transmits light from the exterior through the lobby into the control room. A public space separated from the control room by an aluminum rail with a gate is constructed on either side of the lobby. This entire area is designed with walls of black formica horizontally banded with aluminum stripping. The floor is of black rubber tile and the ceiling of acoustical plaster. The lobby is illuminated by a modern hanging fixture and the public space by concentric louvre flush plates.

Adjoining this area is the transmitter control room which is treated in the same manner as the lobby. The transmitter equipment is mounted on the wall opposite the lobby set flush in the wall and contained as part of the architectural treatment of the room. Provision has been made for expansion of equipment. In the center of the room stands the control desk which is of metal, modern in design and finished in black and aluminum. The chairs and other furnishings are made of black leather and aluminum.

The walls of the control room, which is beyond the transmitter room, are entirely finished in cream color glazed brick. The floor is of granolithic finish in green. This room has a back wall of glass brick and an outside door. From the transmitter control room one enters the left wing which houses a kitchen, bunk room, bath and garage. The kitchen is finished with plaster walls and asphalt tile floor.

The south side of this wing is built of glazed steel projected sash giving ample air and sunlight. The rest of the walls are windowless. Heating equipment which consists of an automatic oil burner and circulating hot water system is also located in this wing.

On the right of the transmitter control room one enters the wing housing tube storage, work room and power room. This area is finished in cream glazed brick walls with granolithic cream floor. As in the opposite wing the south side is built of glass, the remaining walls windowless. The transformer room which is located in this wing is entirely contained within the walls of the building but without a roof. It is accessible from the outside by means of large doors.

Police Radio for Small Cities

A little over a year ago Western Electric introduced the lowest priced and most economical ultra - high - frequency transmitter obtainable from standard manufacturers. This transmitter, the 21A, is incorporated in the complete headquarters one-way or two-way system known as the 216A.

Although this transmitter has an output power of only five watts, it is crystal controlled, resulting in very close frequency stability. It has many other features of design and construction in keeping with much more elaborate and higher powered installations.

They Do the Engineering for Yankee Network

Paul de Mars

To some men, being a radio engineer may mean keeping a radio station on the air and staying abreast of the times. To Paul de Mars, Research Engineer and Technical Director of the Yankee Network and Colonial Network, such duties are taken for granted as the routine part of an engineer's job. Actually, his title is a good indication of the type of engineer he is.

Paul de Mars

De Mars, like any engineer worth his salt, is more interested in keeping ahead of his time. Witness his unusual interest in the ultra - high - frequencies. The Yankee Network operates two ultra-high-frequency transmitters in Boston. From their operation, he and his staff have learned much, developed new and concrete ideas about the behavior of ultra-high-frequency signals.

Although he sees many possibilities in these frequencies, he does not believe they possess all of the advantages sometimes claimed for them. His experiences lead him to believe that power comparable to that used on present broadcast bands is necessary for efficient broadcasting on high frequencies.

De Mars was first initiated into the mysteries of radio in 1910 when he built his first wireless apparatus. From that date until this he has been interested in Radio. Graduated from the Massachusetts Institute of Technology in 1917, he entered the Army and served with the 307th Engineers. From 1920 when he left the Army, until 1927, he was employed by the New England Telephone and Telegraph Company. His work with this company gave him invaluable training in radio, for much of his time was spent in engineering work in connection with the company's circuits for broadcasting.

In 1927 he left the Telephone company to head the engineering department at Tufts College. Here he directed much of the research work, into which he naturally fell as the result of his experimentation with radio in earlier years. During his stay at Tufts and in all of his research work to the present time, he has studied a problem of great importance to radio engineers throughout the world—the elimination of interference between stations.

He left Tufts in 1931 to join the Yankee Network where he has been ever since. In addition to his work with the Network he does private consulting work for a number of New England stations.

I. B. Robinson

Many of the men who have made radio engineering their profession got their first start in radio through an interest in amateur activities. Irving B. Robinson, Chief Engineer of the Yankee Network and Colonial Network, goes these engineers one better. He is in radio today because his father, Dr. H. H. Robinson, was an ardent amateur operator. Dr. Robinson made amateur radio a hobby and was widely known by his operation of Station IJP.

Fascinated by his father's hobby, Irving progressed rapidly in radio under his teaching and from that time on radio has been both avocation and vocation to him.

Irving was born in the little town of Attleboro, Massachusetts, and attended the local schools there. He later attended Harvard Law School. Soon after our entrance in the war he enlisted in the Navy and shipped aboard the battleship U. S. S. New York and later was a member of the armed guard of the transport Edgar F. Luckenbach. After his discharge he became a radio operator for the U. S. Shipping Board and made 34 trips back and forth across the Atlantic.

