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BROADCAST NEWS

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A Radio Corporation of America Subsidiary

Camden, N. J.

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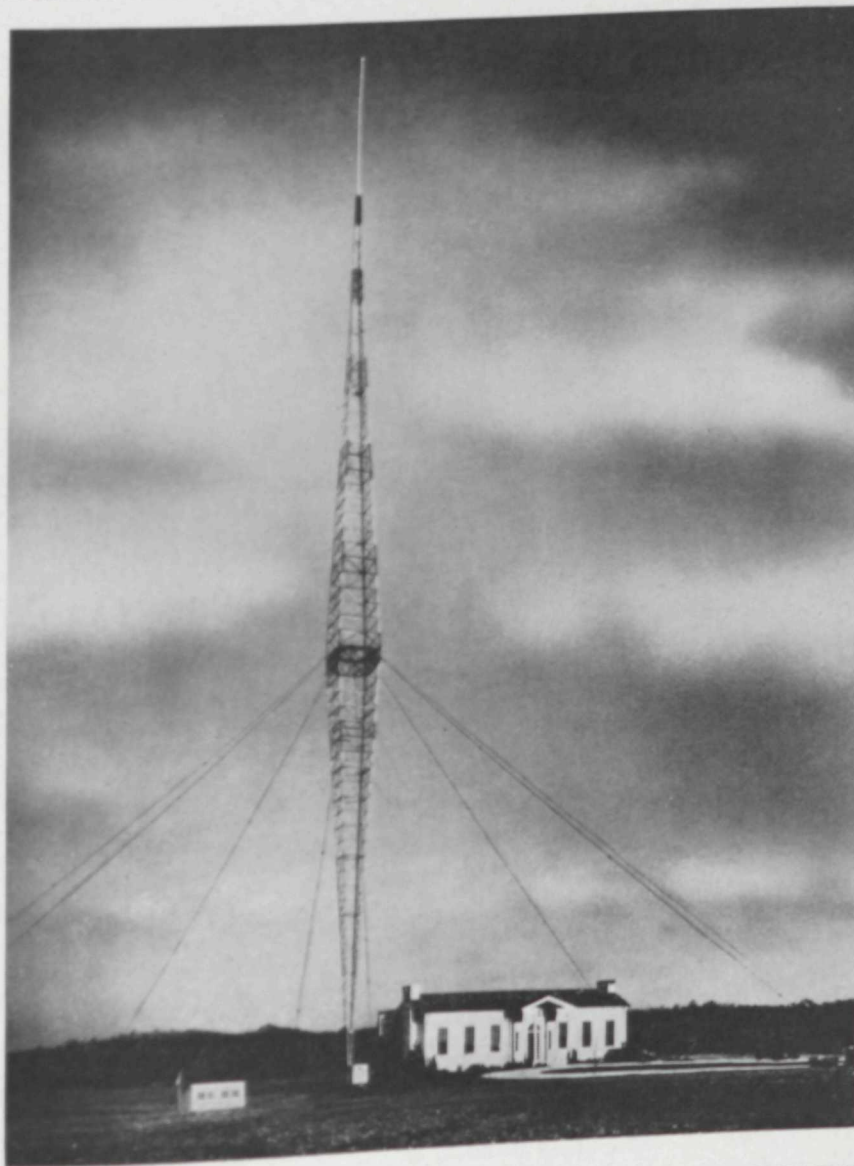
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BROADCAST NEWS

Edited by
E. JAY QUINBY

NUMBER 6

JANUARY, 1933



THE TALLEST RADIO TOWER IN AMERICA

AT THE BASE OF THIS 878' ANTENNA MAST MAY BE SEEN THE BUILDING IN WHICH THE NEW 50,000 WATT RCA TRANSMITTER HAS BEEN INSTALLED FOR STATION WSM, OF THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY, NASHVILLE, TENN.

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RCA VICTOR COMPANY, INC.
CAMDEN, N. J., U. S. A.

WSM Goes On High Power

By **GEORGE D. HAY** (The Solemn Old Judge), Publicity Manager, WSM

PRESENTING a fast moving programme depicting the high lights of its service, WSM, The National Life and Accident Insurance Company's new fifty thousand watt station with its 878 foot tower (America's highest antenna—see illustration on Page 1) was officially dedicated to public service on Saturday night, November 12th and again one week later with a network programme extended as a very unusual courtesy by The National Broadcasting Company. The second programme was carried by NBC's associated stations on the red network.

Best wishes were extended to The Shield Station by many of NBC's outstanding artists who broadcast during the first hour and a quarter, beginning at 10 o'clock central standard time, from New York, Cleveland, Chicago, Denver and San Francisco. The network programme shifted to the studios of WSM at 11:15, at which time Edwin W. Craig, vice-president of the company, in charge of radio activities, thanked the National Broadcasting Company and associated stations for their tributes, made a brief talk to the radio public, and presented "WSM On The Air!"

A New Giant

Mr. Craig said in part: "As we join the ranks of America's radio giants, we realize not only our increased opportunities, but also our heavily increased obligation to the public service. Our constant desire and our constant effort shall be directed toward the fulfillment of these new opportunities and these new obligations. Ladies and gentlemen, I present to you the new WSM!"

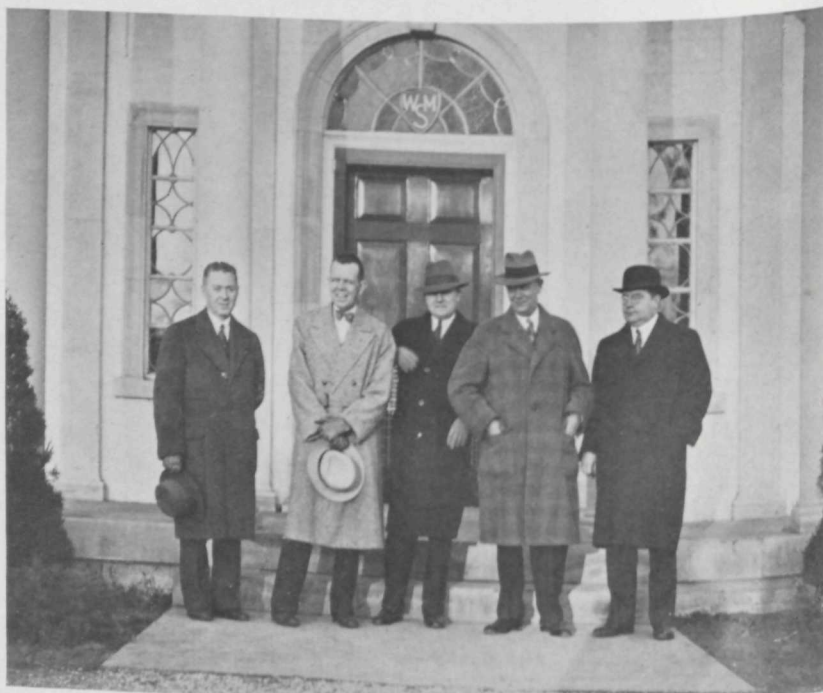
On November 12th, C. R. Clements, executive vice-president of The National Life and Accident Insurance Company, in officially dedicating the new station said in part: "On October 5th, 1925, Radio Station WSM, owned and operated by The National Life and Accident Insurance Company, of Nashville, Tenn., made

its initial broadcast over the air on the latest improved 1,000 watt transmitter.

"After a year of broadcasting, realizing the demand for better service, it was decided to increase the power of the station, and in January, 1927, we began broadcasting on our new 5,000 watt transmitter. Due to the rapid progress in the art and to

Knox Company, of Pittsburgh, Pa., a single radiating tower, 878 feet high, which, I am informed, is the highest radio tower on the continent . . .

"Soon after we began broadcasting, arrangements were made with the National Broadcasting Company to handle their chain programmes and the most cordial relations have



LEFT TO RIGHT:—**MR. STEVENSON**, VICE-PRESIDENT OF THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY, **ED. W. CRAIG**, VICE-PRESIDENT OF THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY, **NILES TRAMMEL**, VICE-PRESIDENT OF NBC, IN CHARGE OF THE CHICAGO OFFICE, **C. R. CLEMENTS**, VICE-PRESIDENT OF THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY, AND **GEORGE McCLELLAND**, ASSISTANT TO PRESIDENT NBC. THIS PICTURE WAS TAKEN BY **I. R. BAKER**, AT THE ENTRANCE TO THE TRANSMITTER BUILDING OF **WSM**.

the demand for greater power, the Federal Radio Commission allocated a certain number of high-powered stations on cleared channels to each radio zone. Having a cleared channel and being mindful of our obligation to the public, we applied to the commission and were fortunate in having one of these high-powered stations allotted to us.

"We immediately purchased and have just completed the erection of the latest model RCA Victor transmitter of fifty thousand watts, over which we are broadcasting tonight. In addition to our new high-powered transmitter, after extended investigation, we installed the latest design antenna developed by the Blaw-

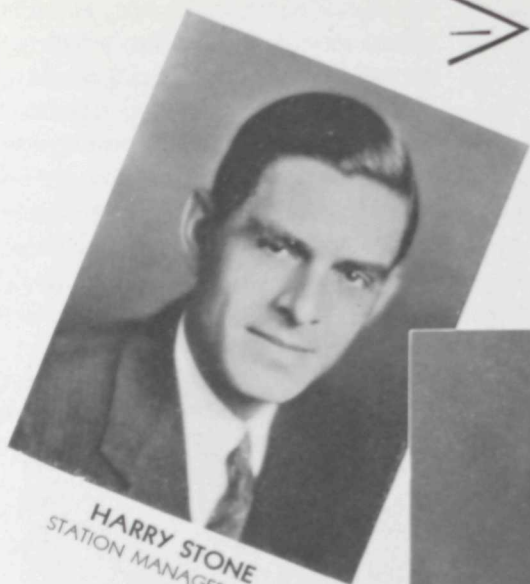
been maintained with this splendid organization . . ."

C. A. Craig, chairman of the board of the National Life, in dedicating WSM when it first went on the air in 1925, said: "Recognizing its great value to our people—commercially, educationally, socially and religiously—and mindful of the wonderful service and splendid entertainment given, it shall be our earnest endeavor to conduct a station that will reflect credit on our community and uphold the highest standards of radio."

Guests and Guest Artists

Among the guests at the opening of the new WSM were Harold A. LaFount, acting chairman of the

W S M



HARRY STONE
STATION MANAGER, WSM



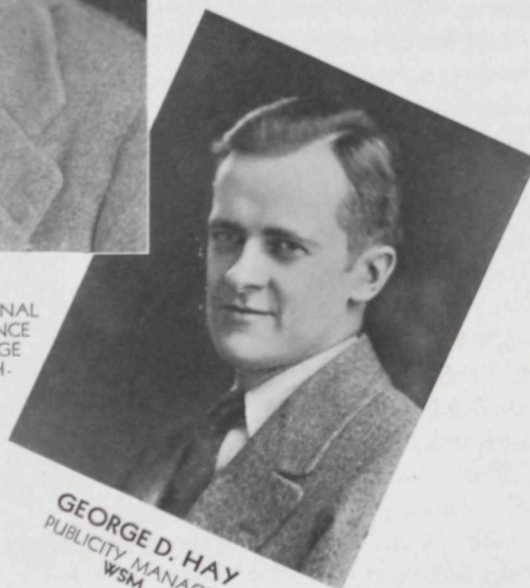
J. LESLIE FOX
COMMERCIAL MANAGER OF WSM



EDWIN W. CRAIG
VICE-PRESIDENT OF THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY, WHO IS IN CHARGE OF STATION WSM, AT NASHVILLE, TENN.



J. H. DeWITT, JR.
CHIEF ENGINEER, WSM



GEORGE D. HAY
PUBLICITY MANAGER, WSM

Federal Radio Commission; George F. McClelland, Niles Trammel and Frank Mason, officials of the National Broadcasting Company and I. R. Baker of RCA

Guest artists were James Melton, internationally famous tenor and member of the Revellers Quartette, who began his radio career at WSM several years ago, and "Smiling Ed" McConnell, one of radio's greatest entertainers, and a former member of the WSM staff. Lambdin Kay, "The Little Colonel," director of WSB, The Atlanta Journal, who was present at the opening of WSM and was in charge of the arrangement of its first programme which went on the air

on October 5th, 1925, appeared as guest announcer on November 12th. In addition to Mr. Kay the following staff announcers of WSM handled the microphones: Harry Stone, A. W. (Tiny) Stowe and George D. Hay (The Solemn Old Judge).

The Network Show

The network show on November 19th was opened at 10 o'clock by Don Bestor and his orchestra from New York. This was followed by an announcers' frolic. Then the scene shifted to Cleveland, from which point Gene and Glenn, well known comedy team played high jinks for a time. Then Ben Bernie, "The Old

Maestro, Himself," assisted by "all of the lads," displayed their usual originality for a few moments. The Commodores, a quartette of male voices, came through with several delightful numbers to close the Chicago show.

Francis Craig and his orchestra, Nashville boys who started at WSM, were in high spirits when their turn came to do their bit which was broadcast from the NBC studios in Denver, Colorado. The scene shifted to San Francisco where "Numb and Dumb" put on a screamingly funny bit to be followed by Anson Weeks and his orchestra.

From the studios of WSM in

Nashville at 11:15 the following staff members put on "WSM on the air!"—The opening was made by the WSM Male Chorus in a Stephen Foster medley. There followed "Three on a mike," with Velma Dean, Marjorie Cooney and Betty Waggoner; the Fiske Mixed Double Quartett from the home of the Fiske Jubilee Singers; Deane Moore, entertainer; Beasley Smith and his orchestra in a dance number; John Lewis, baritone; the Vagabonds, Herald, Dean and Curt, male trio; the WSM Piano Twins, Beasley Smith and Marjorie Cooney; Lasses White and Honey Wilds, minstrel sketch; Ruth and Red, harmony team; The Pickard Family, cabin door songs; Johnny Payne, popular pianist, and the WSM Male Chorus closed the show. The music was under the supervision of Alvin Masten, WSM's musical director. In addition to the above, the following appeared on the preceding studio programme, which was broadcast at 8 o'clock on November 12th: Mary Cornelia Malone, soprano, and Daisy Hoffman, pianist; James Melton, tenor, Ed McConnell, entertainer; Margaret Ackerman, Justine Dumm and Christine Lamb, Claude Sharp and Priestly Miller, vocal soloists; the WSM Mixed Quartette, composed of Margaret Ackerman, Christine Lamb, George Nevins and Ovid Collins; Kenneth Rose, violinist; Mrs. Lawrence Goodman, Edward Loessel, Lawrence Goodman, and Reita Smith.

