PICK-UPS

MAY 1938

ACOUSTICS
in Modern Broadcasting Practice

UHF at W8XWJ
Station Presents 14-Hour Daily Program

PUBLISHED BY · · · Western Electric · · · NEW YORK, N.Y.

— 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*
F. H. LEGGETT . . . . . *Treasurer*

WILL WHITMORE, *Editor*
M. M. BEARD, *Assistant Editor*

MAY, 1938

Sunburned Heroes

Hats off to those sunburned heroes of the microphone—those dynamic, enthusiastic experts who broadcast summer's parade of sports! The casual listener may think that the job of covering America-out-of-doors is an exciting, thrilling way to make a living, and maybe it is. But with the job goes drenching rains, scorching suns, raw and aching vocal cords, and countless other pains. Yep, from where the listener sits on a cool summer porch it sounds like a thrilling job, but it's a job nevertheless, and how splendidly the special events men come through! *Pick-Ups* has tried to symbolize that job on its cover this issue.

Invisible Product

An automobile manufacturer can get into his manufactured product and drive it, look at it, test it. A candy manufacturer can see, smell and taste his product, but a broadcaster who manufactures nothing but sound waves is at a disadvantage. All he can do is listen, and who ever heard of a broadcaster having time to listen to his complete product!

It might be a good idea, however. A prominent advertising man, ordered to bed by his doctor, spent most of his time listening to the radio. At the end of three weeks his ideas about radio had completely changed. What would a broadcaster think of his product if he had to do this?

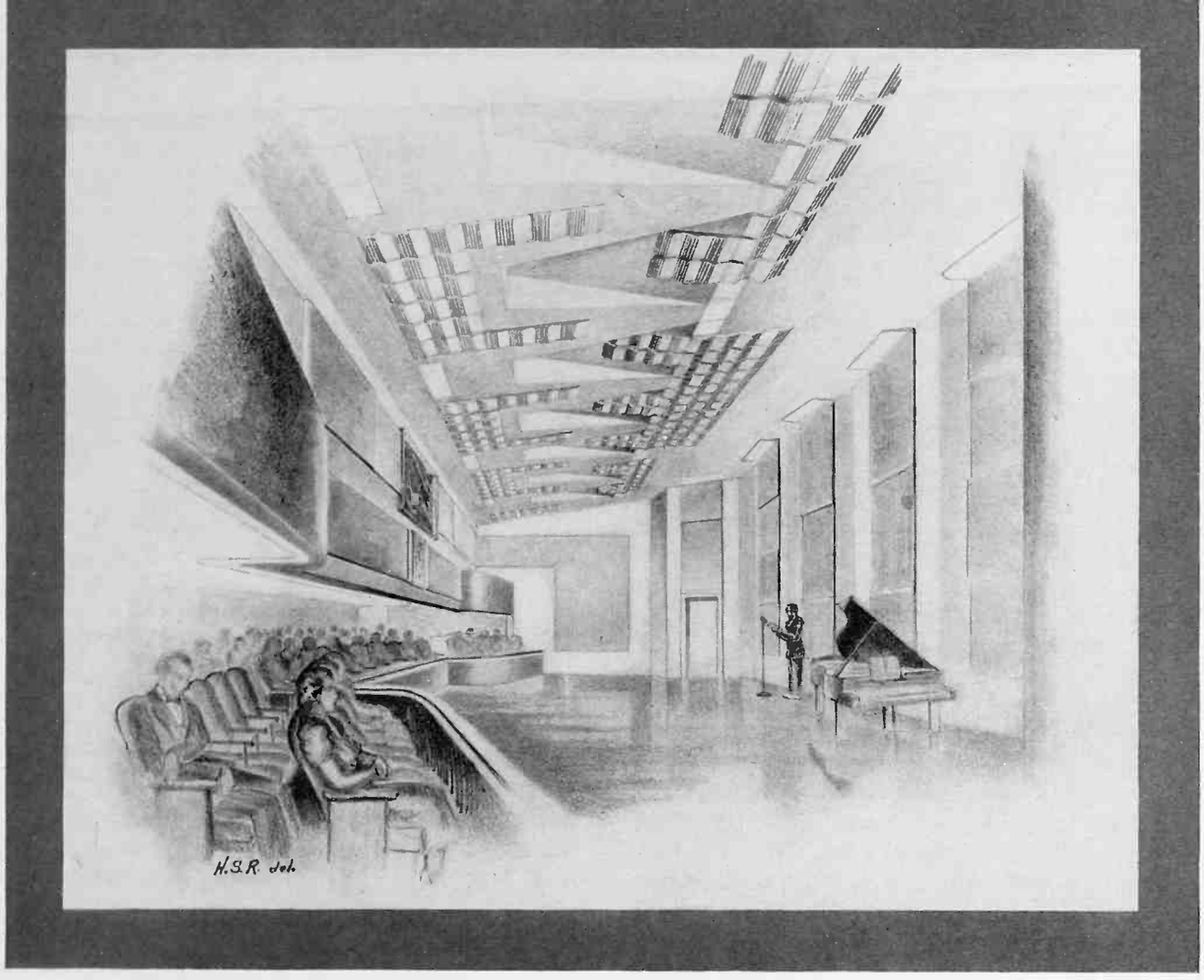
Cycles and Decibels

Since the broadcaster's only product is sound waves, they become rather important. George T. Stanton and C. C. Potwin, acoustic engineers, spend their time putting them through their paces. They have some very definite ideas about the care and treatment of sound waves as they bounce and flit around a broadcast studio. What's more, they tell you about their ideas in the lead article in this issue of *Pick-Ups*.

UHF at W8XWJ

The Detroit News pioneered in radio with station WWJ. It is pioneering again with its ultra-high-frequency station W8XWJ. This station now originates its own program and is on the air daily on a 14-hour schedule. As a result there are probably more ultra-high-frequency receivers and listeners in the Detroit area than any other place in the country. *Pick-Ups* gives you the story in words and pictures on pages 14, 15.

This Issue



Theatre type studio incorporating new acoustic principles.

ACOUSTICS
in Modern Broadcasting Practice

New Improvements in "Live and Dead-End" Studios Produce Far Greater Naturalness, Eliminate Microphone Placement Problems

By

G. T. STANTON and C. C. POTWIN

Technical Consulting Department, Electrical Research Products Inc.

In considering the prominent part acoustics plays today in broadcasting, it is not only interesting but important to note that the provision for more reverberation or "liveness" has become the keynote in modern studio design. Properly controlled, liveness is an element of unlimited value in lending vitality and naturalness to a program. Improperly controlled it becomes a degrading element, inevitably leading to poor quality in both transmission and reception.

It is commonly known that sound absorbing materials are required for the various surfaces in any studio in order to effectively reduce excessive reverberation and to minimize disturbing sound reflections. Since a somewhat lower time of reverberation is required for microphone pick-up due to the lack of the physiological effects associated with two-ear listening, a greater amount of sound absorption must be provided in a broadcasting studio than in the average auditorium where the sound is heard directly. Recognition of the need for additional sound absorption for microphone pick-up was largely responsible, during the early days of radio broadcasting, for the common practice of making practically all surfaces in the studio sound absorbent. This ultimately led to the false conception that an acoustically correct studio was one in which only the original or direct sound should reach the microphone and that all reverberations or reflections should be largely absorbed or dissipated at the

first incidence.

As new developments improved the efficiency of transmitting and receiving systems, the defects presented by the studio having excessive acoustic treatment became increasingly apparent. The sound heard "over-the-air" still lacked many of the pleasing characteristics, such as vitality, depth and naturalness, normally associated with direct instrumental and vocal presentation. Furthermore, the quality was markedly inferior in many instances where an unbalanced frequency absorption characteristic in the treatment distorted the original sound. Not only were these defects accentuated by the excessive amount of absorption in the studio, but became even more noticeable through the extension of the frequency range of transmitting and receiving systems.

Our analysis of the acoustic conditions surrounding the presentation and reception of sound in many auditoria noted for their excellent acoustical properties indicated that not only would additional liveness be required in the studio but that an entirely different distribution of treatment would be necessary. The beneficial effects derived from live or sound reflecting surfaces in close proximity to the performers were evident from the general arrangement of absorptive and non-absorptive areas in acoustically correct auditoria. This fact was corroborated by the results of tests made with a similar arrangement of surfaces in connection with the recording of sound for motion pictures.

The use of three wall sets of a sound reflecting material in a comparatively heavily treated enclosure or sound stage having a reasonably uniform frequency absorption characteristic, gave an increase in the apparent liveness of the recorded sound depending upon the positions selected for the microphone in their relation to the set. These findings contributed in a large measure to our early development of the original "live end—dead end" method of treatment in which the sound absorbing material was confined principally to one-half of the studio, the other half being left relatively live or sound reflective. Using distant pick-up, i.e., with the performers arranged to the best advantage in the live end and the microphone placed in selected positions in the treated end, an outstanding improvement over the results obtained in the heavily treated studio was achieved.

This method was first used commercially in the studios of the Yankee Network in 1932. Depth and perspective, qualities which were formerly lacking to a noticeable extent, became very much in evidence and one of the remarkable and interesting effects derived from this method of treatment was that in the case of orchestral broadcasts it was often possible to create the impression that the orchestra consisted of a larger number of musicians than were actually in use.

Basically, this method of treatment was a step in the right direction since it reduced the quantity of sound absorbing materials employed in the studio and largely eliminated the flat or dead condition formerly associated with broadcasting work. Experience proved, however, that there were two major defects associated with the distribution of material that made for difficult studio operation. The live end was generally too reverberant and the dead end appreciably overdamped, with the result that a very high ratio of reverberant to direct sound was received when using the microphone in relatively close proximity to the live end. Furthermore, under certain conditions an excessive amount of room tone, due principally to marked fluctuations in the sound wave pattern, was encountered with slight variations in the distance and position of the microphone relative to the performers. Consequently, microphone positions became very critical and this lack of flexibility caused comments to the effect that the studio was "hard to handle."

The first modifications of the strictly "live end—dead end" method of treatment shortened the depth of both the reverberant and heavily treated sections, and carried a material having only a moderate degree of sound absorption into the intermediate areas between these two sections. This change made for a somewhat more flexible studio, in that it eliminated the extremely sharp cut-off between the live and dead ends, gave a more uniform diminution of intensity toward the treated end, and ultimately permitted more freedom in microphone placement. It was first employed in the design of a studio group for Station WHN in 1934.

Even though this modification gave a decided improvement in actual broadcasting practice, it was realized that a closer coordination between studio acoustics and equipment development could be achieved. In conjunction with motion picture scoring, which is essentially the process of recording musical numbers independent of the photography in an enclosure similar to a broadcasting studio, it was found that very excellent and altogether superior results with respect to quality, vitality and naturalness were secured when the original function of the "live end—dead end" method was maintained, but where the sound absorbing material was distributed more widely so that no single surface was fully covered and a small part of the treatment was extended into the live end.

After extensive research and development, the underlying principles of this new method of treatment are now being employed in studio design and have produced results which critical performers and observers pronounce the closest approximation to third dimensional sound yet achieved in broadcasting. Fundamentally, the efficient control of specific types of sound reflections forms the basis for the distribution of sound absorbing material under this modern method of studio treatment.

It is generally known among radio engineers and technicians that there are two types of sound reflections which are particularly objectionable