Quitting the sea in 1922 he joined a gold mining company operating in the Northern part of Ontario. Robinson's job was to establish radio communication between the company's gold mines and the little town of South Porcupine. He stayed in this cold country all of one winter.

In 1923 he joined John Shepard and has been a member of the Yankee Network personnel ever since. Robinson is justly proud of his participation in the many outstanding radio engineering activities carried on by the Yankee System which has to its credit many "firsts" in radio development.

A great deal of the equipment of the Yankee Network has been or is in process of complete modernization. This work comes under Robinson's immediate direction and it is a job which keeps him on the go a great part of the time. He never leaves his office without a bag containing clothes and other accessories, because he never knows when he will be back once he is outside of his office. No sooner had WEAN at Providence with its complete new transmitter building, transmitter, and antenna been put on the air than he began work in modernizing the Yankee Network station at Bridgeport.

Mr. Robinson is married and lives in Boston. He is a member of the Engineers Club of Boston.

While broadcasting worthwhile educational subjects, Coffeyville, Kansas, students learn how to become radio performers or engineers as they appear before the mike or handle the remote control equipment. Pictured here is the broadcast of a dramatic production presented by the Coffeyville Junior College over KGGF.

Education and Radio

(Continued from Page 5)

number of pupils have decided to make broadcasting a career. This inter-school competition keeps students on their toes in an effort to present the best programs. A greater number of parents and friends are tuning in, building good-will for the station and arousing greater interest in other KGGF programs. In addition to these public school broadcasts, the junior college in Coffeyville presents a weekly program direct from the main studios. Here again student announcers get their first taste of action. Competition for the honor of handling broadcasts is strong.

In their "School and Studio Series," WICC (Bridgeport, Connecticut) takes students back-stage to see how the wheels of radio turn. Eight high and junior high school groups from surrounding Connecticut towns participate. Complete dramatizations with accompanying musical and sound effects are in students' hands, under supervision of English or dramatic department supervisors. Under the auspices of the New Haven Teachers League, WICC also broadcasts a series of talks on various aspects of educational and civic responsibility by members of the educational board, school principals and civic leaders.

"We bring the classroom to the pupil," says WOW (Omaha, Nebraska).

Over 1,000 broadcasts from Creighton University of the Air have gone into the homes of WOW listeners. This unique school reverses the usual situation by bringing university training to those who are unable to attend classes. According to Dr. Leo H. Mullany, head of the English Department, these broadcasts have obtained marvelous results. Not all persons need or want university training but everyone can profit from the popularized, diversified series of educational lectures and interviews which Creighton's finest instructors and Omaha's leading civic, professional and business men are conducting with the wholehearted cooperation of WOW.

Assisting Dr. Mullany are Professor Frank E. Pellegrin of the Creighton School of Journalism and five outstanding students who prepare and broadcast the programs. The subjects include business English, correct pronunciation, popular law, history, political science, public speaking, economics, literature, chemistry and biology. Although high school students and teachers constitute a large percentage of the listeners, several clubs have been organized in small communities in Nebraska, Iowa and South Dakota for the purpose of attending, via radio, these university "classrooms."

Rochester's largest and most widely attended school was called to order from the studios of WHAM as the "Rochester School of the Air" opened its eighth consecutive scholastic semester of radio education. The 1937 schedule features lessons in science, English, music and art appreciation, vocational guidance, current events. Programs are supervised by the public school system's administrative staff and Lew Stark, WHAM's educational director.

"Something to 'KROW' about," announces KROW (Oakland, California), for they are proud of their educational ventures carried on in cooperation with the Alameda city schools. California history is being enacted over the microphone by pupils of the Radio Speech Technique class assisted by members of the station's staff. Schools in outlying districts as well as those in Oakland are using the programs as an active part of history study. In addition to the historical information obtained from the broadcasts the dramatizations are helpful in social science and art. Primary grade teachers are having pupils make drawings and paintings of the various characters or situations introduced in the sketches. The programs deal with the discovery of the state by Cabrillo on up to the days of the gold rush and the ultimate settling of this great western area. These broadcasts have met with such success that KROW plans an additional series based on California geography.

Students attending Southwestern College at Memphis are appearing before WMC's microphone in "Plays Our Ancestors Attended." Programs are directed entirely by the dramatic department of the college. Other instructional features offered by WMC are a series entitled "Interviews with the Past" broadcast by students of Humes High School and weekly debates conducted under the auspices of the Chickasaw Debating Council of Central High School.