The Organization

Under the supervision of E. W. Craig, WSM's large staff is headed by Harry Stone as station manager. Mr. Stone is one of Nashville's pioneer radio men and has had wide experience in all branches of the broadcasting. The departments are headed by men who have been in the game many years. They are as follows: George D. Hay, (The Solemn Old Judge) publicity manager; J. Leslie Fox, commercial manager; Alvin Masten, musical director; A. W. (Tiny) Stowe, continuity writer, and J. H. DeWitt, Jr., chief engineer.

WSM's slogan, "We Shield Millions" is an established fact in radio as well as insurance.

The Power Supply

The question of reliability is one of particular importance in the large broadcasting station of today. The amount of money being spent on talent justifies a rather large

Electric Power Company, and the other of 13,200 volts which is routed from Muscle Shoals north to the station. The two lines terminate at the corner of the station property where an outdoor substation is located. This substation has two banks of single phase transformers, which step the respective line voltages down to 2,300.



TRANSMITTER ROOM OF THE NEW WSM STATION

expenditure on equipment designed to insure the minimum number of interruptions of programs.

In the years past, the limiting factors affecting reliability were found in the transmitting equipment itself. In present day equipment, such improvements have been made that reliability centers largely around the power and program circuits feeding the station.

At WSM the necessity of a reliable power supply was particularly stressed. As a result, this installation is believed to possess features that may be of interest.

First of all, it is necessary to provide two separate power circuits to the station with their sources of supply so separated geographically that local storm conditions will not affect both circuits simultaneously. Two such circuits are provided at WSM, one of 11,000 volts from the eastern network of the Tennessee

In addition to these transformers two grounding banks are provided, one for each circuit. The purpose of the grounding banks is to provide control voltages and currents for the various operating relays to be described later.

Underground Cables

Three underground cables, one of which carries the control circuits, connect the substation with the transmitter house. One room in the basement is devoted to switch gear and metering equipment. Here two 2,300 volt solenoid operated oil circuit breakers are located; one for each circuit. These breakers are so connected that the two 2,300 volt power circuits may be paralleled on to the transmitter load circuit.

Each power circuit has four control relays associated with it. Three of these are of the voltage type and are connected respectively across the

three phases. Operating voltage is obtained from the secondaries of the grounding bank of transformers at 220 volts. The fourth relay operates from a current transformer connected between the neutral of the primaries of the grounding transformers and ground; these transformers having a V primary connection and a delta secondary connection.

The control circuits for the two supplies are interlocked. In case of a phase short or ground on the line in use, one of the control relays operates and closes in the spare line through its oil circuit breaker. The control circuits are so adjusted that the bad line is disconnected $2\frac{1}{2}$ cycles later. The voltage relays are set to drop out at about 2,000 volts so that it is not

control switch is provided by means of which either power circuit may be selected.

In practice it is found that with the transmitter in full operation the lines may be switched back and forth without causing any break in the program. The efficiency of the automatic arrangement was demonstrated when an automobile struck a pole supporting the line in use, causing the wires to fall. Signal lights informed the operator that the spare line had been selected. However, WSM's listeners were unaware that any change had been made.

Much credit is due the engineers of the Tennessee Electric Power Company for working out so efficient a system.



OUTDOOR SUBSTATION AT WSM

necessary to have an actual short to cause changeover.

In the WSM installation, the recording meter panel, normally mounted in the power control unit, was moved to a position at the right side of the main rectifier unit as may be seen from the photograph of the transmitter. The lower portion of this panel has been made into a control panel for the power supply circuit. Here monitor lights are located which inform the operator of the condition of the two power circuits. Red lights show which circuit is in use. A neon light indicates synchronism between the two supplies. A con-

YOU WITH THE SLIP STICKS

Slide rule experts will enjoy working out this problem, just to keep in practice:

If $3\frac{1}{2}$ hens lay an egg and a half in $4\frac{1}{2}$ days, how long will it take half a hen to lay $5\frac{1}{2}$ eggs?

We offer half an egg for the best solution.

BARON: "You know Sharley, I once built a building that had a million stories."

CHARLEY: "A million stories? What building is that?"

BARON: "... the public library."

WHO BUT GEORGE CLARK COULD?

THE FOLLOWING IS QUOTED WITHOUT CHANGE FROM THE NEW YORK HERALD-TRIBUNE OF JAN 10TH, 1933.

"Technocracy! Team! Team! Team!"

dear f p a since i am a graduate of the massachusetts institute of technocracy i am well fitted to describe this new science to a gasping world our efforts so far have resulted in the introduction of the technocratical term sales resistance which used to be a few hundred ohms but which lately has approached an open circuit our innovation will be the use of the name sales voltage and the measurement of salesmen in volts per meter of height the average salesman is of what we call the battery type ranging from 1.4 to 2 volts then there is a smaller band called socket salesmen who vary in value from 110 to 220 volts and a very few supersellers who may rise as high as 100,000 volts brush discharge being prevented by the liberal use of hair slickum the final step in the series will be the adoption of the term sales current in place of sales volume and our daily acceptance would then be measured in sales amperes or slumps it would take too long to describe the entire system but let me say that his honor o brien would have been inducted into office by henries instead of pats and mikes if our system of inductance had been in use and if we technocrats had been openly in the saddle or rather at the controller not meaning berry also the police who kept the eager crowd if any at bay would have been of course the lines of force finally the question of non intoxicance of beer would be a matter of capacity i personally have a variable capacity let me say in closing that we technocricians would measure the depression wave either in k. c.'s or in s. a.'s depending on whether or not the protest of the salvation army would be heeded although the present cyclic disturbance is lasting so long that we had better measure it not in kilocycles but in bicycles yours technautocratically jorje clairek.

The Selection of Sites For Broadcasting Stations

By H. E. GIHRING, Transmitter Engineer, RCA Victor Co., Inc.

IN the early days of broadcasting when many of the stations started moving from the cities into the suburbs, the prospective broadcaster would usually begin looking around for the highest hill in the vicinity. Furthermore, since such a move was usually accompanied by an increase in power, the idea was prevalent that the transmitter had to be moved many miles from the city limits to prevent "blanketing" of the entire city. Some time after the opening program, complaints would begin coming from various sections of the city that favorite programs were being marred by "static" and that the signal was not as loud as formerly. Often it was found that some local station on low power in the city would render much better service. Then an application for increased power became necessary which often could not be obtained, and if obtained, would in many cases, not correct the difficulty.

A Complex Problem

Anyone who has ever had experience in picking a location for a transmitter knows that it is much more complicated a procedure than would appear on the surface. There are many examples where the strategic location of a low power transmitter resulted in much better coverage than that of some higher power station which did not have the foresight to take great enough pains in locating their transmitter. Empirical data obtained from field surveys reveals many interesting facts and it is now possible to approach the problem more or less scientifically. There is considerable difference in the procedure for selecting a site for a high power and a low power station, assuming that the high power station will be located somewhere beyond the city limits and the low power station within the city limits...

We shall first outline the requirements for a good broadcasting site.



H. E. GIHRING

TRANSMITTER ENGINEER, RCA VICTOR CO., INC.

1. *Transmission aspects.*
 - A. Proper coverage of the service area.
 - B. Minimum population in blanket area.
 - C. Good soil conditions at transmitter site.
2. *Good power and telephone facilities.*
3. *Low cost of land.*
4. *Good publicity value and accessibility.*
5. *Physical properties of site.*
 - A. Immunity from floods.
 - B. Immunity from storms, sleet, etc., wherever possible.
 - C. Ground suitable for good tower foundations.
6. *Special considerations.*
 - A. Proper location with respect to airports and airways.
 - B. Proper location with respect to metal objects including power and telephone lines.

Each of the above considerations will now be taken up as to meaning and accomplishment.

Proper coverage of the service area is probably one of the most important considerations in locating a site. The field intensity required over the im-

mediate service area depends greatly on conditions. For instance, a city like New York with high electrical noise level requires more signal than a smaller town where such electrical interference is not so predominant. However, as a general rule field intensity over the immediate service area should never fall below 10 millivolts per meter.

Electrical Noise

In many instances where the electrical noise level is high, 30 to 50 millivolts per meter should be the minimum. Usually this consideration will immediately fix the maximum distance that the transmitter can be located from the center of the city provided that the rate of decrease of the signal is known. An experienced radio engineer can usually estimate this distance fairly accurately from previous experience. However, should any doubt exist, the constants of the intervening soil can be determined by taking a number of readings on some existing transmitter in the vicinity, preferably on the same frequency. From this data the soil constants can be computed and the distance that the transmitter is to be located from the center of the city can be accurately fixed. All possible locations will then be found on a circle whose center is the center of the city and whose radius is the distance determined.

For a very large city or for a highly variable terrain, soil constants in different directions will be different and the above statement will not be strictly true. In the event that the primary service area consists of two cities, the transmitter site should, of course, be located between the cities. If the cities are too far apart, for both to receive proper service, it is better to serve one well, than to serve both inadequately.

In considering the directions in which to locate the station with respect to the city, certain factors must be taken into account. From a propa-

gation viewpoint, the effect of hills must be considered as well as the amount of population to be served immediately behind the business section of the city. Hills and business sections of cities, where steel buildings are predominant, cast shadows, particularly on the higher broadcast frequencies. Shadows are only cast immediately behind such obstructions; usually the signal fills in several miles

give satisfactory discrimination against signals as high as two hundred millivolts per meter. Hence the blanket areas for transmitters of various powers can readily be determined. An article by A. D. Ring which appeared in the periodical "Broadcasting" in January, 1932, gives some recommendations pertaining to the permissible amount of population within the blanket area.

wave, especially for antennas of the vertical radiator type. The theoretical advantages of special types of antennae can hardly be realized with poor soil conditions.

An excellent aid in determining soil conditions is the soil maps prepared by the Department of Agriculture. The best types of soils are those that have good ability to retain moisture such as clay, loam, etc. Marshes and bottom lands are always excellent transmitter sites, as far as the soil is concerned. Soils with high sand and gravel content should be avoided. As a general rule, the soil on the tops of hills is not suitable mainly because the hill is a hill because it is composed of rock. The conductivity of rock is, of course, very low. A notable exception of this is in geologically new country where the glacial deposits have not been washed into the valleys. New England is an example of this type of country. Often valuable information in this respect can be obtained from the state geologist.

Power Sources

The need for good power and telephone facilities is, of course, obvious. The companies furnishing these services are usually willing to cooperate and should be consulted before the final choice of the site is made. If possible, two sources of power coming from different directions should be obtained. In order to obtain better regulation, it is often advisable to obtain power from a high voltage line and have a local sub-station installed. This is of course only warranted for large installations. Because of their relative immunity from storms, telephone lines in cable should be obtained if possible.

When buying property the first consideration is the size of the plot. The length will depend on tower spacing which is usually about two and one half times the height of the tower. Additional space on the ends is required for the ground system and possibly for the location of tower winches. The width of the plot is determined by the space required for the building and the ground system. It is usually advisable to have the



FIG. 1

THE CONTOURS INDICATE THE SHADOW THAT MAY BE CAUSED BY A SINGLE STEEL BUILDING IF THE BUILDING IS RESONANT AND AT THE CRITICAL DISTANCE.

beyond. The use of geological survey maps showing elevation contours will be a great aid in determining the probable effect of hills.

Every transmitter depending on its power has a blanket area. The blanket area is taken to mean the area immediately adjacent to the transmitter where the signal is so strong that good reception from other stations is not possible without cross talk interference. The average receiving set now on the market will

The broadcaster himself will see the need for observing such recommendations since his object is to retain the good will of all his listeners.

Soil conditions at the transmitter site have considerable bearing on the antenna efficiency of the station. This is one of the most important considerations in selecting a site. The conductivity of the soil within several wavelengths of the antenna is directly responsible for the reduction of sky wave and for increased ground



FIG. 2

SHADOWS CAST BY HILLS CAN BE SEEN FROM THE CONTOURS. THE DIFFERENCE IN ELEVATION IS 800 FEET. IT SHOULD BE NOTED THAT THE SIGNAL BUILDS UP BEYOND THE HILL. A SHADOW CAUSED BY THE BUSINESS SECTION OF THE CITY CAN ALSO BE NOTICED.

building several hundred feet away from the antenna. To obtain land at a suitable cost is hardly a problem for a radio engineer, nevertheless, it is one of prime importance and should be considered in locating a site.

Publicity value and accessibility are always good assets to a station but they are often overemphasized. Many of the previous considerations are of much more importance. Of course, there should be roads leading to the

transmitter which can be traversed in any kind of weather.

The physical aspects of the site are important since it is highly undesirable to have the station under high water should any floods occur. The

flood levels of all rivers in the vicinity can usually be obtained from the proper state or government bureau. In some instances severe storms are often localized to certain areas. Such areas can often be avoided by going on the far side of a range of hills where the storms will not be severe. Severe storms may cripple power and telephone facilities.

While there are at the present no regulations on the location of radio stations with respect to airports and airways, this factor should be taken into consideration. Local airway authorities should be consulted if there is any doubt.

Elimination Process

The exact procedure then of locating a broadcasting site will be more or less a process of elimination and will finally be a compromise between all the various requirements. To take a typical example, suppose we have determined that the location for 50 KW transmitter should be twenty miles from the center of the city. If good soil is scarce in that vicinity the next consideration would be to determine the direction in which good soil is obtainable. If it is obtainable in several directions, the locations should be chosen where the best power and telephone facilities are available. If there is still a choice the roads leading to the site should be considered.

When several sites have been determined the amount of population in the blanket area should be considered, etc., until perhaps only a few sites remain that are suitable. Even these may not fulfill all of the requirements. An effort should be made to have the most important requirements filled. After this process of elimination perhaps one or two sites will remain which appear promising. The only positive way to determine whether the site will fulfill its requirement as to coverage over the area is by a preliminary field strength survey. This is particularly true for highly variable terrain and also for large cities where there are a considerable number of large steel buildings, the effect of which can never be accurately predicted.