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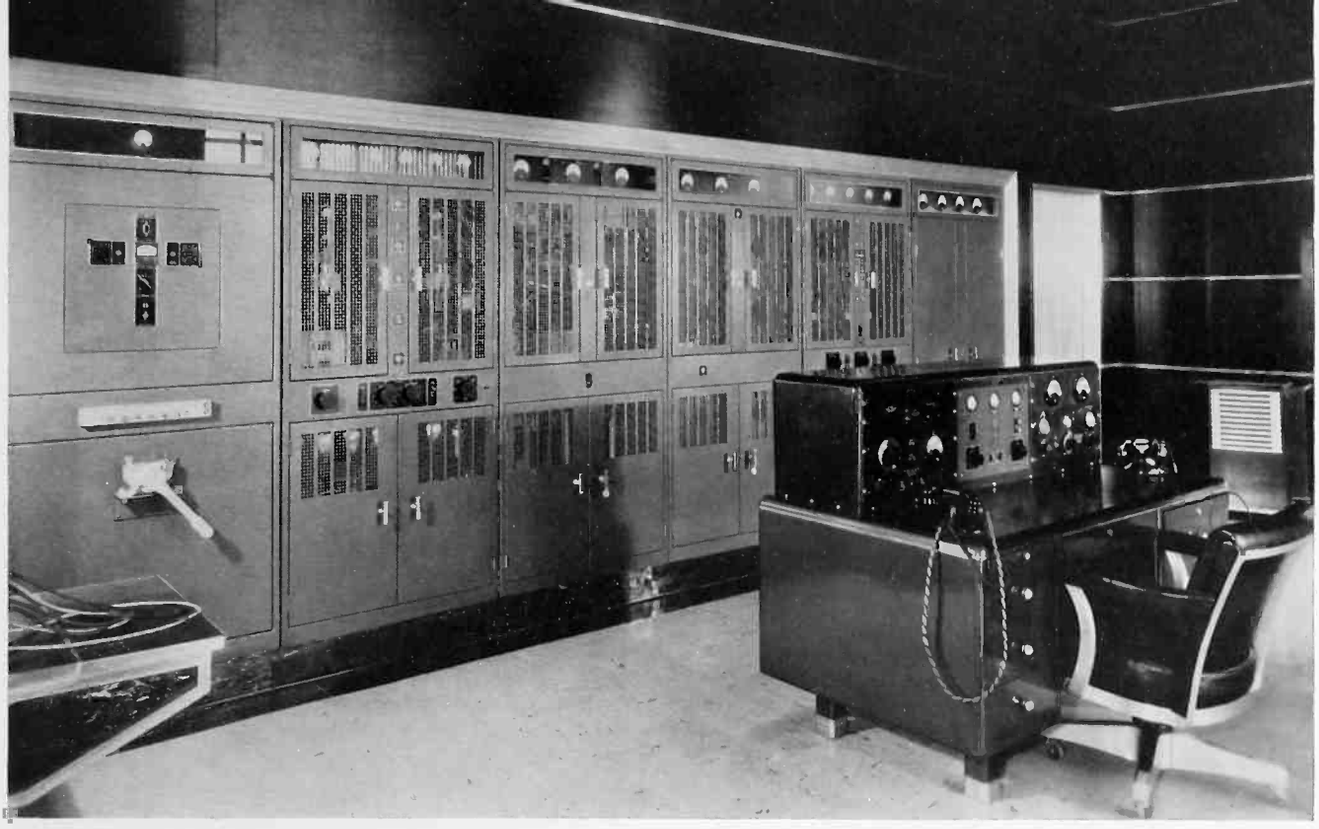
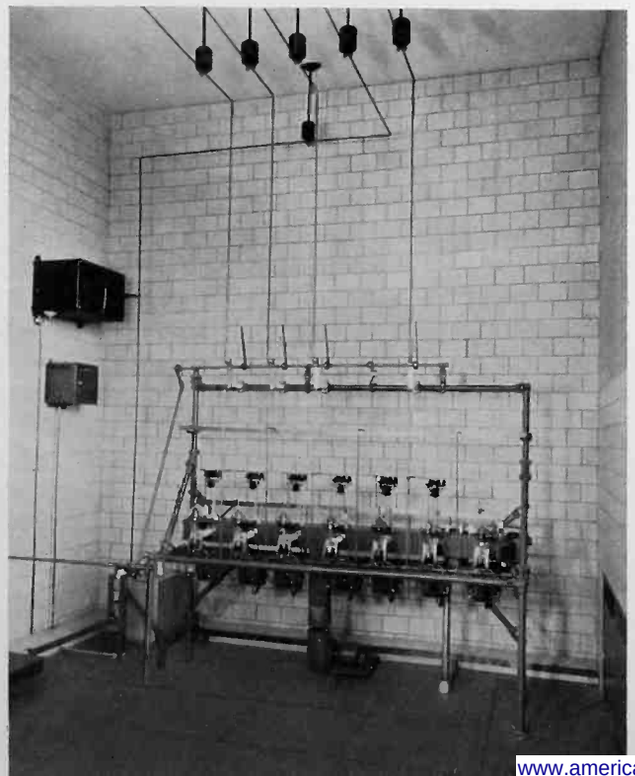


WEAN

Providence, R. I.

WEAN Goes from 1 to 5 KW With Ease. Increase Planned When Building Was Erected



Provision has been made for future expansion. These words appeared in an article on WEAN, Providence, Rhode Island, in the February, 1937, issue of *Pick-Ups*. At that time a new transmitter building had just been completed, a structure that was hailed as an outstanding example of modern architectural design. Installed in this building was a Western Electric one kilowatt transmitter, the power at which the station was then licensed to operate. Application had been made, however, for a five kilowatt license and the building constructed to permit the addition of the equipment necessary for this increase in power.

Today WEAN, its license granted and its new equipment installed, is operating on five kilowatts. Blank decorative panels have been replaced by a five kilowatt amplifier and its associated units. The former one kilowatt transmitter has retained its place and is now used as the driver. In other parts of the building, in space previously prepared for it, additional power and rectifier equipment is installed.

In the transmitter room, the paneled units present a pleasing appearance, harmonizing effectively with the modernistically treated walls. Of interest is the installation of a 110A amplifier mounted in the center of a blank panel above the interlocking device, thus balancing with the phasing unit at the opposite end and preserving the symmetry of the transmitter line-up.

A comparison between the photograph above and the pictures of the earlier installation at WEAN, appearing in the February, 1937, issue of *Pick-Ups,* will illustrate some of the changes made.

High voltage mercury vapor rectifier unit. Space for higher-powered equipment such as this was ready and waiting.

Western Electric Introduces

for the AIR

Today there are almost 9000 private planes in use. These planes, in general, are small and do not need as elaborate radio equipment as the transport planes, but they do a great amount of all-weather flying and must be able to receive beacon signals and weather reports, and to communicate with Department of Commerce stations and with airport officials to receive landing instructions.

Radio equipment for aircraft use must be small, light and rugged. When an attempt is made to locate any of it in the cockpit, particularly on the instrument panel of a modern plane the designer soon learns how very small it must be. The experience gained from constant association with the air transport industry since its beginning, contributed, in a great degree, the outstanding features of what is now the "Multi-Frequency Midget."

In this transmitter is found the answer to how many frequencies are "Multi-Frequency." In the 25A it means one or as many as the plane is licensed for, and the purchaser pays for only what he wants. Additional frequencies can be employed by obtaining the required quartz crystal units.

Two-part construction of the transmitter is one of its outstanding features: a radio-frequency unit, which incorporates the tuning elements, and a voice-frequency unit, which includes the remainder of the transmitter with the dynamotor. The radio-frequency unit is small enough to be mounted directly in the instrument panel, thus permitting direct tuning, while the voice-frequency unit may be mounted in any convenient place in the plane.

This unit is approximately 6¼ inches wide, 4½ inches high, and 4 inches deep. A nameplate, which covers the front of the unit, extends beyond these dimensions sufficiently to permit mounting the transmitter flush in the instrument panel. The two vacuum tubes and the quartz plate project through the cover plate. On the front of the cover plate are all the controls needed to operate the transmitter. In addition to the crystal switch, there is an "off-on" switch, the antenna tuning controls with their associated plate current meter and a microphone jack. The socket for the multiple conductor cord which connects this unit to the audio-frequency unit is mounted on the part of the chassis located behind the instrument panel.

Although the division of the transmitter into two parts is in itself an outstanding stride towards simplicity, the construction and maintenance of the set would have been difficult but for another ingenious innovation. This is the arrangement of the radio-frequency unit itself in two parts, which are

The Western Electric 25A multi-frequency radio transmitter specially designed for installation in private planes.

hinged together and may be opened like a travelling case for assembly and maintenance. Without this provision the necessary compactness of the assemblage would not only have retarded the original assembly, but would have made the replacement or repair in the field exceedingly slow and difficult, since to reach some of the elements within the unit many other elements would have to be removed. The hinge construction solved both these aggravating problems.

Another novel feature is the mounting of the two tubes external to the unit itself to provide ample air circulation for cooling. This arrangement serves the double purpose of accessibility and conservation of space. The body of the unit is in the shape of a "T" with a short stem, and one tube is mounted on the base of each side of the stem. The quartz plate projects through the cover plate into the stem of the "T," and the unit is hinged in the cross of the "T" just above the stem. Further accessibility to the high-frequency unit is provided by making the two side plates of the stem of the "T" removable.

The dynamotor is mounted on the rear of the base of the power and audio-frequency unit. It

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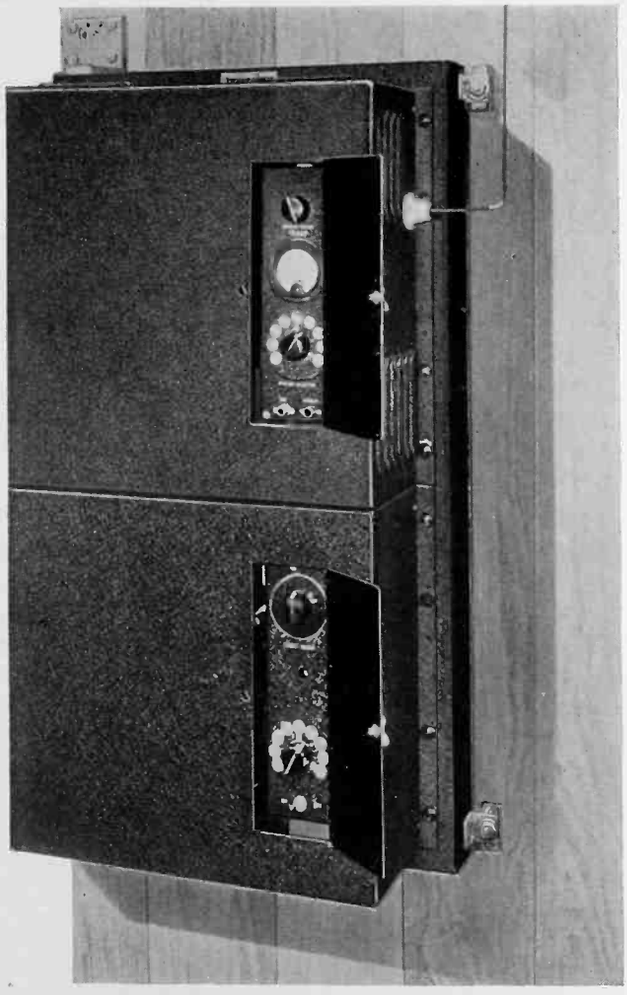
New Radio Telephone Units for the WATER



The 224A marine radio telephone equipment which brings to yacht owners and operators of commercial vessels the same dependable telephone service that they enjoy on shore.

A luxurious cruiser plows her course through the sparkling waters off the Florida coast. The only sounds that break the silence are the slapping of waves against the hull and the low murmur of powerful motors. Suddenly another sound rings out. A familiar one, but strange to be heard so far from shore. It's a telephone bell. The signal of modern communication that was for long only the landsman's privilege, but which now goes to sea, putting a yachtsman in constant communication with his home and office.

Coastal radio telephone service has been available for several years, but until recently it was limited to certain restricted areas along the east and west coasts. Then, too, the ship equipment previously used for this type of service consisted primarily of apparatus which originally had been designed for aircraft, later adapted for marine service. Although its operation was satisfactory, the equipment lacked features of convenience for marine use.

Now, however, six coastal telephone stations are in operation—at Green Harbor in Massachusetts, at New York and Miami on the east coast, and at Los Angeles, San Francisco and Seattle on the west coast. An additional station is being constructed at Norfolk, Virginia. These stations are available for service 24 hours a day, and each has a range of several hundred miles out to sea.

The marine radio telephone equipment now being made available by the Western Electric Company has been specially designed for coastwise commercial vessels and yachts at a material reduction in cost. It is simple in design, easily installed, and provides all of the features desirable for telephone service in the area served by each of the various shore terminals.

This equipment, known as the 224A Radio Telephone Equipment, consists of a 50-watt radio transmitter and a superheterodyne radio receiver mounted together on a channel-iron framework, and a control unit incorporated in a standard hand telephone set. The radio unit may be hinged on any one of its four sides to facilitate installation in a vessel, and at the same time to provide easy access to the rear for maintenance purposes. The 224A operates entirely from 110 volt, 60-cycle, alternating current, which may be obtained from a small motor alternator.

The carrier frequencies of the radio transmitter and the beating-oscillator frequencies of the superheterodyne receiver are controlled by quartz plates, which assure "on frequency" stability of the equipment. The quartz plates are of the plug-in type, and only as many as are required need be purchased. The radio transmitter and receiver are arranged to provide for any one of nine predetermined frequencies in the range from 2.0 to 2.8 megacycles. For coastwise communication these frequencies are from 2.1 to 2.2 megacycles for the transmitter, and from 2.5 to 2.6 megacycles for the receiver.

Switching to any of nine shore-station channels is accomplished by two dial switches marked with station identification and mounted on the front of the radio transmitter and radio receiver. Besides these nine frequencies to which the transmitter and receiver may be set, a tenth frequency is provided which may be selected remotely as required from the

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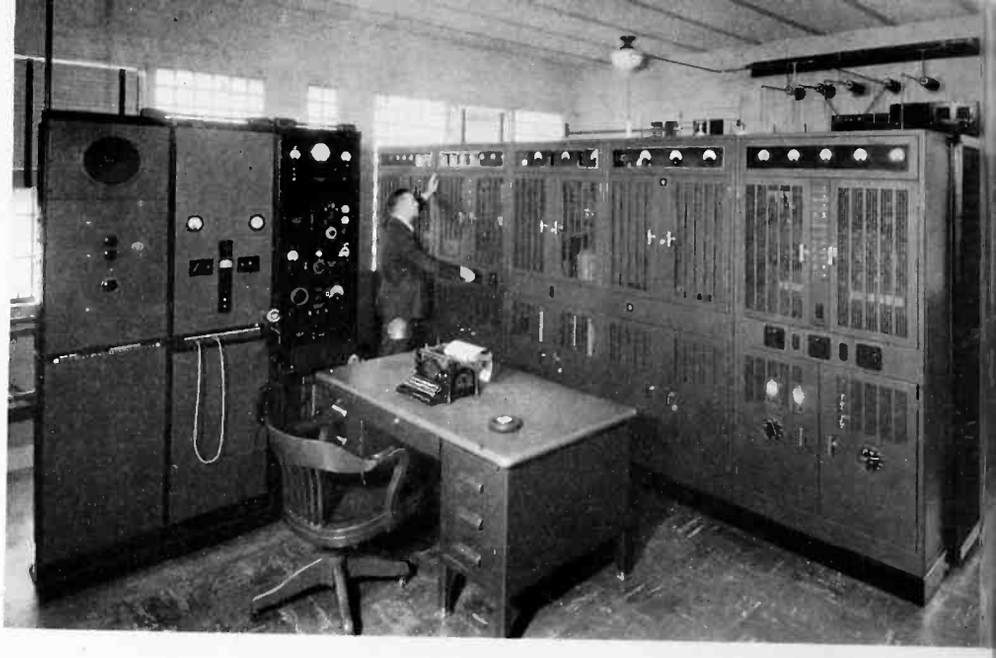
WMBD

Peoria, Illinois



To serve the growing number of listeners, WMBD increased its power with a Western Electric 5000 watt transmitter in 1937. Below: Glass brick transmitter building, Blaw-Knox tower.