From the studios of KEX (Portland, Oregon) go the following educational broadcasts especially prepared for public schools. "Great Moments in History," "Geographical Travelogue," "Na-

ture Trails" and "Current Events." The station's continuity writers work in close collaboration with school instructors thus covering subjects scheduled in the school curricula.

Dedicated in 1925 to a program of public service, WRVA (Richmond, Virginia) has been devoting its time to civic, educational and cultural interests of the state. From studio and pick-up points are broadcast the annual inter-county spelling bee, intercollegiate debates between the Universities of Yale and Richmond and parent-teacher association programs. This last-mentioned broadcast takes the form of committee meetings and is intended to serve as a model for local groups in arranging meetings. Such themes as Safety, Improving School Grounds, Cooperation of School and Church in Community Life are stressed.

IBS, the Iowa Broadcasting System, which includes KSO and KRNT (Des Moines) and WMT (Cedar Rapids) carries "Drake Micropinions" embodying opinions on current events, university classroom subjects, the "Reviewing Stand" in which the Drake University School of Radio dramatizes the week's outstanding Iowa news events, student musicales and parent-teacher programs. Many programs stressing safety have been broadcast and arrangements made that they could be heard in the schools. When a coal shortage seemed imminent in Des Moines and children could not attend school, they heard such programs as the St. Louis Symphony Orchestra from the warm locale of the Shrine Auditorium where IBS installed radio equipment.

Operating from the "Heart of Missouri," KFRU (Columbia, Missouri) carries programs from Stephens and Christian Colleges and the Columbia Public Schools. Included in the Stephens curriculum is a radio course which teaches the different branches of radio, especially dramatics. Christian College presents the Cathedral Hour featuring a string ensemble, organ, chorus, soloists and commentator. Columbia Public Schools are equipped with radios which are tuned in for the music appreciation hour conducted under the supervision of the school system.

The voice of St. Mary's University rings over the air through the courtesy of KTSA (San Antonio, Texas). Interesting aspects of music and art, history, psychology and science stripped of their technicalities are discussed or dramatized.

KGDM (Stockton, California) maintains a studio in the College of the Pacific, known throughout the country for its fine conservatory of music. Listening to the many presentations of numerous musical groups at the college the radio audience is familiarized with the type of music and the caliber of artists at Pacific. Once a week Dr. Tully Knoles, authority on international affairs and president of the college, speaks directly to his class and to the air audience on current international developments.

When WNYC, New York, N. Y., began a series of educational broadcasts from borough schools these men participated in the initial program which was conducted from the auditorium of Brooklyn Technical High School and demonstrated police radio. They are left to right: Gerald Morris, superintendent of Police Telegraph Bureau; Harlan E. Reade, commentator; Commissioner F. J. H. Kracke; Albert L. Colston, school principal.

Keeping step with progress, the City of New York is supplementing work in public schools with radio broadcasts through the cooperation of the municipal station WNYC. The first test, demonstrating police radio, was conducted in the auditorium of the Brooklyn Technical High School which is completely equipped with radio facilities. Imagine the delight of these boy students when a call to headquarters brought detectives armed with shotguns, escorted by uniformed police to the school platform in the space of two minutes.

Budding editors in the Big City are being encouraged in their literary pursuits by the WOR-Herald Tribune Radio League. The League is composed of high school newspapers of Greater New York, individual members joining and auditioning as interviewers through their respective papers. The first broadcast brought Wilbur Forest, executive assistant to the publisher of the Herald Tribune, to the microphone to be interviewed by the editor of the Jamaica High School "Hilltopper." Forest discussed problems of newspaper management and presented a general picture of the correlation of the various departmental features. On following weeks other high school interviewers talked with the editors of the aviation, fashion, book, stage, screen, finance and political departments.

A novel school program offered by the Philadelphia Academy of Arts and Sciences goes out over the air from WIP's studios. Once a week pupils in 68 high, junior high and grammar schools gather in their respective auditoriums to witness a series of stereopticon slides thrown on the screen. A prominent speaker comes before the WIP microphone and explains each slide shown simultaneously on the 68 screens. Through with a particular slide he rings a bell and the operator at each school goes on to the next slide.

Encouraging high school pupils to select appropriate college courses and careers is the aim of WDOD (Chattanooga, Tennessee) and WPG (Atlantic City, New Jersey). A program entitled "How to Select Your College and Your Course" goes on the air each week from WDOD. The president, dean, department heads or outstanding students from the University of Chattanooga are the speakers. WPG conducts a round table discussion with high school students participating. A boy interested in becoming a doctor has an opportunity of asking questions and securing advice from an outstanding physician—a girl wishing to make music her career interviews a well known musician—a pupil planning to study law talks it over with a prominent lawyer. A second educational broadcast carried by WPG is conducted under the auspices of the Atlantic City Board of Education. Teachers and pupils from the first grade on up through grammar grades as well as vocational classes come before the microphone to acquaint the radio audience with the type of work carried on in each of the different grades.