The location of low power trans-

mitters within the city limits is not nearly so involved. Usually the service area consists only of the city itself, and a location near the center of the city is the best that can be found. The blanket area is of very small extent so that a location in a commercial district where there are few residences will overcome this difficulty.

Adjacent Steel

The most important point to be considered is the location with respect to steel buildings. Buildings of a certain height will resonate at some certain frequency and a considerable amount of power will be absorbed. Since there are more steel buildings in the average city with a height of 150 to 200 feet, this point should be particularly watched for the higher broadcast frequencies. The most severe effects occur when the building is a wavelength or less away. If the antenna is located on a roof, the roof should be large and strong enough to accommodate the antenna system. The transmitter should be located in a penthouse on the roof, or if this is not possible, on the top floor to obviate the necessity of a transmission line. There is, of course, no objection to using a transmission line if the transmitter must be located on a lower floor, but since most 100 and 250 watt transmitters do not have transmission line terminating equipment, additional expense will be involved. The building should of course be tall enough so that transmission is not blocked in certain directions by other steel buildings or metal obstructions.

Consultation

The above should give some general knowledge of the factors involved in picking a broadcasting site. It is always advisable, however, before a final decision is made to consult someone having experience in these matters. If any doubt whatever exists a field survey should be resorted to.

The entire discussion given above refers only to the ground wave which serves the primary service area. One often hears the remark that this or that station must have an ex-

cellent location because it gets "out" well. It has been heard in New Zealand, Alaska and other remote points. It is entirely possible that a station can be heard in New Zealand and still render inadequate service twenty miles away. The ability of a station to be heard at remote points has little or no bearing on the site. Coverage beyond the ground wave area of the transmitter can never be predicted accurately since it depends on too many variable factors.

STUDIO NOTES

On the wall of the largest work-room in the Blindcraft building, San Francisco, hangs an enigmatic-looking affair somewhat like a wide poster covered with rows of perforations. It is the list of programs offered by the National Broadcasting Company—in Braille. So many of Blindcraft's members find companionship in their radios when they go home at night that the schedule is kept there for their convenience. The last thing most of them do in the evening as they leave the workshop is to go over to the schedule and read, through their fingers, the time and the station of each program they want to hear at home.

Extreme interest is being shown by broadcast listeners in the WLS National Barn Dances staged at the Eighth Street Theatre near Chicago's Loop and broadcast over WLS every Saturday evening for the past thirty-one weeks.

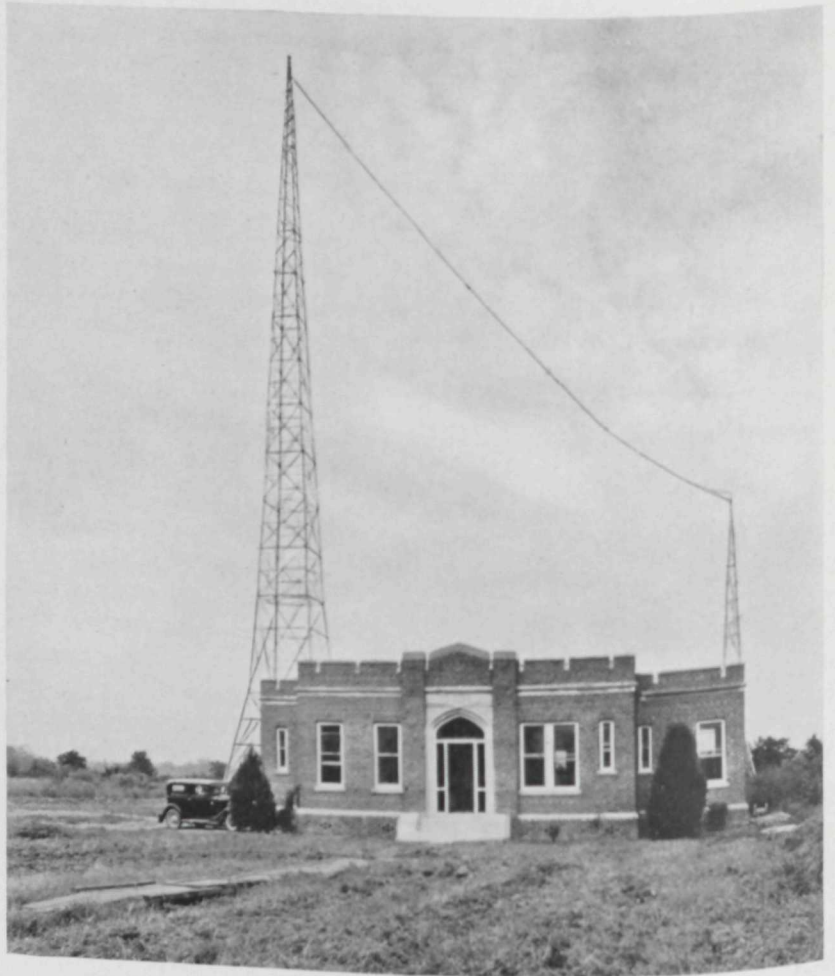
Proof that this interest is genuine is shown by the fact that although an admission charge of seventy-five cents for adults and thirty-five cents for children is made, WLS is compelled to run two shows each Saturday evening before capacity crowds of about twenty-five hundred people per night. Each week tickets for the two shows are sold out in about four hours' time and about five hundred people turned away due to lack of seating capacity.

Among the celebrities who have attended are: Mayor Anton Cermak, of Chicago, Lew Warneke, Cub Pitcher, Yank Taylor, Cub Catcher and One Eyed Connelly (yes, he crashed the gate).

Radio Station WWL, New Orleans

By BEN ADLER, Sales Engineer, RCA Victor Co., Inc.

It has long been the contention of many a radio station site selector that the lower end of the Mississippi River Valley would be an ideal location for a high power radio station. Loyola University's radio station WWL, since their expansion to 10,000 watts has definitely borne out this contention by the excellent performance of their new RCA Victor transmitter located in the shadow of a levee on the east bank of the Mississippi at Kenner, La., about ten miles from New Orleans. The new location and transmitter has improved their efficiency to such an extent that the station can be picked up consistently during the daytime at Houston, Texas and Jacksonville, Florida. Both of these points are located more than four hundred miles from New Orleans. The station's signal has been found useful during daylight as far north along the Mississippi as Memphis and has on several occasions been picked up in St. Louis. Reports indicate that not many 50 KW stations cover the United States any better at night than WWL does with its 10 KW of power. This performance can be attributed to the excellent soil con-



ANTENNA TOWERS AND TRANSMITTER BUILDING OF THE NEW STATION WWL



THE NEW 10 KILOWATT RCA TRANSMITTER EQUIPMENT AT WWL.

ditions within many miles of New Orleans and also to the station's very efficient and modern layout of equipment.

Planned by Father Abell

All of the equipment in the entire lineup from microphones and speech amplifiers located in WWL's new Roosevelt Hotel studios, to the transmitter and antenna system at Kenner, La., are products of the RCA Victor Company. The entire installation was planned and carried out by Father Abell, head of the Physics Department of Loyola University and Technical Supervisor of WWL.

The spacious and elaborate studios constitute the last word in modern acoustic design and in efficiency of layout. The studios and control room are equipped with the most modern air conditioning system available,

thereby eliminating the ill effects of semi-tropical weather on artists, musical instruments and equipment. The layout is such that all parts of the three studios can be viewed by the operator in the control room.

The control room equipment consists of a two channel system employing high level switching. Complete control of all switching is at the finger tips of the announcers in both of the large studios. Program level is maintained by the control room operator who also has supervisory control of the entire switching system.

10,000 Cycle Line

Two wire line circuits are used to transmit the program from the studio control room to the transmitter control room at Kenner. The station was fortunate in being able to obtain wire line circuits with excellent frequency characteristics. Most circuits of this type begin to attenuate rapidly at frequencies above five thousand cycles, but those used by the Loyola station are such that the overall frequency characteristic does not vary more than three decibels over the range between thirty cycles and ten thousand cycles. This characteristic was measured from the input to the microphone at the studios to the rectified output of the antenna.

The transmitter control room contains equipment for terminating the wire line circuits leading from the studios and for bringing the level up to a point sufficiently high to be fed

to the speech amplifier in the transmitter. It also contains a volume indicator, an oscillograph for viewing the modulated wave that leaves the antenna, and a switching arrange-

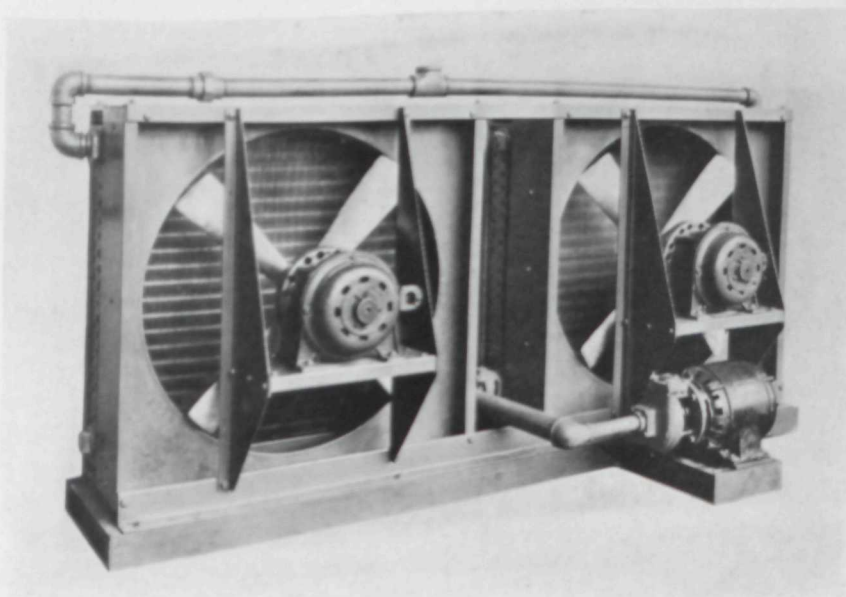
ment which automatically cuts off the monitoring speaker when the microphone is turned on for an emergency announcement at the transmitter.

The Transmitter

The transmitter is a standard RCA type 10-A. It consists of the type 1C one kilowatt exciter unit plus the type A-10-A ten kilowatt linear amplifier. The exciter unit is a standard one kilowatt transmitter capable of producing full output without the use of any of the ten kilowatt power equipment. It is equipped with duplicate crystal control and buffer amplifier units. A separate mercury vapor rectifier is employed for these units. Filament, bias and plate supply for the one kilowatt transmitter is obtained from motor generators. Screen grid tubes are used in all radio frequency stages except the one kilowatt power amplifier. (Continued on Page 22)



RCA SPEECH INPUT EQUIPMENT AT THE TRANSMITTER, WWL.



WATER COOLING AND CIRCULATING UNIT OF THE NEW 10 KILOWATT TRANSMITTER AT WWL.

Pioneer "Live-End, Dead-End" Studios

By C. GORDON JONES, Director of Operations—Yankee Network

IN the past, it has been the duty and, in most cases, the aim of all good radio broadcasting transmitting stations to keep abreast of the times, and to transmit a standard of quality that was superior to that of the best receiving sets on the market.

During the "boom days" just before the depression, radio set manufacturers were beginning to push the broadcasters by building sets which would reproduce, without serious distortion, practically the whole range that was being transmitted. This was especially so when the transmitter was connected to the studios by means of telephone lines. Competition at this time among certain manufacturers was culminating on a quality basis.

However, with the depression, competition and price cutting forced a deterioration in quality wherein the set manufacturer had to sacrifice as much as possible, simply to meet a price. This year, I predict, will see the upward trend again with the value of the set being determined by the prospective buyer on the basis of quality versus price, rather than price alone.

In order to not only keep abreast of the times, but to be at least a step ahead, the Yankee Network has availed itself of all the improvements in acoustic and radio engineering, and microphone technique. This is true of the two major key stations of the Yankee Network; WNAC and WAAB in Boston, as well as the occasional key stations; WICC, Bridgeport, WEAN, Providence, and WMAS, Springfield.

The services of an outstanding Consultant Sound and Acoustic Company were obtained, with the result that all of the studios were modified in accordance with its recommendations, which involved the use of "live-end—dead-end" studios. This modification of the studios prepared the way for the adoption of the so-called "distant pick-up technique;" that is, the location of the micro-



C. GORDON JONES
NOW DIRECTOR OF OPERATIONS FOR THE
"YANKEE NETWORK" FORMERLY ACOUSTICAL
EXPERT WITH ERPI.

phone at a distance from the orchestra or the soloists. This new arrangement permits the use of the studios in a musically correct manner by duplicating the acoustical conditions

the dead portion of the studio, corresponding to the ears of a listener in the best seat in the house, surrounded by that excellent absorbing medium—the audience. This permits orchestra and soloists to interpret music and singing in the most natural manner, without employing any special microphone technique to produce unnatural effects or mongrel combinations.

Music picked up in this manner, when reproduced over a good loud-speaker, has a quality that is not only surprising in its naturalness of reproduction with respect to the original, but further gives the effect of a much larger orchestra, with fewer musicians than could possibly be obtained by the use of dead studios or a number of microphones located close to the orchestra.

It has been the consensus of musical opinion of those who have



FIG. 1—THE "LIVE END" OF THE STUDIO AT WNAC

of an IDEAL chamber, hall or auditorium.

The orchestra is located in the live portion of the studio, as it would be on the stage of a music room, and the microphone is located in an advantageous position, surrounded by

listened to this type of pick-up that not only is all of the above true, but also there was no loss of definition in producing this effect.

The acoustical design of these so-called "live" studios was based upon the use of the moving coil (dynamic)

microphone, although improved results would be obtained by the use of any other type of microphone over those obtained with the same micro-



JOHN SHEPARD, III

PRESIDENT OF THE SHEPARD BROADCASTING SERVICE, INC., OPERATING THE "YANKEE NETWORK."

A new type of loading was ordered from the Telephone Company which will provide circuits from our studios to our transmitter which will pass frequency up to 8,000 cycles.

The audio equipment at the radio transmitter was similarly adjusted, and the transmitter output itself adjusted so that, at 80% modulation, the harmonics introduced did not exceed 3%.