Two transmitters in two years! And that is pretty good evidence that WMBD, Peoria, Illinois, has rapidly taken its place among the most progressive broadcasting stations in the country. It all started when Edgar L. Bill came from WLS, Chicago, to take over the organization. Things began to happen. WMBD became a Columbia Broadcasting System affiliate. Full time was acquired and studios were moved to more adequate space in the Alliance Life Building.

As a result of increasing prestige better equipment was needed. Quoting Mr. Bill, "We are going to get off on the right foot and we want the best equipment that the art provides."

Thus it was that in 1936, WMBD installed a Western Electric 353E1 transmitter in a new glass brick building and erected a 254-foot Blaw-Knox self-supporting vertical radiator. In less than a year the station had gained such wide popularity that more power was needed to serve the increasing number of listeners. Pleased with its first Western Electric transmitter WMBD ordered the 355E1, 5,000 watter, two Western Electric 33⅓ R.P.M. and 78 R.P.M. turntables, for vertical and lateral cut recordings, respectively. The Peoria station was among the first to install the Western Electric 110A amplifier.

The reason for such phenomenal growth may well be credited to a correct mixture of expert management, a progressive staff and a location in one of the richest production areas in the country. Expert management means Mr. Bill who is numbered among radio's outstanding pioneers. As past manager of WLS and president of the Peoria Broadcasting Company he is known to almost everyone in the broadcasting industry. His willingness to listen to comments and suggestions, accepting or rejecting them with uncanny foresight, has won the respect of all who work with him.

WMBD also points with pride to its engineering department which is under the direction of T. A. Giles, Chief Engineer. He has personally supervised all improvements made by the department. Assisting him are R. W. Conner, Engineering; Harvey Day, Remotes and Special Events; Raymond Noll, Lee Elton and Ernest Roberts, Studio Control; Harold McDuff, Harry McCormick and Oliver Mackley, Transmitter.

Time off the air is practically unknown. Since the equipment is checked each day most cases of possible trouble are discovered and corrected before they become serious. The engineers have at

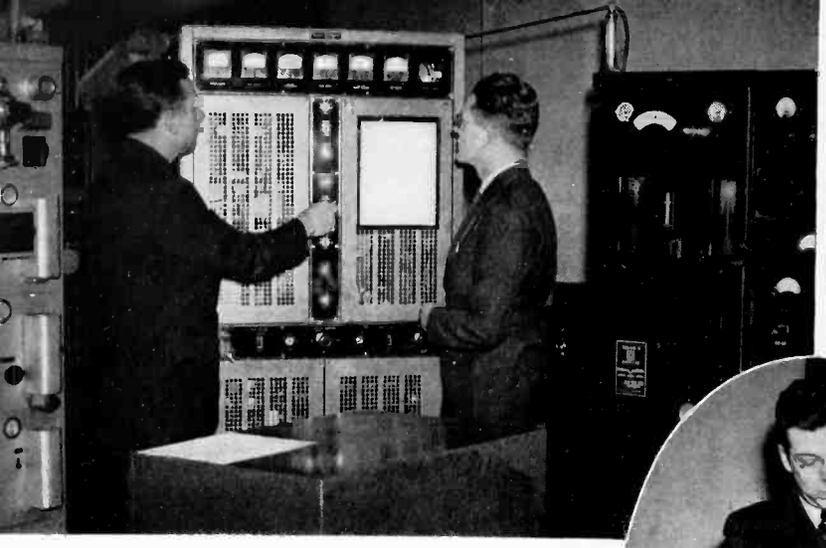
(*Continued on Page 20*)

T. A. Giles, Chief Engineer, heads a staff of eight competent assistants.

Edgar L. Bill, President of Peoria Broadcasting Company, and one of radio's outstanding pioneers.

CBS STATION KNX
Hollywood

Broadcasting reached a new height in functional architecture, technical facilities and transmission fidelity when Columbia Square was officially dedicated on April 30. It is the West Coast outlet for Columbia Broadcasting System and the home of KNX. Western Electric speech input equipment is used throughout to provide complete facilities for seven studios with control and coordination facilities in the main control room to handle network and incoming programs. A forthcoming issue of Pick-Ups will present in words and pictures the complete story of this outstanding broadcasting center.



WLAP

Lexington, Ky.

Located in the heart of the Blue Grass Country, WLAP, Lexington, Kentucky, claims the distinction of being one of the oldest stations in the country having made its debut on the air as a five watt church station. This old timer has established an enviable reputation by stressing the importance of local and territorial programming and coverage. As a result it has more than quadrupled its listener audience in the last 18 months.

In catering to the peculiar preferences of an area which is the home of the horse industry and the largest loose leaf tobacco market in the country, WLAP serves its listeners with horse shows, race track openings, daily reports of races on all major tracks, tobacco auctions and daily loose leaf market reports.

The station also features innumerable other interesting broadcasts such as elections, hospital and civic events, interviews with famous visitors and a newscast, "Extras on the Air." It has rendered a real service in educational fields by working with Kentucky and Transylvania universities through extension studios.

Heading the organization is Gilmore N. Nunn, President of the American Broadcasting Corporation of Kentucky, owners and operators of WLAP. Mr. Nunn has been connected with radio

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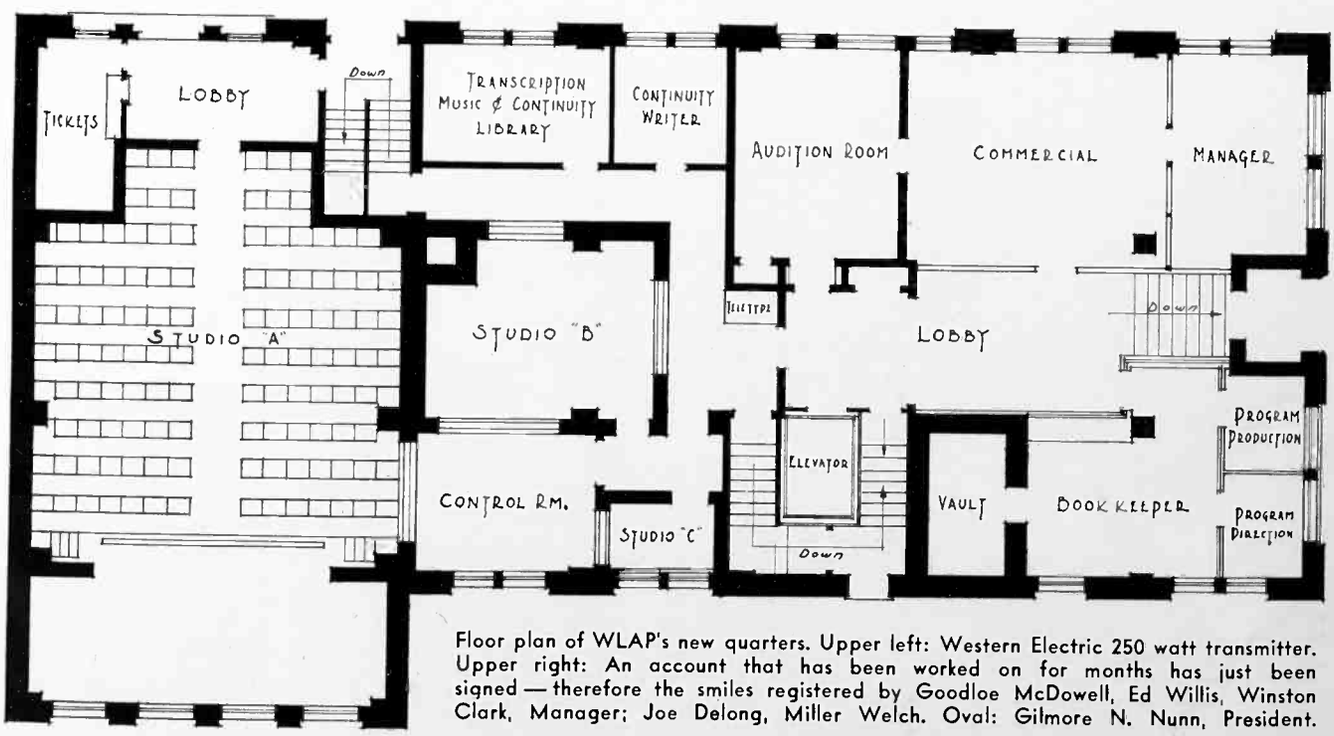


Floor plan of WLAP's new quarters. Upper left: Western Electric 250 watt transmitter. Upper right: An account that has been worked on for months has just been signed — therefore the smiles registered by Goodloe McDowell, Ed Willis, Winston Clark, Manager; Joe Delong, Miller Welch. Oval: Gilmore N. Nunn, President.

New Marine Equipment for Coastal Radio Service

(*Continued from Page 7*)

telephone control unit. This frequency will usually be the ship-to-ship frequency of 2738 kilocycles, although the emergency Coast Guard frequency of 2670 kilocycles may be used instead.

This new marine equipment incorporates several outstanding features not previously available in apparatus for mobile application. Transfer from the receiving to the transmitting condition is now accomplished by voice-controlled switching instead of by the press-to-talk switch in the handset previously used for this service. The transmitter is put "on the air" within a few thousandths of a second after the talking begins, a time short enough to avoid objectionable clipping of the initial speech sounds. The carrier is maintained for a short period after talking ceases to prevent the transmitter from going off the air between syllables or words.

The radio transmitter also incorporates an automatically controlled audio amplifier which assures substantially complete modulation of the carrier over a speech range of 30 db. This feature insures considerably better results with different types of users than could otherwise be obtained, particularly when transmitting conditions are poor. Another feature of this transmitter is the use of a new Western Electric pentode, the 339A, which requires only 500 volts for its plate supply. This relatively low plate voltage permits the use of a plate-voltage rectifier of the type usually employed in radio receivers, resulting in considerable saving in both space and cost.

The receiver is an extremely selective and sensitive superheterodyne set which has built into it a selective ringing unit, which enables a ship to receive calls without the use of a loudspeaker. The operator at the shore station merely dials the number assigned to the particular vessel desired and the telephone bell on this ship, and on this one only, rings. An improved automatic volume-control circuit in the receiver provides a constant audio output over a wide range of radio signal inputs. This is a desirable feature where automatic operation by the general public is required.

The standard handset on which are located all of the controls necessary for the remote operation of the equipment.

With the remote control unit, telephone service at sea becomes as convenient and accessible as it is on land.

The remote control unit contains the bell operated by the selective ringing circuit and all the controls necessary to operate the system as a two-way radio telephone circuit. In place of the dial in the front of the handset mounting there is a small panel on which is located the master control switch, volume control, indicator light, and a momentary contact switch for quickly changing to the ship-to-ship or Coast Guard frequency. This change may be accomplished only when the handset is removed from the cradle, and when the handset is replaced on the cradle, the equipment automatically returns to its monitoring condition on the frequency of the shore channel to which it was last set.

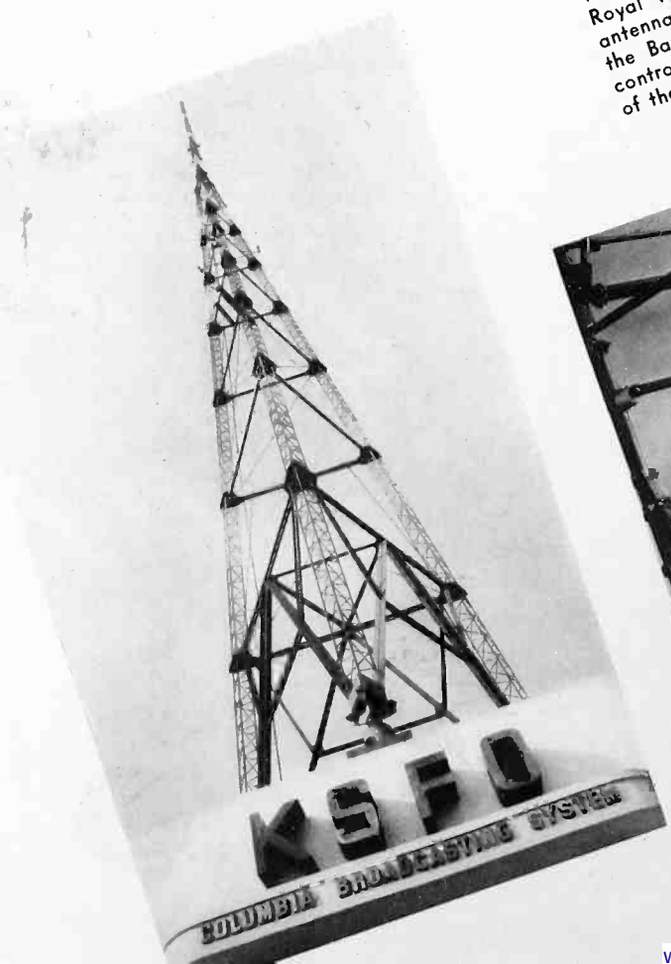
The radio equipment, which weighs about 180 pounds, requires a space 36 by 21 by 10½ inches, and may be mounted either on a bulkhead or on deck. The rotary converter used for supplying the alternating current may be installed in any convenient spot, since it is quiet in operation and occupies a space only 15 inches long, 12 inches wide and 12 inches high. The remote control unit may be installed in the chart room, pilot house, or other convenient location. Additional extension telephones may also be installed if desired.