WTMJ (Milwaukee, Wisconsin) opened its studios six years ago to the Milwaukee Council of Parents and Teachers for musical programs and talks broadcast to classrooms. From the same station come weekly talks by Professor Vernon Utzinger, director of speech at Carroll College. Round table discussions with his students form a part of these broadcasts. The professor analyses the technique of prominent speakers and offers lists of commonly mispronounced words. As a result Wisconsin is becoming "better speech" conscious.

"The Voice of the Treasure State" KFBB (Great Falls, Montana) in its music appreciation broadcast, carries a real treasure to children attending rural schools. Talks are given on each composer's life and events which led up to the compositions. The speaker tries to make the children get the idea expressed by the selection being played. This program is being well received by teachers and pupils alike throughout the State of Montana.

WWAE (Hammond, Indiana) listeners may hear early American history discussed, spelling bees conducted and the value of school athletics stressed.

Other stations developing educational programs and bringing college and grade school students to their microphones are WDRC (Hartford, Connecticut), WHDL (Olean, New York), WCAO (Baltimore, Maryland), KXRO (Aberdeen, Washington), KLZ (Denver, Colorado), KFRC (San Francisco, California), KBIX (Muskogee, Oklahoma), WOKO (Albany, New York).

And from Honolulu, the land of leis and ukuleles, comes KGMB's enthusiastic account of its work in educational fields. So important have KGMB's instructional programs become that many Hawaiian schools have installed public address systems to relay radio programs to each classroom. The "Hawaii School of the Air" schedules a weekly dramatization of some important character in the world of literature, music, science or art. These broadcasts are outlined in mimeograph form by the Oahu Teachers Association and used as part of the homework assignments. "Ports of Call," an animated or dramatized travelogue including 52 countries, sponsored by General Motors, is also being used by teachers on the Islands for classroom discussions and home study. Says KGMB, "The territory of Hawaii, probably the most interesting melting pot in the United States, offers a unique field in education in which radio can play an extremely important part."

Radio too is becoming a vital factor in helping to protect the lives of our people by instructing them in health and safety practices.

Under the auspices of the Milwaukee Society for Mental Hygiene WTMJ listeners may hear prominent doctors speak on phases of mental hygiene dealing with interesting cases of nervous disorders and other abnormal mental conditions as well as health talks prepared under the supervision of the State Board of Health. Further assistance to the cause of health has been given by this station in cooperation with the Wisconsin Anti-Tuberculosis Association. Annually the association conducts a contest among high school students throughout the state for the best paper on tuberculosis prevention. In addition, a yearly contest is carried on among school children—the winning essays being read by their authors over WTMJ.

KMOX (St. Louis, Missouri) features a weekly program delivered by a member of the St. Louis Medical Society dealing with various medical subjects. From these same studios comes the voice of "General Safety," a fatherly chap who talks safety to youngsters. It is a tie-in with Mayor Dickmann's Safety Drive which has proven so successful. The children are asked to join the legion and are given ranks according to the number of new members they are able to sign, 10 members—lieutenant; 25—captain; 50—major; 100—colonel.

"Uncle Bill's Safety Club" from WCAO serves a similar purpose. Around the characters of Uncle Bill and Snowball is built the Safety First idea with timely short talks told in Snowball's own words. To date the two genial performers have enrolled approximately 30,000 members.

Other stations which are hammering away at "Safety First" are WRVA, KXRO, WMBD (Peoria, Illinois), WWAE, KEX, WFBL (Syracuse, New York), WTAQ (Green Bay, Wisconsin), KTSA, IBS, WJAS (Pittsburgh, Pennsylvania), WIL (St. Louis, Missouri), WOKO.

WRVA runs a weekly program in the nature of a safety crusade, with actual accidents re-

enacted, under the auspices of the Richmond Department of Public Safety. KTSA turns a microphone over to a member of the local police department each week for a 15 minute appeal for safety in traffic. The program is designed for children. Care in crossing streets; playing in streets and the use of bicycles and roller skates are discussed. WWAE schedules a talk by the chief of police on local accidents; how they can be prevented and why it pays to be careful. Automobile drivers and pedestrians are appealed to over KEX in an attempt to educate Portland citizens in the matter of safe driving and extreme caution on streets and highways.