This signal was then transmitted over our new vertical half-wave radiator. This increased our primary coverage considerably. The result was so outstanding to even the average listener as to call forth comments from them, and extreme praise from all the artists who participate in our programs.

means of a vertical radiator. Shortly afterwards, a further innovation was tried, by using the same vertical radiator for Station WNAC. Since then, both stations have successfully operated on this same vertical radiator simultaneously.

Mr. Shepard, with the same business acumen which has characterized his dealings in the past, was able to recognize the theoretical possibilities of live-end—dead-end studios, distant pick-up technique, the advantages of the use of a single microphone per program, proper operation and adjustment of equipment, and the advantages of the vertical radiator.

phone in dead studios or with multiple microphone operation.

In designing these studios, the correct type of absorbing material, its proper location within the studios, and the proper amount, are of extreme importance for the complete success of this plan. (Figure 1 shows a typical live-end, where the orchestra is located; and Figure 2 shows a typical dead-end, where the microphone is located.)

Strengthening or improving any link in a chain requires a proportionate strengthening of all of the other links in that chain. In this case, the improvement obtained by the use of these studios and distant pick-up technique was so great as to require further improvement and proper operation of the amplifiers associated with this equipment, and the radio transmitter as well.

It is a well known fact that, as the quality of reproduction is increased, both in range of tone and phase distortion, so is the carrying capacity of a power amplifier reduced. In the case of WNAC and WAAB studios at the Buckminster Hotel in Boston, a distortion factor meter was used in adjusting the amplifiers, so that there was less than 1/2 of 1% distortion at operating levels.



FIG. 2—THE "DEAD END" OF THE STUDIO AT WNAC

The Yankee Network has the distinction of being the first to broadcast from studios employing a live-end—dead-end treatment, the first broadcast taking place early in February, 1932. They also were the first to employ universally on all programs the distant pick-up technique, which was inaugurated at the same time.

It is even more interesting to know that WAAB was the first station in the world to transmit its regular programs to the radio audience by

ERRATA

Mr. E. A. Laporte, whose article entitled "The Line to the Antenna" appeared in our October, 1932 issue, sends us the following corrections to his manuscript:

(Page 26, third column)—

$$R_o = \frac{X_c^2 R}{X_m^2} \text{ should be } R_o = \frac{X_c^2 R}{X_m}$$

(Page 27, first column)—

$$X_m = \frac{X_c^2 R}{R_o} \text{ should be } X_m = \sqrt{\frac{X_c^2 R}{R_o}}$$

$$X_m = \frac{63^2 \times 104}{575} \text{ should be } X_m = \sqrt{\frac{63^2 \times 104}{575}}$$

RADIO BROADCAST RESCUES NAVAL AIRPLANE FLEET

FOURTEEN airplanes—lost in a heavy fog, with their only hope pinned on their chances of landing safely on a field without lights, hidden in the darkness below them!

Radio reached out a swift hand and met this situation when it occurred recently near San Diego, and the story of how the fourteen fliers were saved injury and possible death, is a matter of naval record now.

The airmen's plight first became known when Thomas E. Sharp, manager of NBC station KFSD, received a request from Flight Commander Davidson of the Naval Air Station, North Island, San Diego, asking KFSD's aid. The planes were being instructed by radio to land on Camp Kearney Field, but the field had no lighting facilities—could KFSD help?

KFSD could, and did. The Lucky Strike Dance Hour was being broadcast, and twice during the next quarter-hour, NBC listeners within a radius of many miles heard the music fade into the background while an announcer told them a brief story of fellow beings in peril and how they could help:

"It is requested that everyone everywhere who can reach Camp Kearny within an hour, drive out there immediately and place the lights of their cars on the Camp Kearny Landing Field, to assist these fliers in reaching the ground. This is a serious emergency, so please, if in any way possible, get out to Camp Kearny and take directions from the officers on duty there. Do not go on the field, but throw your lights on it for the benefit of the fliers landing."

Two thousand, five hundred automobiles, driven by San Diego citizens reached Camp Kearny in time, and flooded the landing fields with their lights. The entire group of fourteen planes landed safely, with the total personal injuries amounting to one broken finger, suffered by a pilot. A letter expressing acknowledgment of "your great kindness" has been received by Sharp from Rear Admiral

"OLD FAITHFUL" CONGRATULATED BY YOUTH AND BEAUTY



SARA ANN McCABE

OF NBC DISPLAYS A VETERAN RADIOTRON, UV-864, WHICH WAS RECENTLY TAKEN OUT OF SERVICE AT WENR AFTER MORE THAN 16,000 HOURS OF SATISFACTORY PERFORMANCE.—THE FILAMENT IS STILL GOOD.

This transmission tube, held by Sara Ann McCabe, NBC soprano, holds the record for continuous service by its type, and, incidentally, has been responsible many times for carrying the sound of Sara's voice to the loudspeakers of listeners to station WENR in Chicago.

Known as "Old Faithful" to the engineers at the WENR transmitter, this 100 kilowatt, water cooled tube has seen 16,076 hours use, which at the average of 20 hours' operation per day is equivalent to two years,

two months, two weeks and two days on the air. The energy consumed by it during this time would be sufficient to light 1000 homes for one year. The number of electrons (smallest quantity of electric discharge) which passed through the tube during this time was 1092 trillion trillion, which, if they could be placed in line, side by side, would encircle the earth 100,000 times, but would weigh only 35 thousandths of one ounce, according to Howard Lutgens, NBC division engineer.

H. E. Yarnall, commander of Aircraft, U. S. Fleet, as follows:—

"In response to the announcements with which KGB interrupted its regular program, some three thousand citizens of San

Diego drove their automobiles to Camp Kearny, where they outlined the field with their headlights, and enabled the last of the airplanes to make a safe landing at that place."

Did You Know?

By W. S. FITZPATRICK

THAT twenty-five ocean vessels docked at Camden's piers during the months of September, 1932 handling more than 15,000 tons of goods?

That 51 of the 91 known elements go into the construction of an RCA Radiotron?

That several convicts have enrolled at different times with R.C.A. Institutes for "Home Study" courses—on one occasion a "lifer" and upon another a fellow just starting a twenty year term?

That R.C.A. Communications has thirty-eight 40-kilowatt transmitters in constant use on wavelengths ranging from 14 to 70 meters, in addition to eight of the 200-kilowatt type operating on 12,000 to 17,000 meters?

Fitz Knows—(He Was There)

That there are two women members of the Veteran Wireless Operators Association, one of whom served eight years at sea?

That several different versions have appeared in print at various times regarding the origin of the Victor Dog but that the true romance of the story lies in the voluntary additional award of a substantial sum to the originator years after the Dog made a world-wide hit?

That forty ways in which radio serves shipping are contained in an article in The Merchant Marine Bulletin by Charles J. Pannill, Executive Vice-President of Radiomarine Corporation and President of R.C.A. Institutes, Inc.?

That the Institute of Radio Engineers was founded in 1908 under the name of Wireless Institute; that radio telephony was included among its topics for discussion because it showed "possibilities" and that in all these years the main meeting place and date have not been changed, although originally the place was selected because of the library available at the Engineers' Building and the first Wednesday of the month was chosen "because of the number of wireless operators in port on that day"?



WILLIAM S. FITZPATRICK

PUBLICITY MANAGER OF RCA INSTITUTES, INC. A VETERAN OF THE RCA ORGANIZATION, WHOSE HISTORY DATES BACK THROUGH THE EARLY DAYS OF THE MARCONI WIRELESS TELEGRAPH COMPANY OF AMERICA AND THE UNITED WIRELESS COMPANY. THE OLD TIMERS IN THE RADIO GAME ALL KNOW HIM, AND NEWCOMERS CERTAINLY SHOULD MEET HIM.

That in 1920 one broadcasting station sent out election returns; in 1924 eighteen stations were joined in reporting the political conventions; in 1928 forty-one NBC stations carried both conventions and for the 1932 conventions the National Broadcasting Company had a hook-up of eighty-six stations in addition to the ninety-six stations of the Columbia Broadcasting System?

That 140 houses were removed in New York's most extensive wrecking operations to make way for Radio City?

That the Mayor of Roselle Park, N. J.—the city noted as the site of RCA's first factory and first broadcasting station—is the nationally known radio man and former President of I.R.E., Donald McNicol, editor of Radio Engineering and of Projection Engineering?

That the city of Camden, aside from being America's radio headquarters, has an early radio background? The National Electric Signalling Company, which utilized the famed Fessenden patents, was incorporated in Camden in the year 1902. Arthur A. Isbell, now commercial manager, R.C.A. Communi-

cations, was employed there by Fessenden in 1904 and in the Spring of 1907, after equipping the S.S. President with a 3 k.w. Massie set, sailed from Camden on that ship on an around-the-Horn voyage to San Francisco, on which trip he became the first commercial radio operator on the Pacific Ocean.

That there are about 9000 kinds and sizes of electric lamps, from the tiny "grain of wheat" size to the giant 10,000 watt, manufactured in the United States?

That O. B. Hanson, manager of technical operation and engineering of NBC, now prominent in preparations of New York's Radio City, and J. R. Poppele, chief engineer of station WOR, learned the rudiments of radio in the same class at R.C.A. Institutes and went to sea as radio operators following their graduation—and that G. W. (Johnny) Johnstone, now manager of press relations for NBC, also attended that school after leaving the orchestral field to get back into radio?

That radio has a decided advantage in its competition with the cable in that of reaching the many countries direct as compared with indirect cable routes?

Ask Fitz—He Knows

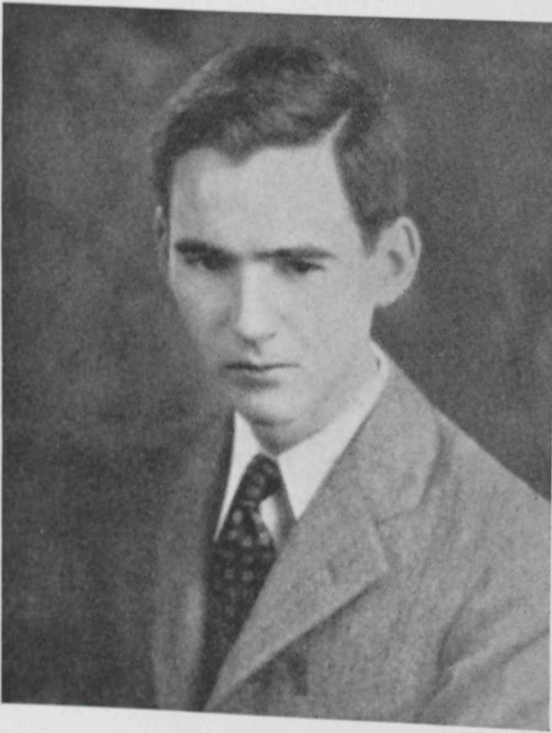
That while Lindberg was the first to make a "solo" flight across the Atlantic, he was not, as many people suppose, the first to fly across? Harry Sadenwater, manager of RCA Victor Engineering Products Division, made the trip in the naval plane "NC-4" several years before Lindberg's famous accomplishment.

That fifty thousand broadcasts originating in the United States and twenty-two foreign countries, took 500,000 speakers, singers and musicians into American homes in 1932 through networks of the National Broadcasting Company?

That RCA is used as a name or as a symbol in every case without periods except in R.C.A. Communications and R.C.A. Institutes?

(Continued on Page 21)

LET'S GET ACQUAINTED



J. P. TAYLOR

OF "RADIO HEADQUARTERS" WHOM WE CONGRATULATE AND THANK FOR THE CIGARS. HE IS TRANSMITTER SALES ENGINEER AT "RADIO HEADQUARTERS"—SEE NOTES IN COLUMN HEREWITH.



D. A. REESOR

ASSISTANT TO H. C. VANCE OF THE CENTRAL DISTRICT (CHICAGO OFFICE)—IF HE HASN'T ALREADY BEEN IN TO SEE YOU,—AND YOUR STATION IS IN THE CENTRAL DISTRICT,—YOU MAY EXPECT HIM MOMENTARILY.

Broadcasting Personalities

J. D. Saumenig, who opened Station WSUN in St. Petersburg, Florida, and was connected with that station for several years, has recently been made manager of WNOX, "The Voice Of The Great Smokies" in Knoxville, Tennessee. J. D. Saumenig, WNOX, has a new ambition in life! Just to be able to manage a small individual chain of Radio Stations and wire ever so often, "regret no sustaining available to you—date" He will even pay for the telegram, he says. Needless to add WNOX is a CBS Station. WNOX, by the way, has added new transmitter equipment and additional microphones and reports that the corner around which prosperity has been hiding is at least being approached.

Vanita La Neir, musical comedy star, has been a very popular artist appearing over WNOX. Altho built along "Kate Smith-Sophia Tucker" lines, Miss La Neir is leaving WNOX for St. Petersburg, Florida, looking for a warmer climate. "You see, it takes me twice as long to thaw out" she says! She will be heard over WSUN, in the future.

Horace Hunnicutt, former program director of WNOX, is now connected with WDRW, Augusta, Georgia.

Charles A. McMahon, popular announcer of WSPA, Spartanburg, S. C. has been promoted to Program Director and Chief Announcer, and is busy working up new and interesting local features, which is ONE MORE JOB, according to Mr. McMahon.

Sam Bento, formerly connected with WAPI in Birmingham has recently become manager of KNOW in Austin, Texas which is now owned and operated by the Southwest Broadcasting Co. of Fort Worth, Texas. Sam always did want to see Texas. And he's in the KNOW.

J. L. Middlebrooks is now chief engineer of WAPI in Birmingham and of WODX in Mobile. His advancement from studio engineer at the Birmingham station to his present position took place when Polk Perdue left WAPI to join the staff of WHAS in Louisville.

Father Abell, technical supervisor of WWL in New Orleans, has just recently returned from an automobile trip through Texas which he took as a vacation after completing the

installation of a new RCA ten kw transmitter and new studios.

Jack Bailey was recently sent down to WODX in Mobile to act as studio manager. He was formerly at WAPI which is under the same management as WODX.

—IT'S A BOY!

In true Walter Winchell style, we beg to announce that Mr. and Mrs. J. P. Taylor "Blessed Evented," without advising us in advance. J. P. arrived in the office with an armful of cigars, to our great surprise and enjoyment, and told the bunch that there was little chance of getting his youngster mixed up with the other little fellows at the hospital, as the young Taylor offspring has a pair of lusty lungs that will identify him anywhere.