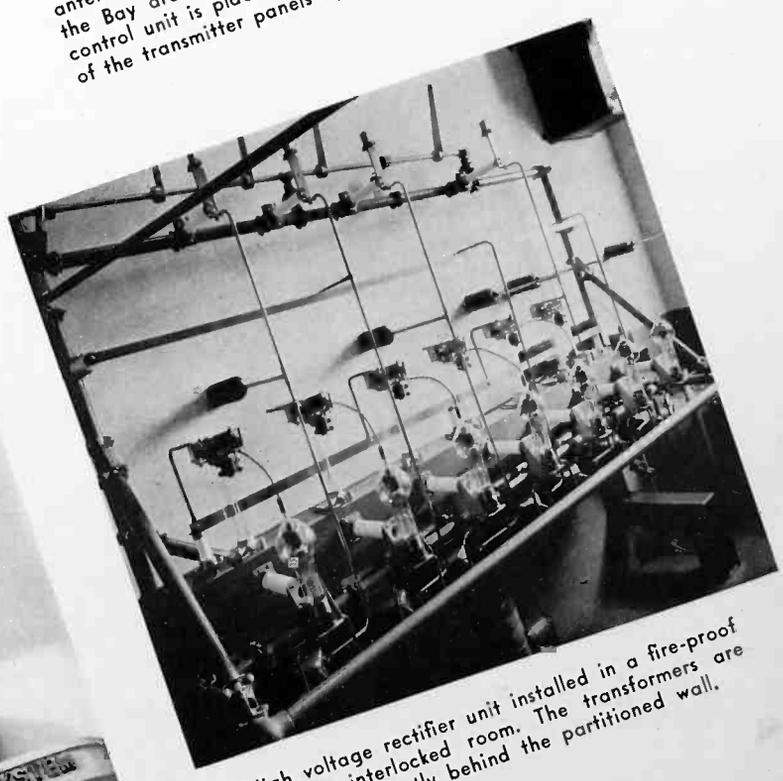
This new equipment offers an adequate and inexpensive radio telephone system for coastwise commercial ships and yachts.

KSFO

San Francisco, Cal.

Beauty and broadcasting go hand-in-hand at KSFO's new station, the entrance to which is shown above. Upper right: Alfred E. Towne, Transmitter Supervisor and Royal V. Howard, Chief Engineer, check the transmitter. Left: "Worm's eye" view of antenna structure topped by a 2,000 watt beacon which is visible for miles around the Bay area. Center: Western Electric 5,000 watt transmitter and 110A Amplifier—control unit is placed on extreme left thus concentrating controls. Door at the far end of the transmitter panels opens into the room which contains the emergency power unit.





High voltage rectifier unit installed in a fire-proof concrete interlocked room. The transformers are placed directly behind the partitioned wall.

Since its inception in 1924 KSFO and Western Electric have been team-mates along the ever-widening trail blazed by broadcasting. Milestones marking the journey read "The 101B oscillator modulator unit —the 6B and now the modern high-fidelity 5 KW transmitter."

The station's coverage is particularly satisfactory due to its operating frequency and the excellent location of the transmitter site. More than half of the ground system rests in the salt water of San Francisco Bay while the remaining portion is laid in salt marsh on filled land at a point known as Islais Creek. This point, three miles south of San Francisco's Market Street, is near the center of the Bay area.

KFSO's reinforced concrete transmitter building, erected on sixty-four 80-foot Douglas fir piles assures stability against all anticipated disturbances and provides ample space for future expansion. The design of the main control room gives the appearance of an amphitheatre with a harmonious combination of colors. Adjoining the main control room are the chief engineer's office which may be used as an emergency studio; supervisor's office; laboratory; workshop, and living quarters. A two-car garage for the operating personnel stands adjacent to the building.

The antenna structure, which is an insulated tower 387 feet high, has been made a part of the building design by erecting it on the roof. It is fed from a coupling unit mounted on the top of the transmitter directly below. The 2,000 watt beacon atop the tower, controlled by photo cells, is visible for miles around the Bay area.

In consolidating power supply facilities for the entire plant, arrangements were made to bring together several of the power panels, supplied with

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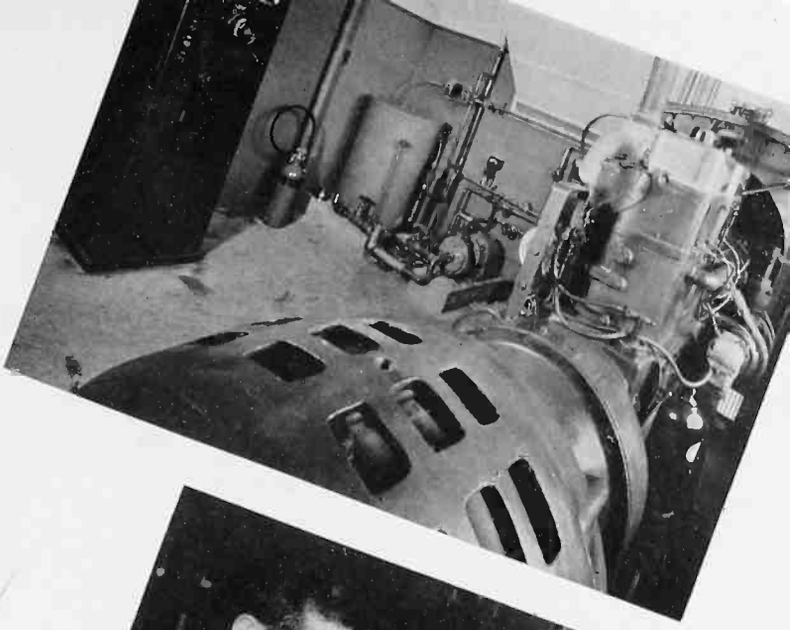
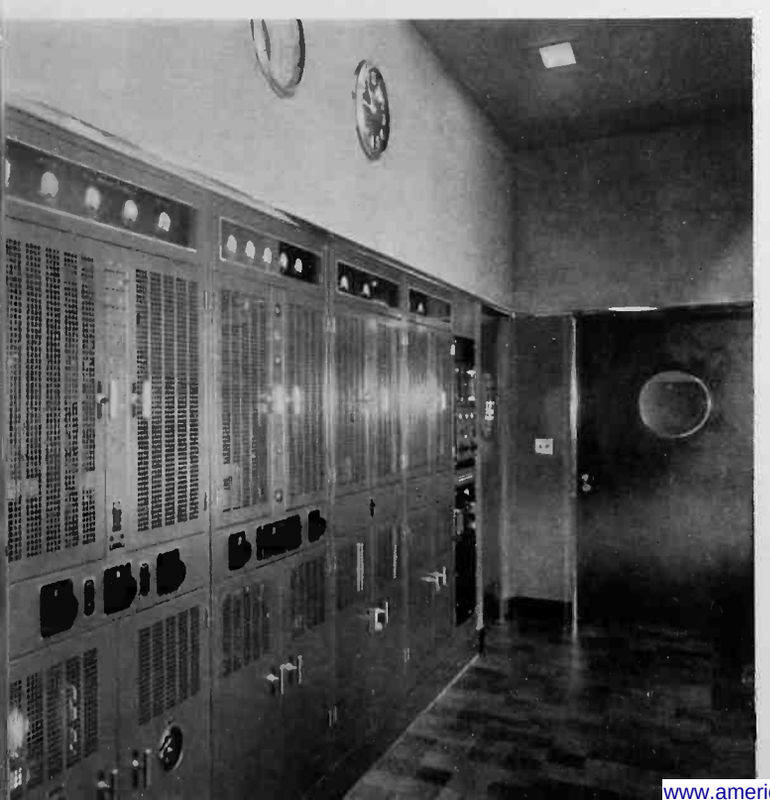
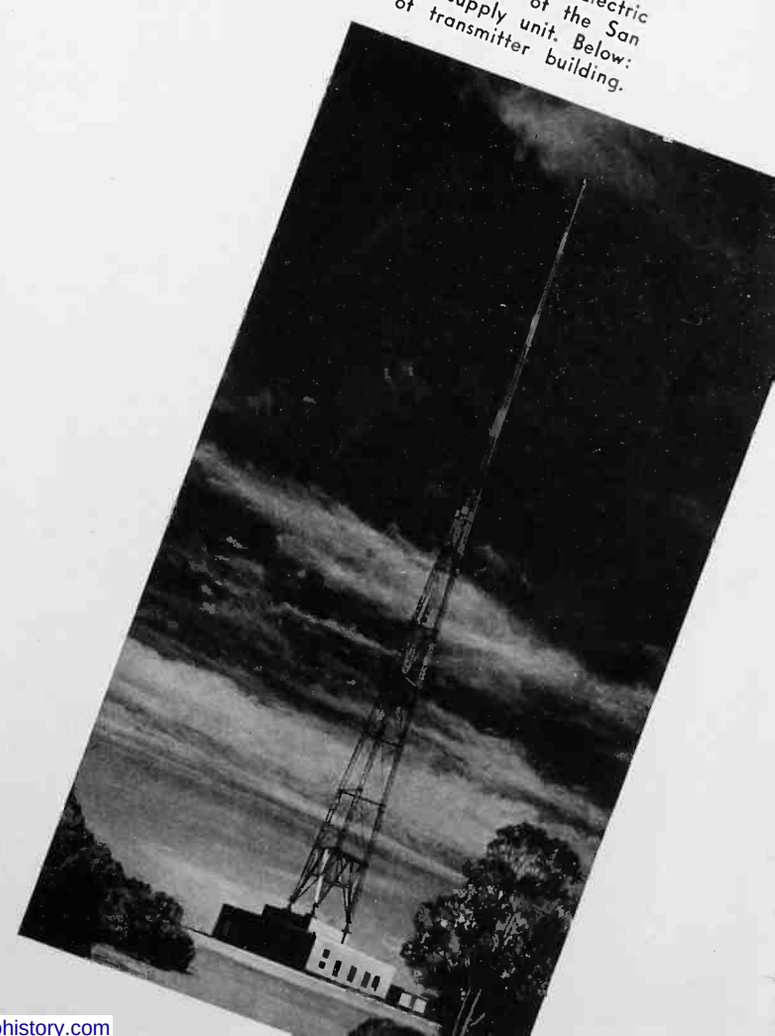
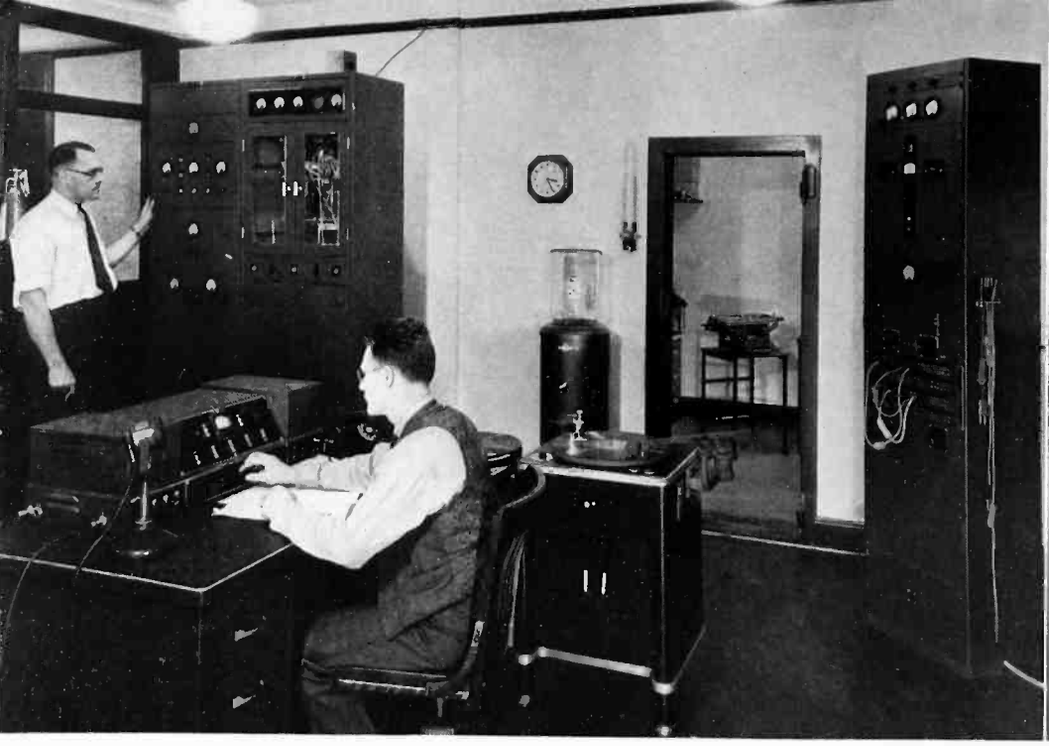


Philip G. Lasky, General Manager, explains the Western Electric frequency monitor to Emila Hodel, Radio Columnist of the San Francisco Daily News. Top: Emergency power supply unit. Below: Antenna structure installed on the roof of transmitter building.