Through the Syracuse Safety Council and police departments WFBL emphasizes safe driving—safety in work and safety in the home. Of IBS's efforts during Safety Week the assistant chief of police in charge of traffic writes, "I want to take this opportunity to thank you for the time you gave us on the air. I want you to know that we realize what a great help this was to us during the campaign."

Information on health practices and medical advice goes out over the air waves from WOR; Iowa Broadcasting System IBS, KTSA, WICC, WLW, WDRC, KLZ, WHAM, WEEI (Boston, Massachusetts), WSBT-WFAM, WIL. For the past two years WOR has been scheduling a Medical Information Bureau program, presenting eminent physicians, nurses and other health authorities. The "Drama of Health," conducted by the Medical Association, and "Teeth and Your Health," sponsored by local medical and dental associations, reach radio listeners from the IBS studios. KTSA broadcasts a 15 minute program devoted to an explanation of public health as it concerns the individual. Prevention and cure are discussed. A program on "'Good Health Rules" is finding favor among WICC fans. Topics cover general illness, safety and preventive measures. Cooperating with the Denver Tuberculosis Society, KLZ broadcasts "News Flashes about Health." The station also devotes a quarter-hour period to health exercises conducted by the physical education director of the YMCA. WDRC, WEEI and WJAS also are making drives against tuberculosis.

KTUL (Tulsa, Oklahoma) performed a signal service late last year when city health officials announced that all schools would be closed because of the increasing number of infantile paralysis cases. It picked up a hurried story from the director of public health and flashed the news to the city. During the three weeks quarantine KTUL provided facilities for broadcasting a weekly half hour Sunday School, arranged under auspices of the Ministerial Alliance and participated in by numerous teachers from various Sunday Schools. Public school teachers, city librarians, YMCA and YWCA workers and others were invited to broadcast suggestions to parents advising methods of keeping the children healthy and happy during this period when they were confined to their homes.

According to broadcasting leaders, radio has been attempting to elevate its listeners' tastes for the best in music, art, literature and drama. Jazz and dance programs are being supplemented by music appreciation broadcasts. The lives and works of great writers, composers, artists and actors are being discussed and dramatized over the microphone and audiences are responding by asking for more. They want and need light entertainment, say these broadcasters, but they are awakening to the fact that things of the mind can be as enjoyable as entertainment for the ear alone.

Typical of this trend in radio are the broadcasts over WICC by the oldest musical club in Bridgeport. Programs are in the form of artists' recitals; the material presented being first used in the bi-monthly study meetings. The club course for members is outlined for the year as to opera, folk music, modern music, great composers and dance. The club also has broadcast various dramatic series based on the lives of musicians, with music. The 1937 series will include programs on contemporary composers of stage, radio and opera as well as Connecticut-born composers.

The Fine Arts Department of the Virginia Federation of Women's Clubs in collaboration with WRVA encourages home talent by presenting a broadcast depicting contributions of Virginians in the field of music, poetry, folk lore, song, writing and other phases of the arts.

The daily half-hour program "What's New in Milwaukee" gives WTMJ listeners a clear idea of what the city currently offers in the way of literature, art and music. By direct reference to exhibits on display, Nancy Grey tells her audience how works of art can be appreciated. She frequently attends concerts to report what interest they may have for the public. Reviews of non-fiction books add to the educational value of these programs.

KEX, WNYC, WWAE, WFBL, WEEI, WLW, KFSD (San Diego, California) all list music appreciation among their schedules. WWAE also carries a Drama Guild broadcast which includes amateur theatricals by local clubs and plays written and produced by local groups. WFBL's "Morning Musical" gives musical interpretation of classics and introduces local concert talent. WNYC recently scheduled a new series designed to give recognition to talent among the blind and conducted under the auspices of the Martha Atwood Committee of the National Bureau for Blind Artists. Miss Atwood is providing free training at her Conservatory in Massachusetts. The committee believes that the 75 sightless singers and musicians participating in the radio series will aid in stimulating and encouraging employment of blind talent.

One of the most outstanding programs carried over KSO and WMT is known as the "Iowa Poets' Corner," conducted by Mrs. L. Worthington Smith, author and poet. The broadcasts have resulted in a most gratifying appreciation of poetry among Iowans as well as a constantly growing development of creative poets in the state. From poems submitted to her Mrs. Smith has had published three excellent volumes, "Silk of the Corn, "Flame on the Hills" and "KSO Poets." WOR too has its "Poetry Hour" presenting prominent contemporary poets in discussions of their own work and new trends in poetry.