Net weight, 8½ pounds, all charges collect, only one in stock as of December 21st, 1932.

For only a three year old "Child," Station WOPI, Bristol, Tenn.-Va., is creating quite a bit of local interest. They have just recently opened new offices and auxiliary studio at the General Shelby Hotel, still maintaining their regular studio in Bristol as well as a remote control studio in Johnson City, Tenn. W. A. Wilson, known as one of the pioneer radio men of this section, directs the



W. A. WILSON
WOPI

business affairs of the station, and through his efforts, WOPI has become one of the main advertising mediums of the Appalachian section.

—IT'S A GIRL!

Mr. and Mrs. Frank Marx (of the WMCA Marxes) recently announced the arrival of a baby daughter.



MR. AND MRS. J. A. CHAMBERS
WLW AND WSAI

T. A. Smith, the Eastern District Sales Engineer, telegraphs us that his 'Phone number has been changed to "Bogardus Four-One-One-Seven-Four,"—we're glad we don't have to dial all that.



WILLIAM L. FOSS
WMAS

William L. Foss, better known as "Bill" to all his friends in the broadcasting industry, is Station Manager of WMAS at Springfield, Mass. He was formerly associated with Henry P. Rines.

J. A. Chambers, the Technical Supervisor of WLW, WSAI and W8XAL, of Cincinnati, Ohio, is quite an aviator. Mr. and Mrs. Chambers are shown above, standing before their own plane. Both of them are experienced pilots. The picture was taken by I. R. Baker, who has flown with Chambers on several occasions, and has even accompanied him on "Tower Inspection Tours," during which Chambers flew the plane around and between the steel antenna towers,—which you'll admit is quite an accomplishment if you have ever seen Baker.

WOR EXPANDING

The Federal Radio Commission has approved the location chosen by Station WOR for their new 50,000 watt Broadcast Transmitter, near Tremley, New Jersey. WOR is now operating on 5,000 watts output. A. J. McCosker, the Managing Director, is looking forward to a bigger and better future for the Station. Construction work has already been started.

(Continued on page 19)

International Broadcasting

THE transition of international broadcasting from the developmental stage to that of a regular commercial service is seen in the announcement by R.C.A. Communications, Inc., that it has completed the provision of facilities for handling programs between the United States and many foreign countries to the East, West and South. These include England, France, Germany, Holland, Switzerland, Italy, Vatican City, Spain, Japan, Philippine Islands, Hawaii, Siam, Dutch East Indies, China, Venezuela, Argentina and Brazil. Through these countries many neighboring countries are also accessible.

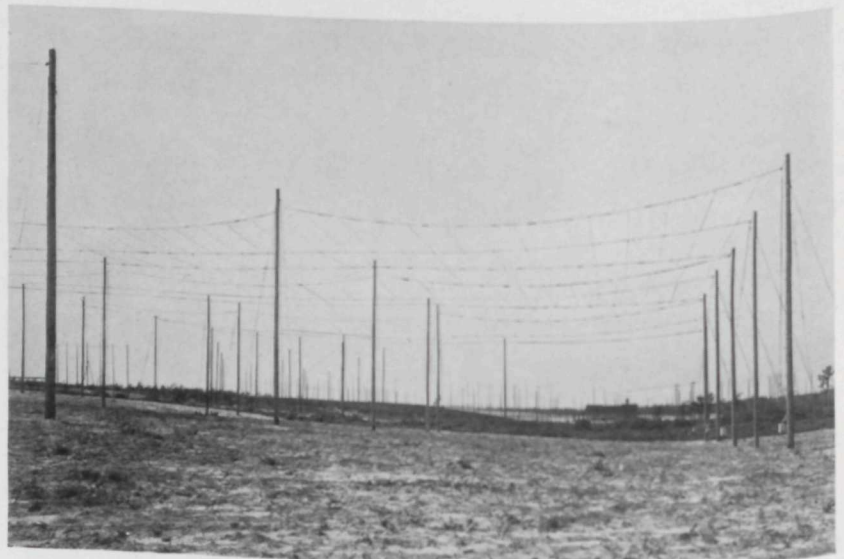
According to W. A. Winterbottom, Vice-President and General Manager of R.C.A. Communications, Inc., the recent addition of a special switchboard at the company's central office at 66 Broad Street now enables the coordination of foreign programs with the split second schedules of this country's networks and individual stations. This latest addition to the plant is regarded as the crowning achievement to the long and intensive effort that has been put into the creation of special transmitting and receiving antennae, modulating equipment and land lines particularly adapted to the work. It places international programs on a basis that meets the close schedules of timing and high standards of quality now current in the United States.

"For several years we have worked very closely with the National Broadcasting Company in the development of this system," said Mr. Winterbottom, "and more recently we are also serving the Columbia System in their international program work. It is a highly specialized activity, presenting problems that are altogether different from those ordinarily encountered in the operation of regular broadcast stations. Experiments of our engineers in this field date from 1923 and since that

time development of the service, based on an endless amount of scientific data, has brought us at last to the position of being able to announce its readiness for any who may wish to use it.

"By the employment of these extensive facilities, American broadcasting companies have accomplished their ends in the most economical

of British origin in this country were made by the Radio Corporation of America as early as 1923. At that time there were no special, short wave facilities in England for the purpose, the best possibility of transatlantic transmission being offered by station 5XX at Chelmsford, England, which conducted regular programs on a wavelength of 1,600



"RIVERHEAD RECEIVING CENTER, R.C.A. COMMUNICATIONS, INC."

manner and have avoided the expense of installing and maintaining a great amount of apparatus for only occasional program use. They have, in addition, saved themselves a vast amount of research and experimental work, for the entire technique of long range radio transmission and reception is considerably different from that of broadcasting. The latter aims to serve all points within a reasonable radius of the transmitter, whereas the former focuses the energy transmitted at a 'target' thousands of miles away, with as little diffusion as possible in other directions of the compass."

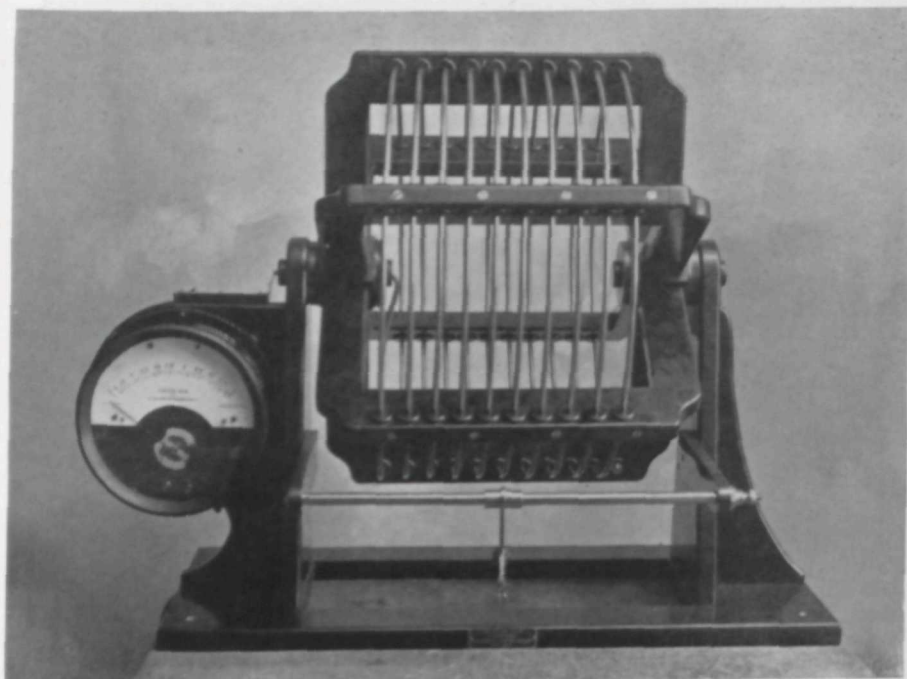
Broadcasting was several years old, and had reached a considerable degree of development in several foreign countries, as well as in the United States, before the international broadcast became even a possibility. Attempts at re-broadcasting programs

meters. Experiments conducted in December, 1923 and January, 1924 were not met with sufficient success to attempt a re-broadcast on this side of the Atlantic. In fact, the first re-broadcasting did not take place until March 12, 1925. This was accomplished by the British station 5XX on 1,600 meters at Belfast, Maine, and relaying the signal to New York by radio on 110 meters, where it was received and again re-broadcast by station WJZ. Another attempt at re-broadcasting was made two days later, on March 14, and this occasion may be said to mark the first really successful attempt. It was not until 1928, however, that short wave facilities became available in England for this purpose. This resulted in much more successful efforts, and international programs have since been given with increasing frequency.

WHAT IS IT, OLDTIMER?

CURIO No. 3—CAN YOU IDENTIFY IT?

Look for the answer in the next issue of
"BROADCAST NEWS"



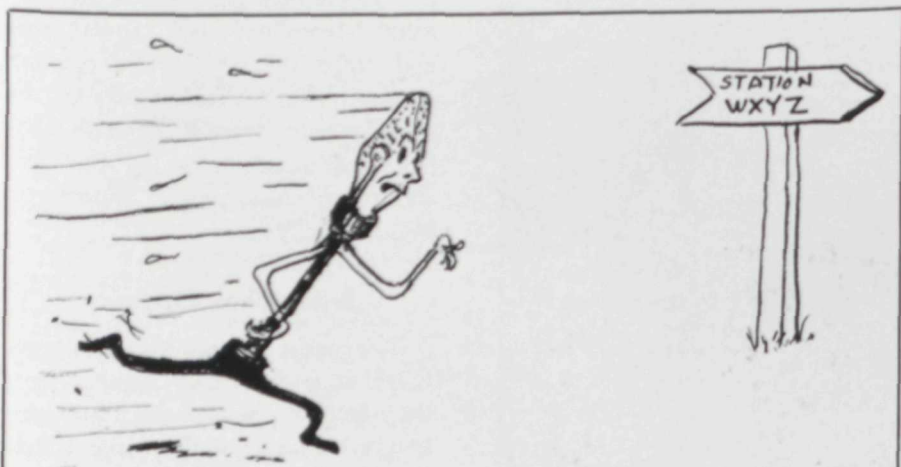
ANSWER TO CURIO No. 2 IN THE OCTOBER ISSUE

It was a trick drive for an early model Synchronous Rotary Spark Gap. The synchronous A. C. motor on the right was started by the little Bi-Polar D. C. motor on the left. (Small self-starting synchronous motors were as yet not available.)

The rheostats on the panel were for line regulation, and the magnetic switches below, in proper sequence, cut in the D. C. motor,

cut in the A. C. motor, and then cut out the D. C. motor, which was equipped also with a special clutch. The Rotary Gap (not shown in the picture) was driven by the synchronous motor.

This elaborate arrangement was the product of the Shoemaker Company in 1905, and the picture was loaned to us by J. M. Sawyer. Needless to say, no one guessed its identity.



"VELOCITY MIKE"—On a Cross Country Dash from Camden to Somebody's Studio, in Response to Another Urgent Telegram.

BROADCASTING PERSONALITIES

(Continued from Page 17)

David S. Little, formerly located at Cleveland, in charge of the Great Lakes Division of the Radiomarine Corporation, is now located at "Radio Headquarters" in Camden, as Sales Engineer in charge of Aviation Radio, which activity has recently been transferred from Radiomarine to RCA Victor. Aviation Radio Equipment, which is developed and built at "Radio Headquarters" will now be promoted and sold from this same source.

Station WSYR, in Syracuse, N. Y. is installing new RCA Victor speech input equipment with Velocity Microphones. The studios are being moved to the Syracuse Building. The work is being carried out under the direction of Mr. H. C. Barth, manager, WSYR, formerly owned by the late Clyde Meredith, and now owned by the Central New York Broadcasting Corporation.....

WGNY, in Chester, New York, owned by Mr. Peter Goelet is nearing completion as we go to press. This station, will operate on 1210 KC., 50 watts power, and will use an RCA Victor 100-W Transmitter and speech input equipment. A description of the station will be given in our next issue...

Mr. E. J. Gluck, Manager of WBT, Charlotte, N. C. will deliver a paper, early in February, before the local A. I. E. E. chapter at the University of North Carolina on the new transmitter at WBT.

T. A. Smith of the Eastern District office gave a brief talk on Velocity Microphones before the Institute of Radio Engineers in Baltimore, late in November.....

WEEU, in Reading, Pa. has been receiving reports on reception from amateurs via their amateur station, W3LP. WEEU has been reported consistently on the West coast during its operation which is daytime only.

"1-MI"

By F. MULLER, Export Sales Engineer, RCA Victor Company, Inc.

In our July 1932 issue, we mentioned the RCA Victor Company's two 50 KW installations in Europe. Since then the second transmitter in Milan has been completed, and the equipment has gone on the air according to schedule.

The station was formally opened on October 26 by Premier Mussolini, in the presence of a group of prominent representatives of the Fascist Government and of the Italian Broadcasting interests. The opening ceremony took place in the Government Palace in Milan. A remote control arrangement was installed by the engineers of the Italian Broadcasting Company, and a button pushed by the Premier started the equipment, located at Sizziano, some fifteen miles away.

Microphones Portray Start

Microphones had been placed in the machine room of the transmitter building, and their output was amplified and fed over telephone lines into loudspeakers placed in front of Premier Mussolini. As he pushed the button, these loudspeakers brought to the assembled dignitaries the clicks of the starting relays, the rising crescendo of starting motors

and their steady hum as they reached full speed, and finally the closing of the time delay relays. Full power operation was quickly reached (main rectifier tubes and crystal ovens having been pre-heated). The loud-

speakers were switched over to an RCA Victor radio receiver, and the audience heard the strains of the National Anthem.

Mussolini Presides

The pictures herewith show Premier Mussolini with Government and radio officials at the opening ceremony, two detail views of the machine room, and of the main rectifier, and a side view of the very attractive, modernistic transmitter building at Sizziano.