W8XWJ

Detroit News

Station Presents 14

Prohibited from deriving revenue from ultra-high frequency broadcasting, radio stations have operated their ultra-high transmitters for experimental purposes only and with no regard for size or type of audience. In most cases the programs going out over the regular broadcast band have also been fed into the ultra-high transmitters. With comparatively few listeners whose receivers are capable of ultra-high reception and with even these choosing the more familiar standard frequencies, ultra-high-frequency broadcasting has had only a small audience. It took W8XWJ, owned by the Detroit News, also owner of pioneer broadcasting station WWJ, to change this situation.

W8XWJ began its career as an ultra-high station in February, 1936, operating in conjunction with WWJ. It was equipped with a 100 watt transmitter, located on the 44th floor of the Penobscot Building in Detroit, coupled through a 7/8 inch coaxial transmission line to a vertical half-wave radiator on top of the beacon tower 680 feet above the ground.

In January, 1938, W8XWJ installed new and more powerful Western Electric equipment and began operating under an entirely new policy with the aim of building up a large and faithful listening audience. As a principal means of reaching this goal it began broadcasting on a full schedule of 14 hours a day.

A complete program and technical staff was selected, the members of which devote their time exclusively to the operation of W8XWJ. All program

Above: C. Leedy at the 23B control console and C. H. Wesser before the 16B transmitter. E. J. Kelly checking bay No. 2 which carries, among other equipment, a Western Electric 60A amplifier and meter panel. Left: Bay No. 1 houses Western Electric meter panel, 110A amplifier, remote amplifier, pre-amplifier, monitor amplifier, power supply unit.

Hour Program Daily

material is arranged and produced independently of WWJ.

Programs at W8XWJ are conducted on a four point basis, emphasizing public service, educational features, fine music and spot news. In this last department the station has the valuable assistance of the Early Bird, the radio equipped Detroit News plane, and also the big radio field car. With these facilities W8XWJ is amply equipped for spot broadcasts from the scene whenever a big news event breaks.

Many educational and cultural forces have already been linked to the station. From Wayne University and the University of Detroit, lectures and debates are broadcast, as well as plays presented by the colleges' drama departments. Many civic agencies have become part of the broadcasting scheme and the Detroit Board of Commerce has a regular program in which the business affairs of the city are discussed. Fine music is a feature of the programs every afternoon and evening.

In January, when W8XWJ inaugurated its new policy, new studio facilities were added and reception rooms and offices entirely revamped. Its frequency was changed from 31.6 to 41 megacycles. The 100 watt transmitter was replaced by a new Western Electric 16B transmitter and a 500 watt 88A amplifier, with a frequency response of from 40 to 12,000 cycles. The associated speech input equipment consists of

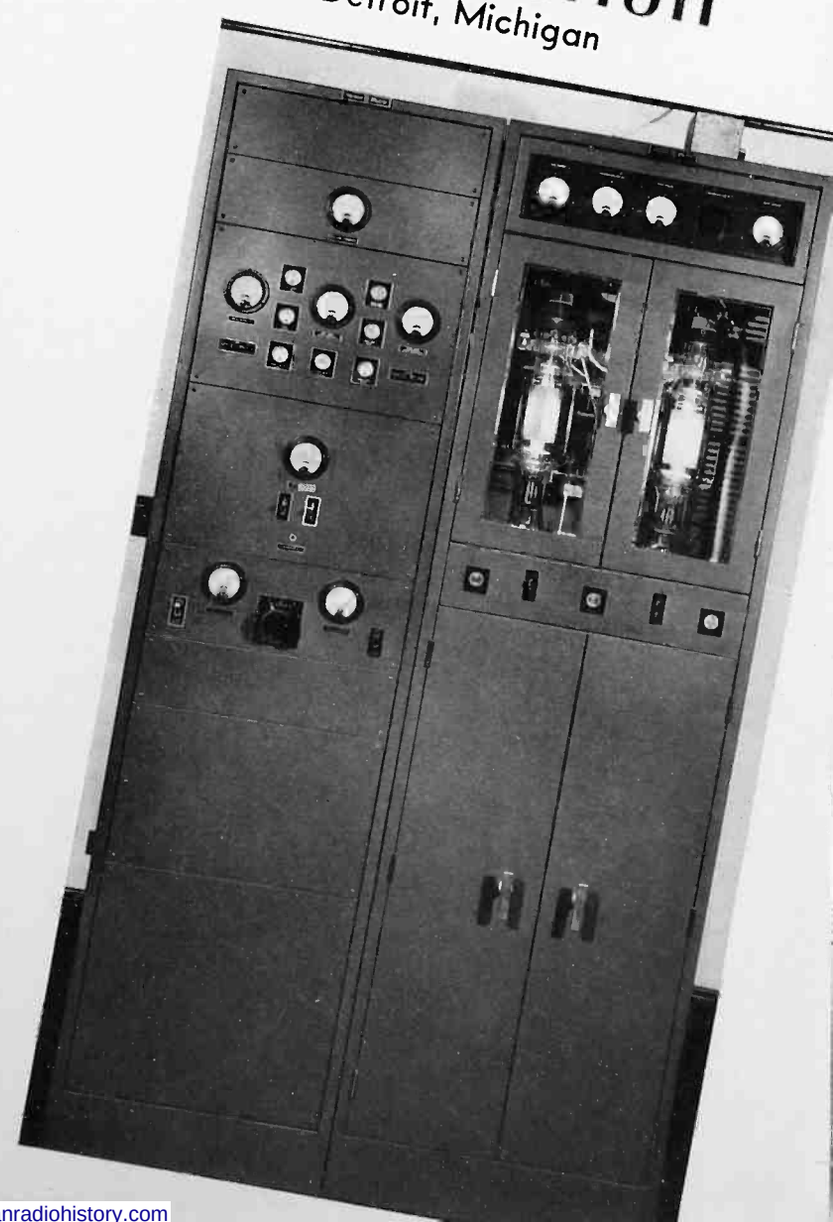
(*Continued on Page 22*)

Above: Installing vertical radiator and concentric transmission line atop the Penobscot Building—the tallest in Detroit.

Center: Full view of the Penobscot on whose 44th floor the station is located. Engineering staff: T. Pennebaker, E. J. Kelly, C. H. Wesser and C. Leedy. Right: The Western Electric UHF 16B transmitter and the 500 watt 88A amplifier.

UHF STATION

Detroit, Michigan



Studio Acoustics

(*Continued from Page 4*)

in a studio, namely, the discrete reflections which reach the microphone through a relatively short path after the first incidence and the multiple reflections which travel between parallel surfaces and produce the disturbing "flutter-echo" effect so frequently encountered in the live end of a studio. We have proved that there are also particular sound reflections which are decidedly beneficial in a studio and ones which have been largely lacking under the former methods of treatment. These are called the long-mean-free-path or, more explicitly, the "around-the-room" reflections, and are the ones which to a large extent lend the necessary support and naturalness to instrumental and vocal renditions.

In order that the beneficial reflections may be maintained and efficiently controlled, and the harmful reflections eliminated or dissipated simultaneously, a very careful arrangement of surfaces and distribution of sound absorbing material is necessary. In the design of a new studio the contours of all wall surfaces, as well as the ceiling surface, are planned in conjunction with the best ratio of proportions in such a manner that not only are multiple reflections totally minimized, but so that these contours coordinate with the distribution of sound absorbing material to maintain and efficiently control the destination of the beneficial or long-mean-free-path reflections. The discrete or short path reflections are controlled and dissipated by the arrangement of surfaces and distribution of treatment in close proximity to the microphone areas.

The authors wish to emphasize at this point that excessive acoustic treatment has been required in many cases to reduce multiple reflections caused by parallelism between surfaces when it would have been possible, had the design principles of sound control been efficiently applied, to minimize these reflections by a careful arrangement of wall and ceiling surfaces.

The quantity and quality of sound absorbing materials required under this new method of treatment are dependent upon three fundamental factors, namely, the volume of the studio, the relationship of surfaces to the source of sound and the type of liveness necessary for specific sections of both the microphone and performance areas. In considering reverberation time versus frequency for a given size of studio, we have found from actual measurements that in the case of a small studio the overall treatment should produce a relatively uniform time of reverberation throughout the entire frequency range, whereas for a large studio some departure from a uniform characteristic is both desirable and necessary at the extremely low and high frequencies.

Needless to say, the provision for proper low frequency absorption through the use of

Figure 1. One of World Broadcasting's new studios in Chicago in which the many acoustic surfaces are plainly seen. Photograph made before any form of decoration was applied.

acoustic materials alone has always presented one of the more difficult and expensive features of studio treatment. For this reason we have developed a type of surface construction to be used in conjunction with the new method of treatment which not only has a high sound insulation value in itself, but is also coordinated with the design of surface contours to provide a limited amount of sound absorption at the low frequencies. This reduces to a certain extent the need for extraordinarily high coefficients of absorption in acoustic materials at these frequencies. One of the outstanding advantages of this construction lies in the fact that the limited amount of sound absorption it does provide is relatively uniform with frequency and entirely free of the resonant peaks normally encountered where the diaphragmatic action of surfaces is a contributing element to the acoustic characteristic of the studio.

The actual distribution of treatment under this method is best described in conjunction with the photograph shown as Figure 1. This represents one of the new studios recently designed for the World Broadcasting System in their new plant at Chicago. The photograph was taken before any form of decoration was applied and, consequently, shows the general arrangement of absorptive and non-absorptive areas to the best advantage. This view is looking toward the microphone end of the studio, and particular attention is called to the wide distribution of sound absorbing material, a part of which actually extends into the performance end not shown in the photograph.

It will be observed that there are numerous large and small sections of live or sound reflective area retained on both the upper and lower portions of the wall surfaces, as well as on the ceiling surface. These are arranged in their relationship to each other and to the treated areas, in such a manner that the long-mean-free-path reflections may be formed and retained and the discrete or short path

reflections efficiently absorbed or dissipated. A close inspection of this photograph will show the broken contours of the wall and ceiling surfaces, which are designed to eliminate multiple reflections and to aid in controlling the destination of the long-mean-free-path reflections.

Heading this article is a sketch of a studio in which this method of distributing sound absorbing material is coordinated with interior architectural treatment to give a very pleasing and interesting decorative effect. This is one of a group of studios, designed by architect Ben Schlanger, now under construction in New York, and is somewhat unusual in design because of the fact that it combines, on a small scale, the functions of the "air" theatre with typical studio operation, to secure a greater sense of intimacy as well as the best acoustic control. This new modern method of distributing sound absorptive and sound reflective surfaces was also employed in the recent design of a group of studios for the Yankee Network.

From an acoustical standpoint, the many outstanding features of this new method of studio treatment, such as full fidelity in the quality of the original sound, vitality and naturalness in pick-up, and complete flexibility in microphone placement, have proved their value in actual broadcasting practice. Economy in both construction and acoustic treatment, also a very important factor in studio design and renovation, has not been overlooked, but rather has been one of the paramount considerations in this development work. Consequently, a "better studio for less money," the ultimate aim of every broadcaster, is realized in this new technique of studio design and acoustic treatment.

In the interests of traffic safety in Miami, Lt. Daniel Reynolds, head of the Accident Prevention Bureau of the Police Department, greets visitors to the city—cautions them as to driving conditions and gives them a copy of driving regulations. Leslie Harris, WQAM, then presents them with a complimentary program of the West Flagler Kennel Club, sponsor of the broadcast, and interviews them on their trip highlights.

KSFO, San Francisco, Cal.

(*Continued from Page 13*)

the equipment, into one assembly. This combination panel also provides for instant transfer from the normal, metropolitan power supply to an emergency, automatic gas-driven unit.

The 60 KVA emergency unit provides complete operating facilities for the entire plant for an indefinite period. Every precaution has been taken to assure continuous operation under all circumstances. Even the two program lines between the studio and transmitter traverse different routes.

In planning the water circulating system provision was made for diverting the exhaust air warmed by the tubes back into the operating room for heating purposes. This arrangement also includes auxiliary electric heating units to take care of unusual weather conditions.

The rectifier room adjoins the transmitter room at the left and is backed up with the transformer vault in such a way as to make the high voltage leads and power supply leads line up progressively. The high voltage potential is fed to the transmitter through a special cable under the concrete floor slab.

Insulating pyrex glass water tubes of the power amplifier are encased in a grounded metal cabinet which provides a "dead front" exterior for the back of the transmitter. This unit is a part of the Cory interlock system which protects the entire transmitter and personnel. Accessibility to the back of the transmitter, while it is operating, is provided by means of two doors, one at the right and the other at the left of the equipment. This arrangement also gives access to the main distributor frame.

By using absorbent type plaster the upper half of the operating control room is given acoustical treatment. Because of this special feature in conjunction with a high fidelity loud speaker system, an excellent check of the sound quality of the program material can be made. To improve further the unusually effective signal, a 110A program amplifier has been installed. A 23B console provides emergency program facilities from the small studio.

Owned and operated by the Associated Broadcasters, Inc., KSFO is one of the oldest major stations on the Pacific Coast. Prior to its affiliation with the Columbia network the latter part of 1936, it figured prominently in the establishment of the Western network (California) together with KNX of Hollywood. The station is recognized for its progressive business policies and showmanship. Many radio stars started their careers in its studios. W. I. Dumm is president of the station, and Philip G. Lasky, widely known in the broadcasting industry, vice-president and general manager. On the operating staff are R. V. Howard, Chief Engineer; A. E. Towne, Transmitter Supervisor, and Warren Gilman, Senior Operator.