Book lovers and those who would become better read are tuning in on various book review and literary broadcasts. One such program originates at KEX with Richard Montgomery at the microphone. Mr. Montgomery, author and assistant manager of Portland's largest book store, reviews current books and discusses literature from an educational viewpoint. Writers visiting Portland are interviewed — during "Good Book Week" eight well known writers appeared on the program. Each Sunday morning over KMOX the latest books are reviewed, the general story outlined and the style of writing commented upon. KTUL devotes a weekly quarter-hour to a "Know Your Library" program. Public libraries provide speakers to discuss various fields of business and professions and to tell of the books to be found in the libraries relating to these subjects. "Meet the Author," a series offered by the Massachusetts Library Association goes on the air from WEEI. Various well known authors who happen to be in Boston are guests on this program. "The Editor Speaks" over WSPD (Toledo, Ohio) five days a week. These broadcasts present the best editorials taken from daily and weekly newspapers published within the station's listening area. Editorials are selected for their timeliness, variety and general interest.

Like charity, education begins at home and it is to the home unit that many broadcasting stations are directing a large variety of instructional programs. WIP carries two—"The Parents' Forum" and "Women's Homemakers' Club." The former is a script prepared by Parents' Magazine and endeavors to explain and correct many problems in every-day life. The latter gives general advice on housekeeping, helpful hints for the home, discussion on foods. The "Friendly Forum" from WMBD includes debates and open discussions devoted primarily to domestic problems. WWAE conducts a cooking school for grown-ups which introduces American products to the foreign housekeeper and explains the value of a balanced diet. KMOX's "Better Films Council" reviews current pictures and classes them for adults, children or family.

Among the most worthwhile and popular children's programs are those dealing with Boy and Girl Scout activities. These are winging over the air

Here is the staff of the Creighton University of the Air which brings the classroom to the pupil over WOW, Omaha, Nebraska. Subjects broadcast include English, law, history, literature, chemistry, biology. Outstanding students help prepare and broadcast the programs.

from so many stations that it is pointless to list them here.

Closely allied with these home interest broadcasts are those dealing with garden clubs of the air. WCAO conducts such a club designed to encourage listeners to develop a keener sense of pride in their gardens and yards, thus helping to beautify the city. Instruction is given on planting and arrangement so that the best effects may be obtained. This has created considerable interest not only among housewives who have formed local clubs but it has also brought comments and queries from agricultural organizations. WEEI's "Breck's Garden Talk" pertains to backyard gardening and gives valuable information on planting and care of flowers and vegetables. WOR has gone into gardening in a big way with its "Radio Garden Club," presented by the Agricultural Extension Service of Rutgers University, the New York Botanical Gardens, the Brooklyn Botanical Gardens, the Federated Garden Clubs of New Jersey and New York States and the Federated clubs of Bergen County, New Jersey.

Numerous stations are arousing, among their listeners, greater interest in civic affairs and developing a sense of pride and responsibility in community, state and federal activities. Typical of such broadcasts is "Know Cleveland" from WHK. Says WHK, "Using our mobile unit we go to interesting places, conduct interviews and give complete facts concerning each particular place. For example, we visited the 'Crib,' five miles out of Cleveland Harbor in Lake Erie—interviewed the three keepers of the Crib and brought to light many facts little known by the

general public." Schools are notified of these broadcasts and pupils given an opportunity to listen as extra assignments. A similar program originates at KBIX, entitled "Know Your Neighbor." This is conducted by the Chamber of Commerce in towns within KBIX's radius and includes talks by prominent citizens concerning activities of the communities.

With its location directly opposite the state capitol grounds, WRVA is considered the official radio voice for the various departments of government. Permanent facilities are maintained in the capitol for broadcasting proceedings of the legislature; public hearings before committees; exercises commemorating anniversaries of important events in the history of the Commonwealth.

WTMJ is helping to educate women voters by bringing the Wisconsin League of Women Voters to the microphone. Matters of importance to the organization are discussed as are legislative problems of interest to all women. At times, members of the Wisconsin legislature give talks on both sides of important bills before the legislature. This enables listeners to form intelligent opinions on legislative activity.

"Over a period of years," says WMBD, "we have tested and constantly improved many programs of educational value realizing that radio must go beyond mere entertainment and reach the true goal of educational leadership. The secret of successful broadcasting is to provide educational material that not only holds the listener but also builds an audience by its own unique appeal. You cannot force your listeners to absorb radio education. Rather must you lead them to it and make them like it by true showmanship and entertainment."