Italians Show Efficiency

The entire installation, although made at such a long distance from the factory, was very smoothly handled by the staff of the Italian Broadcasting Company. As we have mentioned in our previous article, the RCA Victor Company was represented by Mr. J. A. Biondo and Mr. E. A. Laport, who were responsible for the final tests and adjustments of the equipment. Both



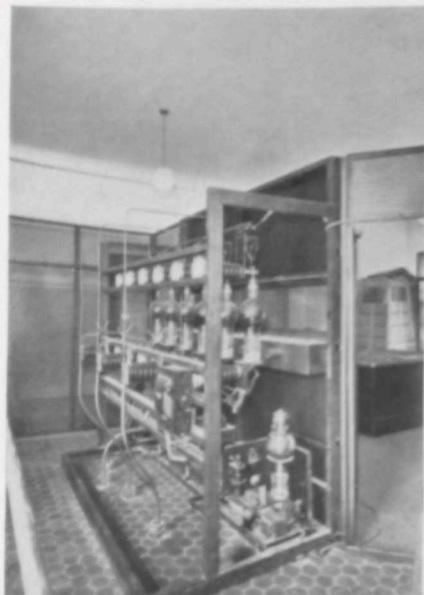
IL DUCE HEADS THE INAUGURATION COMMITTEE

1. PREMIER MUSSOLINI
 2. MR. G. G. PONTI, MANAGING DIRECTOR, E1AR
 3. MR. R. CHIODELLI, GENERAL DIRECTOR, E1AR
 4. MR. MARCHESI, PRESIDENT, E1AR
 5. HIS EXCELLENCY FORNACIARI, PREFECT OF MILANO
 6. HON. BENNI, MANAGING DIRECTOR, MARELLI GROUP, AND CHIEF OF THE FASCIST FEDERATION OF INDUSTRY
 7. MR. J. A. BIONDO
 8. MR. GONZALES, CGE
 9. MR. A. BANF, CHIEF ENGINEER, E1AR
- THE REMAINDER IS A GROUP OF PROMINENT FASCISTS OF MILANO.



STATION BUILDING, SIDE VIEW—NOTE THAT BELOW THE INSCRIPTION "A. D. 1932" APPEARS "X," INDICATING YEAR TEN OF THE FASCIST REGIME.

these engineers, as well as those of the Italian Broadcasting Company, are to be highly commended for handling this big job with speed and efficiency comparable to any installation in the United States.



MAIN RECTIFIER PANEL — THROUGH THE DOORWAY MAY BE SEEN ONE OF THE BIG 862 RADIOTRONS, STILL IN ITS SHIPPING CRATE.

DID YOU KNOW?

(Continued from Page 15)

That the active coating on some Radiotron filaments weighs only twenty-one ten-millionths of a pound?

That while the present home study system of R.C.A. Institutes dates from 1920, extension courses for study at home and encampments were inaugurated during the World War as an added assistance to military forces, supplementing the Institutes' resident school activities in the same cause?

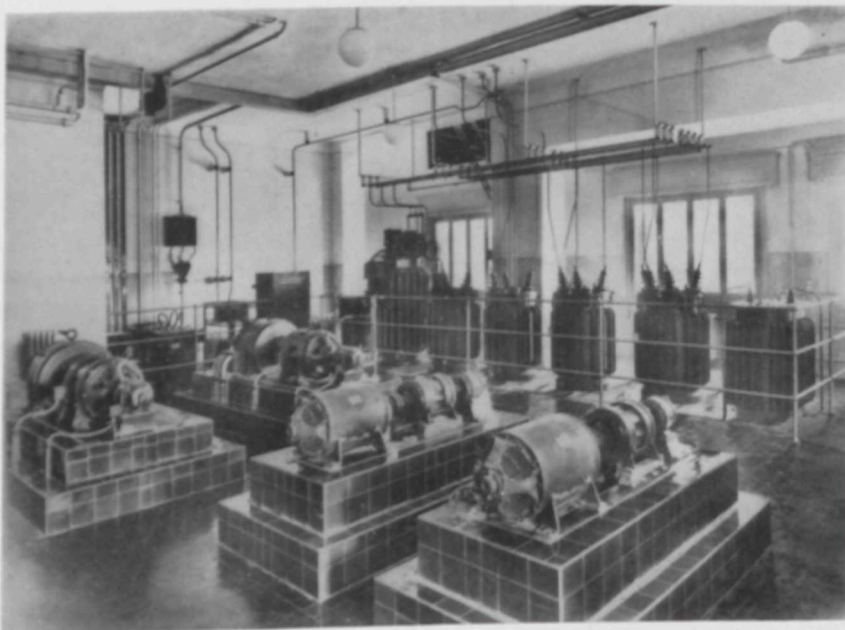
That the electric power bill of NBC's station WEAJ runs \$50,000 a year, not including the \$900 federal tax?

That every Radiotron is completely retested and reinspected after standing two weeks?

That America's oldest radio school, R.C.A. Institutes, has on its staff a member of the original class of 1909?

That there are seventy-nine police radio transmitters in the country and more than thirty thousand amateur stations?

That a stop watch functions on tenth-of-a-second intervals, while an



MOTOR GENERATOR SETS AND MAIN RECTIFIER PLATE TRANSFORMERS, INTERMEDIATE RECTIFIER TRANSFORMERS AND MAIN RECTIFIER FILTER EQUIPMENT AT 1-M.

RCA Radiotron responds to more than a million impulses a second?

That practically all reductions in cable rates during the past twelve years are a result of radio competition?

That RCA Victor received widespread press comment over the feat of bringing the voice of Caruso "back to life"?

Fitz Discovered

That the British steamer Aquitania, of the Cunard Line, has an American made direction finder which was installed by the Radiomarine Corporation?

That the broadcasting equipment for the twenty-seven studios NBC will occupy in Radio City, New York, was designed by O. B. Hanson, who planned the technical equipment now in use at the New York NBC studios and also, with the assistance of Gerard Chatfield, designed the studios at Chicago, Washington and San Francisco, and that the control systems in all stations owned and operated by NBC were designed by Hanson?

That there is highly informative matter in the chronological history of radio now running in Radio Engineering and a Glossary of Technical Terms for Projectionists, running in Projection Engineering?

That NBC's Chicago engineering department has eight ex-ship radio

operators with an aggregate of forty-seven years of NBC service?

That there were no efficient loudspeakers available when in 1921 radio broadcasting became nationally popular? Headphones cost \$18.00 at that time.

That from New York, RCA has direct and continuous radiotelegraphic connection with 31 foreign countries—that San Francisco communicates with 9 additional countries, and that these two cities are linked together by a high-speed radio circuit?

That radio and broadcasting are placed on a lofty pedestal by Olin Downes in the December Women's Home Companion, in his story sub-captioned, "Today in our sitting rooms we, like princes in ancient castles, become patrons of all great music"?

That in one Radiotron there are forty different parts and seventy welding operations?

That radio "sound men" use some peculiar terms, such as;—"Dynamite" (Dangerous if stepped on), "Eagle" (A flying insect), "Ear muffs" (Cans)? "Elephant ears" (Globes) and "Wow-wows"—what RCA Victor equipment is free of, despite the fact that the Victor Dog recently came to life?

That United States radio license No. 1 was issued to Mr. Charles J. Pannill and it still may be seen on the wall of his office in New York?

RADIO STATION WWL, NEW ORLEANS

(Continued from Page 11)

The A-10-A Amplifier is essentially a linear power amplifier designed to be driven by the modulated carrier output of the 1 kilowatt transmitter. When so driven it furnishes 10 kilowatts similarly modulated to the antenna. Use of a coupling coil allows the transmission line to be inductively coupled to the input circuit of the amplifier. A non-inductive load is shunted across the grid circuit to load down the exciter and improve the regulation. The two UV-858 Radiotrons are connected in push-pull and operate into a balanced tank circuit, thus enabling power to be supplied during both halves of the radio frequency cycle. Such a circuit permits a relatively low circulating KVA in the tank circuit and improves the efficiency of the radio frequency equipment. Individual plate ammeters facilitate balancing of the load equally between the tubes. The output of the amplifier is coupled to a transmission line, which in turn is coupled to the antenna by the equipment in the antenna tuning house.

Ideal Location

RCA Engineers have been pioneers in the use of a transmission line for coupling between the transmitter and antenna. The use of such a balanced transmission line to transfer power to the radiating system has several advantages. By placing the antenna well in the open away from trees and buildings, field distortion and loss resistance caused by absorption of surrounding objects may be greatly reduced. In addition, the strong field in the building due to the proximity of the antenna is eliminated.

The equipment for coupling the transmission line to the antenna is mounted on a separate panel and is located immediately below the antenna in the tuning house. The method of terminating the transmission line is advantageous in that after the initial tuning further adjustment is unnecessary as long as operation is maintained at the initial frequency. A choke to prevent accumulation of static charge on the

antenna and a radio frequency ammeter to read antenna current are also included.

In designing the A-10-A amplifier, the elimination of harmonic radiation has been a fundamental consideration. A special coupling arrangement is employed between the transmission line terminating circuit and the antenna, which prevents an effective transfer of harmonic energy from the transmission line to the antenna. The transmission line is balanced with respect to ground and is properly terminated to prevent reflection thus causing the radiation from the transmission line to be a minimum.

Monitoring Rectifier

A monitoring rectifier, coupled to the output circuit, is incorporated in the amplifier unit. The output of this rectifier is used to operate a loudspeaker for program monitoring, an oscilloscope for observing modulation, and a relay which operates a signal lamp in the control room to indicate when power is being supplied to the antenna.

Water Cooling

The water cooling equipment provided with the A-10-A is of the very latest design and is a distinct improvement over older equipment. It is a closed circuit system consisting of a circulating pump, a storage tank, and a radiator which is cooled by a pair of blowers. The simplicity of this arrangement is clearly indicated in the photograph. Use of distilled water in the closed system overcomes the difficulty of scale formation on the tube anodes due to electrolysis which is inherent in the open system where available water, which may have a high mineral content, must be used. As very little replacement water is necessary with this closed system, it is inexpensive to operate.

Plate Rectifier

The plate rectifier which furnishes power for the A-10-A amplifier consists of six UV-869 Radiotrons connected in a 3-phase, full wave rectifier

circuit, followed by a suitable filter circuit. The filter capacitor is incorporated in the rectifier unit, while the reactor is externally mounted. Push buttons on the panel control the filament and plate circuit. Starting mechanisms in the plate transformer circuit include time delays to provide for safe operation. Taps on this transformer allow the plate voltage to be reduced in eight taps to approximately 40% of its maximum value. This feature provides for operation of the equipment as a 5 kilowatt amplifier when desired.

Filament Motor-Generator

The filament motor-generator set, which is self-excited, furnishes 22 volts D. C. and is rated at 150 amperes. It is equipped with an automatic starting box, controlled by a push-button on the control panel. The bias motor generator is separately excited, the exciter unit being mounted on the same driving shaft, as indicated in the photograph. This machine is rated at one ampere, 500 volts D. C. Like the filament motor-generator, it is equipped with automatic starting box controlled from the panel.

The rectifier panel is also used as a control panel, and the filament and bias controls mentioned above are brought out to this. Also mounted on this panel are overload relays in the input and output circuits of the rectifier, a start-stop switch to the rectifier, and the necessary operating meters.

New Mercury Rectifiers

A particular feature of the rectifier equipment of the new Loyola transmitter is the Hot Cathode Mercury Vapor Rectifier Tube. Because of its high efficiency, this Radiotron has increased the overall efficiency of this installation and simplified the associated equipment.

Due to their high internal resistance, thermionic rectifier tubes have a large voltage drop from plate to filament when they are supplying current to a transmitter. This voltage drop represents power which must

be dissipated in heat in these tubes. For this reason, thermionic rectifier tubes employed in high power rectifiers are usually water-cooled. The use of any more water-cooled equipment than is absolutely necessary in a broadcast station is undesirable because of the added complication of equipment and the increased possibility of station interruption. Use of UV-869 Hot Cathode Mercury Vapor Rectifiers in the plate rectifier of the 10-A Amplifier makes air-cooling feasible. Introduction of mercury vapor into these tubes limits the internal voltage drop to a maximum of 15 volts. The consequent reduction in the power which must be dissipated in the tube makes water-cooling unnecessary and increases immeasurably the reliability of the station.

Efficiency

The efficiency of this mercury vapor rectifier equipment is approximately 95 per cent as compared to an efficiency of 80 per cent for a rectifier of similar proportions, employing thermionic tubes. Since the power supply to the rectifier is a large proportion of the total power required by the transmitter, the gain due to high efficiency is not merely a theoretical consideration, but represents a material saving in power cost. Thus, the use of this rectifier means a saving of about 15 per cent in the cost of operation.

The low resistance of the UV-869 Radiotron is also a factor in improving the voltage regulation of the rectifier. Since the voltage drop across the tubes is only very slightly increased by load, the voltage delivered to the amplifier when no load is being drawn is only slightly different from the full load voltage. This means additional safety protection for equipment because there is no danger of the voltage rising to a value high enough to endanger the filter condensers when the load is removed.

The new Loyola University station, in addition to having one of the most modern and most suitably located stations in the country, can boast of an extremely capable and efficient operating and managerial staff.

Radio's Debt to Calvin Coolidge

By ORESTES H. CALDWELL

Federal Radio Commissioner 1927-1929; President, New York Electrical Society; Editor Radio Retailing and Electronics

IT was during the administration of Calvin Coolidge that a great new force in American life was set into operation and given its chance to grow into the far-flung system of radio broadcasting that now reaches every home in the United States.

It was also during Mr. Coolidge's years in the White House that this new giant nearly wrecked itself by its own rapid expansion without control, plunging the radio waves into the chaos of 1926, when the old radio law broke down.

And it was the patient planning of Mr. Coolidge and his Secretary of Commerce, Mr. Hoover, which reclaimed the radio waves from that chaos of squeals and interference, and built it back once more into a great smooth-running interlocking system which now brings entertainment and inspiration to every American fireside.

In August, 1926, you will recall, the Attorney General gave his opinion that the old outdated radio law of 1912, which had contemplated only radio messages between ships at sea, permitted no authority to assign radio wavelengths, control power, or deny licenses to new intending broadcasters.

Immediately hundreds of new stations were put on the air, power was increased, wavelengths were pirated, and confusion and bedlam ruled in the ether lanes.