NEW PRODUCTS

for Broadcast Stations

22 Type Portable Pick-Up

Baseball is king again and grandstand and bleachers echo the rivalry of fighting ball clubs. Up in one corner of the stands the clicking of telegraph keys marks the press section. From another corner hangs the sign or banner with call letters serving notice that a remote crew is on the job, bringing America's favorite sport to the thousands of fans who sit with ears cocked at receivers.

More often than not sports announcer and control engineer find themselves parked in some spot inconvenient for broadcasting, with little room for themselves, and with equipment occupying valuable "pay space." Even in ball parks where provision is made for broadcasting, the remote man must bring his equipment with him, set it up and operate it for long periods of time.

Last year Western Electric came to the

(*Continued on Page 26*)

Above: A typical sports broadcast illustrates the simplicity and ease of operation of the 22 type speech input equipment.

705A Speech Input Bay

The 705A speech input bay, especially designed by Bell Telephone Laboratories for station application, presents for the first time the popular 110A program amplifier in a complete assembly of units with all associated equipment ordinarily required for program control at transmitter locations. This bay assembly may be ordered less any of the individual units already in use or not needed, or any or all units can be furnished separately when a station wishes to build up its own station bay.

In addition to the 110A amplifier, the basic bay assembly includes a 94C monitoring amplifier and key switching-gain control, line repeating coil-equalizer, volume indicator, jack and terminal panels. Adequate space is available and bay wiring is provided in the assembly for the addition of a 106A amplifier for an announcing or spare line channel and a 260A telephone panel. Space is also provided for two 279A adjustable equalizer-attenuator panels and a power switching or apparatus panel which may be required for a specific installation.

The key switching and gain control panel provides the following facilities: Key selection of either of two incoming and either of two outgoing lines, all with "off" positions; key selection for monitor system between channel output and either radio monitor or other source, also with an "off" position; key switch for substituting local emergency announcing channel for program feed—this key is interlocked with the monitor system to provide loud speaker cut-off; line gain control with a 51 db range and an "off" position; monitor gain control, and gain control for radio monitor source.

The line repeating coil and equalizer panel is equipped with one 119C line repeating coil and has space for an additional 119 type line coil and a 119B coil for use in the announcing channel. There is also space for the addition of two 23A fixed line equalizers. Where an adjustable equalizer is required a 279A equalizer may be utilized.

The 751A volume indicator is a general purpose copper oxide type volume indicator meter incorporating indirect illumination and a range switch. It is capable of measuring, with wide scale deflection, program levels across a 600 ohm circuit in two-db steps from —10 db to +10 db (6 milliwatts =0). The meter scale itself is calibrated from —10 db to +6 db, the zero level indication being at mid-scale.

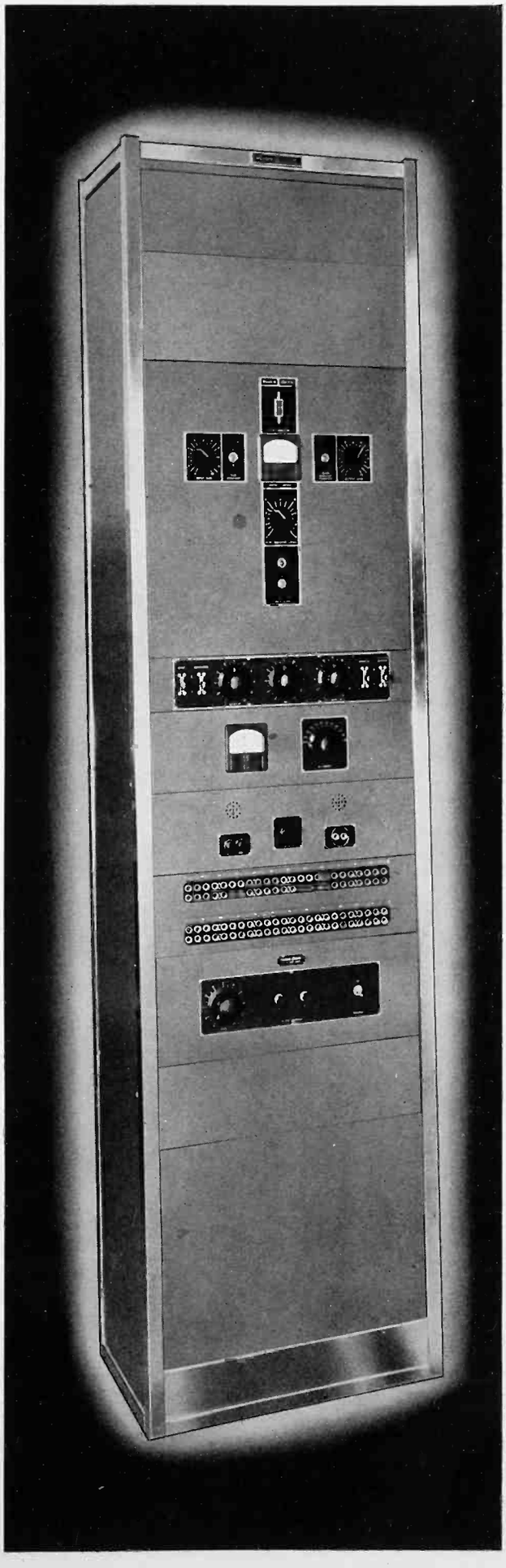
Adequate jacks for patching and testing and terminals for connections are provided.

A satisfactory announcing channel for use with a close talking dynamic microphone may be arranged by the addition of the 106A amplifier and the 119B repeating coil mentioned above. The 106A amplifier will also serve as a spare line amplifier. Wiring for this equipment is provided in the bay cabling.

Wiring is also provided in the bay cable for the addition of a 260A telephone panel which provides telephone terminal facilities for an order-wire line. This panel may be used with either a hand telephone set or an operator's breast type set or both.

Complete AC power supply apparatus is incorporated in each of the amplifiers. No other power supply is required for the operation of the 705A speech input bay except for the 260A telephone panel which normally requires a 12 volt DC power source. This panel may, however, be operated on 4½ volts obtained from dry batteries.

The 705A speech input bay equipment is housed in an attractive gray finished sturdy bay cabinet available with either stainless steel or plain gray corner posts and trim.



The line-up of panels in the 705A bay includes (from top to bottom) repeating coil and equalizer panel, seven-inch blank mat with space for two 279A equalizing panels, 110A program amplifier, 261B control panel, 751A volume indicator, 260A telephone panel, jack panel, 106A amplifier (spare line amplifier), terminal panel, another seven-inch blank panel with space for power switches, 94C monitoring amplifier.

WMBD, Peoria, Illinois

(*Continued from Page 8*)

their disposal a fine set of laboratory test equipment to assist them in keeping operations running smoothly.

At the master control there is a 12-channel mixer which is so constructed that it is possible to run a program and audition at the same time. An interesting feature is a switching system which allows programs and auditions to be run to the various offices without the usual complexity of patch cords. Talk-back between studios and master control eliminates confusing gestures, signals and the element of chance. All equipment is installed in duplicate and arranged to facilitate substitution in case of failures.

Use of ultra-high frequency transmitters for pick-ups where remote lines are not available has progressed to such a point that listeners expect and get studio quality. The short wave unit W9XPS is so constructed that it may be operated as portable, or portable mobile. It uses a storage battery power supply. The unit is housed in a compact cabinet containing pre-amplifier, modulator and transmitter. The speech amplifier is designed to be used with a Western Electric Eight-Ball microphone.

On one occasion this equipment was set up on a river barge to broadcast an airplane disaster in the Illinois River. This proved a decided aid to the state police who were in charge. During the winter, broadcasts were carried on from the Kickapoo River bottoms which were inundated when ice jams broke in the upper river. The broadcasts were made from the valley and picked up by a receiver located 11 miles away in the transmitter building where the program was rebroadcast. Several other remote pick-up broadcasts have been conducted at the airports. Outstanding among these was an interview with Merrill and Lambie, at which time the microphone was taken into the cabin of the plane where Dick Merrill described the various instruments used in their around-the-world flight.

One of the station's most popular programs is "The Good Neighbor." During this broadcast the short wave equipment is carried in a car. A long cable is attached to the microphone which the announcer takes into various homes in central Illinois where he chats with entire families. No sooner does the announcer tell where the program is originating than the street is filled with cars. During each broadcast at least one interview is made with occupants of one of the cars.

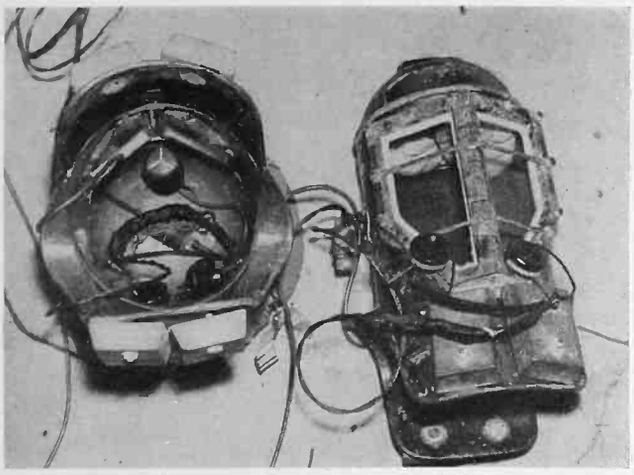
Another remote pick-up feature is a pack transmitter which straps to the announcer's back allowing him to move freely among crowds while he makes his interview or describes special events, sports and fires. Several new uses for the equipment are being investigated by the engineering department in cooperation with the sales group.

The program department employs 50 people. Harold Bean is the director and Gomer Bath, assistant station manager. In charge of women's activities are Jessica McFarland, Josephine Wetzler and Connie Ford. Special events and sports are handled by Jack Brickhouse and Howard Dorsey. News, brought to WMBD by United Press teletype, is edited by Brooks Watson, a veteran newspaper man. The sales department is efficiently headed by Charles C. Caley, Manager, and a staff of five assistants.

Located in the heart of Illinois, one of the richest mining and farming areas in the country, WMBD serves a total population of 750,000. The transmitter is situated on an 11-acre site half way between Peoria and Pekin on the Illinois River. Peoria, with its population of 165,000, is the distilling center of the country and is also noted for farm machinery manufacturing.

The people of central Illinois like WMBD. When the station was dedicated by Governor Horner the largest crowd ever gathered in Peoria helped celebrate its power party. If you happen around these parts stop at WMBD and you will see one of the liveliest stations in this nation.

WOR has the towers of its 50,000 watt transmitter at Carteret, N. J., painted while the station is broadcasting. Although 3,000 volts of electricity are surging through the steel mast, a painter goes serenely about his work as Charles Singer, transmitter supervisor, guides him. The trick is done by insulating the painter from contact with the ground by means of the wooden ladder. Similar jobs have been done previously late at night when the station was off the air. This is believed to be the first time that radio towers have been painted during broadcasting.



From under the ocean waves to out over the air waves would have been an appropriate title for a program that was recently broadcast from station WIOD, Miami, Florida. Making use of two ordinary diving helmets, equipped with headsets and Salt Shaker microphones, WIOD announcers described their surroundings and sensations while walking on the ocean floor.

New Aviation Transmitter

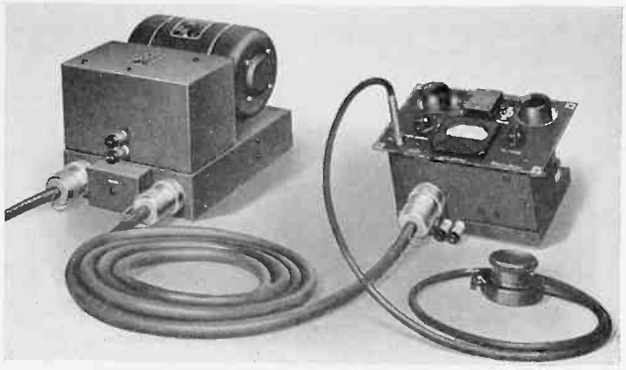
(*Continued from Page 6*)

is driven from the ship's twelve-volt battery and supplies plate voltage for the tubes. On the front of the base, under a shielding cover, is the audio amplifier, the relay for starting the dynamotor, and a control relay. On the front of this unit are two sockets—one for the multi-conductor cord to the radio-frequency unit, and one for the battery cable. Between these receptacles are three fuses under a common cover. The cover is equipped with clips that fit over the main fuse and withdraw it when the cover is removed thus shutting off the power. This avoids the possibility of anyone coming in contact with the high voltage when changing a fuse.

Operation of the set is very simple. With the desired quartz plate in place and the power switch in the "on" position, the six-position loading switch is turned to bring the pointer of the tuning meter approximately to a marked position on the dial. The tuning switch is then turned until the needle makes a marked dip, which indicates a resonance condition. That's all there is to tuning.

When the microphone switch is pressed, a relay operates to start the dynamotor, and another transfers the antenna to the transmitter and provides "side tone" for the head phones. When the switch is released, the antenna is connected to the radio receiver, and the transmitter is cut off.

Another unusual feature is the employment of a band-pass transformer as a coupling between the oscillator and power amplifier. This transformer is designed to pass the full frequency band from 2.8 to 6.4 megacycles, and eliminates all oscillator and interstage tuning. This frequency band includes the



The complete 25A transmitter, including the audio-power unit, radio frequency unit, microphone and interconnecting cables.

frequencies available to private flyers and transport planes.