WMBD lists its news commentator as one of the station's outstanding instructional programs. They believe that a news commentator can be of inestimable value if he is an alert, intelligent student of local affairs. Such a program may grow to a position in community life comparable to if not beyond that of a newspaper editor. WMBD's commentator has succeeded in achieving this position and has in the past been invaluable to the citizens of Peoria. From its daily weather forecast this Prairie State station has developed a weather analysis program which has aroused great interest among shippers, farmers and other listeners. A remote line was installed in the offices of Peoria's government meteorologist. Citizens may now have complete information on high and low pressure areas, their movements and other factors that influence our daily weather.

A third successful program of an educational nature from WMBD is the Town Hall series during which local issues are debated. Following these debates an open forum is held. The result is a clear cut understanding of major problems of community affairs.

With remote control equipment KEX broadcasts a forum luncheon program from the Portland Chamber of Commerce. Speakers discuss subjects of business or civic interest. The United States Post Office presents a program each week over KTSA with Postmaster Dan J. Quill speaking on topics of current interest. Recent programs were devoted to an explanation of the Social Security Act. And from this same station comes the somewhat unique broadcast "Beware of Rackets!" The San Antonio Vigilance Committee, pledged to war on illegitimate business, presents the program which, as the name implies, is an expose of confidence rackets that have been worked too successfully in many parts of the country.

Here then is a cross-section view of what broadcasting is attempting in educational fields. That radio does play a part in education appears to be an established fact. Its scope seems unlimited; its possibilities beyond present conception. How best to develop these possibilities and make of radio the powerful teaching medium it may well become is still a problem — but a problem so vital and intriguing to educators and broadcasters alike that surely a satisfactory solution will be found in the not too distant future.

Bible House Sound System

(*Continued from Page 21*)

is an innovation. If for instance the telephone operator, who also handles the program sound system, wishes to speak to Dr. Stifler and cannot reach him in his office by telephone connection she simply turns a switch on the cabinet—pages him through the microphone at the top of the cabinet and locates him in the proofreading department on the fifth floor. The loudspeaker on the fifth floor also is used as a microphone. Thus she converses with him as easily as though he were talking over his telephone.

At 11:30 each morning the phonographic attachment is operated to broadcast a 15-minute program of classical and religious music throughout the building. This is a pleasant and restful interlude in the busy morning at The Bible House. Each Friday the weekly prayer meeting held on the second floor is broadcast. The radio unit is used when programs of interest to the Society's members are on the air. However, the equipment is operated mainly for inter-office communication such as broadcasting announcements and locating and paging members around the building.

It is easily understood that work at The Bible House, focal point for its far flung activities, must be conducted with speed and efficiency and at the same time as quietly as possible. Since their business continues to expand executives felt that the Western Electric program sound system would aid considerably in increasing the efficiency of the organization.

Without the audiometer many cases of impaired hearing among children would go undetected.

New Hearing Tester Tells Amount and Kind of Impairment

Closely interwoven in the history of Bell Telephone Laboratories is the fascinating story of their extensive physiological research work devoted to the interests of medical science. From time to time from the Laboratories have come electrical instruments and devices which have proved to be valuable aids to the medical fraternity. Among such inventions are Western Electric audiometers.

The Western Electric Company recently introduced a new and improved instrument, designed by Bell Telephone Laboratories, and known as the 6A Audiometer. It not only measures hearing acuity accurately but also provides data which will be extremely helpful in diagnosing hearing defects and in prescribing correct hearing aids.

The 6A Audiometer offers all of the advantages of the 2A Audiometer which it replaces and in addition provides many new features which are distinct advances in the art of audiometric measurement.

With the older type instrument only eight fixed frequencies were available for use. The new audiometer has a continuously variable frequency which provides test tones within the range of from 100 to 10,000 cycles per second. Thus it is possible to determine accurately the extent of the patient's hearing loss and behavior at any frequency within this wide range. Tests may be made by air conduction, simple bone conduction or bone conduction by the masking method.

This masking method meets a long felt need of otologists as it gives them a means of isolating and measuring the bone conduction loss of an individual ear. The masking examination, made possible by the development of the 100A Audiometer Masking Attachment, in general, consists of masking one ear while the other ear is being tested. An air conduction receiver supplies the masking tone to one ear while the bone conduction receiver supplies the test tone to the ear under examination. The masking tone applied to the air conduction receiver has the same frequency as the test tone applied to the bone conduction receiver. The test is then conducted by interrupting the tone to the bone conduction receiver and determining at what intensity the tone is perceptible to the patient. This establishes the bone conduction nerve loss for the individual ear and for the first time gives the otologist definite information as to the extent and location of auditory nerve lesions.