At once Mr. Coolidge began steps to secure the passage of new and adequate legislation to control the forces of broadcasting. Always insistent on the observation of law and order, he worked patiently with radio leaders in Congress to get a sound radio statute. In February, 1927, the new radio law was finally passed, and Mr. Coolidge at once began sifting the hundreds of recommendations that poured in upon him, to find Radio Commissioners to administer the new law, and clear up the cluttered air-lanes. Political influence was thrown aside, and President Coolidge appointed a working

commission, with the needed background in radio and legal matters. He chose such men as Admiral Bullard, who put radio into the Navy; Colonel Dillin, the Army's radio expert; Judge Sykes, former member of the Mississippi Supreme Court, and Henry Bellows, one of the most brilliant of the broadcasters.

But time and again, in the hectic months that followed the setting up of that pioneer commission, with its task of meeting unknown situations in both radio and law, it seemed as if all the orderly plans might be crashed by some injunction obtained by an obdurate broadcaster. In these repeated crises, the members of the Radio Commission went to Mr. Coolidge for advice.

Sitting there in his quiet office, looking out upon the lower reaches of the Potomac, the President left no doubt as to his position. Said he, "Gentlemen, I am solidly back of you. Radio must be cleaned up. We must give this great force the clear, undisturbed facilities it needs."

Then Mr. Coolidge continued, "I do not know how to do your radio job. But there is one principle which I have observed all my official life, and have found useful. Whenever I am in doubt about my official course, I get out the law itself, and I read it all through again. And almost without fail, I have found that the language of the law itself gives me the answer, on which I can go ahead confidently to do my official duty."

It was Mr. Coolidge's practical wisdom and conscientious persistence which saved radio at a critical time in its history, and gave it the chance to grow into its present untold usefulness. Like sixty millions of Americans he was himself a regular and interested listener to the radio sets in his own home.

And it is appropriate that the many tributes to his memory, now go out to the public, through the magic airplanes he protected and preserved.



Nipper Makes His Bow on The Air

(without a wow)

By J. P. TAYLOR, Sales Engineer,
RCA Victor Co., Inc.

MOHAMMED—finding he would have to change his plans—is said, nevertheless, to have approached the mountain without loss of dignity. Like the prophet, we've had to change our plans—but a turntable is not a mountain, and our dignity is not the equal of Mohammed's. As that other old prophet, Ben Bernie, would say, we approach the subject with a bit of an abashment,—yes, ladies and gentlemen, a bit of an abashment.

You're going to be tempted to remind us of our repeated protestations that we weren't building transcription equipment. Go to it—we think we can take it. But give us a little break—remember that it was you who urged us into building these things. And if we recall correctly, it was you who reminded us of our boast that RCA Victor leads the world in the production of recording and reproducing equipment, as well as records—that engineers working in RCA Victor laboratories have consistently led in the development of improved recording and reproducing equipment—and that because of all this, we had nothing short of an obligation to develop equipment for broadcast use. So here is the Type UZ-4210 Transcription Equipment.

Improved Frequency Characteristics

This time the program really is going to be different. We're not

going to tell you that the frequency characteristic of this equipment is a straight line,—nor even that it is "substantially flat." It is not. The technique of modern recording is such that the whole frequency range is not recorded with exactly uniform intensity. Obviously it is desirable

In developing the Type UZ-4210 Transcription Equipment, engineers of the RCA Victor Company, Inc., have made use of the experience and knowledge gained in a good many years of recording work. They have designed this equipment to have a frequency characteristic such that,



that the frequency characteristic of the reproducing unit be such as to properly compensate for the recording characteristic. The design of an equipment having such a characteristic requires a special knowledge of recording technique and recording equipment.

when used with normal recordings, the overall reproduction characteristic—that is, from recording microphone input to reproducing unit output—is flat from 30 cycles to beyond 6,000 cycles. But these figures do not adequately convey the improvement in quality which this really means.

They did not particularly impress us—and, unless you are an expert on the subject, they will probably not impress you. Fortunately, there is another way—the good old listening test. For in this instance, at least, the difference—and this is a point on which you should convince yourself—is great enough to be immediately apparent, even to the untrained ear. Our own reaction is that the reproduction of recorded programs with this equipment is just about as good as the present state of the recording art permits.

Constant Speed Motor

Ever since we started this turntable business, we've been beguiled with the idea of writing some crack about Nipper, the old Victor dog, having left his "wows" behind him. This idea—which, fortunately for you, came to naught—may be a little far-fetched to some. But to many of those engineers who have built their own turntables (and, unfortunately, not a few of those who have bought them) it has much point. For the "wows" which, in inferior equipments, occur on sustained notes are nearly as ruinous to good reproduction as is poor frequency characteristics. The "wows" are due directly to poor speed regulation of the motor turntable. They can only be prevented by the use of a motor having sufficiently good regulation that variations of the load imparted by the pickup and suspension arm do not appreciably affect its speed. RCA Victor engineers, after careful investigation of the problem, decided that speed variations must be kept within 1.5 per cent. Having done this they proceeded to build into the Type UZ-4210 Transcription Equipment a self starting synchronous motor which would have a torque strong enough to provide this close regulation. Actual measurements on the completed equipment show that inherent speed variations of this motor plus the variations introduced by the loading mechanism in no case exceed 0.8 per cent.

33 $\frac{1}{3}$ and 78 R. P. M.

Broadcasting is generally credited with having begun with Dr. Conrad's record programs from his experimental transmitter, 8XK. Since then standard records have always been an important source of programs for many stations—and it

reduction is provided for by an ingenious ball-bearing mechanism—the change being effected by shift of a small lever protruding from beneath the turntable. Thus a complete two turntable system operable at either speed is contained in two small cabinets which may be placed



is fairly evident that, at least for the near future, they will continue to be so. Moreover, those stations which do not use them regularly still find them useful for emergency and test programs. Reproduction of these records requires a 78 R. P. M. turntable. But it is also necessary to have equipment for use with the long-playing records and transcriptions which have done much to return recorded programs to popularity. Since these latter are recorded at 33 $\frac{1}{3}$ R. P. M., there must also be provided turntables for operation at this speed.

Station rate cards often bear the inscription "33 $\frac{1}{3}$ and 78 R. P. M. Equipment." In the past a broadcaster reading this usually envisaged a cumbersome and bulky pair of turntables as big as a large office desk—in fact there were usually two pairs, one for each speed. This is no longer necessary. The Type UZ-4210 Equipment is complete in one small box—and it may be operated at either 33 $\frac{1}{3}$ or 78 R. P. M. Speed

on a table in the control room or in a corner of one studio.

Specially Designed Pickup

During the development of the Type UZ-4210 Equipment, every attempt was made to keep the cost of this equipment as low as possible. In line with this policy a standard pickup unit was considered and carefully tested. However, it was found that the frequency response of such a unit was too limited and that the response characteristic was unfavorably affected by a high-frequency resonance peak. As a result, development of an entirely new unit was undertaken. It was found that by making use of a newly perfected armature and associated suspension and an improved viscaloid-damping system it was practical to build a pickup unit having a smooth response curve over a materially increased frequency range. This unit, utilized for the first time in the Type

(Continued on Page 27)

The New Beat Frequency Oscillator

By W. F. DIEHL, Test Engineer, RCA Victor Co., Inc.

THE continued attempt on the part of Engineers to improve the overall fidelity of audio frequency networks used both in broadcasting and sound pictures has resulted in an extension of the broadcast frequency spectrum to include frequencies up to 10,000 cycles. This new development naturally require laboratory equipment which would be adequate for checking the characteristics of such networks and also the components included therein. One of the most valuable instruments for obtaining these overall characteristics is a continuously variable audio frequency oscillator and the many advantages found in the use of the beat frequency principle makes this type of oscillator most suitable for this class of service. Previous to the development of this new beat frequency oscillator instruments of this type were available to supply audio frequencies of only a limited range generally 5,000 and in special cases 10,000 cycles maximum. The new instrument designated the type 52A, however, has a frequency range of 20 to 17,000 cycles. Its many very excellent characteristics make it an invaluable instrument in broadcast stations, sound motion picture studios and development laboratories.

New Radiotrons Employed

The oscillator utilizes four (4) of the new type RCA tubes and incorporates special circuits which are conducive to low distortion, resulting in low harmonic content and flat output characteristics. Both the fixed and variable frequency oscillators utilize screen grid tubes in special electron coupled circuits, which serve to isolate the work circuit from the frequency generating portion of each R-F oscillator, thereby producing a high degree of stability. The work circuit of each oscillator is coupled to a demodulator through a specially designed intermediate frequency transformer in combination with a re-



W. F. DIEHL

sistance capacity network. The fixed frequency oscillator is coupled to the demodulator through a sharply tuned intermediate frequency transformer whereas the voltage from the variable

frequency. By means of special band pass filters and a mixing circuit to obtain the proper voltage ratio between the fixed and variable frequency oscillators, approximately a pure sine wave is obtained in the output of the demodulator which is then amplified through resistance capacity coupling and excites the output stage consisting of one (1) type 112A tube. The output feeds the load through a special transformer which is provided with a tap to work into 250, 500, and 5,000 ohms, the essential load figures for universal use. A special tap is provided on the secondary of the output transformer which is used to excite the 60 cycle tuned Reed frequency indicator.

Rack or Cabinet

The illustration indicates the general appearance of the instrument, which can be supplied either as shown or for rack mounting. The frequency control is shown on the left, the dial



frequency oscillator is fed to the demodulator through a broadly tuned resistance capacity circuit. This circuit arrangement eliminates harmonics introduced by the oscillator and prevents coupling of the two (2) oscillators with the result that there is no lock-in effect even at the lowest fre-

being approximately $6\frac{1}{2}$ " in diameter and calibrated directly in frequency from 20 to 17,000 cycles. The calibration includes sixty (60) calibration points and covers 270° of the dial which is equivalent to $15\frac{1}{4}$ ". This long scale together with the Vernier knob permits very ac-

curate setting of the frequency. For calibration check against the 60 cycle source, a pearl push button switch is provided and a compensation condenser control, which is shown on the right of the main frequency dial. Output may be varied from a zero to full maximum by means of the volume control connected in the input circuit to the output tube. Binding posts shown at the extreme right are for use with the various desired leads. Two terminals are provided on the extreme right of the cabinet for connecting the A battery, space being provided inside the cabinet for the B supply. The filaments require 6 volts at .55 amperes and the plate requires 135 volts of B at 15 milliamperes. $22\frac{1}{2}$ volts of bias is also required and space is provided for mounting these batteries in the instrument.

Characteristics Ideal

The overall characteristics of this instrument are excellent. The output voltage is approximately 16 volts when worked into the proper load, and this voltage does not vary more than 1 decibel over the entire frequency range of 20 to 17,000. The instrument has inherent high stability, the drift being only a few cycles in several hours and this drift is a constant and independent of the frequency setting. The total harmonic content under load is approximately $1\frac{1}{2}\%$ at 60 cycles, and increases gradually to a few percent at 20 cycles. Above 60 cycles the harmonic content is negligible and extraneous voltages in the output are less than one-tenth of 1%.

The instrument can be supplied with logarithmic condenser and true logarithmic dial or straight line frequency condenser and dial as shown in the photograph. The entire assembly is mounted on an aluminum panel $19 \times 8\frac{3}{4}$ " and is housed in a wooden cabinet with space provided for the B batteries, or a metal cabinet or dust cover for rack mounting can be furnished. As a complimentary unit to the 52-A there will also be available a power supply and amplifier unit which will increase the power output of the 52-A to four (4) watts, and will also supply the B power.

NIPPER MAKES HIS BOW ON THE AIR

(Continued from Page 25)

UZ-4210 Equipment, has been acclaimed by unbiased engineers as superior not only to standard pickups, but also to the expensive oil-damped pickups widely used in sound picture reproduction.

Cushioned Suspension Arm

Not long ago there came into our hands a letter which a well known authority on broadcast equipment had written in answer to a request for recommendations on transcription turntables. In this letter he particularly stressed a defect found in most equipments—namely, conduction of motor board vibration to the audio pickup system. Such vibration, which may not be detectable when the turntable is new, may later become markedly so. To insure against this the suspension arm assembly in the Type UZ-4210 Equipment has been cushion-mounted. This not only makes vibration pickup impossible, but also provides protection from minor external shocks and vibration.

The suspension arm used in this equipment is of the inertia type. In general design it is similar to the standard arm used in various RCA Victor equipments. It has, however, been considerably improved by the addition of balanced loading which effectually prevents any tendency to mechanical resonance in the arm itself.

Pre-Setting Device

Our own private irritation with the usual transcription broadcast has been the necessity of listening to several blank grooves of the record before the program starts. When the Type UZ-4210 Equipment is used, this wait is eliminated. A pickup lift mechanism allows the suspension arm to be raised vertically from the record after the exact starting groove has been determined. With the arm so raised, the turntable may be kept in motion without disturbing the setting of the arm. When the broadcast is to begin, the arm may be lowered without guesswork into the predetermined groove and the pro-

gram started without delay. This feature is also extremely convenient when using recorded sound effects—as it insures the correct effect at the exact instant.

Cabinet Mounting

We'll probably be asked why we made the Type UZ-4210 Equipment a single rather than a double turntable. There were two reasons. First, we found some stations could get along with one—and we didn't want to force them to buy two. And, moreover, some stations wanted three—the additional unit to go in the control room, or at the transmitter, for emergency and test use. Second, a double unit would have to be at least twice as large—and possibly more, as the increased weight would entail heavier construction. This would have made the equipment bulky and inconvenient to move. For these reasons, then, a single unit was decided upon. It has been mounted in an attractive plywood table-type cabinet, finished in durable Black Duco. This cabinet is provided with a removable lid which forms a convenient dust cover when the equipment is not in use. The motor board is also finished in Black Duco and all metallic surfaces above the board are plated or finished in matching black. The whole appearance of this equipment is such as to harmonize pleasingly with other studio and control apparatus of modern design.

General Use

As indicated above, the Type UZ-4210 Transcription Equipment is suitable for use in reproducing lateral-cut records up to 17 inches in diameter, at either $33\frac{1}{3}$ or 78 R. P. M. (An additional tone arm for use in reproduction of vertical-cut records has been developed for use with this equipment, where desired, and can be furnished as optional additional equipment.) The output circuit of this equipment has been

(Continued on Page 30)

Police Alarm Broadcast News

THE RADIO POLICE

Reprinted from N. Y. World Telegram of Dec. 16, 1932

THE crime outbreak in the last few days has brought distinction to the radio patrol system.