The complete transmitter, including both units, the crystal, microphone and the connecting cords, weighs only 23 pounds, and provides 15 watts of carrier power with substantially complete modulation. Although intended primarily for telephone transmission, it may readily be arranged to include facilities for either continuous-wave or modulated continuous-wave telegraph transmission.

The 25A works into practically any type of fixed or trailing wire antenna, and, being at the pilot's finger tips, can be adjusted to maximum efficiency at any time. This feature alone is of tremendous importance since any transmitter's tuning varies widely between earth and air adjustments. Then too the "Multi-Frequency Midget" gets its name from the fact that it really is multi-frequency—it can be shifted by the pilot in a few seconds to any frequency for which he has a crystal in the 2.8 to 6.4 megacycle band. Such shift is not an approximation of tuning, as is afforded by some remote control transmitters. Tuning controls are right at his finger tips, and the careful pilot can tune the transmitter to any assigned frequency as well as the best radio engineer. This feature should appeal to pilots who prefer to do their own final checking of all equipment in their planes and have heretofore been unable to do so with their radio transmitter because of its elaborate design and undue complications.

WLAP, Lexington, Ky.

(*Continued from Page 10*)

since the early days, having installed his first broadcasting station at Amarillo, Texas, almost two decades ago.

At present new studios are being constructed and an application has been filed for increased power. When these plans are completed "The Voice of the Blue Grass," energized by Western Electric equipment, will rank among the best equipped, housed and programmed stations in the country.

Synchronization Controls Twin WLLH

Two good markets are better than one.

To demonstrate that axiom, WLLH, the Voice of the Merrimac Valley, now speaks from two transmitters—the original one in Lowell, Mass., and the second in the neighboring city of Lawrence. When the latter transmitter—a Western Electric 310A—went on the air last December, synchronization of two stations on a local channel with only a small mileage separation was accomplished for the first time.

Successful operation of the synchronized transmitters makes WLLH the dominant station for the 120,000 persons residing within a three-mile radius of the Lawrence transmitter, as well as for the city of Lowell. It has also added scores of thousands to the audience in WLLH's service area, without affecting in any way the service of other stations. Actually, it has made two stations grow where one was before.

WLLH was established in Lowell in 1934, operating full time with a power of 250 watts days and 100 watts nights on the 1370 kc. channel. A. S. Moffat, President of the Merrimac Broadcasting Company which owns the stations, was convinced that synchronized operation at short distances was practical and saw the Lowell-Lawrence territory as an ideal place for experimental work in this direction.

Consequently, on March 4, 1936, application was filed with the FCC for a station in Lawrence, ten miles away, to synchronize with the Lowell station. Permission for the experiment was granted last summer and in November tests were begun, paving the way for regular broadcasts starting December 1.

Two Western Electric 280A panels, one installed in each control room, constitute the synchronizing equipment. A Bell Telephone Laboratories oscillator unit in the Lowell panel feeds a 4,000 cycle tone over a wire circuit into the Lawrence panel as the basis for synchronization. Unmodulated r.f. from the Lowell transmitter is fed into the master panel, and a synchronous motor in the 6A control unit varies the frequency of the 4 kc. oscillator to conform with any deviation of the transmitter crystal from 1370 kc. On the receiving end in Lawrence, another 6A control unit with a similar motor is installed for vernier adjustment of the transmitter crystal to maintain the crystal output in synchronism with the Lowell frequency.

Paul DeMars was consulting engineer on the project, together with Paul Godley and Dr. G. H. Brown. William B. MacDonald, WLLH Chief Engineer, was in charge of the construction.

Several weeks of practical operation have shown that the "mush" area is confined to a narrow, thinly-populated strip mid-way between the two cities, while the entire city of Lawrence, as well as the adjacent cities of Methuen, Andover, and North Andover, are given a clear, static-free signal. Since there is no full-time station nearer than Boston, the dual territory served by the synchronized transmitters gives WLLH a position as one of the leading local stations in the country.

While the main studios and offices are maintained in Lowell, a complete plant is also operated in Lawrence, with a large studio to accommodate practically any studio group, and two smaller studios as well as offices, control room, and reception room. Nemo lines for Lawrence pick-ups terminate in the control room in that city, and are fed from there to Lowell.

The Lawrence installation is Western Electric throughout, with a 23B speech input console, and 633A "salt shaker" microphones, in addition to the 310A transmitter. WLLH utilizes two of the 110A program amplifiers, having installed one at Lawrence and the other in Lowell.

All programs carried by one station are broadcast simultaneously by the other, whether they originate in the Lowell or Lawrence studios, at a remote pick-up point, or from the network. Three wire lines are set up permanently between the two control rooms. In addition to the circuit for the synchronizing frequency, there is a talk circuit, and an equalized program circuit to match the quality of network transmission. For programs originating in Lawrence this line is reversed simply by throwing a switch in each control room. With this instantaneous reversal it is possible to originate part of a program in Lowell and the balance in Lawrence. Programs of the Mutual, Yankee, or Colonial Networks are fed into the Lowell control room and from there to Lawrence.

W8XWJ, Detroit, Mich.

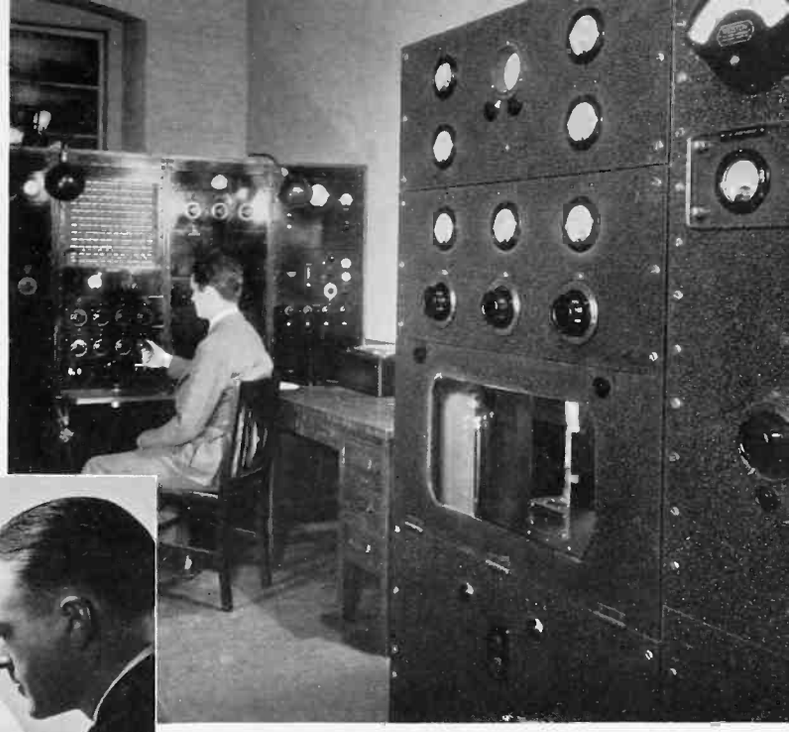
(*Continued from Page 15*)

standard Western Electric 23B high fidelity broadcast type. A 110A amplifier is also included in the audio.

By means of diversity receiving antennas, two modified communication receivers and a specially designed mixing system, it is possible to feed radio pick-up from the mobile units as well as other sources into the speech system and the transmitter.

Carl H. Wesser, chief engineer of W8XWJ, has been in charge of the station since its inception. His engineering staff includes R. T. Pennebaker, E. J. Kelly and C. E. Leedy. Wellington Granzow is the program director of the station.

This luxurious foyer greets the visitor to WLLH in Lowell where the main studios and offices are located. Three attractive studios are also maintained in Lawrence for programs originating from that point.

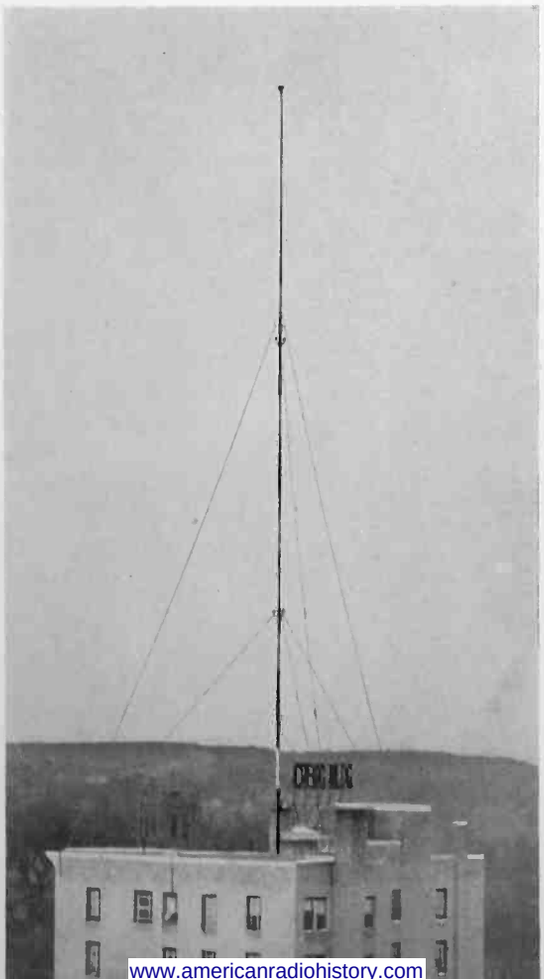


Transmitting equipment at Lowell. Chief Engineer William MacDonald, who supervised the installation of both synchronizing equipments is seated at the controls. Insert: Station Manager Robert F. Donahue.

WLLH

Lowell and Lawrence, Mass.

The synchronizing panel at Lowell. Center: The antenna for the Lawrence transmitter. This is one of the first shunt excited antennas to be installed on top of a building and is rendering fine service.

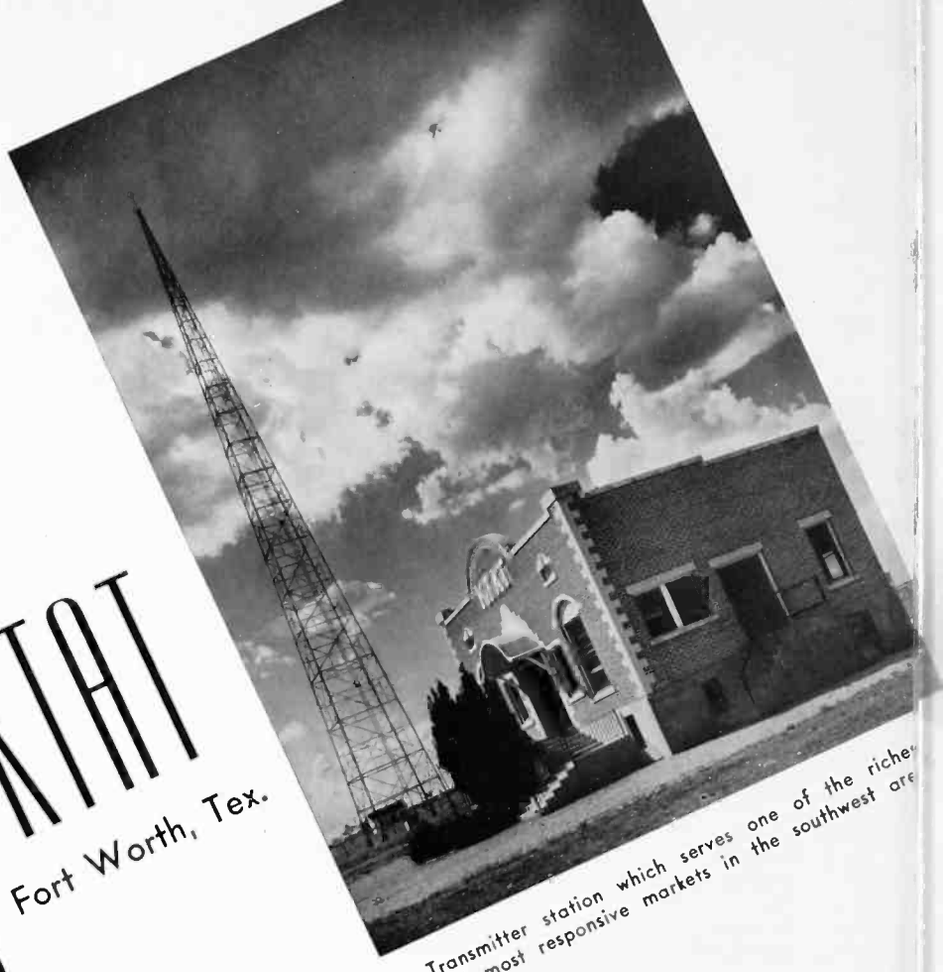


The Western Electric transmitting and control equipment at Lawrence. Noticeable in the photograph is the 310B transmitter, synchronizing panel, 110A amplifier, 23A speech input equipment.

Sam H. Bennett, General Manager.

KTAT

Fort Worth, Tex.



Transmitter station which serves one of the richest and most responsive markets in the southwest are

KTAT's Joe E. Pierson and Lenard Finger turn the mike over to Everett Marshall. Below: Joe B. Haigh, Chief Engineer, at Western Electric 1,000 watt transmitter.