Another advantage of the 6A Audiometer is that a microphone may be used to enable the operator to talk to the patient under test. The microphone also permits making an actual speech test to determine the sound amplification required to overcome a given hearing loss.

Those using the new audiometer will find that the graphs of hearing acuity that can be made with this instrument will be decidedly helpful in diagnosing hearing impairment and in providing permanent records to indicate any improvement of function or the reverse.

The 6A Audiometer is lighter in weight and smaller in size than the 2A Audiometer which it replaces. Simplicity of operation enables accurate tests to be made by office assistants and nurses as well as by trained otologists. The instrument is operated from ordinary AC or DC lighting current, thus doing away with the use of batteries.

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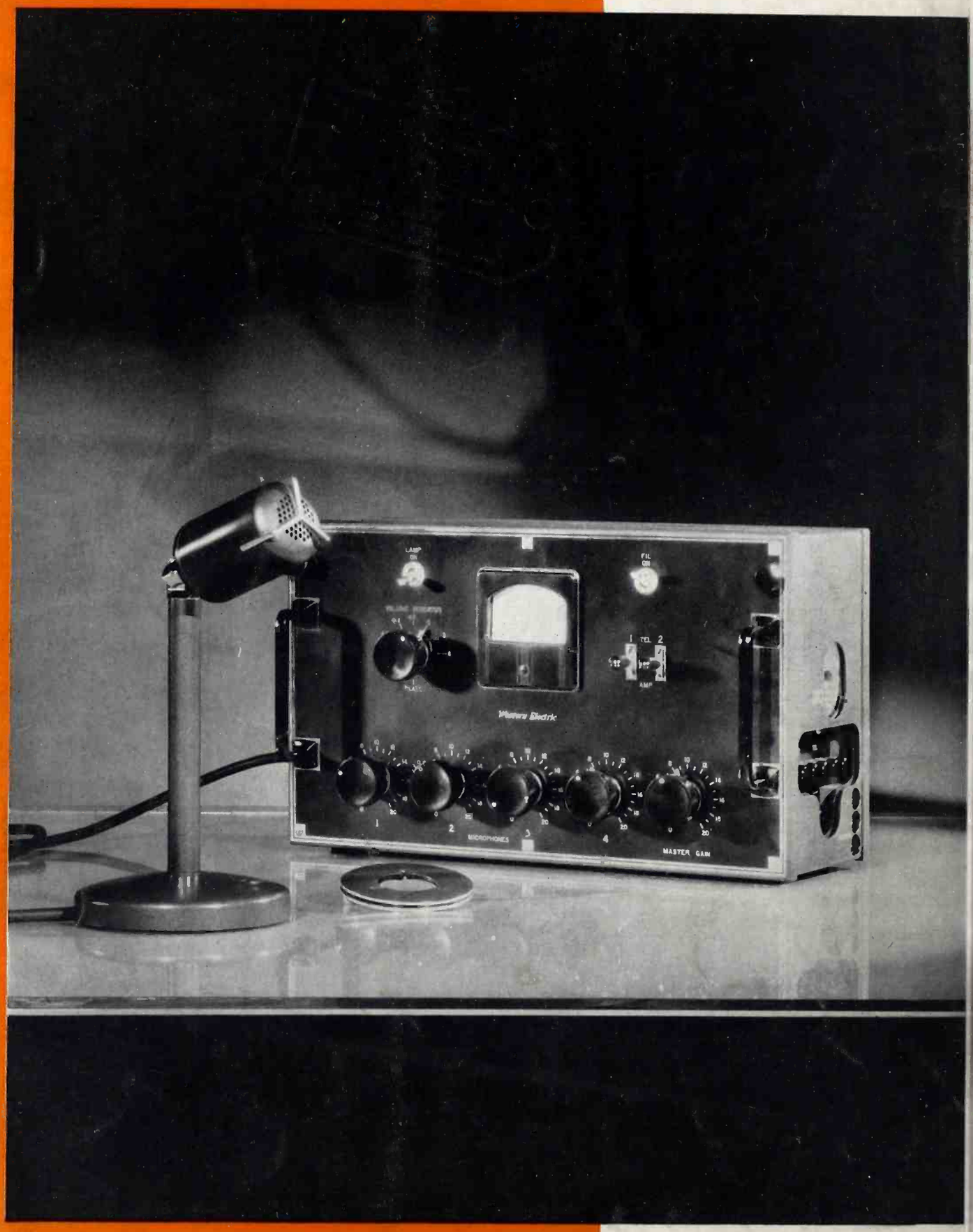

NEWCOMERS — The 633 A Microphone and the 22 A Speech Input equipment