Patrolman George L. Gerhard, cruising in a radio car, surprised three gunmen holding up a cordial shop early Wednesday, and though he was killed other radio cars took up the chase and one bandit was shot, another of the three captured.

Patrolmen in a radio car Wednesday night pursued and wounded the man who fatally shot Dr. William J. Walsh, honorary police surgeon.

Yesterday at 9:30 A. M. radio car police witnessed the escape of the five youths who had held up the bank at 169th St. and St. Nicholas Ave. Traffic, heavy at the hour, frustrated the pursuit.

For three months preceding this latest outbreak violent crime, especially in Manhattan, had been quiescent. To what extent the omnipresence and fleetness of the radio cars and the fast alarm system is responsible for this is not known, but it seems to have been a strong factor.

One of the last major outbreaks had been the hold-up of a pawnshop in the Red Hook section of Brooklyn on September 2. A radio car, catching an alarm passed on through a protective service, gave chase. Two of the patrolmen were wounded, but they killed two of the four gunmen and wounded a third.

This quick spraying of bullet retribution via radio alarm may have helped strike fear into the hearts of gangdom. It was six weeks until the next attempt upon a cop, whose life was saved when the bullet struck a thick summons book.

The last of the three recent outbreaks, the shooting of the honorary police surgeon and the bank hold-up, have produced speculation, the first as to possible unrevealed or concealed circumstances which the police will need to explore more vigorously than yet appears, the second as to whether the bank gunmen were out-of-townners. They used both sawed-off shotguns and tear gas bombs, equipment unfamiliar to New York but much used in Chicago, leading to the suspicion that the bandits, driven perhaps from Chicago by Mayor Cermak's activities, came here seeking new fields.

However this may be, we extend our hearty compliments to the Police Department upon the success of the radio patrol system and to the officers who man it, for their fine and courageous police work.

The presence and swift action of the radio patrol ought to help shorten the life of the latest crime outbreak.

NEW POLICE RADIO INSTALLATIONS

The first of the new type RCA Victor 500 watt Police Radio Transmitters employing "Class B" modulators, are being installed in the cities of Baltimore, Maryland, and Lexington, Kentucky. Complete receiving equipments are also being installed, along with the transmitters, and the Police Forces of these two cities are also being equipped with RCA Victor Mobile Police Receivers. Both of these installations are scheduled for completion by February 15th.

General Charles D. Gaither is in charge of the Police Installation of the City of Baltimore, and is assisted by Officer William E. Taylor, who has been promoted to Detective Sergeant.

SAID CHARLEY CHAN:
"Man must sit with mouth open long time before roast duck fly in."

NEW BULLETINS ISSUED

Just off the press,—and available to those interested upon request to the Transmitter Sales Section, RCA Victor Company, Camden, New Jersey—

Bulletin No. 22—TRANSCEIVER

Model RT-5000

Bulletin No. 27—TRANSCRIPTION EQUIPMENT

Type UZ-4210

SEND FOR YOUR COPIES

A Miniature Ultra-High Frequency Receiver

By P. A. ANDERSON, Sales Engineer, RCA Victor Company, Inc.

IN the July issue of "Broadcast News" the writer described the "Transceiver," a recent development of the RCA Victor Company, Inc. in the ultra high frequency band operating below ten meters. This equipment provided a miniature radio communication system for telephony and telegraphy possessing extreme simplicity and light weight.

It was felt that a small receiver unit would be a valuable adjunct to this equipment. We therefore have introduced the "belt" type receiver, which is shown herewith in Figure 1.

The receiver proper is contained in the box on the officer's right side. The chassis is shown in Figure 2. The special battery block is contained in the smaller box on the officer's left. The inter-connecting wires are encased in the belt proper, while the antenna is encased in the shoulder strap of the "Sam Brown" belt.

The extremely compact construction of the chassis is clearly shown in Figure 2. It measures approximately $2\frac{1}{4}$ " by $4\frac{3}{4}$ " by $1\frac{3}{4}$ ", and weighs about $1\frac{3}{4}$ pounds without tubes or container. The total weight of both units complete is about six pounds. A small featherweight single unit headphone is used, although a leather helmet containing two units may be substituted.

The receiver utilizes three RCA Type 230 Radiotrons, and is of the super-regenerative type. The Receiver has semi-fixed tuning, provision being made to peak the signal by a band-spread adjustment. This Receiver is also made in the form of a camera case, which can be carried by means of a shoulder strap. The battery box has a separate shoulder strap, and connections are made by means of a cable with plug connectors.

The special battery block supplies filament and plate current, and due to the low drain gives very long life for its size, approximately twelve to fifteen hours.



FIG. 1—CONVENIENT CARRYING ARRANGEMENT.

A MINATURE ULTRA-HIGH FREQUENCY RECEIVER

(Continued)

This unit, in conjunction with the small Transceiver previously described, or the new 10 watt Transceiver to be described in a later issue, provides a receiver which is finding an important place in emergency communications, particularly for police and fire departments, and forest fire patrol.

In the case of fire departments, a Transceiver in the Chief's car and a belt receiver carried by the leader of a crew in a burning building would enable these men to be directed and also warned in case of falling walls or other hazards.

During a recent test in a large city while awaiting the arrival of the Chief, one of the captains of the fire department took one of these units into a large building and we were able to maintain constant communication with him. When the Chief arrived, he immediately asked for this captain and was quite surprised when we called this officer from the automobile and he appeared from within the building in a few moments.

Later a crew in charge of an officer equipped with the belt receiver was sent into a training building and a number of instructions were given by the chief. These instructions were promptly carried out and all concerned in the test expressed great enthusiasm over the great possibilities of its use by fire departments.

In forest fire work, these receivers have been used by ground crews at the scene of a fire. Information was successfully conveyed from the fire towers and also from the fire warden's plane which flew over the burning area and furnished information which was marked on the maps of the division fire warden giving them valuable information which could not be obtained from the ground.

For police work, this equipment offers many possibilities for special emergencies where a local communication system is needed. A Transceiver can be set up in a few moments and, for example, a belt

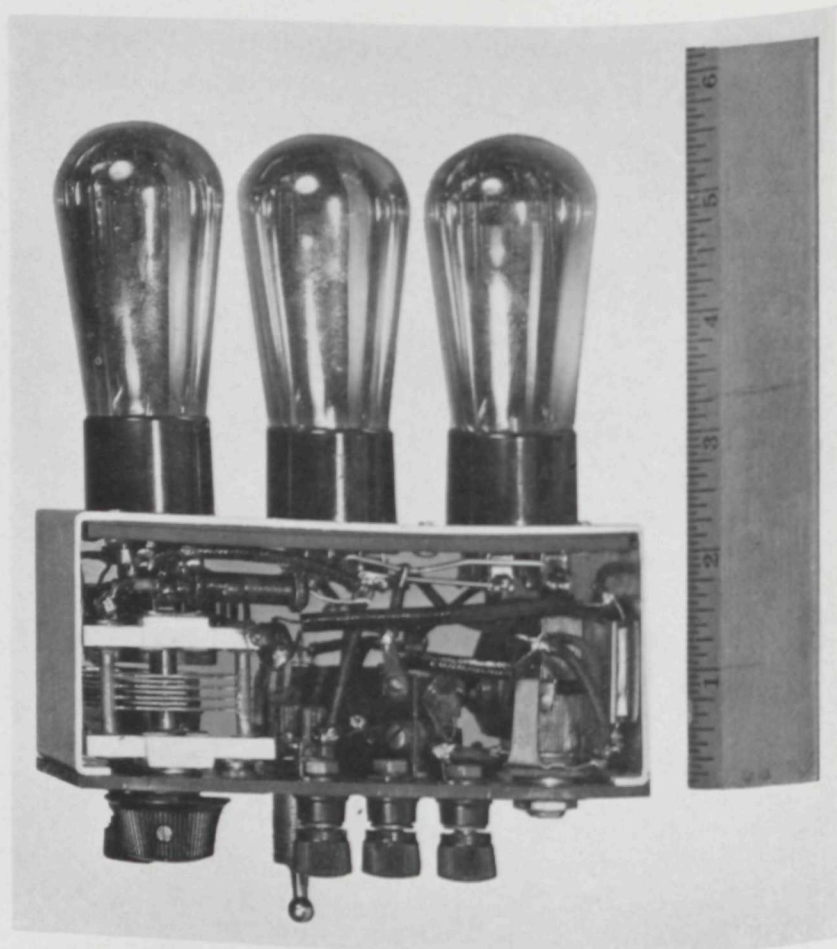


FIG. 2—COMPACT CHASSIS OF RECEIVER.

receiver can be put on a motorcycle policeman and communication maintained over a considerable area. In the case of special crimes or riots where the police surround an estate or other property and patrol roads entering the property, the police officer in charge can set up a field station and communicate instructions to each exit or entrance. These receivers can also be used by mounted police and instructions can be given them from the emergency station. In tests the Transceiver has been used on a horseman, the Transceiver and Batteries being carried in saddle bags and a special cavalry guidon used as an antenna. Many other uses for this equipment in actual police practice are constantly being discovered.

In the broadcasting field, it now becomes possible to pick up and transmit certain events to a man equipped with a belt receiver, who may relay this information to the broadcast station, or the output of

the receiver may be connected, through a suitable filter, direct to the land line for re-broadcasting.

NIPPER MAKES HIS BOW

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designed to work into a 200 to 250 ohm line; however, reproduction quality will not be noticeably affected when it is worked into a 500 ohm input. The output level (as compared to a zero reference level of 12.5 milliwatts) is approximately —43 db. when used with normal recordings. A 105/125 volt, 60 cycle power supply is required for operation.

James Melton, NBC tenor, writes Santa each year for a "bigger and better" toy electric train and a lot of new track. Melton's hobby is building miniature railroads. (Give him our name and address too, Melt.—Ed.)

Organ Reveille

FOR three years Fred Feibel has played Organ Reveille, which wakes up station WABC and commuters simultaneously at 7:30 A.M., E.S.T., from the console in the Paramount Theatre, New York.

He was born 26 years ago in Union City, New Jersey. At the age of ten, while a grammar school student, he took violin lessons. Having reached proficiency on this instrument, he played as soloist at local concerts and in the high school orchestra. He taught himself to play the piano, and experimented with melodic arrangements.

It was at church, however, that Fred discovered the instrument of his dreams. He listened to the tone colors of the organ, considered the wonderful possibilities thereof and decided immediately that he must learn to play it. A sympathetic pastor encouraged Fred in this, and he began to take lessons. After a year of study, he was appointed one of the church organists.

During summer vacation from high school, he dropped into a small motion picture house in the neighborhood and noticed that the picture was being shown without any accompaniment. When an ad was flashed on the screen "pianist wanted for afternoons only," Fred seized what appeared to him to be an opportunity of a lifetime, and applied to the manager at once. He stated, however, that it was the organ he wished to play instead of the piano. The manager consented to give him a trial and Fred made good.

From afternoon organist, he became chief organist, and advanced to more important theatrical positions. At twenty-one, he completed his contract in a neighborhood theatre in which he had played five and a half years. After a short period in a well-known theatre in Westchester County, N. Y., he became one of the organists at the Rialto Theatre, Times Square. Three months later, Fred was appointed one of the assistant organists at the Paramount Theatre, N. Y., which post



FRED FEIBEL

he holds today, playing one of the greatest theatre organs in the world.

Three years ago, Fred was drawn into the ranks of radio artists. Organ Reveille was his first program, which he still plays every week-day. At present, his radio schedule is augmented by a program at 5:15 P.M., E.S.T., sponsored by International Oil Heating Company, and Romance of Beauty, sponsored by Primrose House, Wednesday and Friday at 9:45 A.M., E.S.T.

Fred lives in Ridgefield Park, N. J., a distance of fifteen miles from Times Square. Every morning he must rise at 4:45 A.M. in order to make his early morning broadcast. He leaves home approximately at 5:40 A.M., motors most of the way, and arrives

at the Paramount at about 6:15 A.M. in time for rehearsal. Fred estimates 940 performances and 6500 compositions on this early morning hour.

Though his fan mail is one of his greatest gratifications, his name is frequently misspelled; Fred Bible, Red Biple, Mr. Fival, Mr. Ikel, Fred Biblo and numerous other arrangements have been worked out for him by admiring fans. He has a beautiful pipe organ designed by himself in his own home. It has 250 pipes and contains numerous features of large theatrical organs . . . he works out arrangements when a musical idea occurs to him at home . . . his mother records his broadcasts, and he checks on tone balance and coloring after each performance.



GREETINGS

TO ALL OUR FRIENDS
IN THE BROADCASTING INDUSTRY

We, in the RCA Victor Company, Inc., who have had the pleasure and privilege of negotiating and transacting business with you during the past year, wish to express our gratitude, and the hope that you have found a little more than just the measure of satisfaction in our products that you are entitled to expect.

The new developments which result from the tireless efforts of our Engineering Department will continue to be made available to you as fast as they are produced, and we hope that this New Year will not only confirm your choice of RCA Victor products, but that it will bring you full reward for your good judgment.

Upon your success depends our own,—so BONNE CHANCE!

Cordially yours,

J. R. Baker Manager

Transmitter Sales Division

RCA Victor Company, Inc.



TIME OUT FOR LUNCH AT RADIO CITY

—CONSTRUCTION GANGS, IN THE PAST, WENT ALOFT IN THE MORNING FOR THEIR DAY'S WORK AND WERE COMPLETELY OUT OF COMMUNICATION WITH THE REST OF THE WORLD UNTIL THEY DESCENDED IN THE EVENING.

TODAY, THEY CAN KEEP IN CONSTANT COMMUNICATION WITH THE CONTRACTORS AND ENGINEERS IN THE FIELD OFFICE, THANKS TO THE HANDY LITTLE RCA VICTOR TRANSCEIVER.



NEW BULLETINS ISSUED

Just off the press,—and available to those interested upon request to the Transmitter Sales Section, RCA Victor Company, Camden, New Jersey—

Bulletin No. 22—TRANSCEIVER

Model ET-5000

Bulletin No. 27—TRANSCRIPTION EQUIPMENT

Type UZ-4210

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