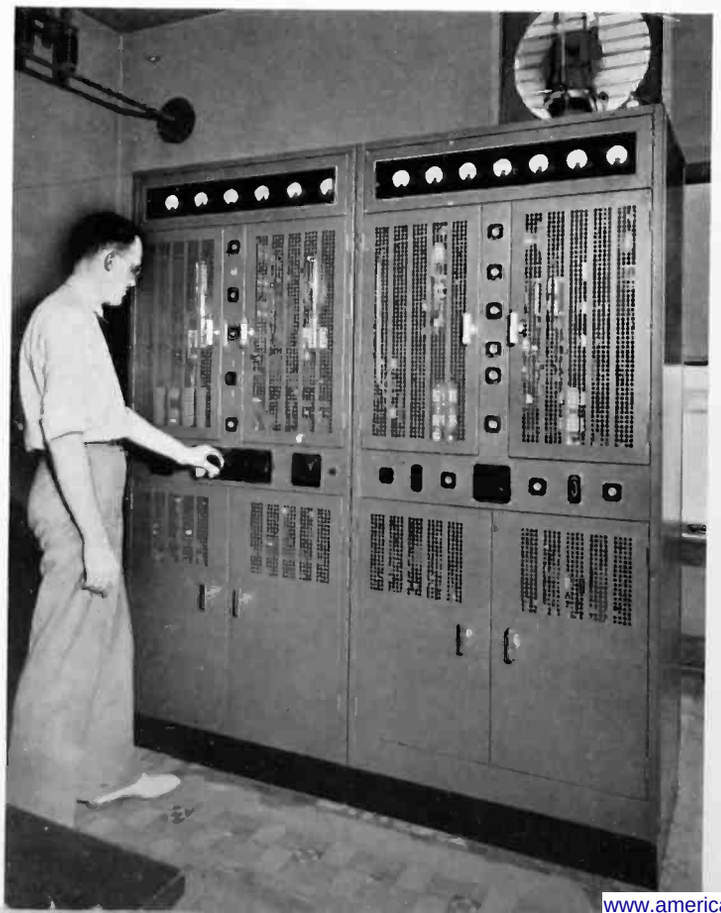
This Texas station not only has kept pace with the broadcasting industry by installing the latest equipment but it has utilized that equipment to the fullest advantage. It has become an established axiom in this territory that wherever anything of public interest happens, KTAT's Candid Mike is on the spot to deliver an oral picture of the event. For three consecutive years, starting with 1934, the station won the Variety designation for showmanship leadership.

Field intensity surveys prove that KTAT's primary listening zone covers the 21 counties within a 50 mile radius which comprise the Ft. Worth market—one of the richest and most responsive in the southwest. Superior equipment makes possible this complete coverage. Moreover, KTAT is completely high fidelity from microphone to antenna.

The station was one of the first in the southwest to use the Western Electric 1000 watt 353 E1 transmitter, the 110A Amplifier, 22A remote equipment, dynamic microphone and a vertical radiator. Only Western Electric dynamic microphones are used for both studio and remote broadcasts.

Remote programs play a big part in KTAT's presentations. The station has aired every high school football game played in Ft. Worth and has thoroughly covered college and university grid contests. Visiting celebrities arriving at the airport and railroad station are frequently interviewed. Among those who have contributed to this phase of the station's activities are: Jesse Jones, Commander

(*Continued on Page 26*)



WICA

Ashtabula, Ohio

In the Sheldon-Remick building, Ashtabula, Ohio, an expectant group of men awaits the pulling of a switch. Counting seconds that seem to stretch on interminably they watch an engineer standing before an assortment of electrical equipment. The signal is given. The switch is thrown. A control is opened. From hundreds of receivers, tuned to 940 kilocycles, there issues a rousing fanfare. A voice speaks a few words of greeting. And another broadcasting station takes its place in the field of entertainment and community service. It is WICA, "The Friendly Voice of Northeastern Ohio."

Since this real radio drama was enacted six months ago it has become a dawn-to-dusk habit in northeastern Ohio and northwestern Pennsylvania to tune in on WICA and enjoy the variety of excellent programs the newcomer has to offer. In keeping with the urban and rural territory the station now serves, its call letters symbolize both city and country activities—namely, Industry, Commerce, Agriculture.

More than three years were devoted to planning the station. Advantages and disadvantages of many types of equipment were carefully considered. Location after location for both studios and transmitter was weighed and discarded in favor of something better. Such caution proved worthwhile for results have more than justified the painstaking care which went into the making of WICA.

The transmitter site finally decided upon is situated approximately four miles south of Ashtabula in an old salt marsh in Plymouth township. Surface water in the marsh is within a few inches of the ground's surface the year around.

The voice of WICA—Western Electric 250 watt transmitter, serves both urban and rural listeners in Northeastern Ohio.

The antenna system consists of a 220-foot shunt-excited grounded radiator with 40,000 feet of No. 10 copper wire, extending in radials from the center of the tower. Radials are bonded at 25 and 50 feet from the tower's center to circles of four inch copper strips. The radiating structure is fed from the transmitter through a buried, concentric transmission line. Atop the tower is a 1,000 watt flashing beacon, which is clock regulated. Strangely enough, the tower with its flashing light is so situated that it marks the exact center of the entrance to Ashtabula's harbor—a welcome landmark to Lake Erie freighter captains.

Included in the transmitting equipment are a Western Electric 310B 250 watt transmitter and a 110A program amplifier. Equipment is housed in an attractive, modern frame building which resembles a cozy summer house and nestles about 100 feet from the antenna structure.

Studios in use at WICA are of the latest construction featuring floating walls, ceilings and floors. Decorations throughout have been made as light as possible with the use of pale blues and grays which add to the modern note emphasized by the use of glass brick windows and linoleum floors inlaid with fitting radio symbols and designs. The modernistic

Pale blues and grays blend nicely with the chrome furniture in the modernistic reception room. Right: Studio A features floating walls, ceiling, floor. Control room seen through panel.

style is carried out in the reception room where furniture in chrome is inviting but formal.

Among the microphones in use in the studios and at points from which remote control broadcasts are made are Western Electric "Salt Shakers." The equipment was installed by the station's technical staff. Coupling and adjustment of the shunt-excited radiator was made under supervision of J. C. Bayles of Bell Telephone Laboratories.

So strong is WICA's signal that such points as far flung from Ashtabula as Coral Gables, Florida; Hernando, Mississippi; Fargo, North Dakota, and Burlington, Vermont, have received it during the station's regular broadcasts. The signal, moreover, is heard consistently at points from 150 to 200 miles distant. During the few months WICA has been on the air the carrier frequency has varied only one cycle from its assigned 940 kilocycles.

C. A. Rowley of Ashtabula is owner of the station which numbers among its personnel Robert B. Rowley, Manager; George E. Gautneyas, Chief Engineer, and Glenn Brenneman, Frank N. Bernato and Robert G. Cornwell, Operators.

"Pen Opinions," the station's forum of views and comments of listeners, comparable to a newspaper's "letters to the editor," is one of its outstanding Sunday programs, while news broadcasts are made at five regular periods during the day. Local news is stressed in the broadcasts through cooperation of newspapers in the area. National news is covered through United Press Bureau service.

The territory served includes more than 250,000 persons in the primary area and 500,000 in the secondary area. Thus programs consistently reach at least six counties — Ashtabula, Trumbull, Geauga, Lake and Cuyahoga in Ohio, and Erie, Pennsylvania.

KTAT, Fort Worth, Texas

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Rosendahl, Jimmy Mattern, Fannie Brice, Paul Whiteman, Everett Marshall.

From special studios at Texas Christian University, KTAT broadcasts two weekly programs. The well-known Candid Mike has been at the scene of practically every athletic banquet in Ft. Worth, including the occasion when Byron "Whizzer" White was awarded the "most valuable player" medallion of the year. The mikes also have become familiar sights at civic clubs' luncheons, theatres and stores.

All this has been made possible by the progressive leadership of Sam H. Bennett, General Manager, and the following staff directors: Roy George, Program; Michael Gallagher, Production; Lenard Finger, Publicity; Harry Hoxworth, Merchandising and Sales; Frances Kay, Musical, and Joe B. Haigh, Chief Engineer. Other members of the personnel are: Joe E. Pierson, Spencer Allen, Howard Foley, N. Sheeran.

22 Type Portable Pick-Up

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assistance of the men who do remote work with the 22A speech input equipment, a portable outfit that went a long way toward meeting their needs. Weighing less than 50 pounds, and fitting into two carrying cases, this equipment could be carried and set up anywhere. The power supply case was arranged to contain either a 115 volt, 50-60 cycle AC power unit, or batteries, with ample room for both, if desired.

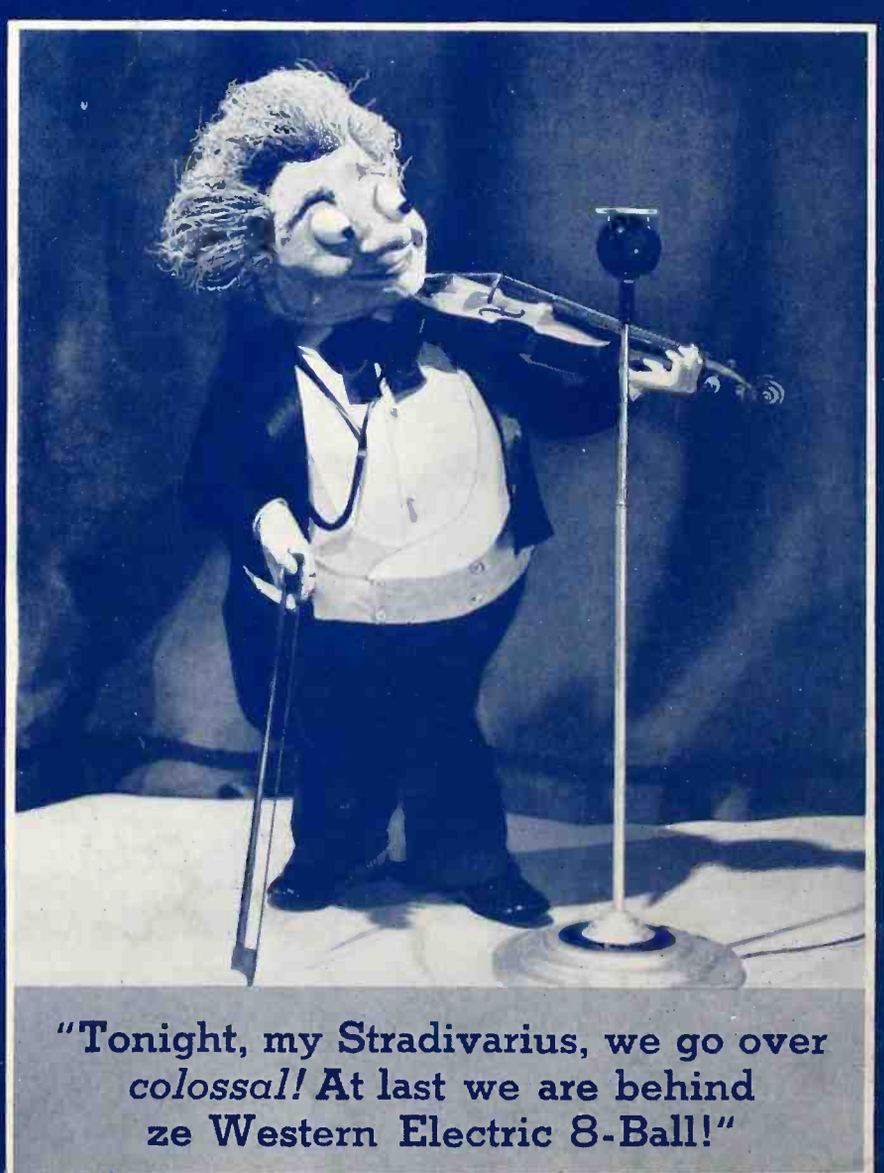
This year it's the 22B or C. These retain all of the outstanding features of the 22A but include, in addition, a number of improvements, both mechanical and electrical, which will make them even more popular and valuable to broadcasters.

Several of these improvements were suggested by broadcast station men, after field experience with the 22A. To facilitate maintenance and rapid replacement of tubes, the amplifier control unit has been redesigned so that the rear cover can be removed without disconnecting any external or internal connections. This one piece "rear cover" includes the top and bottom, as well as the rear covering, so that all parts are readily accessible. Also removable is the microphone receptacle end-plate, so that a station can substitute any common type of microphone receptacle for the sturdy, self-closing Hubbel-lock receptacles furnished initially.

An operating convenience that will be welcomed by control engineers is the use of mushroom shaped knobs with knurled undersurface and with skirts and raised pointers. Also the new flat type key handles with concave finger surfaces. These greatly facilitate fingertip operation and prevent the cramped fingers or hands that result from long sessions at the controls.

The electrical improvements include an increase in attenuation range from 37 to 45 db for each mixer. The change to parallel connection of the mixing circuit, with one side of all mixers grounded, has eliminated possible noise pick-up at or near cut-off positions, especially at high frequencies.

Stabilized feedback is, of course, a part of the design of this new equipment, insuring a standard of high fidelity performance comparable with the largest and most elaborate equipments. Other outstanding performance features are: 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 90 db; 600 ohm or 150 ohm output impedance; a maximum of control facilities through use of parallel mixing circuits for four microphones plus master gain control; jacks for two monitoring headsets, one for the operator and the other for the announcer; provision for connecting a portable telephone set for communication.



"Tonight, my Stradivarius, we go over *colossal!* At last we are behind ze Western Electric 8-Ball!"